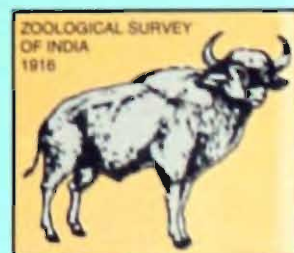


FAUNA OF ANDHRA PRADESH

**PART - 3
Insects**

ZOOLOGICAL SURVEY OF INDIA



State Fauna Series 5

FAUNA OF ANDHRA PRADESH

(PART-3)

Insects

Edited by
The Director, Zoological Survey of India, Kolkata



Zoological Survey of India
Kolkata

CITATION

Editor-Director, 2007. *Fauna of Andhra Pradesh, State Fauna Series, 5(Part-3)–Insects* : 1-544 (Published by the Director, *Zool. Surv. India*, Kolkata)

Published : May, 2007

ISBN 978-81-8171-139-7

© 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, re-sold hired out or otherwise disposed of without the publisher's consent, in any 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

India Rs. 1000.00

Foreign \$ 50; £ 40

Published at the Publication Division by the Director, Zoological Survey of India, 234/4, AJC Bose Road, 2nd MSO Building, (13th Floor), Nizam Palace, Kolkata-700 020 and printed at Calcutta Repro Graphics, Kolkata-700 006.

STATE FAUNA SERIES
FAUNA OF ANDHRA PRADESH

Insects

Part-3	2007	1-544

CONTENTS

1. PLANT MITES (ACARI) 1-24
S. K. Gupta, A. K. Sanyal, and B. J. Sarkar
2. IXODID TICKS (ACARI : IXODIDAE) 25-36
A. K. Sanyal and B. J. Sarkar
3. ORIBATID MITES (ACARI : ORIBATEI) 37-70
A. K. Sanyal
4. ARACHNIDA : ARANEAE 71-86
Bijan Biswas
5. INSECTA : APTERYGOTA : COLLEMBOLA 87-104
A.K. Hazra, G.P. Mandal and K.K. Suman
6. INSECTA : THYSANURA (APTERYGOTA) 105-113
A. K. Hazra, G.P. Mandal and Anand Kumar A.
7. ODONATA 115-181
M. Prasad
8. INSECTA : ORTHOPTERA : ACRIDOIDEA 183-222
S. K. Mandal and K. Yadav
9. INSECTA : MANTODEA 223-234
T. K. Mukherjee and A. K. Hazra
10. INSECTA : BLATTARIA (DICTYOPTERA) 235-247
S. K. Mandal
11. INSECTA : HEMIPTERA : APHIDIDAE 249-256
B.C. Das, C.K. Sengupta and N.K. Pramanik

12. INSECTA : HEMIPTERA : HOMOPTERA : CERCOPOIDEA :
MEMBRACIDAE : FULGOROIDEA 257-277
B. Biswas, M. Ghosh and Animesh Bal
13. INSECTA : HEMIPTERA : HOMOPTERA : CICADELLOIDEA 279-299
M. Ghosh and Animesh Bal
14. INSECTA : HEMIPTERA : HETEROPTERA : PENTATOMOIDEA 301-319
B. Biswas and Animesh Bal
15. INSECTA : HEMIPTERA : PYRRHORIDAE 321-329
P.C. Saha and Animesh Bal
16. INSECTA : HEMIPTERA : REDUVIIDAE 331-346
B. Biswas and Animesh Bal
17. INSECTA : HEMIPTERA : WATER-BUGS 347-374
Animesh Bal
18. INSECTA : COLEOPTERA : COCCINELLIDAE 375-392
S. K. Chakraborty
19. INSECTA : COLEOPTERA : HISTERIDAE 393-401
S. K. Chakraborty
20. INSECTA : COLEOPTERA : POLYPHAGA :
HYDROPHILOIDEA : HYDROPHILIDAE 402-415
P. Mukhopadhyay
21. INSECTA : COLEOPTERA : STAPHYLINIDAE 417-438
P. Mukhopadhyay and A. Sar
22. INSECTA : COLEOPTERA (AQUATIC) ADEPHAGA :
FAM. GYRINIDAE AND FAM. DYTISCIDAE 439-459
P. Mukhopadhyay and S. K. Ghosh
23. INSECTA : COLEOPTERA : SCARABAEIDAE (CETONIINAE,
DYNASTINAE & COPRINAE) 461-478
S. K. Chatterjee
24. INSECTA : DIPTERA : SYRPHIDAE 479-490
M. Mukherjee, P. Parui and Bulganin Mitra
25. LEPIDOPTERA : FAMILIES : PIERIDAE, HESPERIIDAE, ARCTIIDAE
AND CTENUCHIDAE 491-520
Mridula Majumdar
26. INSECTA : LEPIDOPTERA, NYMPHALIDAE (DANAINAE),
LASIOCAMPIDAE AND LYMANTRIIDAE 521-544
D. R. Maulik

PLANT MITES (ACARI)

S. K. GUPTA*, A. K. SANYAL, AND B. J. SARKAR

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The plant associated mites have received global attention because of two fold reasons, first because of importance as injurious pests of agricultural-horticultural crops and secondly as useful predators of pest mites and thereby help in biological control.

Out of over 1038 species under 164(+) genera and 20 families of plant associated mites so far recorded from India (Gupta, undet), Andhra Pradesh represents only 10 species under 3 families and 4 genera (Gupta 1985, 2002, 2004). Due to inadequacies in knowledge of mite fauna of Andhra Pradesh, surveys were undertaken in the state by the second and third authors during the years 2001 and 2002 for collection of mite fauna from different habitats. Besides that collection, the work also includes the species which have not been studied by the authors but were described or recorded earlier from the state as available through literature related to taxonomic studies on plant mites done by previous workers.

The paper reports 40 species under 12 families and 21 genera, of which 25 species under 16 genera and 9 families are reported for the first time from that state. These are indicated in the paper with asterisk (*). Besides collection data for each species, nature of damage and the biological information of the economically important species, wherever possible, are provided. Keys to all the taxa dealt with are also incorporated in the paper.

The specimens reported here are deposited in the National Zoological Collection in Zoological Survey of India, Kolkata.

MATERIAL AND METHODS

Gupta (1985) may be consulted.

GENERAL MORPHOLOGY

Gupta (1985) may be consulted.

* IC/10, Anandam Housing Complex, 7 K. B. Sarani, Kolkata-700 080

LIST OF PLANT MITE TAXA

1. Order **PROSTIGMATA**

2. Family **TETRANYCHIDAE** Donnadieu

1. Subfamily **BRYOBIINAE** Berlese

1. Tribe **Tetranychini** Reck

1. Genus ***Tetranychina*** Murray

1. *T. hartii* (Ewing)

2. Subfamily **TETRANYCHINAE** Berlese

2. Tribe **Eurytetranychini** Reck

2. Genus ***Eutetranychus*** Banks

2. *E. orientalis* (Klein)

3. Tribe **Tetranychini** Reck

3. Genus ***Eotetranychus*** Oudemans

3. *E. hirsti* Pritchard and Baker

4. *E. suginamensis* (Yokoyama)

5. *E. syzygii* Gupta and Gupta

6. *Eotetranychus* sp.

4. Genus ***Oligonychus*** Berlese

7. *O. indicus* (Hirst)

8. *O. punicae* (Hirst)

5. Genus ***Panonychus*** Yokoyama

9. *P. citri* (McGregor)

6. Genus ***Schizotetranychus*** Tragardh

10. *S. hindustanicus* (Hirst)

7. Genus ***Tetranychus*** Dufour

11. *T. ludeni* Zacher

12. *T. macfarlanei* Baker and Pritchard

13. *T. neocaledonicus* Andre

14. *T. urticae* Koch

2. Family **ERIOPHYIDAE** Nalepa

8. Genus ***Aceria*** Keifer

15. *A. sacharini* Wang

3. Family BDELLIDAE Duges
 9. Genus *Octobdellodes*
16. *O. guajavae* Chatterjee and Gupta
4. Family CHEYLETIDAE Leach
 10. Genus *Hemicheyletia*
17. *H. bakeri* (Ehara)
5. Family CUNAXIDAE Thor
 11. Genus *Cunaxa* von Heyden
18. *C. setirostris* (Hermann)
12. Genus *Dactyloscirus*
19. *Dactyloscirus* sp.
6. Family ERYTHRAEIDAE Robineau–Desvoidy
 13. Genus *Abrolophus* Berlese
20. *Abrolophus* sp.
14. Genus *Sphaerolophus* Berlese
21. *Sphaerolophus* sp.
7. Family PYEMOTIDAE Oudemans
 15. Genus *Pyemotidae* Amerling
22. *P. ventricosus* (Newport)
8. Family STIGMAEIDAE Oudemans
 16. Genus *Agistemus* Summers
23. *A. macrommatus* Gonzalez - Rodriguez
9. Family TYDEIDAE Kramer
 17. Genus *Tydeus* Koch
24. *Tydeus* sp.
2. Order ASTIGMATA
 10. Family ACRIDAE Ewing and Nesbitt
 18. Genus *Tyrophagus* Oudemans
 11. Family PYROGLYPHIDAE Cunliffe
 19. Genus *Dermatophagoides*
25. *T. putrescentiae* (Schrunk)
26. *D. pteronyssinus* (Trouessart)

3. Order MESOSTIGMATA

12. Family PHYTOSEIIDAE Berlese

20. Genus *Amblyseius* Berlese

27. *A. (Amblyseius) largoensis* (Muma)
28. *A. (Euseius) alstoniae* Gupta
29. *A. (E.) bambusae* Ghai and Menon
30. *A. (E.) coccineae* Gupta
31. *A. (E.) coccosocius* Ghai and Menon
32. *A. (E.) finlandicus* (Oudemans)
33. *A. (E.) ovalis* (Evans)
34. *A. (E.) rhododendronis* Gupta
35. *A. (Neoseiulus) longispinosus* (Evans)
36. *A. (Paraphytoseius) multidentatus* (Swirski and Shechter)
37. *A. (Typhlodromalus) kalimpongensis* Gupta
38. *A. (Typhlodromips) guajavae* Gupta

21. Genus *Typhlodromus* Scheuten

39. *T. (Amblydromella) homalii* Gupta
40. *T. (Orientiseius) rickeri* Chant

Order PROSTIGMATA

Family TETRANYCHIDAE Donnadieu

Subfamily BRYOBIINAE Berlese

Tribe Petrobiini Reck

*1. *Tetranychina hartii* (Ewing)

1909. *Neophyllobius hartii* Ewing, *Trans. Amer. Ent. Soc.*, **35** : 405.

1994. *Tetranychina hartii*, Gupta and Gupta, *Mem. zool. Surv. India*, **18**(1) : 26-27.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 2 ♀ ♀, Karimnagar dist., Keshavapattanam, 25.ix.2002, ex unidentified weed, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Karimnagar), Delhi, Karnataka, West Bengal.

Elsewhere : Africa, Australia, Brazil, Hawaii, Japan, Middle East, North America, Taiwan.

Remarks : The infestation damages the chlorophyll and such damaged leaves turn yellow.

Subfamily TETRANYCHINAE Berlese

Tribe Eutetranychini Reck

***2. *Eutetranychus orientalis* (Klein)**

1936. *Anychus orientalis* Klein, *Agric. Res.Stn. Rehovoth*, **21** : 3.

1994. *Eutetranychus orientalis*, Gupta & Gupta, *Mem. zool. Surv. India*, **18(1)** : 35-37.

Diagnosis : Gupta & Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 10 ♀ ♀, Krishna dist., Vijaywada, D.F.O. Bunglow area, 18.i.2001; 1 ♀, Karimnagar dist., Keshavapattanam, 25.ix.2002, ex. undetermined plant, coll. A.K. Sanyal & B.J. Sarkar.

Ditribution : India : Andhra Pradesh (Krishna, Karimnagar), A & N Islands, Assam, Delhi, Gujarat, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh.

Elsewhere : Afganistan, Bangladesh, Cyprus, Hong Kong, Iran, Israel, Japan, Pakistan. Philippines, South Africa, Sudan, Taiwan.

Remarks : The species occurs on upper surface of leaves. The serious infestation causes appearance of brownish patches on leaves.

Tribe Tetranychini Reck

***3. *Eotetranychus hirsti* Pritchard and Baker**

1926. *Tetranychus fici* Hirst, *Proc. zool. Soc. London*, : 828.

1994. *Eotetranychus hirsti*, Gupta and Gupta, *Mem. zool. Surv. India*, **18(1)** : 67.

Material examined : Andhra Pradesh : 1 ♀, Vishakhapatnam dist., Araku Valley, Bora cave, 24.i.2001, ex unidentified plant, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Vishakhapatnam), throughout the country.

Elsewhere : Pakistan.

Remarks : The infestation causes the appearance of greenish-yellow transparent patches on leaves.

***4. *Eotetranychus suginamensis* (Yokoyama)**

1992. *Tetranychus suginamensis* Yokoyama, *Bull. Imp. Ser. Stn. Japan*, **8** : 282.

1994. *Eotetranychus suginamensis*, Gupta and Gupta, *Mem. zool. Surv. India*, **18(1)** : 83.

Diagnosis : Gupta (1994) may be consulted.

Material examined : Andhra Pradesh, 5 ♀ ♀, Krishna dist., Vijaywada, D.F.O. Bunglow area, 18.i.2001, ex arum (*Colocassia esculen*), coll. A.K. Sanyal and B.J. Sarkar.

Distribution : India : Andhra Pradesh (Krishna), Punjab, West Bengal.

Elsewhere : Japan.

***5. *Eotetranychus syzygii* Gupta and Gupta**

1979. *Eotetranychus syzygii* Gupta and Gupta, *Indian J. Acar.*, **3** : 88.

1994. *Eotetranychus syzygii*, Gupta and Gupta, *Mem. zool. Surv. India*, **18**(1) : 84.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 3 ♀ ♀, 1 ♂, Nandyal, 01.iii.2001, ex. unidentified plant, coll. A.K. Sanyal & B.J. Sarkar.

Distridbution : India : Andhra Pradesh, Madhya Pradesh.

***6. *Eotetranychus* sp.**

Material examined : Andhra Pradesh : 1 ♀, Rangareddi dist., Golkunda Fort, 15.i.2001, ex. unidentified plant, coll. A.K. Sanyal.

Remarks : The specimens could not be identified due to absence of male specimen.

7. *Oligonychus indicus* (Hirst)

1923. *Paratetranychus indicus* Hirst, *Proc. zool. Soc. London*, : 990.

1994. *Oligonychus indicus*, Gupta and Gupta, *Mem. zool. Surv. India*, **18**(1) : 104-105.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 2 ♀ ♀, Vishakhapatnam dist., Araku Valley Horticultural garden, 25.i.2001, ex. banana leaf (*Musa sapientum*), coll. A.K. Sanyal; 1 ♀, Nandyal, 09. ix. 2001, ex banana leaf, coll. A.K. Sanyal.

Distribution : Andhra Pradesh(Vishakhapatnam), Bihar, Delhi, Haryana, Karnataka, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Pakistan.

Remarks : The infestation causes the appearance of reddish patches on leaves.

***8. *Oligonychus punicae* (Hirst)**

1926. *Paratetranychus punicae* Hirst, *Proc. zool. Soc. London*, : 830.

1994. *Oligonychus punicae*, Gupta & Gupta, *Mem. zool. Surv. India*, **18**(1) : 112-113.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Nizamabad dist., Navipet, Padura, 28. ix. 2002, ex Akashmoni plant (*Acacia auriculiformis*), coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Nizamabad), Punjab, Tamil Nadu, Rajasthan, Uttar Pradesh.

Elsewhere : Brazil, South America.

***9. *Panonychus citri* (McGregor)**

1916. *Tetranychus citri* McGregor, *Ann. Ent. Soc. Amer.*, **9** : 284.

1994. *Panonychus citri*, Gupta and Gupta, *Mem. zool. Surv. India*, **18(1)** : 53-54.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Vishakhapatnam dist., Araku Valley, 25.i.2001, ex papaya (*Carica papaya*), coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Vishakhapatnam), Himachal Pradesh, J & K, Uttar Pradesh, West Bengal, Manipur, Meghalaya, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : Central America, China, Japan, Middle East, Nepal, New Zealand, South Africa, South America, Taiwan.

Remarks : The chlorophyll is damaged causing speckled effects. This species attacks papaya throughout India.

***10. *Schizotetranychus hindustanicus* (Hirst)**

1924. *Tetranychus* (*Schizotetranychus*) *hindustanicus* (Hirst), *Ann. Mag. nat. Hist.*, (9) **14** : 525.

1994. *Schizotetranychus hindustanicus* Gupta and Gupta, *Mem. zool. Surv. India*, **18(1)** : 95.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 1 ♀ Vishakhapatnam dist., Araku Valley F.R.H., 24.i.2001, ex Nayantara (*Catharanthus roseus*) flower plant, coll. A.K. Sanyal.

Distribution : Andhra Pradesh (Vishakhapatnam), Kerala, Tamil Nadu.

Remarks : The infestation occurs on both surfaces of leaves and causes appearance of white stipplings on leaves. This is primarily a pest of citrus in South India.

11. *Tetranychus ludeni* Zacher

1913. *Tetranychus ludeni* Zacher, *Kais. Biol. Anst., London, U. Forstw.*, **14** : 40.

1994. *Tetranychus ludeni*, Gupta and Gupta, *Mem. zool. Surv. India*, **18(1)** : 127-129.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 10 ♀ ♀, 1 ♂, Chittoor Dist., Chittoor F.R.H., 15.ix.2001, ex arum (*Colocassia esculenta*), coll. A.K. Sanyal and B.J. Sarkar.

Distribution : India : Andhra Pradesh, (Chittoor), Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Orissa, Punjab, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : Australia, Europe, France, Portugal, Hawaii, Mexico, New Zealand, South Africa, South America, Southern Port of USA, Zimbabwe.

Remarks : This reddish mite occurs on undersurface of leaves and attacks a large number of plants, mostly vegetables and causes first yellowing and then browning of leaves. Thereafter, the leaves wither and fall off. This is known to occur on over 50 plants (Smith Meyer, 1987, Gupta, 1985, Gupta and Gupta 1994).

***12. *Tetranychus macfarlanei* Baker and Pritchard**

1960. *Tetranychus macfarlanei* Baker and Pritchard, *Hilgardia*, **29** : 537.

1994. *Tetranychus macfarlanei*, Gupta and Gupta, *Mem. zool. Surv. India*, **18**(1) : 129-131.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 8 ♀ ♀, Krishna dist., Vijayawada, Ambapuram, 18.i.2001, ex unidentified plant, coll. A.K. Sanyal and B.J. Sarkar.

Distribution : India : Andhra Pradesh (Krishna), A & N Islands, Gujarat, Karnataka, Madhya Pradesh, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Mauritius.

Remarks : This mite attacks undersurface of leaves causing yellowing of leaves. This infests mostly vegetables.

***13. *Tetranychus neocaledonicus* Andre**

1933. *Tetranychus neocaledonicus* Andre, *Bull. Mus. natn. Hist. Nat. Paris*, **5**(2) : 302.

1994. *Tetranychus neocaledonicus*, Gupta and Gupta, *Mem. zool. Surv. India*, **18**(1) : 131-133.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh : 4 ♀ ♀, Vishakapatnam dist., Araku Valley F.R.H., 24.x.2001, ex rose plant (*Rosa damasciana*), 5 ♀ ♀, ex. *Ipomea* sp., 8 ♀ ♀, Nayantara (*Catharanthus roseus*) flower plant; Khammam dist., Khammam F.R.H. campus, 20.ix.2002, 4 ♀ ♀, ex ladies finger (*Abelmoschus esculentus*), 3 ♀ ♀, ex Jhingey (*Luffa acutangula*) plant; Anandha Sagar Pandhilla pally, 22.ix.2002, 8 ♀ ♀, ex wild plant; Nizamabad dist., Nizamabad, Navipet, 1 ♀, 28.9.02. ex papaya. Karimnagar dist., Keshavapattanam, 25.ix.2002, 1 ♀, ex

akanda (*Calotropis gigantia*); Mudak Pally, 30.ix.2002, 8 ♀ ♀, Chichinga plant (*Luffa cylindrica*), coll. A.K. Sanyal and B.J. Sarkar.

Distribution : Andhra Pradesh (Vishakhapatnam, Khammam, Karimnagar, Nizamabad), throughout the country.

Elsewhere : Cosmopolitan.

Remarks : This is a serious pest of a number of agri-horticultural crops and infestation turns the leaves yellow, the plants look sickly and suffer from heavy defoliation. In case of serious damage, the young plants may die.

*14. *Tetranychus urticae* Koch

1836. *Tetranychus urticae* Koch, *Deu, Crust. Myr. Arach., Fasc.*, 1 : 10.

1994. *Tetranychus urticae*, Gupta and Gupta, *Mem. zool. Surv. India*, 18(1) : 129-131.

Diagnosis : Gupta and Gupta (1994) may be consulted.

Material examined : Andhra Pradesh; 1 ♀, Rangareddi dist., Golkunda Fort Campus, 16.i.2001, ex. flowering plant, coll. A.K. Sanyal; 6 ♀ ♀, K.B.R. National Park, 16.i.2001, ex. wild plant, coll. B.J. Sarkar, 3 ♀ ♀, Krishna dist., Kondapally, 19.i.2001, wild plant, ex. B.J. Sarkar; 1 ♀, Ambapuram, 16.i.2001, ex. *Acacia* sp., coll. A.K. Sanyal; 2 ♀ ♀, Vijaywada, Circuit House Campus, 20.i.2001, ex. belphool (*Naringi crenulata*), coll. A.K. Sanyal; 2 ♀ ♀, Vishakhapatnam dist., Uppada, 22.i.2001, ex. an undet. plant, coll. A.K. Sanyal, 1 ♀, Cuddapah dist., Cuddapah town, 13.ix.2001, ex. ornamental plant; 7 ♀ ♀, Chittoor dist., Kartik vanam, 16.ix.2001, ex. an undet plant, coll. B.J. Sarkar; 17 ♀ ♀, Tirupati, Tirumala, 18.ix.2001, ex. an undet creeper, coll. B.J. Sarkar. 10 ♀ ♀, Nizamabad dist., Navipet, 28.ix.2002, ex. an undet plant, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi, Krishna, Vishakhapatnam, Cuddapah, Chittoor, Nizamabad), throughout the country.

Elsewhere : Cosmopolitan.

Remarks : This is one of the most serious mite pests in the world including India and is known to attack over 200 plants (Smith-Meyer, 1987, Gupta, 1985, Gupta and Gupta 1994). The serious infestation causes yellowing and then produces brownish patches. Such leaves fall off in case infestation is heavy.

Key to the Subfamily, Tribe, genera and species of Phytophagous mites

- Body worm-like, annulate ERIOPHYIDAE, A. *saccharini*
- Body rounded, not worm-like TETRANYCHIDAE

1. Empodium with tenant hairs, females with 3 pairs of anal setae and males with 5 pairs of genitoanal setae subfamily BRYOBIINAE
 - True claw uncinatate or if pad-like, prodorsum with well developed setiferous lobes, empodium pad-like BRYOBIINAE**
 - **Dorsal body setae on tubercles TETRANYCHINA***
 - *** Clunals much shorter than inner and outer saccharals *Tetranychina harti*
 - Empodium without tenant hairs or empodium may be absent, females with 2 or 1 pair of anal setae and males with 3 pairs of genitoanal setae Subfamily TETRANYCHINAE
2. Tarsus I dorsally with a single set of usually loosely associated duplex setae or duplex setae absent EUTETRANYCHINI*
 - * Female with 2 pairs of anal setae; 4th pair of dorsocentral setae in normal position *Eutetranychus***
 - **Propodosomal mediodorsal striae with well developed lobes, 3rd pair of dorsocentral setae similar to other lateral setae; 3rd and 4th dorsocentral hysterosomal setae forming a square *orientalis*
 - Tarsus I dorsally with 2 sets of closely associated duplex setae TETRANYCHINI*
 - * Opisthosoma with 4th pair of dorsocentrals in normal dorsal position or if more widely spaced then preceding three pairs of dorsocentrals, those setae situated well proximal to body margin TETRANYCHINI, 3
3. With 2 pairs of paraanal setae 4
 - With 1 pair of paraanal setae 8
4. Empodium ending into tuft of hairs *Eotetranychus*, 6
 - Empodium claw-like, entire or splits bilaterally into 2 claw-like structures 5
5. Empodium a simple claw-like structure *Panonychus**
 - * Fifth pair of dorsocentrals and 4th pair of dorsolateral equal in length *P. citri*
 - Empodium splits bilaterally into two claw-like structures, usually with appendent hairs *Schizotetranychus**
 - *Aedeagus turned dorsally without angulation *S. hindustanicus*
6. Dorsal idiosomal setae serrate *Eotetranychus syzygii*
 - Dorsal idiosomal setae not serrate 7

7. Distal portion of aedeagus sigmoid *Eotetranychus hirsti*
 - Distal portion of aedeagus curved, not sigmoid *Eotetranychus suginamensis*
8. Tarsus I with duplex setae distal and approximate *Oligonychus*, 9
 - Tarsus I with duplex setae well separated dividing segments into 3 more or less equal parts *Tetranychus*, 10
9. Aedeagus bent ventral; tarsus I with not more than single tactile seta on venter just distal of duplex setae *Oligonychus punicae*
 - Aedeagus bent dorsal; although the distal end may be directed ventral; tarsus I with two tactile setae on venter just distal of duplex setae *O. indicus*
10. Proximal duplex setae on tarsus I of female placed distal to tactile seta 12
 - Proximal duplex setae on tarsus I of female more or less in line with tactile seta 11
11. Aedeagal knob with very small anterior and posterior projections; empodium II of male with proximoventral tridigitate spurs *T. macfarlanei*
 - Aedeagal knob with anterior acute projections while posterior projection absent; empodium II of male with 3 pairs of proximoventral hairs and small distinct mediodorsal spur ..
..... *T. ludeni*
12. Upper surface of aedeagal knob straight or rounded with some kind of projection
..... *T. urticae*
 - Upper surface of aedeagal knob concave with anterior and posterior rounded projections
..... *T. neocalidonicus*

Family ERIOPHYIDAE Nalepa

15. *Aceria saccharini* Wang

1964. *Aceria saccharini* Wang, *Taiwan Sug. Exp. Stn.*, **33** : 83-94.

1985. *Aceria saccharini*, Gupta, *Handbook, Plant Mites of India*, : 202-230.

Diagnosis : Gupta (1985) may be consulted.

Distribution : India : Andhra Pradesh, Karnataka, Punjab, Tamil Nadu.

Remarks : Earlier it was reported from Andhra Pradesh (Gupta, 1985). It attacks sugarcane, causing erineum production on leaves. This mite is vector of sugarcane streak mosaic virus (Sisthananthan & Velayurthan, 1979).

Predatory mites

Key to the families of PROSTIGMATA

1. Gnathosoma with minute palpi lying closely appressed laterally, chelae tiny and stylet-like, with 4 pairs of legs or less; stigma of female opening behind gnathosoma on propodosoma; male without stigma or tracheae, empodium usually a membranous flap-like organ, attached to claws
 - Legs II, III, IV of females identical; trochanter of leg IV triangular or ribbon-shaped, considerably wider than long, gnathosoma of males similar to that of females and suitable for food uptake, usually associated with insects PYEMOTIDAE
 - Gnathosoma closely conspicuous with large chelicerae; palpi usually well developed, rarely without 4 pairs of legs; stigma opens at base of chelicerae, empodium free, pad-like or claw-like, arising from tarsus 2
 2. Without a palpal thumb claw complex 3
 - with a palpal thumb claw complex, in some cases the claw may be small or obsolete, if obsolete, replaced by a relatively long seta 5
 3. Cheliceral bases fused or if not fused, not capable of lateral scissor-like motion over gnathosoma TYDEIDAE
 - Chelicera free, attached at base and free to move scissor-like laterally across gnathosoma 4
 4. With 2 pairs of genital suckers, the relatively long palpi turned inward, distal segments usually claw-like, free living CUNAXIDAE
 - With 3 pairs of genital suckers, the relatively long palpi elbow-like with distal setae; free living BDELLIDAE
 5. Body densely clothed with setae; larvae heteromorphic ERYTHRAEIDAE
 - Body setae relatively few, arranged in transverse rows; larvae heteromorphic 6
 6. Cheliceral bases closely fused with gnathosoma and without indication of suture; peritremes usually M-shaped, may be present on gnathosoma CHEYLETIDAE
 - Cheliceral bases fused with each other but not with gnathosoma, having suture conspicuous; peritremes usually present on anterior portion of propodosoma *
- * Chelicerae generally independently movable but may be adnate or stylophore-like, in a few genera coxae II and III not contiguous; legs I and II directed anteriorly, III and IV directed posteriorly STIGMAEIDAE

Family BDELLIDAE Duges

***16. *Octobdellodes guajavae* Chatterjee and Gupta**

2002. *Octobdellodes guajavae* Chatterjee and Gupta, *Mem. zool. Surv. India*, **18**(1) : 34-36.

Diagnosis : Body 806 μ m long, 379 μ m wide, cheliceral digits without teeth, anterior sensory seta 88 μ m long, posterior sensory seta 95 μ m long; 2 pairs of eyes, hypostome with 6 pairs of setae; chelicera sickle-shaped; genital plate with 6 setae, paragenital 2 pairs.

Material examined : Andhra Pradesh : 2 ♀ ♀, Chittoor dist., Reddygunta village, 16. i. 2001, ex. wild plant, coll. A. K. Sanyal.

Distribution : India : Andhra Pradesh (Chittoor), West Bengal.

Family CHEYLETIDAE Leach

***17. *Hemicheyletia bakeri* (Ehara)**

1962. *Paracheyletia bakeri* Ehara, *Annot. Zool. Jap.*, **35**(2) : 109-111.

2002. *Hemicheyletia bakeri*, Gupta, *Mem. zool. Surv. India*, **18**(1) : 55.

Diagnosis : Gupta (2002) may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Khammam dist., Anantha Sagar, 22.ix.2002, ex. maize (*Zea mays*), coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh, (Khammam), Punjab.

Elsewhere : Cosmopolitan (Southern U.S.A., Canada, Israel, Philippines, Chile).

Remarks : In India, its earlier record was from Punjab on rose.

Family CUNAXIDAE Thor

Key to the genera of CUNAXIDAE

1. Palp genu without elongate apophysis, apically tarsi I – IV long, Slender, gradually tapering distally, without conspicuous Lateral bilobed flangs ****Cunaxa***
 - * Telofemur inner surface with elongate apophysis and one dorsomedian simple seta ***C. setirostris***
- Palp genu apically with or without elongate apophysis, tarsi I – IV stout, short or long with lateral bilobed flangs ***Dactyloscirus* sp.**

***18. *Cunaxa setirostris* (Hermann)**

1804. *Seirus setirostris* Hermann, *Apterologie*, : 60-62.

2002. *Cunaxa setirostris*, Gupta, *Mem. zool. Surv. India*, **18**(1) : 67-68.

Diagnosis : Gupta (2002) may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Krishna dist., Vijaywada, Kondapally, 19.i.2001, ex. wild plant, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Krishna), Arunachal Pradesh, Andaman & Nicobar Isls., Himachal Pradesh, Lakshadwip, Meghalaya, Punjab, Sikkim, Uttar Pradesh.

Elsewhere : Cosmopolitan.

Remarks : This is an efficient predator of *Olygonychus iseilemae*, *O. mangiferae* and *Eutetranychus orientalis* (Gupta 2002) and mostly fed upon Tetranychid and Tenuipalpid mites.

*19. *Dactyloscirus* sp.

Material examined : Andhra Pradesh : 1 ♀, Nandyal, 9.ix.2001, ex. banana leaf, coll. A.K. Sanyal.

Remarks : So far only two species of *Dactyloscirus* have been reported from India on plants (Gupta 2002). However, the present specimen was damaged and therefore specific identity could not be established. The genus is the first record from the state.

Family ERYTHRAEIDAE Ronineau–Desvoidy

Key to the genera of ERYTHRAEIDAE

1. Palptarsus greatly enlarged globular or pyriform, and extending beyond palpal tibial claw *Sphaerolophus*
- Palptarsus not greatly enlarged or normal or nearly normal Structure, not overreaching palp tibial claw *Abrololophus*

*20. *Abrololophus* sp.

Material examined : Andhra Pradesh : 1 ♀, Rangareddi dist., Golkunda Fort Campus, 15.i.2001, ex. wild plant, coll. A.K. Sanyal.

Remarks : The damaged condition of the specimen did not allow specific identity of the specimen. This is first record of this genus from the state.

*21. *Sphaerolophus* sp.

Material examined : Andhra Pradesh : 1 ♀, Vishakhapatnam dist., Uppada, 22.i.2001, ex. wild plant, coll. A.K. Sanyal.

Remarks : Earlier no record of this genus was known from Andhra Pradesh.

Family PYEMOTIDAE Oudemans

***22. *Pyemotes ventricosus* (Newport)**

1850. *Heteropus ventricosus* Newport, *Proc. Linn. Soc. Lond.*, : 2271.

1974. *Pyemotes ventricosus*, Prasad, *A Catalogue of Mites of India*, : 20.

Diagnosis : Idiosoma flattened; propodosoma with a pair of dorsal protuberances; pseudostigmatid organs with globular heads; apodems of leg I joined.

Material examined : Andhra Pradesh : 3 ♀ ♀, Nizamabad dist., Mudakpally, 30.ix.2002, ex. chichinga (*Luffa cylindrica*), coll. B.J. Sarkar.

Distribution : India : Andhra Pradesh (Nizamabad), Karnataka, Kerala, Tamil Nadu.

Remarks : Earlier the species was reported from Karnataka, Kerala and Tamil Nadu associated with caterpillar, *Nephantis serinopa*. However, its occurrence in the host plant chichinga is an accidental one and might have got detached from the body of the borer.

Family STIGMAEIDAE Oudemans

***23. *Agistemus macrommatus* Gonzalez-Rodriguez**

1965. *Agistemus macrommatus* Gonzalez Rodriguez, *Univ. Calif. Pub. Ent.*, **41** : 38-39.

2002. *Agistemus macrommatus*, Gupta, *Mem. zool. Surv. India*, **18(1)** : 106-107.

Diagnosis : Gupta (2002) may be consulted.

Material examined : Andhra Pradesh : 2 ♀ ♀, Khammam dist., V.V. Palam, 20.ix.2002, ex. akand (*Calotropis gigantea*), coll. B.J. Sarkar.

Distribution : India : Andhra Pradesh (Khammam), Arunachal Pradesh, Lakshadwip, Tamil Nadu, Uttar Pradesh, West Bengal.

Remarks : This is a very common stigmaeid mite and has been reported earlier from Arunachal Pradesh, Lakshadwip, Tamil Nadu, Uttar Pradesh and West Bengal and appears to be a good predator of tetranychid mites.

Family TYDEIDAE

***24. *Tydeus* sp.**

Material examined : Andhra Pradesh : 2 ♀ ♀, Vishakapatnam dist., Arakoo valley horticulture garden, 25.i.2001, ex. rose plant (*Rosa indica*), coll. A.K. Sanyal.

Remarks : The specimens could not be identified up to species as these were in damaged condition.

Order ASTIGMATA

Key to the families of ASTIGMATA (after Krantz, 1978)

1. Tibia 1 with 2 setae or none, dorsal solenidion generally distinct, ambulacral pulvaillus and empodial claw present on at least some of the tarsi, pulvilli occasionally reduced but rarely absent. With 2 pairs of well developed genital acetabula or sclerotic ring like structures *

* Idiosoma with a distinct sejugal furrow, genital acetabula each with no more than two segments. Small to large species typically ovoid and with developed opisthosoma
.....ACARIDAE

- Tibia 1 with only one seta plus the dorsal solenidion, tarsi with membranous ambulacral discs or with claw like seta or spines, genital acetabula absent or greatly reduced **

** Legs III–IV of female inserted ventrally, normally developed and without long terminal setae, leg IV of male often reduced, male with or without anal suckers, vertical setae absent in both sexes PYROGLYPHIDAE

Family ACARIDAE Ewing and Nesbitt

*25. *Tyrophagus putrescentiae* (Schränk)

1781. *Acarus putrescentiae* Schränk, *Enum. Ins. Aust. India*, : 521.

1985. *Tyrophagus putrescentiae*, Gupta, *Handbook, Plant Mites of India*, : 409.

Material examined : Andhra Pradesh : 4 ♀ ♀, Nizamabad dist., Navipet, 28.ix.2002, ex. Papaya (*Carica papaya*), bottle-gourd (*Lagenaria siceraria*), coll. A.K. Sanyal and B.J. Sarkar.

Distribution : India : Andhra Pradesh (Nizamabad), Bihar, Punjab, Sikkim, Tamil Nadu, West Bengal.

Elsewhere : Cosmopolitan.

Remarks : This is a cosmopolitan species and has been reported from diverse types of habitats like plants, storage, bird's nests, house dust and leaf litter. It occurs on plants in association with fungi and is not harmful to plants.

Family PYROGLYPHIDAE Cunliffe

*26. *Dermatophagoides pteronyssinus* (Trouessart)

1897. *Mealia pteronyssinus* Trouessart, In : Berlese, 1897. *Acari, Myr. Scorp. Ital.*, 1 : 104.

1953. *Dermatophagoides pteronyssinus*, Dubinin, *Fauna USSR*, 6 : 87.

1974. *Dermatophagoides pteronyssinus*, Prasad, *A catalogue of Mites of India*, : 11.

Diagnosis : Hughes, 1976 may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Karimnagar dist., L.M. Dam colony, 24.ix.2002, ex. Maize (*Zea mays*), coll. A.K. Sanyal

Distribution : India : Andhra Pradesh (Karimnagar), all other states.

Elsewhere : Cosmopolitan.

Remarks : This species is widely distributed in India in habitats like house dust and bed dust, storage and bird's nests. Its occurrence on plants is an accidental one and might have struck up on leaf after being blown away along with dust.

Order MESOSTIGMATA

Family PHYTOSEIIDAE Berlese

Key to the subfamilies, genera, subgenera and species of PHYTOSEIIDAE

1. Dorsal shield with 4 pairs of prolateral setae....Subfamily Amblyseiinae, ... *Amblyseius*, 2
 - Dorsal shield with 5 pairs of prolateral setae..... PHYTOSEIIDAE, *Typhlodromus*, 13
2. Dorsal shield with less than 5 pairs of prolateral setae–*Paraphytoseius* A. (*Paraphytoseius*) *multidentatus*
 - Dorsal shield with 5 pairs of prolateral setae 3
3. Seta Z_4 , S_4 , Z_4 long and whip like, longer than distance between their bases, leg IV with macroseta on genu and erect seta on tarsus *Amblyseius*, (*Amblyseius*) *largoensis*
 - Setae Z_5 shorter at most as long as distance between; their bases, Leg I with no macrosetae or only one on genu, no erect seta on tarsus 4
4. Sternal shield distinct, posterior margin straight or concave, ventrianal shield approximately shield shaped and pentagonal 5
 - Sternal shield indistinct, posterior margin may be trilobate, ventrianal shield elongate, vase shaped 6
5. Z_5 , Z_4 indistinctly serrate, sternal shield as wide as or wider than long, macrosetae may be present on genu I and also on genu II and III A. (*Typhlodromips*) *guajavae*
 - Z_5 and Z_4 indistinctly serrate, sternal shield longer than wide, genu I, II, III without macrosetae A. (*Neoseiulus*) *longispinosus*
6. Peritreme extends anteriorly upto j_3 , anterior pair of preanal setae adjacent to anterior margin of ventrianal shield A (*Typhlodromalus*) *kalimpongensis*

- Peritreme not extends upto j_3 , anterior pair of preanal setae removed from anterior margin of ventrianal shield *A.(Euseius)*, 7
- 7. All setae on dorsal shield minute except j_1 and Z_5 8
 - Besides Z_5 , j_1 some other setae also long 9
- 8. S_2 , S_5 equal *A. (E). ovalis*
 - S_2 , S_5 unequal *A(E). rhododendronis*
- 9. j_1 , j_3 either equal or j_3 longer than j_1 10
 - j_1 longer than j_3 12
- 10. j_3 longer than j_1 *A. (Euseius) alstoniae*
 - J_3 as long as j_1 11
- 11. Spermatheca with funnel-shaped cervix *A. (Euseius) coccineae*
 - Spermatheca with bulb-shaped cervix *A(Euseius) coccosocius*
- 12. S_5 longer than S_4 *A(Euseius) finlandes*
 - S_5 as long as or shorter than S_4 *A. (Euseius) bambusae*
- 13. Seta Z_5 , Z_4 normally serrate, the former may be knobbed
 - *T. (Amblydromella)homelii*
 - Seta Z_5 , Z_4 never serrate *T. (Orientatiseius) rickeri*

27. *Amblyseius (Amblyseius) largoensis* (Muma)

1955. *Amblyseopsis largoensis* Muma, *Ann.ent.Soc. Amer.*, **48** : 266.

2003. *Amblyseius (Amblyseius) largoensis*, Gupta, *Mem. zool. Surv. India*, **20**(1) : 22-23.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Krishna dist., Ambapuram, 18.i.2001, ex. *Acacia* sp., coll. B.J. Sarkar.

Distribution : India : Andhra Pradesh (Krishna), all states of India.

Elsewhere : Brazil, China, Costa Rica, Guatemala, Honduras, Jamaica, Hong Kong, Japan, Kenya, Mexico, New Calidonia, New Zealand, Papua New Guinea, Philippines, Puerto Rico, South Africa, Taiwan, Thailand, Trinidad, USA, Western and Northern Iran.

Remarks : This is abundantly available and widely distributed in India and has been reported to be efficient predator of tetranychid (*Panonychus citri*, *Oligonychus mangiferus*, *Tetranychus urticae*), tenuipalpid (*Brevepalpus lewisi*) and eriophyid mites (*Aceria litchii*) (Gupta 2003).

***28. *Amblyseius (Euseius) alstoniae* Gupta**

1975. *Amblyseius alstoniae* Gupta, *Internat. J. Acarol.*, **1** (2) : 31-32.

28. *Amblyseius (Euseius) alstoniae*, Gupta, *Mem. zool. Surv. India*, **20**(1) : 32-34.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Cuddapah dist., Kamapalam village, 11.ix.2001, ex. ladies finger (*Abelmoschus esculentus*), coll. A.K. Sanyal; Cuddapah town, 13.ix.2001, ex. papaya (*Carica papaya*) and ornamental plant, coll. B.J. Sarkar. 6 ♀ ♀, Rangareddi dist., Hyderabad, Osmania University campus, 14.i.2001, ex. *Colocasia* sp. and *Hibiscus* sp., coll. A.K. Sanyal; 1 ♀, Golkunda fort, 15.i.2001, ex. an undet. plant, coll. A.K. Sanyal. 2 ♀ ♀ Chittoor dist., Kartick Vanam, 16.ix.2001, ex. an undet. plant, coll. A.K. Sanyal; 4 ♀ ♀ Chittoor forest, 15.ix.2001, ex. an undet. plant, coll. B.J. Sarkar. 4 ♀ ♀, Krishna dist., Vijaywada, Ambapuram, 18.i.2001, ex. an undet. plant, coll. A.K. Sanyal; 1 ♀, Forest Office Campus, 18.i.2001, ex. arum (*Colocasia esculenta*), coll. A.K. Sanyal. 6 ♀ ♀, Rangareddi dist., Araku Valley forest rest house campus, 24.i.2001, ex. rose (*Rosa damasciana*) (1 ♀), *Ipomea* sp. (5 ♀ ♀), coll. B.J. Sarkar. 4 ♀ ♀, Khammam dist., Khammam town, 20.ix.2002, ex. ladies finger (*Abelmoschus esculentus*), 3 ♀ ♀, ex. *Hibiscus* sp. coll. A.K. Sanyal; 1 ♀, V.V. palam, 20.ix. 200, ex. akand (*Calotropis gigantea*), coll. B.J. Sarkar. 10 ♀ ♀, Chittoor dist., Venkataswara, 21.ix.2002, ex. Maize (*Zea mays*) coll. B.J. Sarkar.

Distribution : India : Andhra Pradesh (Rangareddi, Krishna, Khammam, Cuddapah, Chittoor), Arunachal Pradesh, Bihar, Gujarat, Haryana, Jammu and Kashmir, Karnataka, Madhya Pradesh, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Remarks : It is very abundantly available in Andhra Pradesh on a large number of plants and from India it is known from most of the states. It is a good predator of tetranychid (*Eutetranychus orientalis*, *Tetranychus urticae*, *Oligonychus indicus*) and tenuipalpid (*Brevipalpus phoenices*, *B. deleoni*) mites (Gupta 2003)..

29. *Amblyseius (Euseius) bambusae* Ghai and Menon

1967. *Amblyseius bambusae* Ghai and Menon, *Oriental Ins.*, **1** : 66-67.

2003. *Amblyseius (Euseius) bambusae*, Gupta, *Mem. zool. Surv. India*, **20**(1) : 34-35.

Diagnosis : Gupta, (2003) may be consulted.

Distribution : India : Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Tripura, West Bengal.

Remarks : This is of no known predatory importance. The species was earlier known from Andhra Pradesh.

30. *Amblyseius (Euseius) coccineae* Gupta

1975. *Amblyseius coccineae* Gupta, *Internat. J. Acarol.*, 1(2) : 30.

2003. *Amblyseius (Euseius) coccineae*, Gupta, *Mem. zool. Surv. India*, 20(1) : 35-36.

Diagnosis : Gupta, (2003) may be consulted.

Material examined : Andhra Pradesh : 10 ♀ ♀ Nandyal, 9.ix.2001, ex. banana leaf, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Gujarat, Jammu and Kashmir, Madhya Pradesh, Meghalaya, Tamil Nadu, Orissa, Pondichery, Sikkim, Tripura, Uttar Pradesh, West Bengal.

Remarks : It was reported feeding on eggs of *Oligonychus indicus* and *Eutetranychus orientalis* (Gupta 2003).

31. *Amblyseius (Euseius) coccosocius* Ghai and Menon

1967. *Amblyseius (Euseius) coccosocius* Ghai and Menon, *Oriental Ins.*, 1 : 67-68.

2003. *Amblyseius (Euseius) coccosocius*, Gupta, *Mem. zool. Surv. India*, 20(1) : 36-37.

Diagnosis : Gupta, 2003 may be consulted.

Distribution : India : Andhra Pradesh, Karnataka, Kerala, Lakshadwip, Pondichery, Punjab, Tamil Nadu, Tripura, West Bengal.

Remarks : This was reported feeding upon *Brevipalpus rugulosus* and *Oligonychus coffeae* (Gupta, 2003). The species was earlier known from the state.

*32. *Amblyseius (Euseius) finlandicus* (Oudemans)

1915. *Amblyseius finlandicus* Oudemans, *Ent. Ber.*, 4 : 183.

2003. *Amblyseius (Euseius) finlandicus*, Gupta, *Mem. zool. Surv. India*, 20(1) : 39-40.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Rangareddi dist., Golkunda Fort campus, 15.i.2001, ex. ornamental plant, coll. B.J. Sarkar. 6 ♀ ♀, Krishna dist., Vijaywada, circuit house campus, 20.i.2001, ex. belphool (*Naringi crenulata*), coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi, Krishna), Bihar, Himachal Pradesh, Jammu and Kashmir, Karnataka, Lakshadwip, Meghalaya, Mizoram, Punjab, Sikkim, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : Africa, Canada, Europe, Indonesia, Japan, Mexico, Pakistan, South America, USA.

Remarks : This is a very commonly occurring predatory mite. The species is a very efficient predator of tetranychid (*Eutetranychus orientalis*, *Tetranychus urticae*, *Oligobnychus mangiferus*, *Tetranychus ludeni*) and tenuipalpid mite (*Brevipalpus phoenicis*) (Gupta, 2003).

33. *Amblyseius (Euseius) ovalis* (Evans)

1953. *Typhlodromus ovalis* Evans, *Ann. Mag. Nat. Hist.*, **6** : 458-461.

2003. *Amblyseius (Euseius) ovalis*, Gupta, *Mem. zool. Surv. India*, **20**(1) : 42-43.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 3 ♀ ♀, Krishna dist., Kondapally, 19.i.2001, ex. an undet. plant, coll. A.K. Sanyal. 4 ♀ ♀, Vishakhapatnam, dist., Araku valley, 25.i.2001, ex. an undet. flowering plant, coll. B.J. Sarkar. 1 ♀, Chittoor dist., Venkataswara temple campus, 21.ix.2002, ex. cotton (*Gossypium herbaceum*), coll. A.K. Sanyal. 6 ♀ ♀, Nizamabad dist., Navipet, 28.ix.2002, ex. an undet. plant, coll. B.J. Sarkar.

Distribution : India : Andhra Pradesh, (Vishakhapatnam, Chittoor, Nizamabad), Andaman and Nicobar Isls., Arunachal Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Lakshadwip, Maharashtra, Manipur, Meghalaya, Mizoram, Pondichery, Punjab, Sikkim, Tamil Nadu, Tripura, West Bengal.

Elsewhere : Africa, Australia, Far east, Mexico, New Zealand, Philippines, South east Asia.

Remarks : A number of authors reported this mite as an efficient predator of tetranychid (*Tetranychus urticae*, *Oligonychus coffeae*, *Eutetranychus* sp.), tarsonemid (*Polyphagotarsonemus latus*) mite and white fly (*Bemesia tabaci*) (Gupta 2003). The species is abundantly available in nature and it will prove to be a profitable predator if properly utilized. Gupta (2003) reviewed the work done on predatory efficiency and biology of this mite.

*34. *Amblyseius (Euseius) rhododendronis* Gupta

1970. *Amblyseius rhododendronis* Gupta, *Oriental Ins.*, **4** : 187-188.

2003. *Amblyseius (Euseius) rhododendronis*, Gupta, *Mem. zool. Surv. India*, **20** : 44-45.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Karimnagar dist., Karimnagar, Bishop's garden, 26.ix.2002, ex. ornamental plant, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh, (Karimnagar), Karnataka, Mizoram, Sikkim, Tamil Nadu, Tripura, West Bengal.

Remarks : Its predatory habit has been recorded on *Tetranychus ludeni* in Karnataka. Unfortunately, its population remains at low level in field and hence its effectiveness as predator is questionable.

***35. *Amblyseius (Neoseiulus) longispinosus* (Evans)**

1952. *Typhlodromus longispinosus* Evans, *Ann. Mag. Nat. Hist.*, **5**(12) : 413-416.

2003. *Amblyseius (Neoseiulus) longispinosus*, Gupta, *Mem. zool. Surv. India*, **20**(1) : 54-56.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Krishna dist., Ambapuram, 18.i.2001., ex. an undet. plant, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Krishna), Andaman and Nicobar Isls., Arunachal Pradesh, Bihar, Karnataka, Lakshadwip, Orissa, Pondichery, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Australia, Far east, New Zealand, Papua New Guinea, Southeast Asia, West Indies.

Remarks : This is another very efficient predator and is abundantly available in various parts of India. Because of its importance as very good predator, a number of workers carried out experiments on its bioecology and predatory behaviour and those have been reviewed in Gupta (2003). It is mainly a predator of tetranychid mites.

36. *Amblyseius (Paraphytoseius) multidentatus* (Swirski and Shechter)

1961. *Amblyseius multidentatus* Swirski and Shechter, *Israel J. agric. Res.*, **11**(2) : 114-116.

2003. *Amblyseius (Paraphytoseius) multidentatus*, Gupta, *Mem. zool. Surv. India*, **20**(1) : 59-60.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Vishakapatnam dist., Araku valley horticulture garden, 25.i.2001 ex. rose (*Rosa damasciana*) leaf, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh, (Vishakapatnam), Andaman and Nicobar Isls., Arunachal Pradesh, Assam, Bihar, Karnataka, Maharashtra, Meghalaya, Mizoram, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : China, Hong Kong, Madagaskar, Malayasia, Nigeria, Philippines, Thailand.

Remarks : This species is very abundantly available on different types of plants and has been reported to be feeding on or associated with tetranychid, tenuipalpid and tarsonemid mites. Though it is widely available but it is not a voracious feeder and therefore its predatory habit is doubtful.

37. *Amblyseius (Typhlodromalus) kalimpongensis* Gupta

1969. *Amblyseius kalimpongensis* Gupta, *Bull. Ent. Soc. India*, **10** : 128-129.

2003. *Amblyseius (Typhlodromalus) kalimpongensis* Gupta, *Bull. zool. Surv. India*, **20**(1) : 68-69.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 3 ♀, Krishna dist., Vijaywada, Kondapally, 19.i.2001, ex. an undet. plant, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Krishna), Assam, Bihar, Delhi, Gujarat, Karnataka, Meghalaya, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Remarks : This is not an efficient predator.

*** 38. *Amblyseius (Typhlodromus) guajavae* Gupta**

1978. *Amblyseius guajavae* Gupta, *Indian J. Acar.*, 2(2) : 63.

2003. *Amblyseius (Typhlodromus) guajavae*, Gupta, *Mem. zool. Surv. India*, 20(1) : 75-76.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh, 1 nymph, Chittoor dist., T.T.D. Campus, 19.ix.2001, ex. guava leaf (*Psidium guajava*), coll. B.J. Sarkar.

Distribution : India : Andhra Pradesh (Chittoor), Arunachal Pradesh, Meghalaya, West Bengal.

Remarks : It is though available abundantly but is of no predatory importance.

*** 39. *Typhlodromus (Amblydromella) homalii* Gupta**

1970. *Typhlodromus homalii* Gupta, *Oriental Ins.*, 4(2) : 188-189.

2003. *Typhlodromus (Amblydromella) homalii*, Gupta, *Mem. zool. Surv. India*, 20(1) : 124-125.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Vishakhapatnam dist., Arakoo valley F.R.H. campus, 25.i.2001, ex. jasmine flower plant (*Jasminum sambac*), coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Vishakhapatnam), Arunachal Pradesh, Bihar, Haryana, Himachal Pradesh, Kerala, Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Pakistan.

Remarks : This species is available almost in all the states of India on different plants.

***40. *Typhlodromus (Orientiseius) rickeri* Chant**

1970. *Typhlodromus (Typhlodromus) rickeri* Chant, *Can. Ent.*, 92 : 62-64.

2003. *Typhlodromus (Orientiseius) rickeri*, Gupta, *Mem. zool. Surv. India*, 20(1) : 137-138.

Diagnosis : Gupta, 2003 may be consulted.

Material examined : Andhra Pradesh : 1 ♀, Guntoor, ex. citrus, coll. S.K. Gupta.

Distribution : India : Andhra Pradesh (Guntoor), Karnataka, Madhya Pradesh, Meghalaya, Mizoram, Nagaland, Sikkim, Uttar Pradesh.

Elsewhere : China, Florida (introduced).

Remarks : The species was not earlier known from Andhra Pradesh.

SUMMARY

The paper deals with the plant associated mites from different districts of Andhra Pradesh. A total of 40 species pertaining to 21 genera and 12 families are recorded. The present work adds 30 species under genera to the list of plant mites from Andhra Pradesh. Besides nature of damage and biological informations of economically important species, keys to identification of families, genera and species; diagnostic features, distribution and collection data are incorporated in this paper.

ACKNOWLEDGEMENTS

The authors wish to express their thanks to the Director, Zoological Survey of India, for encouragement and providing laboratory facilities.

REFERENCES

- Gupta, S.K. 1985. *Handbook. Plant mites of India*. Zoological Survey of India, Calcutta, : 1-520.
- Gupta, S.K. 2002. *A monograph on plant inhabiting predatory mites of India*. Part I : Orders : Prostigmata, Astigmata and Cryptostigmata. *Mem. zool. Surv. India*, **19**(2) : 1-183.
- Gupta, S.K. 2003. *A monograph on plant inhabiting predatory mites of India*. Part II : Order : Mesostigmata. *Mem. zool. Surv. India*, **20**(1) : 1-185.
- Gupta, S.K. and Gupta, Y.N. 1994. A taxonomic review of Indian Tetranychidae (Acari : Prostigmata) with descriptions of new species, redescriptions of known species and keys to genera and species. *Mem. zool. Surv. India*, **18**(1) : 1-196.
- Gupta, S.K. (Undet.). Mite pests of agricultural crops in India and their management. In : *Mites, their identification and management* (Eds. P.R. Yadav, R. Chauhan, B.N. Putatunda and B.S. Chhillar), CCS, Haryana Agricultural University, Hissar.

IXODID TICKS (ACARI : IXODIDAE)

A. K. SANYAL and B. J. SARKAR

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The ticks are recognized as one of the most important disease causing arthropod occurring throughout the world. These ectoparasites cause variety of diseases to man and domestic and wild animals.

Altogether 15 species and 5 genera of ixodid ticks were known from Andhra Pradesh before the present study was taken up to prepare a consolidated report of ixodid ticks found in the state.

The present work is based on a series of collection of ixodid ticks made from Andhra Pradesh by the authors. The work also includes the species which have not been studied by the authors but are known to occur in the state through publications by the earlier workers.

The authors undertook the following three surveys in Andhra Pradesh for collection of ticks.

1. Andhra Pradesh Survey—Dr. A.K. Sanyal & Party (January, 2001)
2. Andhra Pradesh Survey—Dr. A.K. Sanyal & Party (September, 2001)
3. Andhra Pradesh Survey—Dr. A.K. Sanyal & Party (September, 2002)

MATERIAL AND METHODS

The details have been given in Sanyal and De (1992).

GENERAL MORPHOLOGY AND TERMINOLOGY

The details have been given in Sanyal and De (1992).

LIST OF TAXA

Family IXODIDAE

1. Genus *Amblyomma* Koch

- 1. *A. javanense* (Supino)
- 2. *A. testudinarium* Koch

2. Genus *Boophilus* Curtice

- 3. *B. microplus* (Canestrini)

3. Genus *Haemaphysalis* Koch

- 4. *H. bispinosa* Neumann
- 5. *H. intermedia* Warburton and Nuttall
- 6. *H. silvafelis* Hoogstraal and Trapido
- 7. *H. spinigera* Neumann
- 8. *H. turturis* Nuttall and Warburton

4. Genus *Hyalomma* Koch

- 9. *H. anatolicum anatolicum* Koch
- 10. *H. brevipunctata* Sharif
- 11. *H. dromedarii* Koch
- 12. *H. hussaini* Sharif
- 13. *H. marginatum isaaci* Sharif

5. Genus *Rhipicephalus* Koch

- 14. *R. haemaphysaloides* Supino
- 15. *R. sanguineus* (Latreille)
- 16. *R. turanicus* Pomerantzev

SYSTEMATIC ACCOUNT

Key to the genera of IXODID TICKS

- 1. Eyes absent 2
- Eyes present 3
- 2. Capitulum short with lateral salience on palpal article II; blade-like dorsal retroverted spur on trochanter I; cox I never bifid..... *Haemaphysalis* Koch
- 3. Long capitulum with long narrow palps 4
- Short capitulum with short broad palps 5

4. Ventral shields present in male; usually inornate; eyes spherical and orbital *Hyalomma* Koch
- Ventral shields absent in male; ornate scutum; usually flat and non-or bital eyes *Amblyomma* Koch
5. Oval-shaped spiracle; faint or obsolete festoons and anal groove *Boophilus* Curice
- Sub-triangular or comma-shaped spiracle; well developed festoons and anal groove ..
..... *Rhipicephalus* Koch

1. Genus *Amblyomma* Koch

1844. *Amblyomma* Koch, Arch. Naturgesch, 10 : 223-231.

1. *Amblyomma javanense* (Supino)

1897. *Rhipicephalus javanense* (Supino), Atti. Soc. Veneto-Trent Sci. Nat., 3(1) : 233.

1908. *Aponomma javanense* Cooper and Robinson, Proc. Comb. Philos. Soc., 14 : 464-466.

1968. *Amblyomma javanense* (Supino), Hoogstraal, Santana and Peenen, Ann. Ent. Soc. Amer., 61(3) : 722-729.

Diagnosis : Male – Broad, oval and narrow scutum, anteriorly inornate; fine punctations; marginal groove obsolete; indistinct eyes; coxa I with two minute blunt flat spurs; dentition 3/3.

Female – Inornate and cordiform scutum; punctations numerous; indistinct eyes; coxae as in male; dentition 3/3.

Hosts : *Manis pentadactyla*, *Manis crassicaudata*, *Nicoria tricarinata*.

Distribution : India : Andhra Pradesh, Bihar, Delhi, Gujarat, Karnataka, Maharashtra, Orissa, Uttar Pradesh, West Bengal.

2. *Amblyomma testudinarium* Koch

1844. *Amblyomma testudinarium* Koch, Arch. Naturgesch, 10(1) : 226.

1928. *Amblyomma testudinarium*, Sharif, Rec. Indian Mus., 30(3) : 330.

Diagnosis : Male – Scutum with ornamentation with dark-brown markings on pale ground; falciform stripe large and thick; deep punctations; dentition 4/4; cox I with two unequal stout spurs.

Female – Triangular scutum, posterior part narrow, ground colour yellowish, heavily punctated; porose areas moderately large; dentition 4/4; cox I with moderately stout spurs.

Hosts : Buffalo, tiger.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Assam, Karnataka, Madhya Pradesh, Meghalaya, Punjab, Orissa, Sikkim, West Bengal.

2. Genus *Boophilus* Curtice

1891. *Boophilus* Curtice, *Journ. Compar. Med. Veter. Arch.*, **12** : 313.

3. *Boophilus microplus* (Canestrini)

1887. *Haemaphysalis micropla* Canestrini, *Atti.Soc. Veneto-Trent. Sci. Nat.*, **11** : 104.

1890. *Rhipicephalus micropla* Canestrini, *Padova*, **4** : 493.

1899. *Rhipicephalus australis* Fuller, *Qd. Agric. J.*, **4**(5) : 289-394.

1901. *Boophilus australis* Stiles and Hassall, *Bur. Anim. Ind. U.S. Dept. Agric.*, Washington, D.C. Circ. No. **34** : 2-3.

1928. *Boophilus australis*, Sharif, *Rec. Indian Mus.*, **30**(3) : 284.

Diagnosis : Male—Quite hirsute scutum; caudal appendage short, tapering; dentition 4/4; inner margin of basal palpal segment ventrally concave.

Female—Coxa I with deep, inverted 'V'-shaped cleft, inner margin of basal palpal segment ventrally short, deeply concave; dentition 4/4.

Material examined : Krishna District : 6 nymphs, Kondapally, 19.i.2001, ex. buffalo, coll. A.K. Sanyal. Visakhapatnam district : 1 ♀, 3 ♂♂, 10 nymphs, Borra Cave, 24.i.2001, ex. cow, coll. A.K. Sanyal. Chittoor, district : 1 ♀, Ahanavanam, Pakala, 15.ix.2001, ex. goat, coll. A.K. Sanyal. Nizamabad district : 1 ♀, Mudak Pally, 30. ix 2002, ex.cow, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Andaman and Nicobar Islands, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Maharashtra, Madhya Pradesh, Meghalaya, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal.

Remarks : This is a most common ixodid tick attacking cattle in almost all the states of India.

3. Genus *Haemaphysalis* Koch

1844. *Haemaphysalis* Koch, *Arch. Naturgesch.*, **10**(1) : 217-239.

4. *Haemaphysalis bispinosa* Neumann

1897. *Haemaphysalis bispinosa* Neumann, *Mem. Soc. Zool. Fr.*, **10** : 341.

1928. *Haemaphysalis bispinosa*, Sharif, *Rec. Indian Mus.*, **30**(3) : 255.

Diagnosis : Male—Elongate-oval-shaped scutum; cervical grooves with convergent

depressions; lateral grooves long, well marked, ending behind spiracles; festoons are twice as long as broad; palps slightly salient, segment 2 and 3 subequal, segment 3 bluntly conical and bears a prominent dorsal retrograde spur in the mid-dorsal line and a similar but larger ventral spur; dentition 4/4; a moderate sharp spur on coxa I; a very slight protubérance on coxae II and IV.

Female—Sub-cordiform scutum, punctations little longer than male; basis capituli broader; cornua short; porose areas oval; palpi as in male.

Material examined : Kurnool district : 2 nymphs, Alampur, 7.ix.2001, ex. goat, coll. A.K. Sanyal. Krishna district : 2 ♀ ♀, 2 nymphs, Ambapuram, 18.i.2001, ex. goat, coll. A.K. Sanyal; 5 ♀ ♀, 10 nymphs, Kondapally, 19.i.2001, ex. goat, coll. A.K. Sanyal. Visakhapatnam district : 2 ♀ ♀, Uppada, 22.i.2001, ex. goat, coll. A.K. Sanyal; 3 ♀ ♀, 10 nymphs, Borra cave, 24.i.2001, ex. lamb, coll. A.K. Sanyal. Kurnool district : 1 nymph, Nandyal, 9. ix. 2001, ex. goat, coll. A.K. Sanyal. Cuddapah district : 7 ♀ ♀, Siddavatham, 11.ix.2001, ex. goat, coll. A.K. Sanyal; 5 nymphs, ex. cow, coll. A.K. Sanyal; 1 ♀, Kamalapuram, 12.ix.2001, ex. goat, coll. A.K. Sanyal. Chittoor district : 3 ♂ ♂, 4 ♀ ♀, Reddygunta village, 16.ix.2001, ex. goat, coll. A.K. Sanyal. Khammam district : 20 ♀ ♀, Jellacharu, surroundings of Vengkatwar temple, 21.ix.2002, ex. goat, coll. A.K. Sanyal. Karimnagar district : 5 ♂ ♂, 10 ♀ ♀, 5 nymphs, Lower Manair Dam, 24.ix.2002, ex. goat, coll. A.K. Sanyal; 2 ♀ ♀, Nagnoor, 26. ix. 2002, ex. goat, coll. A.K. Sanyal. Nizamabad district : 1 ♀, Mallaram, 29.ix.2002, ex. cow, coll. A.K. Sanyal; 4 nymph, Mudakpally, 30.ix.2002, ex. cow, coll. A.K. Sanyal.

Hosts : Cattle, goat, tiger, vegetation.

Distribution : India : Andhra Pradesh, Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Meghalaya, Maharashtra, Meghalaya, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal.

5. *Haemaphysalis intermedia* Warburton and Nuttall

1909. *Haemaphysalis bispinosa* var. *intermedia* Warburton and Nuttall, *Parasitology*, 2 : 69.

1915. *Haemaphysalis bispinosa* var. *intermedia*, Nuttall and Warburton, *Ticks-Mongr. Ixodoidea*, pt. 3 (Cambridge Univ. Press) : 433.

1928. *Haemaphysalis bispinosa* var. *intermedia*, Sharif, *Rec. Indian Mus.*, 30(3) : 258.

1963a. *Haemaphysalis intermedia*, Hoogstraal and Trapido, *J. Parasit.*, 49(5) : 838.

Diagnosis : Male—Scutum oval, lateral grooves medium; cervical grooves indistinct; punctations large, numerous; palpi conical, segment 3 dorsally with widely convex inner margin, inner half of basal margin forming a short, pointed triangular spur, ventrally with a large spur extending to basal margin of segment 2; dentition 4/4; coxa I with long pointed spur, II to IV each with short widely triangular spur.

Female – Scutum with subequal length and breadth; cervical grooves distinct; punctations moderate, discrete; palpi as in male, ventral spur of segment 3 does not reach the basal margin of segment 2; legs as in male.

Material examined : Karimnagar district: 5 ♀ ♀, Lower Manair Dam, 24.ix.2002, ex. lamb, coll. A.K. Sanyal; 10 ♀ ♀, Keshavapattanam, 25.ix.2002, ex. goat, coll. A.K.Sanyal.

Hosts : Cattle, goat, sheep, *Centropus sinensis*, tiger, barking deer, forest undergrowth.

Distribution : India : Andhra Pradesh, Bihar, Great Nicobar Island, Maharashtra, Orissa, Tamil Nadu.

Remarks : The species is a common parasite of domestic and wild mammals in India. The species also carries KFD viruses.

6. *Haemaphysalis silvafelis* Hoogstraal and Trapido

1963b. *Haemaphysalis silvafelis* Hoogstraal and Trapido, *J. Parasit.*, **49** : 346.

Diagnosis : Male – Lateral grooves long; punctations numerous, large; cervical grooves deep, short; palpi subconical lacking basolateral salience, elevation of dorsobasal margin of segment 3 reduced, segment 3 with a large elongated ventral spur; dentition 4/4; coxae each with a well defined spur, I with a large pointed spur; ventral spur of trochanters rudimentary.

Female – Scutum with length and breadth subequal; punctations large, less numerous; palpi with slight basolateral salience forming wider basal margin; dentition 4/4; coxae and trochanters as in male; cervical grooves deep, extending midlength of scutum.

Hosts : Jungle cat (*Felis chaus kutas*).

Distribution : India : Andhra Pradesh, Orissa.

7. *Haemaphysalis spinigera* Neumann

1897. *Haemaphysalis spinigera* Neumann, *Mem. Soc. Zool. Fr.*, **10** : 324.

1928. *Haemaphysalis spinigera*, Sharif, *Rec. Indian Mus.*, **30**(3) : 262.

1974. *Haemaphysalis spinigera*, Ghalsasi and Dhanda, *Oriental Ins.*, **8**(4) : 505.

Diagnosis : Male – Pyriform scutum; cervical grooves obsolete; basis capituli dorsally rectangular; palpi short, widely salient, as broad as long, segment 2 dorsally 1.5 times as broad as long, postero-dorsal margin crenate forming obtuse angle at its juncture, segment 3 with ventral spur; dentition 5/5; spur of coxa I long, tapering, sharply pointed, spurs of coxae II and III small, triangular; spur of coxa IV very long, dagger like, sharply pointed.

Female – Subcircular scutum; cervical grooves deep, narrow; punctations moderate, deep; palpi as in male except segment 3 dorsally with a posteriorly directed triangular spur; genital operculum 'U'-shaped; dentition 4/4; coxae I with a long bluntly pointed spur, coxae II to IV with small triangular spurs.

Hosts : Cattle, birds, vegetation.

Distribution : Andhra Pradesh, Andaman & Nicobar Islands, Arunachal Pradesh, Assam, foot hills of Central and Eastern Himalayan region, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, West Bengal.

8. *Haemaphysalis turturis* Nuttall and Warburton

1915. *Haemaphysalis turturis* Nuttall and Warburton, *Ticks-Mongr. Ixodoidea*, pt. 3 (Cambridge Univ. Press) : 410.

1928. *Haemaphysalis turturis*, Sharif, *Rec. Indian Mus.*, **30**(3) : 250.

1963. *Haemaphysalis turturis*, Trapido *et al.*, *J. Parasit.*, **49**(4) : 678.

Diagnosis : Male – Scutum with small numerous punctation, cervical grooves nearly deep, lateral grooves very short; palpi conical with basolateral junctures, segment 3 with a short dorsobasal spur and a long tapered ventral spur; dentition 4/4 (rarely 5/5); cox I with a narrowly elongate spur, II and IV with a wide spur; trochantral spurs present.

Female – Scutum subcircular; punctations as in male; palpi widely triangular and with slight basolateral salience; coxal spurs somewhat smaller.

Material examined : Nizamabad district: 3♂♂, 5♀♀, Navipet, 28.ix.2002, ex. goat, coll. A.K. Sanyal.

Hosts : Cattle, goat, Indian Wild boar, porcupine, Indian muntjac, jungle cat, leopard, cat, panther, wild hare, spotted deer, mouse deer, wild dog, rat, vegetation.

Distribution : India : Andhra Pradesh, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh.

Remarks : The species is reported here for the first time from Andhra Pradesh.

4. Genus *Hyalomma* Koch

1844. *Hyalomma* Koch, *Arch. Naturgesch.*, **10**(1) : 220.

9. *Hyalomma anatolicum anatolicum* Koch

1884. *Hyalomma anatolicum anatolicum* Koch, *Arch. Naturgesch.*, **10**(1) : 220.

Diagnosis : Male–Faintly punctated scutum; lateral grooves short but distinct; posteromedian groove not reaching the parma; subanal shields small, situated directly posterior of adanals; basis capituli dorsally with slightly concave posterior margin, never angular; legs without ring.

Female – Scutum longer than wide with narrowly rounded posterior margin; punctations large in scapular areas; operculum short, small.

Hosts : Cattle, buffalo, sheep, forest undergrowth, pasture land.

Distribution : India : Andhra Pradesh, Assam, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu.

10. *Hyalomma brevipunctata* Sharif

1928. *Hyalomma hussaini* var. *brevipunctata* Sharif, *Rec. Indian Mus.*, 30(3) : 318.

1963. *Hyalomma brevipunctata*, Kaiser and Hoogstraal, *J. Parasit.*, 49(1) : 130.

Diagnosis : Male – Punctations few in the central area and lateral grooves deep, distinct, reach the level of the eyes; cervical grooves deep, short pits; basis capituli broader than long with anterior projections, adanal shields broad and subanal shields lacking; spiracular plates comma-shaped.

Female – Punctations fine, numerous in lateral and cervical fields and in the anteromedian field; genital operculum elongate oval; others more or less same as in male.

Hosts: Cattle, rat, sambar, chita.

Distribution : India : Andhra Pradesh, Bihar, Delhi, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Orissa, Punjab, Tamil Nadu.

11. *Hyalomma dromedarii* Koch

1884. *Hyalomma dromedarii* Koch, *Arch. Naturgesch.*, 10(1) : 220.

Diagnosis : Male–Sub-anal shields displayed laterally; lateral grooves limited to the posterior third of scutum; punctations few, scattered over the scutum.

Female–Genital operculum elongately triangular in outline, gradually depressed in profile, surrounded by a narrow, raised integumented fold; ratio of scutal length : width almost equal; punctations few and large, surface frequently rugose.

Hosts : Cattle, goat, sheep, donkey, horse, camel, lizard, rodent, hedgehog, hare, bird.

Distribution : India : Andhra Pradesh, Delhi, Gujarat, Himachal Pradesh, Jammu and Kashmir, Maharashtra, Orissa, Punjab, Uttar Pradesh.

12. *Hyalomma hussaini* Sharif

1928. *Hyalomma hussaini* Sharif, *Rec. Indian Mus.*, 30(3) : 314.

Diagnosis : Male – Central and caudal areas punctated, large in scapular and cervical areas; well developed, deep lateral grooves; cervical grooves shallow, rounded, extended to the scutal midlength; basis capituli broader than long dorsally, lateral projections ventrally; broad adanal shields; subanal shields absent; median and paramedian grooves deep, distinct; elongate oval spiracular plates.

Female – Scutum longer than wide, smooth and glossy; punctations few, larger than wide, smooth and glossy; punctuations few, large in scapular and cervical areas; cervical grooves smooth; shallow, distinct; genital operculum shield-shaped.

Material examined : Chittoor district : 3♂♂, 6♀♀ Kartikavanam, Reddygunta village, 16.ix. 2001, ex.goat, coll. A.K. Sanyal.

Hosts : Cattle.

Distribution : Andhra Pradesh, Assam, Bihar, Delhi, Goa, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, West Bengal.

13. *Hyalomma marginatum isaaci* Sharif

1928. *Hyalomma marginatum isaaci* Sharif, *Rec. Indian Mus.*, **30**(3) : 307.

1963. *Hyalomma marginatum isaaci*, Kaiser and Hoogstraal, *J. Parasit.*, **49**(1) : 130.

Diagnosis : Male—Long, distinct lateral grooves; punctations few, large; cervical grooves rounded and extend to the anterior third of scutal length; posteromedian and paramedian grooves extend to the festoons; anal shield large, subanals small, situated on the mid axis of the adanals, spiracular plates pilose with a thick tail; parma absent; legs with sharply defined rings near joints.

Female—Scutum slightly longer than wide; cervical grooves smoothly rounded, extend to and breaking the posterior margin of the scutum; genital operculum profile, slightly bulging, legs with white, narrow, sharply defined rings.

Material examined : Kurnool district : 1♂, Nandyal, 9.ix.2001, ex. goat, coll. A.K. Sanyal. Cuddapah district, 25♂♂, 15♀♀, Kamlapuram, 12.ix.2001, ex. cow, coll. A.K. Sanyal.

Hosts : Cattle, goat.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Bihar, Delhi, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh.

5. Genus *Rhipicephalus* Koch

1844. *Rhipicephalus* Koch, *Arch. Naturgesch.*, **10**(1) : 238.

Key to the species of *Rhipicephalus* is to be followed from Sanyal and De (1992).

14. *Rhipicephalus haemaphysaloides* Supino

1897. *Rhipicephalus haemaphysaloides* Supino, *Atti. Soc. Veneto-Trent. Sci. Nat.*, 2s, **3**(1) : 234.

1928. *Rhipicephalus haemaphysaloides*, Sharif, *Rec. Indian Mus.*, **30**(3) : 280.

Diagnosis : Male—Lateral grooves narrow, deep; cervical grooves short converging pits; few punctations of larger and smaller types; basis capituli twice as broad as long; palpi longer than broad; sickle-shaped adanal shields; comma-shaped spiracle; dentition 3/3.

Female—Cervical grooves deep shallow; punctations few, large, finer one hardly visible; spiracle sub-triangular with a large macula; cornua short; blunt palpi twice as long as broad.

Hosts : Cattle, goat, *Capricornis sumatraensis*, barking deer, vegetation.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh.

15. *Rhipicephalus sanguineus* (Latrielle)

1806. *Ixodes sanguineus* Latrielle, *Genera Crustaceorum et. Insectorum* 1 : 157.

1844. *Rhipicephalus sanguineus*, Koch, *Arch. Naturgesch*, 10(1) : 238.

1928. *Rhipicephalus sanguineus*, Sharif, *Rec. Indian Mus.*, 30(3) : 275.

Diagnosis : Male- Lateral grooves narrow deep, cervical grooves elongated semicircles; punctations comparatively numerous, unequal, irregularly arranged; basis capituli 3 times as broad as long; adanal shields triangular with internal margin almost straight; spiracle long, comma-shaped; palpi twice as long as broad with segment 2 and 3 subequal; dentition 3/3.

Female – Scutum sub-hexagonal, cervical grooves deep, punctate cervical fields; punctations as in male, spiracle subtriangular with a postero-dorsal angle.

Material examined : Krishna district : 7 ♂♂, 3 ♀♀, 5 nymphs, Ambapuram, 18.i.2001, ex. dog, coll. A.K. Sanyal. Visakhapatnam district : 1 ♂, 1 ♀, Uppada, 22.i.2001, ex. dog, coll. A.K. Sanyal. Karimnagar district : 1 ♀, Lower Manair Dam, 24.ix.2002, ex. lamb, coll. A.K. Sanyal; 1 ♂, 2 ♀♀, Keshavapattanam, 25.ix.2002, ex. goat, coll. A.K. Sanyal; 10 ♀♀, Nagnoor, 26.ix.2002, ex. goat, coll. A.K. Sanyal. Nizamabad district : 5 ♂♂, 15 ♀♀, Navipet, 28.ix.2002, ex. goat, coll. A.K. Sanyal.; 5 ♂♂, 5 ♀♀, Navipet, 29.ix.2002, ex. dog, coll. A.K. Sanyal; 20 ♀♀, Mallaram, 29.ix.2002, ex. cow, coll. A.K. Sanyal; 1 ♂, 5 ♀♀, Mudakpally, 30. ix. 2002, ex. cow, coll. A. K. Sanyal.

Hosts : Cow, bullock, goat, lamb, dog.

Distribution : India : Andhra Pradesh, Assam, Maharashtra, Orissa, Bihar, Gujarat, Haryana, Jammu and Kashmir, Madhya Pradesh, Tamil Nadu, Uttar Pradesh, West Bengal.

16. *Rhipicephalus turanicus* Pomerentzev

1940. *Rhipicephalus turanicus* Pomerentzev, Matikashvily and Lototzky, *Mag. Parasit.*, Moscow, 7 : 113.

Diagnosis : Male—Small, oval, semicircular cervical grooves; punctations small basic one

and large scattered one; adanal shields long and narrow with a small conical spur-like projection on the internal margin; spiracular plate with a definite depression in the posterior third of its dorsal margin, posterior tip bent dorsally.

Female – Scutum slightly elongated, posterior margin wavy; punctations large and sparse, superficially covers evenly the central field of scutum; lateral grooves distinct; spiracular plate short, oval, wide dorsal projection, rounded posteriorly; long outside spur of coxal I does not reach the tip of the inside coxal spur.

Hosts : Cattle, dog, rat.

Distribution : India : Andhra Pradesh, Gujarat, Jammu and Kashmir, Madhya Pradesh, Maharashtra, Tamil Nadu, West Bengal.

SUMMARY

The paper deals with the ixodid tick fauna so far known from the State of Andhra Pradesh. Altogether 17 species under 5 genera hitherto known from the State have been recorded. Of these, one species *Haemaphysalis turturis* has been reported here for the first time from the state. The first and important references, diagnostic features, distribution in India and hosts of the ticks and key to the identification of genera and species have also been incorporated.

ACKNOWLEDGEMENTS

The authors express sincere gratitude to the Director, Zoological Survey of India for providing facilities.

REFERENCES

- Canestrini, G. 1887. Intorno ad alcuni Acari ed Opiolionidi dell' America. *Atti Soc. Ven.-Trent. Sci. Nat. Padova*, **11**(1) : 104.
- Canestrini, G. 1890. Prospetto dell' acarofauna italiana. pt 4. Famiglie : Tetranychini, Ixodini, Argasini. Padova, 427-540.
- Cooper, W.F. and Robinson, L.E. 1908. On six new species of Ixodidae, including a record of species of the new genus *Rhipicentor* N. and W. *Proc. Camb. Phil. Soc.*, **14**(5) : 457-470.
- Curtice, C. 1891. The biology of the cattle tick. *J. Comp. Med. Vet. Arch.*, **12**(7) : 313-319.
- Fuller, C. 1899. Notes on the queensland cattle tick and its relationship to the Texas fever tick the blue tick of cape colony (South America). *Qd Agric. J.*, **4**, pt. 5 : 389-394.

- Ghalsasi, G.R. and Dhanda, V. 1974. Taxonomy and biology of *Haemaphysalis (Kaiseriana) spinigera* (Acarina : Ixodidae). *Oriental Ins.*, **8**(4) : 505-520.
- Hoogstraal, H., Santana, F.J. and Van Peenen 1968. Ticks (Ixodoidea) of Mt. Sontra, Darang, Republic of Vietnam. *Ann. Ent. Soc. Amer.*, **61**(3) : 722-729.
- Hoogstraal, H. and Trapido, H. 1963a. *Haemaphysalis silvafelis* sp.n.; a parasite of the jungle cat in southern India (Ixodoidea : Ixodidae). *J. Parasit.*, **49** : 346-349.
- Hoogstraal, H. and Trapido, H. 1963b. Redescription of cotyp and all stages of *Haemaphysalis intermedia* Warb. and Nuttall, 1909(= *H. parva* Neumann, 1908, preoccupied) from Ceylon and India (Ixodoidea : Ixodidae). *J. Parasit.*, **49**(5) : 838-46.
- Koch, C.L. 1844. Systematische Übersicht ubeer die ordnums der Zecken. *Arch. Naturgesch.*, **10**(1) : 217-239.
- Latreille, P.A. 1806. Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimis explicata. *Paris et Argentorati*, **1** : 1-302.
- Neumann, L.G. 1897. Revision de la famille des Ixodides (2e memoire). *Mem. Soc. Zool. Fr.*, **10** : 324-420.
- Nuttall, G.H.F. and Warburton. C. 1915. The genus *Haemaphysalis*. In : Nuttall *et al.*, *Ticks. A monograph of the Ixodoidea*, part 3 : i-xiii, 349-550.
- Sharif, M. 1928. A revision of the Indian Ixodidae, with special reference to the collection in the Indian Museum. *Rec. Indian Mus.*, **30**(3) : 217-344.
- Stiles, C.W. and Hassall, A. 1901. Notes on parasites—55-57. 56. *Boophilus australis* present in Cuba, Porto Rico, Venezuela and India. *Bur. Anim. Ind. U.S. Dept. Agric.*, Washington, D.C. Circ. No. **34** : 2-3.
- Supino, F. 1897. Nuovi Ixodes della Birmania. (Nota preventiva). *Atti Soc. Ven.- Trent. Sci. Nat. Padova*, 2.s., **3**(1) : 230-238.
- Trapido, H., Hoogstraal, H. and Varma, M. G. R. 1963. Redescription of the holotype and description of all stages of *Haemaphysalis turturis* Nuttall and Warburton from Ceylon and India (Ixodoidea, Ixodidae). *Amer. J. Trop. Med. Hyg.*, **49** : 678-685.
- Warburton, C. and Nuttall, G.H.F. 1909. On new species of Ixodidae, with a note on abnormalities observed in ticks. *Parasitology.*, **2**(1-2) : 57-76.

ORIBATID MITES (ACARI : ORIBATEI)

A. K. SANYAL

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The oribatid mites which are commonly known as “beetle” or “moss” mites are one of the most important groups of arthropods. They live almost in every possible habitats including soil, litter, humus, compost heaps, house-dusts, caves, lava caves, nests of small mammals and various other habitats like pasture soils, coniferous taiga forest, arctic tundra and even in Antarctic and sub-Antarctic zones (Wallwork, 1973).

These mites are of great economic importance from the point of increase of soil fertility through humification of organic matter and to act as agent for biological control of pests. They are also responsible for transmitting various helminth diseases to domestic animals, causing injury to plants and causing allergic diseases to human beings.

The present paper includes the oribatid mites collected from different districts of Andhra Pradesh by the author. The work also incorporated the oribatid species which have not been collected and studied by the author but were described or recorded earlier from the state by other workers.

REVIEW OF THE LITERATURE ON ORIBATID MITES

As such no intensive study of oribatid mites of Andhra Pradesh has been done. Only two records of study on this group of mites by two different scientists are known till date. The first oribatid mite species known from the state was *Pergalumna andhraense* which was described as new species by Raju *et al.* (1981) from Visakhapatnam district. Later Venugopala Rao *et al.* (1982) reported the infestations of rice by *Scheloribates zealandicus* in Vishakhapatnam district.

So only two species of oribatid were known from the state before the present work was started.

MATERIAL AND METHODS

In the present work the specimens were collected from all possible habitats in different localities (Table 1) in different districts in Andhra Pradesh. A map showing the sampling localities has also been incorporated. The samples were taken from upper 5-10 cm of soil profile and kept in polythene bags till those were subjected to the process of extraction. The mites extracted from the samples, by using modified Tullgreen funnel apparatus, were collected in glass vials containing 70% alcohol. The oribatid mites were kept in a solution of 70% alcohol and lactic acid (1 : 1) for desclerotization as suggested by Balogh (1965, 1972) and Balogh and Mahunka (1983). The methods of temporary mounting as advocated by Grandjean (1949), Balogh (1965, 1972) and Balogh and Mahunka (1983) were followed. The specimens were identified following the keys for identification prepared by Balogh (1965, 1972), Balogh and Mahunka (1983), Balogh and Balogh (1988) and Subias and Balogh (1989).

All the specimens included in the present study have been deposited in the National Zoological Collection, Zoological Survey of India, Kolkata.

Table 1. Collection localities in the districts of Andhra Pradesh

Visakhapatnam District

1. Borra cave, Araku
2. Borra junction, Araku
3. Horticultural Farm, Araku
4. Simachalam
5. Uppada
6. Araku valley Forest Rest House surroundings

Rangareddi District

7. Kasu Brahmananda Reddy National Park, Hyderabad
8. Mahavir Harina Vanasthali National Park, Hyderabad
9. Nehru Zoological Park, Hyderabad
10. Kondapalli Village
11. Forest Rest House surroundings, Vijaywada
12. Ambapuram, Vijaywada

Krishna District

13. Alampur
14. Nandyal

15. Kalvagubba

16. Srisailam

Cuddapah District

17. Siddavatam

18. Kamalapuram

19. Cuddapah

Chittoor District

20. Chittoor

21. Pakala

22. Reddygunta village

Tirupati District

23. Tirumala

Khammam District

24. V. V. Palam

25. Khammam

26. Jallahcharu, Venkataswaram

27. Ananthasagar

28. Pandin Pally

Karimnagar District

29. LMD Colony

30. Keshavapattanam

31. Nagnoor

32. Bishop Garden, Karimnagar town

Nizamabad District

33. Navipet

34. Mallahram

35. Mudakpally

GENERAL MORPHOLOGY AND TERMINOLOGY

The general morphology of oribatid mites and terminology usually used have been discussed in details in Sanyal (2000).

LIST OF ORIBATID TAXA

1. Family HAPLOCHTHONIIDAE Hammen, 1959
 1. Genus *Haplochthonius* Willmann, 1930
 1. *H. clavatus* (Hammer, 1958)
2. Family PHTHIRACARIDAE Perty, 1841
 2. Genus *Atropacarus* Ewing, 1917
 2. *A. (Hoplophorella) scapellatus* (Aoki, 1965)
3. Family EUPHTHIRACARIDAE Jacot, 1930
 3. Genus *Rhysotritia* Markel and Meyer, 1959
 3. *R. ardua ardua* (Koch, 1841)
4. Family LOHMANNIIDAE Berlese, 1916
 4. Genus *Haplacarus* Wallwork, 1962
 4. *H. foliates* Wallwork, 1962
 5. Genus *Heptacarus* Piffel, 1963
 5. *H. hirsutus* Wallwork, 1964
 6. Genus *Javacarus* Balogh, 1961
 6. *J. kuhneli* Balogh, 1961
 7. Genus *Millotacarus* Balogh, 1960
 7. *M. granulatus* Balogh, 1960
 8. Genus *Papillacarus* Kunst, 1959
 8. *P. simplirostratus* Bhattacharya, Bhaduri and Raychaudhuri, 1974
5. Family EPILOHMANNIIDAE Oudemans, 1923
 9. Genus *Epilohmannia* Berlese, 1916
 9. *E. pallida pacifica* Aoki, 1965
 10. *Epilohmannia* sp.
6. Family TRHYPOCHTHONIIDAE Willmann, 1931
 10. Genus *Allonothrus* Hammen, 1953
 11. *A. pararusseolus* Subias and Sarkar, 1982
 12. *A. russeolus* Wallwork, 1960
 11. Genus *Archezogozetes* Grandjean, 1931
 13. *A. magnus longisetosus* Aoki, 1965
 14. *A. tuberculatus* Sarkar, 1985

7. Family MALACONOTHRIDAE Berlese, 1916
 12. Genus *Malacothrus* Berlese, 1904
15. *M. asiaticus* Aoki, 1967
8. Family PLASMOBATIDAE Grandjean, 1954
 13. Genus *Plasmobates* Grandjean, 1929
16. *P. pagoda* Grandjean, 1929
9. Family LIODIDAE Grandjean, 1954
 14. Genus *Liodes* von Heyden, 1826
17. *L. terrestris* Wallowrk, 1963
10. Family MICROZETIDAE Grandjean, 1936
 15. Genus *Berlesezetes* Mahunka, 1980
18. *B. auxiliaris* (Grandjean, 1936)
11. Family ZETORCHESTIDAE Michael, 1898
 16. Genus *Zetorchestes* Berlese, 1888
19. *Z. saltator* Oudemans, 1915
12. Family TECTOCEPHEIDAE Grandjean, 1954
 17. Genus *Tectocephus* Berlese, 1913
20. *T. velatus velatus* (Michael, 1888)
13. Family OTOCEPHEIDAE Balogh, 1961
 18. Genus *Dolicheremaeus* Jacot, 1938
21. *D. geminus* Mondal and Kundu, 1986
14. Family OPPIIDAE Grandjean, 1954
 19. Genus *Arcoppia* Hammer, 1977
22. *A. arcualis novaeguineae* Balogh and Balogh, 1986
20. Genus *Oppia* Koch, 1836
23. *O. kuhneli* Csiszar, 1961
24. *O. yodai*, Aoki, 1965
21. Genus *Oppiella* Jacot, 1937
25. *Oppiella nova* (Oudemans, 1902)
22. Genus *Paroppia* Hammer, 1968
26. *P. lebruni* Hammer, 1968

15. Family CHAUNOPROCTIDAE Balogh, 1961

23. Genus *Chaunoproctus* Pearce, 190627. *C. longisetosus* Dhali and Bhaduri, 1980

16. Family XYLOBATIDAE Balogh and Balogh, 1984

24. Genus *Xylobates* Jacot, 192928. *X. capucinus* (Berlese, 1908)29. *Xylobates* sp.

17. Family ORIBATULIDAE Thor, 1929

25. Genus *Zygoribatula* Berlese, 191730. *Z. longiporosa* Hammer, 1953

18. Family HAPLOZETIDAE Grandjean, 1936

26. Genus *Peloribates* Berlese, 190831. *P. intermedius* Mondal, 198432. *Peloribates* sp.27. Genus *Rostrozetes* Sellnick, 192533. *R. foveolatus* Sellnick, 1925

19. Family SCHELORIBATIDAE Grandjean, 1953

28. Genus *Euscheloribates* Kunst, 195834. *E. samsinaki* Kunst, 195829. Genus *Ischeloribates* Corpuz-Raros, 198035. *I. benguetensis* Corpuz-Raros, 198030. Genus *Scheloribates* Berlese, 190836. *S. huancayensis* Hammer, 196137. *S. indicus* Sanyal, 199238. *S. natalensis* Pletzen, 196339. *S. parvus* Pletzen, 196340. *S. praeincisus interruptus* Berlese, 191641. *S. thermophilus* Hammer, 196142. *S. zealandicus* Hammer, 1967

20. Family CERATOZETIDAE Jacot, 1925

31. Genus *Ceratozetes* Berlese, 190843. *C. gracilis* Michael, 1884

32. Genus *Hamobates* Hammer, 1962
44. *H. cristatus* Hammer, 1962
33. Genus *Porozetes* Hammer, 1962
45. *P. polygonalis* Hammer, 1962
21. Family AUSTRACHTERIIDAE Luxton, 1985
34. Genus *Lamellobates* Hammer, 1958
46. *L. palustris* Hammer, 1958
47. *Lamellobates* sp.
22. Family ORIBATELLIDAE Jacot, 1925
35. Genus *Plakoribates* Popp, 1960
48. *Plakoribates* sp.
23. Family GALUMNIDAE Jacot, 1925
36. Genus *Galumna* von-Heyden, 1826
49. *G. crenata* Deb and Raychaudhuri, 1975
50. *G. flabellifera orientalis* Aoki, 1965
51. *Galumna* sp.
37. Genus *Pergalumna* Grandjean, 1936
52. *P. andhraense* Raju, Appalanaidu and Rao, 1981

SYSTEMATIC ACCOUNT

Family HAPLOCHTHONIIDAE van Der Hammen, 1959

1. Genus *Haplochthonius* Willmann

1930. *Haplochthonius* Willmann, *Abh. Naturw. Ver. Bremen.*, **28**(1) : 2.

1. *Haplochthonius clavatus* (Hammer)

1958. *Tetrochthonius clavatus* Hammer, *Biol. Skr. Dan. Vid., Selsk.*, **10**(1) : 23.

1958. *Haplochthonius clavatus* (Hammer), *Balogh, Acta Zool. Hung.*, **7** : 243.

Diagnosis : Rostral and lamellar setae Strong, equally thick throughout, situated on short apophyses which are connected by a faint line; a sharp line between lamellar setae, long, flat sensillus with club-shaped head, beset with fine bristles; 15 pairs straight and stiff notogastral setae.

Material examined : Kurnool dist. : 1 ♀, Alampur, 7.ix.2001, from litter and soil in flower garden, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Kurnool), Mizoram, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

2. Family PHTHIRACARIDAE Perty, 1841

2. Genus *Atropacarus* Ewing

1917. *Atropacarus* Ewing, *J. Economic Ent. Concord*, **10** : 131.

2. *Atropacarus (Hoplophorella)* Niedbala

1986. *Atropacarus (Hoplophorella)* Niedbala, *Acarologia*, **27**(1) : 80.

2. *Atropacarus (Hoplophorella) scapellatus* (Aoki)

1965. *Hoplophorella scapellatus* (Aoki), *Nat. Life Southeast Asia*, **4** : 131.

1967. *Hoplophorella africana* Wallwork, *Rev. zool. Bot. Afr.*, **75** : 36.

1992. *Atropacarus (Hoplophorella) scapellatus*, Niedbala, In : *Phthiracaroida (Acari, Oribatida)*, *Systematic Studies*, Amsterdam, 226.

Diagnosis : Yellowish-brown coloured; long, thick, rough rostral setae directed inwards; lamellar setae spiniform, minute; lanceolate, rough interlamellar setae; long, narrow sensillus, inflated in middle, beset with thin spines; notogastral setae 15 pairs, foliate, covered with thin spines; $c_1 < c_1-d_1$; genito-aggenital plate with 6 (4+2) : 3 genital setae; ad_2 foliate with spines, ad_1 and ad_3 spiniform, smooth, short.

Material examined : Cuddapah dist. : 8 ♀ ♀, Cuddapah, 13.ix.2001, from soil, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah), Assam, Bihar, Manipur, Meghalaya, Mizoram, Orissa, Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

3. Family EUPHITHIRACARIDAE Jacot, 1930

3. Genus *Rhysotritia* Markel and Meyer

1959. *Rhysotritia* Markel and Meyer, *Zool. Anz.*, **163** : 329.

3. *Rhysotritia ardua ardua* (Koch)

1841. *Hoplophorella ardua* Koch, *Deutschlands Crustacean Myriapoden und Arachniden*, **32** : 315.

1923. *Tritia ardua*, Sellnick, *Acari, Blatter fur Milben Kunde*, **3** : 12.

1928. *Oribotritia ardua*, Sellnick, *Tierw. Mitteleur*, **3**(9) : 39.

1930. *Pseudotritia ardua*, Jacot, *Proc. Boston Soc. Nat. Hist.*, **39** : 243.

1959. *Rhysotritia ardua ardua* Markel and Meyer, *Zool. Anz.*, **168** : 329.

Diagnosis : Minute granules on the anterior part of aspis, aspis with single lateral carina on each side; rostral setae weakly barbed; sensillus thick, pointed, finely barbed; notogaster finely punctate; thick lamellar and interlamellar setae, strongly barbed; notogaster punctate with 14 pairs of strong, apically barbed setae; 9 pairs of genital setae; very minute *an*₁.

Material examined : Visakhapatnam dist. : 3 ♀ ♀, Araku valley, Horticulture garden, 25.i.2001, from litter and soil, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Visakhapatnam), Himachal Pradesh, Orissa, Sikkim, Tripura, Uttar Pradesh, West Bengal.

Remark : The species is recorded for the first time from the state.

4. Family LOHMANNIIDAE Berlese, 1916

Key to the genera of LOHMANNIIDAE

1(4) Genital plates with transverse suture

2(3) Anal and adanal plates separated; weak pygidial neotrichy, ciliated prodorsal and notogastral setae ***Papillacarus* Kunst, 1959**

3(2) Anal and adanal plates fused; ano-adanal setal formula 5+2 ***Heptacarus* Piff, 1963**

4(1) Genital plates without transverse suture

4. Genus ***Haplacarus*** Wallwork

1962. *Haplacarus* Wallwork, *Acarologia*, **4** : 465.

4. ***Haplacarus foliatus*** Wallwork

1962. *Haplacarus foliatus* Wallwork, *Acarologia*, **4** : 465.

Diagnosis : Fine microsculpture of irregular punctations on integument; all prodorsal setae foliate with short barbs; sensillus pectinate with 10-12 branches; 10 pairs of notogastral setae, foliate, smooth; notogaster with 10 transverse bands; foliate adanal setae, thin, transparent; genital plate with 10 setae.

Material examined : Cuddapah dist. : 2 ♀ ♀, Kamalapuram, 12. ix. 2001, from litter and soil, coll. A.K. Sanyal; 2 ♀ ♀, Kamalapuram, 12.ix.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah), Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

5. Genus *Heptacarus* Piff.

1963. *Heptacarus* Piff., Anz. Ost. Akad. Wiss., 2 : 24.

5. *Heptacarus hirsutus* Wallwork, 1964

1964. *Heptacarus hirsutus* Wallwork, Rev. Bot. Zool. Afr., 70 : 358.

Material examined : Cuddapah dist. : 2 ♀ ♀, Siddavatam, 11.ix.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah), Kerala.

Remark : The species is recorded for the first time from the state.

6. Genus *Javacarus* Balogh

1961. *Javacarus* Balogh, Acta Zool. Acad. Sci. Hung., 7 : 24.

6. *Javacarus kuhneli* Balogh

1961. *Javacarus kuhneli* Balogh, Acta Zool. Acad. Sci. Hung., 7 : 31.

Diagnosis : Small tubercles on prodorsum; rostrum sculptured; lanceolate prodorsal setae; sensillus with secondary branches; notogaster with light spots forming pattern of beaded line; notogastral setae lanceolate without mid rib; 10 pairs of genital setae.

Material examined : Cuddapah dist.: 3 ♀ ♀, Cuddapah, 13.ix.2001, ex. soil & litter, coll. A. K. Sanyal.

Distribution : India : Andhra Pradesh, (Cuddapah), Maharashtra, Mizoram, Orissa, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

7. Genus *Millotacarus* Balogh

1960. *Millotacarus* Balogh, Mem. Inst. Sci. Madagascar, 14A : 12.

7. *Millotacarus granulatus* Balogh

1960. *Millotacarus granulatus* Balogh, Mem. Inst. Sci. Madagascar, 14A : 12.

Material examined : Cuddapah dist.: 3 ♀ ♀, Cuddapah, 13.ix.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah).

Remark : The species is recorded for the first time from India.

8. Genus *Papillacarus* Kunst

1974. *Papillacarus* Kunst, *Acta Univ. Carol. Biol.*, 52.

8. *Papillacarus simplirostratus* Bhattacharya, Bhaduri and Raychaudhuri

1974. *Papillacarus simplirostratus* Bhattacharya, Bhaduri and Bhattacharya, *Oriental Ins.*, 8(12) : 281.

Diagnosis : Body with polygonal reticulation and fine punctations; barbed prodorsal setae; sensillus pectinate with fine barbs on outmargin; a transverse band in between interlamellar setae; notogastral setae c₁, d₁ e₁, f₁ smooth; genital plate of each side with 4-5 simple setae; epimeral setal formula 9-4-3-4.

Material examined : Rangareddi dist. : 5 ♀ ♀, Gandhi Pet, Hymatsagar, Hyderabad, 18. ix. 2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi), West Bengal.

Remark : The species is recorded for the first time from the state.

5. Family EPILOHMANNIIDAE Oudemans, 1923

9. Genus *Epilohmannia* Berlese, 1916

1916. *Epilohmannia* Berlese, *Redia*, 12 : 176.

9. *Epilohmannia pallida pacifica* Aoki

1965. *Epilohmannia pallida pacifica* Aoki, *Pacific Insects*, 7(2) : 321.

Diagnosis : Rostral setae very fine, distal ends sometimes bifid, right setae placed a little anterior to left one; distally barbed lamellar setae; interlamellar setae longer than lameallar setae, minutely barbed; sensillus with a swollen fusiform barbed head; 14 pairs notogastral setae, short, barbed, c₁ – d₁ – d₁ – c₁ almost forming a square; no *ih* and *ip*; 7 or 8 pairs genital setae, minute; a longitudinal curved ridge on coxisternal plate I.

Material examined : Cuddapah dist.: 2 ♀ ♀, Cuddapah, 13.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Chittoor dist. : 2 ♀ ♀, Reddygunta village, 16.ix.2001, forest litter & soil ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah, Cuddapah), Kerala, Orissa, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

10. *Epilohmannia* sp.

Material examined : Chittoor dist. : 3 ♀ ♀, Pakala, 15.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal.

Remark : The specimens could not be identified due to paucity of literature.

6. Family TRHYPOCHTHONIIDAE Willmann, 1931

10. Genus *Allonothrus* Hammen

1953. *Allonothrus* Hammen, *Proc. Acad. Sci. Amst.*, 56C : 244.

Key to the species of *Allonothrus*

- 1(2) Body sculpture in the form of lobulated foveolae surrounded by polygonal-shaped fine punctuation *pararusseolus* Subias and Sarkar
- 2(1) Body sculpture either with circular or polygonal areolae surrounded by punctuation not polygonally arranged *russeolus* Wallwork

11. *Allonothrus pararusseolus* Subias and Sarkar

1982. *Allonothrus pararusseolus* Subias and Sarkar, *Redia*, 65 : 40.

Diagnosis : Rostral setae smooth, spiny, lamellar setae long, membranous, densely barbed with rib bifurcated at the base, tip rounded; interlamellar setae small; sensillus long, papillate apically; lateral and central prodorsal ridges prominent; notogaster with polygonally arranged punctations containing irregular shaped lobulated foveolae inside; notogastral setae 15 pairs, fan-shaped, membranous, thickly barbed, tips truncate or rounded; 12-14 pairs of genital setae; *ad*, barbed, others smooth.

Material examined : Cuddapah dist. : 5 ♀ ♀, Kamalapuram, 12.ix.2001, ex. soil & litter, coll. A.K. Sanyal; 10 ♀ ♀, Cuddapah, 13.ix.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah), Tripura.

Remark : The species is recorded for the first time from the state.

12. *Allonothrus russeolus* Wallwork

1960. *Allonothrus russeolus* Wallwork, *Acaralugia*, 2(4) : 571.

Diagnosis : Prodorsum minutely punctated; lateral prodorsal ridges strongly curved, central ridges fused anteriorly; rostral setae pointed, barbed; an interrupted transverse ridge behind the interlamellar setae; other dorsal setae fan-shaped; notogaster with circular or polygonal areolae surrounded by reddish-brown ridges; genital setae 13 pairs.

Material examined : Rangareddi dist. : 1 ♀, Mahavir Harina Vanasthali National Park, Hyderabad, 14.i.2001, ex. soil & litter, coll. A.K. Sanyal; 5 ♀ ♀, Gandhi Pet, Hymaitsagar, Hyderabad, 18. ix. 2002, ex. soil & litter, coll. A.K. Sanyal. Visakhapatnam dist. : 20 ♀ ♀, Horticultural Farm, Araku, 25.i.2001, ex. soil & litter, coll. A.K. Sanyal. Kurnool dist : 1 ♀, Sri Sailam, 8.ix.2001, ex. soil & litter from grass land, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi, Visakhapatnam, Kurnool), Assam, Manipur, Meghalaya, Mizoram, Sikkim, West Bengal.

Remark : The species is recorded for the first time from the state.

11. Genus *Archegozetes* Grandjean

1931. *Archegozetes* Grandjean, *Bull. Mus. Hist.Nat. Paris*, 3(2) : 144.

Key to the species of *Archegozetes*

- 1(2) Prodorsal and notogastral setae very long, bilaterally barbed; setae d_1 extends beyond the base of d_2 ; sensillus fine, pointed; no tubercle at posterior end of notogaster; $4a$ about half as long as $4b$ *magnus longisetosus* Aoki, 1965
- 2(1) Notogastral setae short, unilaterally barbed; setae d_1 never reaches d_2 ; sensillus blunt at tip; tubercle at posterior end of notogaster; $4a$ as long as $4b$
..... *tuberculatus* Sarkar, 1985

13. *Archegozetes magnus longisetetus* Aoki

1965. *Archegozetes magnus longisetosus* Aoki, *Nat. Life Southeast Asia*, 4 : 147

Diagnosis : Prodorsum punctated; prodorsal and notogastral setae long, fine, densely beset with fine bristles; sensillus long, fine, densely covered with bristles; d_1 longer than their mutual distance; genital setae 7 pairs; $4a$ about $\frac{1}{2}$ as long as $4b$; solenidia on palp sharp.

Material examined : Kurnool dist.: 10 ♀ ♀, Nandyal, 9.ix.2001, ex. soil & litter from grass land, coll. A.K. Sanyal. Cuddapah dist. : 3 ♀ ♀, Siddavatam, 11.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Rangareddi dist. : 4 ♀ ♀, Gandhi Pet, Hymaitsagar, Hyderabad, 18. ix. 2002, ex. soil & litter, coll. A.K. Sanyal. Khammam dist. : 4 ♀ ♀, Jallahcharu, Venkataswaram, 21.ix.2002, ex. soil & litter, coll. A.K. Sanyal; 14 ♀ ♀, Ananthasagar, 22.ix.2002, ex. soil & litter, coll. A.K. Sanyal. Karimnagar dist. : 1 ♀ ♀, Nagnoor, 26.ix.2002, ex. soil & litter, coll. A.K. Sanyal. Nizamabad dist. : 2 ♀ ♀, Navipet, 28.ix.2002, ex. soil & litter, coll. A.K. Sanyal; 10 ♀ ♀, Mallahram, 29.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Kurnool, Cuddapah, Rangareddi, Khammam, Nizamabad), Assam, Kerala, Orissa, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

14. *Archezogozetes tuberculatus* Sarkar

1985. *Archezogozetes tuberculatus* Sarkar, *Uttar Pradesh J. Zool.*, 5(1) : 83.

Diagnosis : Prodorsal setae long, thick, unilaterally barbed; sensillus long, uniformly thick throughout, thinly barbed on outer margin; notogastral setae 15 pairs, unilaterally barbed; genital setae 7 pairs, thin, simple, moderately long.

Material examined : Kurnool dist. : 20 ♀ ♀, Kalvogubba, 9.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Cuddapah dist. : 9 ♀ ♀, Kamalapuram, 12.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Chittoor dist. : 1 ♀, Reddygunta village, 16.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal. Khammam dist. : 20 ♀ ♀, V.V. Palam, 20.ix.2002, ex. decomposed dung, soil & litter, coll. A.K. Sanyal; 1 ♀, Khammam, 21.ix.2002, ex. soil & litter from agricultural field, coll. A.K. Sanyal; 4 ♀ ♀, Pondin Pally, 22.ix.2002, ex. soil & litter, coll. A.K. Sanyal. Karimnagar dist. : 1 ♀, LMD Colony, 24.ix.2002, ex. soil & litter, coll. A.K. Sanyal. Nizamabad dist. : 10 ♀ ♀, Mudakpally, 30.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Kurnool, Chittoor, Khammam, Karimnagar), Tripura.

Remark : The species is recorded for the first time from the state.

7. Family MALACONOTHRIDAE Berlese, 1916

12. Genus *Malaconothrus* Berlese

1904. *Malaconothrus* Berlese, *Redia*, 2 : 24.

15. *Malaconothrus asiaticus* Aoki

1967. *Malaconothrus asiaticus* Aoki, *Nat. Life Southeast Asia*, 5 : 182.

1982. *Malaconothrus asiaticus*, Subias and Sarkar, *Redia*, 65 : 43.

Diagnosis : The propodosoma and hysterosoma covered with secretion consisting of minute and dense granules; very broad chitinous ridge on either side of propodosoma form a broad translamella; rostral setae situated on a protuberance on the end of ridge, stout, pointed, directed inward; projection between legs I and II bordered by a brown chitinous ridge; similar ridge between interlamellar setae; interlamellar and exopseudostigmatic setae very thin; longitudinal ridge on notogaster very broad and distinct, posterior end forms a 'V'-shaped figure; a transverse line immediately in front of the posterior rounded end of notogaster; thick longitudinal ridge between ventral plates I touches anterior border of ventral plates II.

Material examined : Khammam dist. : 4 ♀ ♀, V.V. Palam, 20.ix.2002, ex. decomposed dung, soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Khammam), Tripura.

Remark : The species is recorded for the first time from the state.

8. Family PLASOBATIDAE Grandjean, 1916

13. Genus *Plasmobates* Grandjean

1929. *Plasmobates* Grandjean, *Bull. Soc. Zool. Fr.*, **54**(5) : 410.

16. *Plasmobates pagoda* Grandjean

1929. *Plasmobates pagoda* Grandjean, *Bull. Soc. Zool. Fr.*, **54**(5) : 410.

Diagnosis : Incised rostrum; smooth, setiform rostral setae inwardly directed; lamellar setae minute, placed on small tubercle; interlamellar setae very small, baciliform, obtusely bifurcate; aggenital setae close to genital plate; ventral setae short, fine.

Material examined : Visakhapatnam dist., 6 ♀ ♀, Borra cave, Araku, 24.i.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Visakhapatnam), Mizoram, West Bengal.

Remark : The species is recorded for the first time from the state.

9. Family LIODIDAE Grandjean, 1954

14. Genus *Liodes* von Heyden

1826. *Liodes* von Heyden, *Isis (Von Oken)*, 18.

17. *Liodes terrestris* Wallwork

1963. *Liodes terrestris* Wallwork, *Acarologia*, **5**(1) : 102.

Diagnosis : Three transverse ridges on prodorsum; rostral setae smooth, as long as their mutual distance, strongly curved; lamellar setae absent; interlamellar setae minute, sensillus with slender stem and slightly expanded distal portion beset with fine barbs; larval scalp with series of prominent transverse ridges; notogaster rounded; regularly arranged polygonal figures on anterior portion of notogaster; notogastral setae 4 pairs; genital setae 7 pairs, smooth.

Material examined : Rangareddi dist. : 6 ♀ ♀, Kasu Brahmananda Reddy National Park, Hyderabad, 16.i.2001, ex. soil & litter, coll. A.K. Sanyal. Visakhapatnam dist., 6 ♀ ♀, Borra cave, Araku, 24.i.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi, Visakhapatnam), Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

10. Family MICROZETIDAE Grandjean, 1936

15. Genus *Berlesezetes* Mahunka

1980. *Berlesezetes* Mahunka, *Acta zool. Acad. Sci. Hung.*, **26**(4) : 397.

18. *Berlesezetes auxiliaris* (Grandjean)

1936. *Microzetes auxiliaris* (Grandjean), *Bull. Mus. Hist. Nat. Paris*, 8(2) : 138.

1980. *Berlesezetes auxiliaris* (Grandjean), Mahunka, *Acta Zool. Acad. Sci. Hung.*, 26(4) : 397.

Diagnosis : Lamellae long, folded to a sharp angle along the paraxial crest, not reaching the tip of rostrum; translamella well developed; rostral setae long, smooth, very thin; interlamellar setae extend beyond the tip of rostrum, stout; notogaster granulated.

Material examined : Karimnagar dist. : 2 ♀, Keshavapattanam, 25.ix.2002, ex. soil & litter from grassland, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Karimnagar), Kerala, Mizoram, Orissa, Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

11. Family ZETORCHESTIDAE Michael, 1898

16. Genus *Zetorchestes* Berlese

1888. *Zetorchestes* Berlese, *Acari, Myriapoda et Scorpiones hucusque in Italia reperta*, Padova.

19. *Zetorchestes saltator* Oudemans

1915. *Zetorchestes saltator* Oudemans, *Ber. Ned. Ent. Ver.*, 4 : 194.

Diagnosis : Body covered with irregularly scattered granules; rostrum with nasiform apex; thick, long, distally bifurcated rostral setae placed on small tubercles; sensillus long, head flattened in lateral view; barbed; notogastral setae 10 pairs, phylliform; genital setae 6 pairs.

Material examined : Visakhapatnam dist. : 3 ♀, Simchalam, 21.i.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Visakhapatnam), Manipur, Meghalaya, Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

12. Family TECTOCEPHEIDAE Grandjean, 1954

17. Genus *Tectocephus* Berlese

1913. *Tectocephus* Berlese, *Redia*, 9 : 91.

20. *Tectocephus velatus velatus* (Michael)

1888. *Tectocephus velatus velatus* (Michael), *Ray. Soc.*, : 65.

Diagnosis : Body rough with irregularly raised dots; lamellae large, detached blades, lying nearly horizontal, extend beyond the lateral margin of the cephalothorax; translemella distinct; rostral and lamellar setae unilaterally barbed, curved inward; interlamellar setae minute, smooth, long sensillus with slender stalk, head lieheniform; interrupted dorsosejugal suture; paired *iad* large, placed parallel to the anterior part of the lateral side of anal field.

Material examined : Cuddapah dist. : 1 ♀, Siddevatam, 11.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Karimnagar dist. : 1 ♀, Keshavapattanam, 25.ix.2002, ex. soil & litter from grassland, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah, Karimnagar), Bihar, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Orissa, Sikkim, Tripura, Uttar Pradesh, West Bengal.

Remark : The species is recorded for the first time from the state.

13. Family OTOCEPHEIDAE Balogh, 1961

18. Genus *Dolicheremaeus* Jacot

1938. *Dolicheremaeus* Jacot, *Florida Ent.*, 21(4) : 51.

21. *Dolicheremaeus geminus* Mondal and Kundu

1986. *Dolicheremaeus geminus* Mondal and Kundu, *Rec. zool. Surv. India*, 83 (1&2) : 91.

Diagnosis : Uniseriate rostral and lamellar setae; interlamellar setae with blunt tips; sensillus with thin long stalk, head spoon-shaped; median prodorsal condyle absent; tooth-like lateral notogaster condyles; 10 pairs notogastral setae, barbed, tips blunt; 4 pairs of genital setae.

Material examined : Visakhapatnam dist.: 1 ♀, Simchalam, 21.i.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Visakhapatnam), Bihar, Himachal Pradesh, Manipur, West Bengal.

Remark : The species is recorded for the first time from the state.

14. Family OPPIIDAE Grandjean, 1954

Key to the genera of OPPIIDAE

1(4) Costula and crista absent

2(3) Genital setae four pairs; tibia I with long distal process *Paroppia* Hammer, 1968

3(2) Genital setae five pairs; tibia I without distal process *Oppia* Koch, 1836

4(1) Short costula and crista present *Oppiella* Jacot, 1937

19. Genus *Arcoppia* Hammer

1977. *Arcoppia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **21**(4) : 32.

22. *Arcoppia arcualis novaeguineae* Balogh and Balogh

1986. *Arcoppia arcualis novaeguineae* Balogh and Balogh, *Acta Zool. Acad. Sci. Hung.*, **32**(1-2) : 54.

Diagnosis : Basal part of prodorsum just above the dorsosejugal suture with 5 longitudinal dark spots; rostral setae longer than lamellar setae; lamellar setae much shorter than interlamellar setae; interlamellar setae long; sensillus with two long, setiform branches, the posterior one almost twice longer than the anterior branch; 10 pairs of very short fine notogastral setae, distance *ti-ms* thrice longer than setae *ti*; distance *ms-r₂* three or four times longer than *r₂*; genital setae 6 pairs.

Material examined : Krishna dist. : 9 ♀ ♀, Kondapalli village, 19.i.2001, ex. soil & litter, coll. A.K. Sanyal. Visakhapatnam dist.: 3 ♀ ♀ Simchalam, 21.i.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh, (Krishna, Visakhapatnam).

Remark : The species is recorded for the first time from india.

20. Genus *Oppia* Koch

1836. *Oppia* Koch, *Deutschlands Crustaceen, Myriapoden und Arachniden*, 1-9.

Key to the species of *Oppia*

- 1(2) Sensillus elongated, slightly fusiform apically; interlamellar setae long, directed anteriorly; *p₁* and *p₃* smooth; setae of row *p* about half as long as other dorsalsetae *kuhnelti* Csiszar, 1961
- 2(1) Sensillus spindle-shaped; interlamellar setae short, directed posteriorly; all notogastral setae ciliate; length of setae of row *p* about 1/3rd of other notogastral setae. *yodai* Aoki, 1965

23. *Oppia kuhnelti* Csiszar, 1961

1961. *Oppia kuhnelti* Csiszar, *Acta Zool. Acad. Sci. Hung.*, **7**(3-4) : 350.

Diagnosis : Rostral and lamellar setae short, arched forward; interlamellar setae long, directed anteriorly, sparsely covered with ciliae; sensillus elongated, slightly fusiform apically, pointed with very minute ciliae; two pairs of finely punctate areolae in front of interlamellar setae; 10 pairs of notogastral setae, *p₁* and *p₃* smooth, all other notogastral setae ciliate; setae of row *p* about half as long as other dorsal setae; genital setae 5 pairs, represented by alveoli; all ventral setae minute, ciliate.

Material examined : Rangareddi dist. : 6 ♀ ♀, Mahavir Harina Vanasthali National Park, Hyderabad, 14.i.2001, ex. soil & litter, coll. A.K. Sanyal. Visakhapatnam dist.: 1 ♀, Simchalam, 21.i.2001, ex. soil & litter, coll. A.K. Sanyal; 4 ♀ ♀, Borra cave, Araku, 24.i.2001, ex. soil & litter, coll. A.K. Sanyal. Kurnool dist.: 2 ♀ ♀, Nandyal, 9.ix.2001, ex. soil & litter from grass land, coll. A.K. Sanyal. Cuddapah dist. : 4 ♀ ♀, Kamalapuram, 12.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Tirupati dist. : 1 ♀, Tirumala, 18.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Khammam dist. : 2 ♀ ♀, Ananthasagar, 22.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi, Visakhapatnam, Kurnool, Cuddapah, Tirupati, Khammam), Kerala.

Remark : The species is recorded for the first time from the state.

24. *Oppia yodai* Aoki

1965. *Oppia yodai* Aoki, *Nat. Life Southeast Asia*, 4 : 169.

Diagnosis : Finely barbed prodorsal setae, sensillus spindle-shaped, beset with fine bristles; one pointed protrusion behind the bothridium; 5 pairs of notogastral setae.

Material examined : Kurnool dist.: 3 ♀ ♀, Nandyal, 9.ix.2001, ex. soil & litter from grass land, coll. A.K. Sanyal. Khammam dist. : 1 ♀, Khammam, 21.ix.2002, ex. soil & litter from agricultural field, coll. A.K. Sanyal. Karimnagar dist. : 1 ♀ Bishop garden, Karimnagar town, 26.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Kurnool, Khammam, Karimnagar), Assam, Manipur, Meghalay, Mizoram, Orissa, Sikkim, Tripura, Uttar Pradesh, West Bengal.

Remark : The species is recorded for the first time from the state.

21. Genus *Oppiella* Jacot

1937. *Oppiella* Jacot, *J.N.Y. ent. Soc.*, 45 : 356.

25. *Oppiella nova* (Oudemans)

1902. *Oppiella nova* (Oudemans), *Ent. Ber.*, 1 : 36.

Diagnosis : A 'Λ'-shaped slit on the rostrum; all prodorsal setae smooth; a thin transverse line below the rostral setae; lamellar setae originating from the tip of short costulae, thin; interlamellar setae directed posteromedially; sensillus fusiform with 7-8 radiating branches; 10 pairs of notogastral setae, smooth; 6 pairs of genital setae.

Material examined : Krishna dist. : 1 ♀, Ambapuram, Vijaywada, 18.i.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Krishna), Meghalaya, West Bengal.

Remark : The species is recorded for the first time from the state.

22. Genus *Paroppia* Hammer

1968. *Paroppia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 16(2) : 19.

26. *Paroppia lebruni* Hammer

1968. *Paroppia lebruni* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 16(2) : 19.

Diagnosis : Rostral setae placed close together, reach by about one third of their length beyond the tip of rostrum, slightly barbed; lamellar setae thin, short, about as long as their mutual distance; interlamellar setae about as long as lamellar ones; between interlamellar setae eight small light spots in two rows; sensillus sickle-shaped, distal third coarsely serrate, especially on the posterior border; a ridge with furrow from the side of sensillus; laterally to the arch of notogaster two teeth on either side, *ta* absent; notogastral setae strong, stiff, rough; *im* located near r_3 ; 4 pairs of long genital setae.

Material examined : Kurnool dist. : 2 ♀ ♀, Nandyal, 9.ix.2001, ex. soil & litter from grass land, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Kurnool).

Remarks : The species is reported here for the first time from India.

15. Family CHAUNOPROCTIDAE Balogh, 1961

23. Genus *Chaunoproctus* Pearce

1906. *Chaunoproctus* Pearce, *Journ. Roy. Micr. Soc.*, : 271.

27. *Chaunoproctus longisetosus* Dhali and Bhaduri

1980. *Chaunoproctus longisetosus* Dhali and Bhaduri, *Indian J. Acar.*, 5 : 33.

Diagnosis : Rostral setae thin, curved inward, placed laterally on apophyses, set with minute setae; narrow bar-like lamellae joined by thin translamella; lamellar setae rough, curved inward; interlamellar setae barbed, slightly longer than lamellar setae; sensillus with club-shaped head; notogastral surface rough and foveolated; notogastral setae 10 pairs, *ta* short, without minute setae, all other notogastral setae exceptionally long, barbed; 5 pairs of small area porosae on notogaster; genital setae 6 pairs; all legs tridactylous.

Material Examined : Visakhapatnam dist. : 2 ♀ ♀, Horticultural Farm, Araku, 25.1.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Visakhapatnam), Sikkim, Tripura.

Remark : The species is recorded for the first time from the state.

16. Family XYLOBATIDAE Balogh and Balogh, 1984

24. Genus *Xylobates* Jacot

1929. *Xylobates* Jacot. *Trans. Amer. Micr. Soc. Menasha*, **48** : 429.

28. *Xylobates capucinus* (Berlese)

1908. *Xylobates capucinus* (Berlese), *Redia*, **5** : 2.

1989. *Xylobates capucinus*, Norton and Kethly, *Redia*, **62**(2) : 428.

Diagnosis : Small, fine, smooth rostral setae; lamellar tip pointed, broad in the middle; lamellar setae smooth, smaller than rostral setae; interlamellar setae long, fine, barbed unilaterally; sensillus with long stalk, head swollen, barbed outwardly; 11 pairs of minute notogastral setae.

Material examined : Cuddapah dist.: 2 ♀ ♀, Cuddapah, 13.ix.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah), Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

29. *Xylobates* sp.

Material examined : Cuddapah dist. : 1 ♀, Siddavatam, 11.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Chittoor dist. : 1 ♀, Reddygunta village, 16.ix.2001, forest litter & soil ex. soil & litter, coll. A.K. Sanyal. Nizamabad dist. : 1 ♀, Mallahram, 29.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Remarks : The specific identification could not be made due to damaged condition of the specimens and paucity of literature.

17. Family ORIBATULIDAE Thor, 1929

25. Genus *Zygoribatula* Berlese

1917. *Zygoribatula* Berlese, *Documents Scientiques*, : 5.

30. *Zygoribatula longiporosa* Hammer

1953. *Zygoribatula longiporosa* Hammer, *Australian Journal of Zoology*, **1**(2) : 236.

Diagnosis : Rostrum with a median tooth; rough, erect, anteriorly directed prodorsal setae; sensillus with setose club-shaped head; notogaster with 11 pairs of short, stiff, rough setae; areae porosae adalaris and mesonotica elongate, narrow.

Material examined : Cuddapah dist. : 2 ♀ ♀, Siddavatam, 11.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Chittoor dist. : 1 ♀ ♀, Reddygunta village, 16.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah, Chittoor), Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

18. Family HAPLOZETIDAE Grandjean, 1936

Key to the genera of HAPLOZETIDAE

- 1(2) Dorsosejugal suture with three arches; notogastral setae 10 pairs
 **Rostrozetes** Sellnick, 1925
- 2(1) Dorsosejugal suture with a single arc; notogastral setae 14 pairs
 **Peloribates** Berlese, 1908

26. Genus *Peloribates* Berlese

1908. *Peloribates* Berlese, *Redia*, 5 : 3.

31. *Peloribates intermedius* Mondal

1984. *Peloribates intermedius* Mondal, *Rec. zool. Surv. India*, 81(3-4) : 153.

Diagnosis : Rostrall and lamellar setae unilaterally barbed outside; interlamellar setae short, beset with minute bristles; sensillus with club-shaped head set with pseudoscales, notogastral setae 14 pairs, short, stiff, setose; 5 pairs of genital setae.

Material examined : Chittoor dist. : 19 ♀ ♀, Pakala, 15.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Chittoor), Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

32. *Peloribates* sp.

Material examined : Krishna dist. : 2 ♀ ♀, Forest Rest House, Vijayawada, 29.i.2001, ex. soil & litter, coll. A.K. Sanyal.

Remarks : Due to non-availability of literature the specimens could not be identified upto species level.

27. Genus *Rostrozetes* Sellnick

1925. *Rostrozetes* Sellnick, *Suppl. Ent. Berlin*, 11 : 84.

33. *Rostrozetes foveolatus* Sellinick

1925. *Rostrozetes foveolatus* Sellinick, *Suppl. Ent. Berlin*, **11** : 84.

Diagnosis : Distinctly foveolated body; long, thin, unilaterally barbed prodorsal setae; sensillus with swollen brush-like head; notogastral setae 10 pairs, short, fine; distance between t_1 - ms and ms - h_3 almost same; genital setae 5 pairs, minute, fine.

Material examined : Kurnool dist.: 2 ♀ ♀, Alampur, 7.ix.2001, ex. soil and litter from flower garden, coll. A.K. Sanyal. Cuddapah dist.: 6 ♀ ♀, Cuddapah, 13.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Karimnagar dist. : 1 ♀, Keshavapattanam, 25.ix.2002, ex. soil & litter from grassland, coll. A.K. Sanyal. Nizamabad dist. : 2 ♀ ♀, Mudakpally, 30.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Kurnool, Cuddapah, Karimnagar, Nizamabad), Bihar, Himachall Pradesh, Manipur, Meghalaya, Mizoram, Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

19. Family SCHELORIBATIDAE Grandjean, 1953

Key to the genera of SCHELORIBATIDAE

1(4) Legs monodactylous

2(3) Genital setae four pairs *Ischeloribates* Corpuz-Raros, 1980

3(2) Genital setae three pairs *Euscheloribates* Kunst, 1958

1(1) Legs tridactylous or bidactylous, genital setae four pairs
..... *Scheloribates* Berlese, 1908

28. Genus *Euscheloribates* Kunst

1958. *Euscheloribates* Kunst, *Acta Soc. Ent. Cech.*, **55** : 67.

34. *Euscheloribates samsinaki* Kunst

1958. *Euscheloribates samsinaki* Kunst, *Acta Soc. Ent. Cech.*, **55** : 68.

Material examined : Cuddapah dist. : 2 ♀ ♀, Siddavatam, 11.ix.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah), Tripura.

Remark : The species is recorded for the first time from the state.

29. Genus *Ischeloribates* Corpus-Raros, 1980

1980. *Ischeloribates* Corpus-Raros, *Philipp. J. Biol.*, **9**(2-3) : 180.

35. *Ischeloribates benguetensis* Corpus-Raros

1980. *Ischeloribates benguetensis* Corpus-Raros, *Philipp. J. Biol.*, 9(2-3) : 181.

Diagnosis : Rostrum moderately long, truncate; rostral setae finely pointed, sparsely barbed on outside; two faint parallel transverse lines present behind level of insertion of rostral setae; lamellar and interlamellar setae finely pointed and sparsely barbed on both sides; sensillus long, extending beyond lateral margin of pteromorph, anterior margin barbed; notogastral setae 10 pairs, very short and fine; seta r_1 arising at about the same level as r_2 and p_3 distinctly posterior to r_3 , epimeral apodemes III not meeting apodemes sj ; genital setae 4 pairs; all legs monodactyle.

Material examined : Krishna dist. : 1 ♀, Ambapuram, Vijaywada, 18.i.2001, ex. soil & litter, coll. A.K. Sanyal; 2 ♀ ♀, Forest Rest House, Vijayawada, 19.i.2001, ex. soil & litter, coll. A.K. Sanyal; 1 ♀, Kondapalli village, 19.i.2001, ex. soil & litter, coll. A.K. Sanyal. Visakhapatnam dist.: 1 ♀, Borra cave, Araku, 24.i.2001, ex. soil & litter, coll. A.K. Sanyal; 2 ♀ ♀, Horticultural Farm, Araku, 25.i.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Krishna, Visakhapatnam).

Remarks : The genus was earlier recorded from Kerala. The species is reported here for the first time from India.

30. Genus *Scheloribates* Berlese

1908. *Scheloribates* Berlese, *Redia*, 5 : 2.

Key to the species of *Scheloribates*

- 1(2) All tarsi monodactylous; apodemata III and IV meet each other and abutting anterior rim of genital capsule *natalensis* Pletzen, 1963
- 2(1) All tarsi tridactylous; apodemata III and IV never meet each other
- 3(4) Hysterosoma as broad as long; lamellar setae as thick as rostral setae; sensillus with spear-shaped head *huancayensis* Hammer, 1961
- 4(3) Hysterosoma longer than broad; sensillus not spear-shaped
- 5(8) Sensillus club-shaped
- 6(7) Prodorsal setae smooth *indicus* Sanyal, 1922
- 7(6) Prodorsal setae barbed *praeincisus interruptus* Berlese, 1916
- 8(5) Sensillus not club-shaped
- 9(10) Sensillus with clavate head; rostral setae on apophyses *parvus* Pletzen, 1963
- 10(9) Sensillus with lanceolate head; rostral setae not on apophyses
..... *thermophilus* Hammer, 1916

36. *Scheloribates huancayensis* Hammer

1961. *Scheloribates huancayensis* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 13(1) : 94.

Diagnosis : All prodorsal setae distinctly feathered, one and a half times longer than their mutual distance; sensillus very slender, head narrowly spear-shaped, pointed at the tip, set with short bristles in four longitudinal rows; notogastral setae represented by chitinous pores; apodemata II and III meeting in front of the genital field.

Material examined : Kurnool dist.: 3 ♀ ♀, Nandyal, 9.ix.2001, ex. soil from grassland, coll. A.K. Sanyal ; 8 ♀ ♀, Kalvogubba, 9.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Cuddapah dist. : 3 ♀ ♀, Kamalapuram, 12.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Chittoor dist. : 6 ♀ ♀, Pakala, 15.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal. Khammam dist. : 1 ♀ Ananthasagar, 22.ix.2002, ex. soil & litter, coll. A.K. Sanyal. Karimnagar dist. : 1 ♀, Bishop garden, Karimnagar town, 26.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Kurnool, Cuddapah, Chittoor, Khammam, Karimnagar), Assam, Meghalaya, Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

37. *Scheloribates indicus* Sanyal

1992. *Scheloribates indicus* Sanyal, *Fauna of West Bengal, State Fauna Series*, 3(Part 3) : 315.

Diagnosis : All prodorsal setae thin, smooth; sensillus with club-shaped head, directed outward and forward; notogastral setae 10 pairs, smooth, minute, faint pockmarks on ventral surface; 4 pairs of genital setae; minute epimeral setae.

Material examined : Kurnool dist : 1 ♀, Sri Sailam, 8.ix.2001, ex. soil & litter from grassland, coll. A.K. Sanyal. Chittoor dist. : 1 ♀, Chittoor, 14.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal. Krishna dist. : 1 ♀ ♀, Forest Rest House, Vijayawada, 19.i.2001, ex. soil & litter, coll. A.K. Sanyal. Khammam dist. : 2 ♀ ♀, Pondin Pally, 22.ix.2002, ex. soil & litter, coll. A.K. Sanyal. Nizamabad dist. : 1 ♀ ♀, Mudakpally, 30.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Kurnool, Chittoor, Krishna, Khammam, Nizamabad), Manipur, Mizoram, West Bengal.

Remark : The species is recorded for the first time from the state.

38. *Scheloribates natalensis* Pletzen

1963. *Scheloribates natalensis* Pletzen, *Acarologia*, 5(4) : 700.

Diagnosis : Fine and short prodorsal setae; lamellar and dorsal setae barbed; interlamellar setae unilaterally barbed distally; very long sensillus with slightly thickened head, anterior part unilaterally barbed; notogastral setae minute; *ad*, very small; 5 pairs of genital setae.

Material examined : Kurnool dist. : 1 ♀, Nandyal, 9.ix.2001, soil from grassland, ex. soil & litter, coll. A.K. Sanyal. Cuddapah dist. : 3 ♀ ♀, Kamalapuram, 12.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Chittoor dist. : 3 ♀ ♀, Reddygunta village, 16.ix.2001, forest litter & soil ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Kurnool, Cuddapah, Chittoor), Mizoram, Sikkim, West Bengal.

Remark : The species is recorded for the first time from the state.

39. *Scheloribates parvus* Pletzen

1963. *Scheloribates parvus* Pletzen, *Acarologia*, 5(4) : 701.

Diagnosis : All prodorsal setae barbed; sensillus with short stalk and clavate head beset with distinct setae; ad_3 nearly parallel with iad ; 4 pairs of genital setae.

Material examined : Rangareddi dist. : 6 ♀ ♀, Mahavir Harina Vanasthali National Park, Hyderabad, 14.i.2001, ex. soil & litter, coll. A.K. Sanyal. Krishna dist. : 1 ♀, Kondapalli village, 19.i.2001, ex. soil & litter, coll. A.K. Sanyal. Visakhapatnam dist. : 1 ♀, Simchalam, 21.i.2001, ex. soil & litter, coll. A.K. Sanyal; 5 ♀ ♀, Uppada, 21.i.2001, ex. soil & litter, coll. A.K. Sanyal.; 1 ♀, Bora junction, Araku, 24.i.2001, ex. soil & litter, coll. A.K. Sanyal. Krishna dist. : 1 ♀, Ambapuram, Vijaywada, 18.i.2001, ex. soil & litter, coll. A.K. Sanyal; 1 ♀, Forest Rest House, Vijayawada, 19.i.2001, ex. soil & litter, coll. A.K. Sanyal. Khammam dist. : 5 ♀ ♀, Khammam, 21.ix.2002, ex. soil & litter from agricultural field, coll. A.K. Sanyal; 1 ♀, Ananthasagar, 22.ix.2002, ex. soil & litter, coll. A.K. Sanyal; 3 ♀ ♀, Pondin Pally, 22.ix.2002, ex. soil & litter, coll. A.K. Sanyal. Karimnagar dist. : 1 ♀, LMD Colony, 24.ix.2002, ex. soil & litter, coll. A.K. Sanyal; 2 ♀ ♀, Keshavapattanam, 25.ix.2002, ex. soil & litter from grassland, coll. A.K. Sanyal. Nizamabad dist. : 4 ♀ ♀, Navipet, 28.ix.2002, ex. soil & litter, coll. A.K. Sanyal; 1 ♀, Mallahram, 29.ix.2002, ex. soil & litter, coll. A.K. Sanyal; 3 ♀ ♀, Mudakpally, 30.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi, Krishna, Visakhapatnam, Krishna, Khammam, Karimnagar, Nizamabad), Assam, Meghalaya, Mizoram, West Bengal.

Remark : The species is recorded for the first time from the state.

40. *Scheloribates praeincisus interruptus* Berlese

1916. *Scheloribates praeincisus interruptus* Berlese, *Redia*, 12 : 315

Diagnosis : Very long prodorsal setae; sensillus long, club-shaped, rounded at tip, set with minute bristles; notogastral setae hardly discernible, setal pores long, narrow in middle, or dividing into two parts, with the setae arising from smaller part.

Material examined : Visakhapatnam dist. : 11 ♀ ♀, Uppada, 21.i.2001, ex. soil & litter, coll. A.K. Sanyal; 2 ♀ ♀, Borra cave, Araku, 24.i.2001, ex. soil & litter, coll. A.K. Sanyal; 2 ♀ ♀, Horticultural Farm, Araku, 25.i.2001, ex. soil & litter, coll. A.K. Sanyal; 1 ♀, Araku valley Forest Rest House, 25.i.2001, ex. soil & litter, coll. A.K. Sanyal; Krishna dist. : 1 ♀ Forest Rest House, Vijayawada, 19.i.2001, ex. soil & litter, coll. A.K. Sanyal. Khammam dist. : 1 ♀, Jallahcharu, Venkataswaram, 21.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Visakhapatnam, Krishna, Khammam), Assam, Meghalaya, Mizoram, Kerala, Tripura.

Remark : The species is recorded for the first time from the state.

41. *Scheloribates thermophilus* Hammer

1961. *Scheloribates thermophilus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13**(1) : 95.

Diagnosis : All prodorsal setae barbed; rostral setae about twice as long as their mutual distance; lamellar setae thick, unusually short, slightly longer than their mutual distance; interlamellar setae thick; sensillus slender with lanceolate head; notogastral setae minute.

Material examined : Rangareddi dist. : 1 ♀, Nehru Zoological Park, Hyderabad, 16.i.2001, ex. soil & litter, coll. A.K. Sanyal. Kurnool dist.: 2 ♀ ♀, Alampur, 7.ix.2001. ex. soil and litter from flower garden, coll. A.K. Sanyal; 3 ♀ ♀, Sri Sailam, 8.ix.2001, ex. soil & litter from grassland, coll. A.K. Sanyal; 2 ♀ ♀, Nandyal, 9.ix.2001, ex. soil from grassland, coll. A.K. Sanyal. Cuddapah dist. : 1 ♀, Siddavatam, 11.ix.2001, ex. soil & litter, coll. A.K. Sanyal; 1 ♀, Kamalapuram, 12.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Chittoor dist. : 6 ♀ ♀, Pakaia, 15.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal. Rangareddi dist. : 3 ♀ ♀, Gandhi Pet, Hymaitsagar, Hyderabad, 18. ix. 2002, ex. soil & litter, coll. A.K. Sanyal. Karimnagar dist. : 2 ♀ ♀, Bishop garden, Karimnagar town, 26.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi, Kurnool, Cuddapah, Chittoor, Chittoor, Karimnagar), Gujarat, Manipur, Meghalaya, Mizoram, Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

42. *Scheloribates zealandicus* Hammer

1967. *Scheloribates zealandicus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **15**(4) : 40.

1982. *Scheloribates zealandicus*, Venugopala Rao *et al.*; *IRRN*, **7** : 11.

Diagnosis : Barbed rostral setae extended by half their length beyond the tip of the rostrum; lamellar setae as long as lamella, barbed; interlamellar setae short, barbed; sensillus with lanceolate head set with minute bristles in longitudinal rows; notogastral setae extremely small; all tarsi tridactylous.

Distribution : India : Andhra Pradesh (Visakhapatnam).

Remarks : The species was recorded from Andhra Pradesh by Venugopala Rao *et al.* in 1982.

20. Family CERATOZETIDAE Jacot, 1925

Key to the genera of CERATOZETIDAE

31. Genus *Ceratozetes* Berlese

1908. *Ceratozetes* Berlese, *Redia*, 5 : 4.

43. *Ceratozetes gracilis* Michael

1884. *Ceratozetes gracilis* Michael, *Ray. Soc.*, 61 : 225.

Diagnosis : Long, stout and unilaterally finely barbed rostral setae; lamellae long; no translamella; lamellar setae stiff, slightly rough; long, stout and unilaterally barbed interlamellar setae; sensillus long, slender, head swollen with fine setae; notogastral setae represented by pores; genital setae 6 pairs.

Material examined : Chittoor dist. : 1 ♀, Pakala, 15.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal. Rangareddi dist. : 1 ♀, Gandhi Pet, Hymaitsagar, Hyderabad, 18. ix. 2002, ex. soil & litter, coll. A.K. Sanyal. Karimnagar dist. : 1 ♀, Nagnoor, 26.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Chittoor, Rangareddi, Karimnagar), Mizoram, Sikkim, West Bengal.

Remark : The species is recorded for the first time from the state.

32. Genus *Hamobates* Hammer

1962. *Hamobates* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 13(2) : 66.

44. *Hamobates cristatus* Hammer

1962. *Hamobates cristatus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 13(2) : 66.

Diagnosis : Rostral setae reach in a large curve beyond the tip of the rostrum, densely unilaterally feathered; lamellar setae placed on the tip of lamellar cusps dagger-shaped, stiff; interlamellar setae reach beyond the tip of cusps, rough or serrated; sensillus elongate, club-shaped, cup deep; tip of tectopodium reaches beyond the base of rostral setae; no setae on dorsal surface of notogaster but 7 pairs of setal pores seen; epimeral setae long; genital setae 6 pairs; adanal setae 2 pairs.

Material examined : Rangareddi dist. : 1 ♀ Nehru Zoological Park, Hyderabad, 16.i.2001, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi).

Remarks : The genus and the species are recorded here for the first time from India.

33. Genus *Porozetes* Hammer

1962. *Porozetes* Hammer, *Biol Skr. Dan. Vid. Selsk.*, 13(2) : 70.

45. *Porozetes polygonalis* Hammer

1962. *Porozetes polygonalis* Hammer, *Biol Skr. Dan. Vid. Selsk.*, 13(2) : 70.

Diagnosis : Rostral setae placed far backwards, coarse, densely feathered or bushy, reach beyond the tip of rostrum; lamellar setae two and a half to three times longer than their mutual distance, reach by almost half their length beyond the tip of rostrum; densely feathered; interlamellar setae of same length as lamellar setae, more densely feathered; the space between the lamellae polygonal-shaped; sensillus sit in deep cups with pointed lobe, head pear-shaped, densely hairy; tip of tectopodium I reaches beyond the base of rostral setae; 10 pairs of notogastral setae; genital setae 6 pairs; legs tridactylous.

Material examined : Chittoor dist. : 1 ♀, Pakala, 15.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Chittoor).

Remarks : The genus was earlier recorded from Orissa. The species is reported here as new to India.

21. Family AUSTRACHTERIIDAE

34. Genus *Lamellobates* Hammer

1958. *Lamellobates* Hammer, *Biol Skr. Dan. Vid. Selsk.*, 10(1) : 100.

46. *Lamellobates palustris* Hammer

1958. *Lamellobates palustris* Hammer, *Biol Skr. Dan. Vid. Selsk.*, 10(1) : 100.

Diagnosis : Very long rostral setae, reaching far beyond the tip of rostrum; unilaterally feathered; inner cuspides of lamellae convexly rounded, outer lamellar cuspides extremely long and narrow; interlamellar setae very long, rough, tip reaches beyond lamellar setae, sensillus spatulate, densely barbed; notogastral setae 9 pairs; genital setae 6 pairs.

Material examined : Cuddapah dist. : 2 ♀ ♀, Kamalapuram, 12.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Khammam dist. : 7 ♀ ♀, Jallahcharu, Venkataswaram, 21.ix.2002, ex. soil

& litter, coll. A.K. Sanyal. Karimnagar dist. : 4 ♀ ♀, Bishop garden, Karimnagar town, 26.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Cuddapah, Khammam, Karimnagar), Bihar, Kerala, Meghalaya, Mizoram, Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

47. *Lamellobates* sp.

Material examined : Karimnagar dist. : 1 ♀, Keshavapattanam, 25.ix.2002, ex. soil & litter from grassland, coll. A.K. Sanyal.

Remarks : The specimens could not be identified upto species level due to nonavailability of pertinent literatures.

22. Family ORIBATELLIDAE

35. Genus *Plakoribates* Popp

1960. *Plakoribates* Popp, *Bull. Soc. Ent. Egypte*, **44** : 212.

48. *Plakoribates* sp.

Material examined : Nizamabad dist. : 1 ♀, Mallahram, 29.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Remarks : The genus is reported here for the first time from India.

23. Family GALUMNIDAE

Key to the genera of GALUMNIDAE

1(2) Lamellar setae placed between lines 'L' and 'S' *Galumna* von-Heyden, 1826

2(1) Lamellar setae placed between lines 'L' and 'L' *Pergalumna* Grandjean, 1936

36. Genus *Galumna* von-Heyden

1826. *Galumna* von-Heyden, *Isis Oken*, **18**:611.

Key to the species of *Galumna*

1(2) Head of sensillus club-shaped; *im* curved and directed anteroposteriorly; a crenate line passes across the hypostome; *gen*₁ and *gen*₂ placed on the anterior border of genital plate *crenata* Deb and Raychaudhuri, 1975

- 2(1) Head of sensillus long, broad; *im* straight and placed obliquely, crenate line absent; *gen*₁ and *gen*₂ placed on the anterior border of left part of genital plates
 *flabellifera orientalis* Aoki, 1965

49. *Galumna crenata* Deb and Raychaudhuri

1975. *Galumna crenata* Deb and Raychaudhuri, *Annot. Zool. Japan*, **48**(3) : 167.

Diagnosis : Rostral setae not discernible; lamellar and interlamellar setae represented by pits; club-shaped sensillus with short and stout bristles; *Ad* gattiform, provided with comma-like slit on the inner end; *hy* leaf-like; *Aa* placed obliquely; *im* slightly curved, directed anteroposteriorly; notogastral setae represented by 10 pairs of pits; a crenate line runs across the hypostome; genital setae 6 pairs.

Material examined : Rangareddi dist. : 4 ♀ ♀, Mahavir Harina Vanasthali National Park, Hyderabad, 14.i.2001, ex. soil & litter, coll. A.K. Sanyal. Krishna dist. : 2 ♀ ♀ Kondapalli village, 19.i.2001, ex. soil & litter, coll. A.K. Sanyal. Kurnool dist : 2 ♀ ♀ Sri Sailam, 8.ix.2001, ex. soil & litter from grassland, coll. A.K. Sanyal. Khammam dist. : 12 ♀ ♀ Jallahcharu, Venkataswaram, 21.ix.2002, ex. soil & litter, coll. A.K. Sanyal. Nizamabad dist. : 2 ♀ ♀, Mallahram, 29.ix.2002, ex. soil & litter, coll. A.K. Sanyal; 2 ♀ ♀, Mudakpally, 30.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Rangareddi, Krishna, Kurnool, Khammam, Nizamabad), Manipur, Meghalaya, Mizoram, Sikkim, West Bengal.

Remark : The species is recorded for the first time from the state.

50. *Galumna flabellifera orientalis* Aoki

1965. *Galumna flabellifera orientalis* Aoki, *Nat. Life Southeast Asia*, **4** : 187.

Diagnosis : Very thin and short rostral and interlamellar setae; lamellar setae very minute; head of sensillus long and broad, anterior margin round and beset with spur-like bristles; posterior margin flat, without bristles; *ia* placed obliquely to the longitudinal axis of the body; areae porosae large; *gen*₁-*gen*₃ placed on the anterior border of left genital plate; *gen*₃ in right genital plate.

Material examined : Visakhapatnam dist.: 1 ♀, Simchalam, 21.i.2001, ex. soil & litter, coll. A.K. Sanyal; 1 ♀, Borra cave, Araku, 24.i.2001, ex. soil & litter, coll. A.K. Sanyal. Krishna dist. : 1 ♀, Forest Rest House, Vijayawada, 19.i.2001, ex. soil & litter, coll. A.K. Sanyal. Cuddapah dist. : 1 ♀ Kamalapuram, 12.ix.2001, ex. soil & litter, coll. A.K. Sanyal; 3 ♀ ♀, Cuddapah, 13.ix.2001, ex. soil & litter, coll. A.K. Sanyal. Chittoor dist. : 3 ♀ ♀ Pakala, 15.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal; 1 ♀ Reddygunta village,

16.ix.2001, ex. forest litter & soil, coll. A.K. Sanyal. Rangareddi dist. : 4 ♀ ♀, Gandhi Pet, Hymaitsagar, Hyderabad, 18. ix. 2002, ex. soil & litter, coll. A.K. Sanyal. Khammam dist.: 3 ♀ ♀, Pondin Pally, 22.ix.2002, ex. soil & litter, coll. A.K. Sanyal. Karimnagar dist. : 10 ♀ ♀, LMD Colony, 24.ix.2002, ex. soil & litter, coll. A.K. Sanyal; 2 ♀ ♀, Keshavapattanam, 25.ix.2002, ex. soil & litter from grassland, coll. A.K. Sanyal; 1 ♀, Bishop garden, Karimnagar town, 26.ix.2002, ex. soil & litter, coll. A.K. Sanyal.

Distribution : India : Andhra Pradesh (Visakhapatnam, Krishna, Cuddapah, Chittoor, Rangareddi, Khammam, Karimnagar), Kerala, Manipur, Mizoram, Sikkim, West Bengal.

Remark : The species is recorded for the first time from the state.

51. *Galumna* sp.

Material examined : Cuddapah dist.: 1 ♀, Cuddapah, 13.ix.2001, ex. soil & litter, coll. A.K. Sanyal.

Remarks : Due to non-availability of pertinent literatures the specimens could not be identified upto species level.

36. Genus *Pergalumna* Grandjean

1936. *Pergalumna* Grandjean, *Ann. Soc. Ent. Fr.*, **105** : 106.

52. *Pergalumna andhraense* Raju, Appalanaidu and Rao

1981. *Pergalumna andhraense* Raju, Appalanaidu and Rao, *Geobios*, **8**(5) : 219.

Diagnosis : Rostral setae smaller than lamellar setae, inserted near the lateral margins of the camerostome; lamellar and interlamellar setae glabrous; sensillus long, club-shaped; areae porosae *Ad* prominent, elongated; 10 pairs of alveoli of notogastral setae; *Aa* single on both sides, dumbel-shaped; genital setae 6 pairs; anterior margins of genital plates located on the level with the medial ends of the apodemata between epimeres 3 and 4; 5 pairs of epimeral setae; lines 'L' and 'S' present; all legs tridactylous.

Distribution : India : Andhra Pradesh (Vishakhapatnam).

Remarks : The species was described from Andhra Pradesh by Raju *et al.* (1981).

DISCUSSION

The present paper shows that a total of 52 species, 37 genera and 23 families are known from the state. Of these, 50 species under 36 genera are reported here for the first time from Andhra Pradesh. The paper also records 5 genera and species viz., *Millotacarus granulatus*,

Arcoppia arcualis novaeguineae, *Paroppia lebruni*, *Ischeloribates benguetensi* and *Porozetes polygonalis* for the first time from India. It may be mentioned here that at present the oribatid fauna of Andhra Pradesh represents about 13% of the total oribatid species in India. The assessment also shows that only one species *Pergalumna andhraensis* has so far been described as new to science from the state and distribution of this species is still restricted to Andhra Pradesh.

SUMMARY

The paper deals with the oribatid fauna from 10 districts of Andhra Pradesh. This study records 52 species under 37 genera and 23 families. The present work added 50 species pertaining to 36 genera and 23 families. Only one species has been described as new to science from the state. Key to identification of families, genera and species; diagnostic features and distribution of the species have also been incorporated in the paper.

ACKNOWLEDGEMENTS

The author wishes to express his gratefulness to the Director, Zoological Survey of India, for kind encouragement and providing laboratory facilities. Thanks are also due to Shri B. J. Sarkar, Senior Zoological Assistant, Z.S.I. for assistance in collection and during the course of this study.

REFERENCES

- Balogh, J. 1965. A. Synopsis of the world oribatid (Acari) genera. *Acta zool. Hung.*, **11**(1-2) : 5-99.
- Balogh, J. 1972. The oribatid genera of the world. Akademiai Kiado, Budapest, Hungary. : 1-138.
- Balogh, J. and Balogh, P. 1988. Oribatid mites of the Neotropical region 1. Elsevier, Amsterdam, : 1-335.
- Balogh, J. and Mahunka, S. 1983. Primitive oribatids of the palaearctic region. Elsevier, Amsterdam, : 1-372.
- Grandjean, P. and Bhattacharya, T. 1992. Observation et conservation des petits Arthropodes. *Bull. Mus. Nat. Hist. Paris*, **21**(2) : 363-370.
- Raju, V. Venkata, Appalanaidu, V. and Rao, Hanumantha, K. 1981. *Pergalumna andhraense*, new species (Galumnidae : Oribatei) from Visakhapatnam, Andhra Pradesh, India. *Geobios*, **8**(5) : 219-221.

- Venugopala Rao, A, Sanyal, A.K. and Ramamohan Rao, T. 1982. Mites infesting rice in Visakhapatnam District, Andhra Pradesh, India. *IRRN*, **7**(1) : 11.
- Subias, L.S. and Balogh, P. 1989. Identification keys to the genera of oppiidae Grandjean, 1951 (Acari : Oribatei). *Acta zool. Hung.*, **35**(3-4) : 335-412.
- Wallwork, J.A. 1973. Zoogeography of some terrestrial Microarthropoda in Antarctica. *Biol. Rev.*, **48** : 223-259.

ARACHNIDA : ARANEAE

BIJAN BISWAS

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The spider fauna of Andhra Pradesh has not so far been-studied in a comprehensive manner. The only published information about the spiders from Andhra Pradesh is Tikader & Malhotra (1980) which recorded only nine species. The present work was taken upto provide an up-to-date information regarding the families : Araneidae, Tetragnathidae, Hersiliidae, Lycosidae, Oxyopidae, Gnaphosidae, Heteropodidae, Thomisidae, Salticidae, Pholcidae and Eresidae from Andhra Pradesh in the light of modern taxonomic concept and it is hoped that this work will prove quite useful to the future workers. Though the sincerest effort was made here to make this faunal account as comprehensive as possible but yet it is believed that there are many more species awaiting discovery from this region.

Family ARANEIDAE

1806. *Araneidae* Latreille, *Genera Crustaceorum*, 1 : 82.

1981. *Araneidae* : Tikader & Bal, *Rec. zool. Surv. India, Occ. Pap. No.*, 24 : 42.

Distribution : Cosmopolitan.

Key to the genera of the family ARANEIDAE Latreille

1. Median eyes closer to each other than the laterals. Tibiae of male is straight and unmodified ***Argiope***
Median eyes not closer to each other than laterals. Tibiae of male is not straight and unmodified 2
2. Carapace flat with distinct thoracic furrow ; abdomen anteriorly very high one provided with atleast one pair of shoulder humps ***Cyrtophora***

- Carapace not flat, thoracic furrow may or may not distinct; abdomen anteriorly not high and shoulder humps may or may not present 3
3. Thoracic groove longitudinal epigyne with unwrinkled scaps and provided with one or two pairs of lateral lobes *Neoscons*
- Thoracic groove not longitudinal; epigyne without un-wrinkled scape and without lateral lobes 4
4. Abdomen elongated; cephalothorax with convex and elevated cephalic region *Nephila*

Genus 1. *Argiope* Audouin

1826. *Argiope* Audouin, in Savigny, *Descriptions de l' Egypte*, 1(4) : 121.
1970. *Argiope* : Tikader, *Rec. zool. Surv. India*, 64(1-4) : 27.
1995. *Argiope* : Biswas & Majumder, Araneae : Spiders, *Fauna of Meghalaya, State Fauna Series*, 4(Part 2) : 94.

Type-species : *Argiope lobata* (Thorell)

Distribution : Tropical and temperate countries of the world.

1. *Argiope catenulata* (Doleschall)

1859. *Epeira catenulata* Doleschall, *Act. Soc. Ind. Neerl.*, 5 : 10.
1992. *Argiope catenulata* : Biswas & Biswas, Araneae : Spiders, *Fauna of West Bengal, State Fauna Series*, 3(Part 3) : 454.

Diagnosis : Cephalothorax longer than wide, narrowing in front, clothed with thick layer of white pubescence; cephalic region slightly elevated than thoracic region; provided with a yellow patch in the middle at the junction of head and thorax. Ocular quad much longer than wide and slightly wider behind than in front; both the median eyes are subequal in size; posterior medians encircled by black rings; lateral eyes close and situated on a prominent tubercle; anterior lateral smaller than the posterior laterals. Sternum heart-shaped, pointed behind, clothed with pubescence and hair, blackish brown, provided with a broad median longitudinal yellow path. Chelicerae small and weak, brownish, provided with rudimentary boss. Legs are long and strong. Abdomen elongated, oval, depressed, blunt anteriorly and moderately overlapping on the cephalothorax. Dorsum of abdomen ornamented with transverse yellow stripes and patches; five pairs of distinct sigilla on the dorsum.

Material examined : 3 ♀, Chhennur, Dist. Cuddapah, Andhra Pradesh, India, 31.xii.1999, coll. G. Sen & Party.

Distribution : India : Andhra Pradesh (Dist. Cuddapah), New record; West Bengal; Andaman and Nicobar Islands.

Elsewhere : Burma, Sri Lanka, Indo and Austro-Malaysia.

Genus 2. *Cyrtophora* Simon

1864. *Cyrtophora* Simon, *Hist. Nat. des Araign.*, 1 : 261.

1982. *Cyrtophora* : Tikader, *Fauna of India, Araneas : Spiders*, 2(1) : 171.

Type-species : *Cyrtophora citricola* (Forsk.)

Distribution : Tropical and sub-tropical countries of the world.

Key to the species of the genus *Cyrtophora* Simon

1. Abdomen provided with two pairs of humps and one median caudal hump are not high up anteriorly; epigyne provided with a broad rim..... *cicatrosa*
2. Abdomen provided with three pairs of humps of which caudal hump bifurcated the abdomen posteriorly, epigyne provided with narrow rim..... *citricola*

2. *Cyrtophora cicatrosa* (Stoliczka)

1869. *Epeira cicatrosa* Stoliczka, *J. Asiat. Soc. Bengal*, 33 : 242.

1992. *Cyrtophora cicatrosa* : Biswas & Biswas, *Araneas : Spiders, Fauna of West Bengal, State Fauna Series*, 3(Part 3) : 460.

Material examined : 10 ♀, Rangareddy, Dist. Rangareddy, Andhra Pradesh, India, 27.xii.2000, coll. B.K. Biswas & party; 5 ♀, Nalgonda, Dist. Nalgonda, India, 28.xiii.2000, coll. B.K. Biswas & party (Andhra Pradesh); 7 ♀, Osmania University Guest House Campus, Dist. Hyderabad, Andhra Pradesh, India, 29.xii.2000 coll. K. Biswas; 10 ♀, Hyderabad, Dist. Hyderabad, Andhra Pradesh, India, 30.xii.2000, coll. B.K. Biswas & party; 10 ♀ Visakhapatman, Dist. Visakhapatman, Andhra Pradesh, India, 7.i.2001, coll. B.K. Biswas & party.

Distribution : India : Andhra Pradesh (Dists. Rangareddy, Nalgonda, Hyderabad, Visakhapatman), New record; West Bengal; Uttar Pradesh; Gujarat; Maharashtra; Punjab; Andaman and Nicobar Islands; Tamil Nadu.

Elsewhere : Myanmar, Australia, Malaysia. New Guinea, Pakistan.

3. *Cyrtophora citricola* (Forsk.)

1775. *Aranea citricola* Forskal, *Descriptions animalium*, : 86.

1992. *Cyrtophora citricola* : Biswas & Biswas, *Araneae : Spiders, Fauna of West Bengal, State Fauna Series*, 3(Part 3) : 461.

Material examined : 10 ♀, Rangareddy, Dist. Rangareddy, Andhra Pradesh, India, 27.xii.2000, coll. B.K.Biswas & party; 5 ♀, Hyderabad, Dist. Hyderabad, Andhra Pradesh, India, 30.xii.2000, coll. B.K. Biswas & party; 10 ♀, Visakhapatman, Dist. Visakhapatman, Andhra Pradesh, India, 7.i.2001, coll. B.K. Biswas & party.

Distribution : India : Andhra Pradesh (Dists. Rangareddy, Hyderabad, Visakhapatman), New record; West Bengal; Assam; Gujarat; Punjab; Karnataka; Maharashtra; Tamil Nadu; Madhya Pradesh.

Elsewhere : Africa, Australia, Myanmar, Egypt, Europe, Madagascar, Malaysia.

Genus *Neoscona* Simon

1864. *Neoscona* Simon, *Hist. nat. des Aragin*, 1 : 261.

1992. *Neoscona* : Biswas & Biswas, Araneae : Spiders, *Fauna of West Bengal, State Fauna Series*, 3(Part 3) : 465.

Type-species : *Neoscona anabesca* (Walckenaer)

Distribution : Cosmopolitan.

Key to the species of the genus *Neoscona* Simon

1. Cephalic region provided with a conspicuous dark brown "V" shaped patch; epigynal scape with deep constriction *mukerjei*
 Cephalic region not having any "V" shaped patch; epigynal scape without a deep constriction 2
2. Abdomen triangular; epigynal scape short, broad and triangular *nautica*
 Abdomen sub-triangular, epigynal scape long, narrow 3
3. Sternum dark brown with longitudinal white band; epigynal scape with no prominent rim, constriction present behind the lateral lobe *theis*
 Sternum without white band, epigynal scape with rim, no constriction behind the lateral lobe 4
4. Sternum uniformly black, epigynal scape provided with prominent wide rim and without constriction *singhagensis*

4. *Neoscona mukerjei* Tikader

1980. *Neoscona mukerjei* Tikader, *Proc. Indian Acad. Sci.*, 89(3) : 247.

2000. *Neoscona mukerjei* : Biswas & Majumder, Araneae : Spiders, *Fauna of Tripura, State Fauna Series*, 7(Part 2) : 116.

Material examined : 2 ♀, Rangareddy, Dist. Rangareddy, Andhra Pradesh, India, 27.xii.2000, coll. B.K. Biswas & party; 2 ♀, Vijayawada, Dist. Vijayawada, Andhra Pradesh, India, 3.i.2001, coll. B.K. Biswas & party.

Distribution : India : Andhra Pradesh (Dists. Rangroddy, Vijayawada), New record; West Bengal; Maharashtra; Tripura.

5. *Neoscona nautica* (L. Koch)

1875. *Epeira nautica* L. Koch, *Aegypt. Abssin Arachn, Jickeli*, : 17.

1992. *Neoscona nautica* : Biswas & Biswas, *Araneae : Spiders, Fauna of West Bengal, State Fauna Series, 3(Part III)* : 467.

Material examined : 3 ♀, near the Krishna river, Dist. Krishna, Andhra Pradesh, India, 2.i.2001, coll. B.K. Biswas & party : 4 ♀, Simachalanam Hill, Dist. Visakhapatman, Andhra Pradesh, India, 7.i.2001, coll. B.K. Biswas & party; 3 ♀, Arraku Valley, Dist. Visakhapatman, Andhra Pradesh, India, 18.xi.2000, coll. P.H. Roy & party; 10 ♀, Paderu, Dist. Visakhapatman, Andhra Pradesh, India, 19.xi.2000, coll. P.H. Roy & party.

Distribution : India : Andhra Pradesh (Dists. Vijayawada, Visakhapatman). New record; West Bengal; Meghalaya; Gujarat.

Elsewhere : Myanmar, Pakistan, North America.

6. *Neoscona theis* (Walckenaer)

1841. *Epeira theis* Walckenaer, *Hist. Nat. Ins. Apt.*, 2 : 53.

1995. *Neoscona theis* : Biswas & Majumder, *Araneae : Spiders, Fauna of Meghalaya, State Fauna Series, 4 (Part II)* : 98.

Material examined : 2 ♀, Near Krishna river, Dist. Krishna, Andhra Pradesh, India, 2.i.2001, coll. B.K. Biswas; 3 ♀, Hyderabad, Dist. Hyderabad, Andhra Pradesh, India, 30.xii.2000, coll. K. Biswas.

Distribution : India : Adhra pradesh (Dists. Krishna, Hyderabad), New record, West Bengal; Meghalaya; Maharashtra; Orissa; Gujarat.

Elsewhere : South New Guinea.

7. *Neoscona sinhagadensis* (Tikader)

1975. *Araneus sinhagadensis* Tikader, *Proc. Indian Acad. Sci.*, 87(4) : 146.

1981. *Neoscona sinhagadensis* : Tikader & Bal, *Rec. zool. Surv. India, Occ. Pap. No.*, 24 : 30.

Material examined : 4 ♀, Simachalman Hill, Dist. Visakhapatman, Andhra Pradesh, India, 7.i.2001, coll. B.K. Biswas & party.

Distribution : India : Andhra Pradesh (Dist. Visakhapatnam), New record; Maharashtra.

Genus *Nephila* Leach

1815. *Nephila* Leach, *Zoological Miscellany*, : 133.

1995. *Nephila* : Biswas & Majumder, Araneae : Spiders, *Fauna of Meghalaya, State Fauna Series*, 4(Part 2) : 96.

Type-species : *Nephila maculata* (Fabricius)

Distribution : Tropical and rarely sub-tropical countries of the world.

8. *Nephila maculata* (Fabricius)

1793. *Aranea maculata* Fabricius, *Ent. Syst.*, 2 : 425.

2000. *Nephila maculata* : Biswas & Majumder, Araneae : Spiders, *Fauna of Meghalaya, State Fauna Series*, 7(Part 2) : 114.

Diagnosis : Cephalothorax longer than wide, clothed with a silky, greyish-yellow pubescence, relatively broad in front; a deep groove in the middle, with a pair of sharp tubercles in front. Ocular quad square and slightly high. Clypeus narrow. Sternum is dark, triangular, pointed behind. Legs are very long, clothed with hair and spines; coxae of legs and first half of palpus are yellow. Abdomen is very long clothed with hair; slightly overlapping the posterior region of cephalothorax, dorsal surface with a pair of longitudinal yellow lines from base to tip of the abdomen.

Material examined : 10 ♀, Paderu, Dist. Visakhapatnam, Andhra Pradesh, India, 19.xi.2000, coll. P.H. Roy & party; 3 ♀, Arraku Valley (Forest area), Dist. Visakhapatnam, India, 18.xi.2000, coll. P.H. Roy & party.

Distribution : India : Andhra Pradesh (Dist. Visakhapatnam), New record; West Bengal; Assam; Meghalaya; Tripura; Karnataka; Gujarat; Maharashtra; Andaman & Nicobar Islands.

Elsewhere : Australia, Myanmar, China, Japan, Malaysia, New Guinea, Sri Lanka.

2. Family ERESIDAE

Genus *Stegodyphus* Simon

1873. *Stegodyphus* Simon, *Ann. Soc. Ent. Fr.*, 3(5) : 336.

1935. *Stegodyphus* : Dyal, *Bull. Zool. Punjab Univ.*, 1 : 129.

1992. *Stegodyphus* : Biswas & Biswas, Araneae : Spiders, *Fauna West Bengal, State Fauna Series*, 3(Part 3) : 378.

Type-species : *Stegodyphus lineatus* Latreille

Distribution : India, Asia, Africa, Arabia.

9. *Stegodyphus sarasinorum* Karsch

1892. *Stegodyphus sarasinorum* Karsch, *Ent. Z. Berlin*, 36 : 275.

1992. *Stegodyphus sarasinorum* : Biswas & Biswas, Araneae : Spiders, *Fauna of West Bengal, State Fauna Series*, 3(Part 3) : 378.

Diagnosis : This spider is gregarious in habits. It spin a labyrinthine tube, which ends blindly a one end and the other end expands into a broad sheet, which however is smaller than that spin by the genus *Hippasa*. This species does not sting the prey to death, but feeds on the captive alive, all members of the colony showing the same victim. Spiderlings hatch in the most October and November and feed on their parents, hibernating in web tubes in winter.

Material examined : 10 ♀, Rangareddy, Dist. Rangareddy, Andhra Pradesh, India, 27.xii.2000, coll. B.K. Biswas & party : 20 ♀, Hyderabad, Dist. Hyderabad, India, Andhra Pradesh, 30.xii.2000, coll. B.K. Biswas & Party.

Distribution : India : Andhra Pradesh (Dists. Rangareddy, Hyderabad), New record; West Bengal; Maharashtra; Orissa; Punjab; Tamil Nadu.

3. Family HERSILIDAE

Genus *Hersilia* Audouin

1826. *Hersilia* Audouin, *Descr. Egypte Arachn.*, : 114.

1981. *Hersilia* : Tikader & Biswas, *Rec. zool. Surv. India, Occ. Pap. No.*, 30(1) : 47.

Type-species : *Hersilia caudata* Audouin

Distribution : Africa, Madagascar, Oriental region.

10. *Hersilia savignyi* Lucas

1836. *Hersilia savignyi* Lucas, *Mag. Zool.*, 8 : 10.

1987. *Hersilia savignyi* : Biswas, Araneae : Spiders, *Fauna of Orissa, State Fauna Series*, 1(Part I) : 270.

Diagnosis : Colour varying from quite pale to nearly black on the upper side, generally banded; abdomen with a black rim, transverse stripe and a median longitudinal black bar in front; legs and palpi banded. Posterior spinnerets very long, usually longer than abdomen.

Material examined : 2F, Rangareddy, Dist. Rangareddy, Andhra Pradesh, India, 27.xii.2000, coll. B.K. Biswas & party; 3F, Osmania University Guest House Compound, Dist. Hyderabad, Andhra Pradesh, India, 29.xii.2000, coll. B.K. Biswas & party.

Distribution : India : Andhra Pradesh (Dists. Rangareddy, Hyderabad), New record; West Bengal; Assam; Maharashtra; Uttar Pradesh; Orissa; Tamil Nadu.

Elsewhere : Myanmar, Sri Lanka.

4. Family PHOLCIDAE

Genu *Crossopriza* Simon

1893. *Crossopriza* Simon, *Hist. Nat. Araign.*, 1 : 476.

1992. *Crossopriza* : Majumder & Biswas, *Rec. zool. Surv. India*, 92(1-4) : 1-3.

Type-species : *Crossopriza pristina* Simon

Distribution : Egypt, Arabia, India.

11. *Crossopriza lyoni* (Blackwall)

1867. *Pholcus lyoni* Blackwall, *Ann. Mag. Nat. Hist.*, 19(3) : 302.

1992. *Crossopriza lyoni* : Biswas & Biswas, *Araneae, Fauna of West Bengal, Spiders, State Fauna Series*, 3 (Part 3) : 383.

Diagnosis : *Crossopriza* is a common house spider. It spins an extremely fine irregular cob-web, from which it hangs upside down. It prefers old dark and abandoned houses. No cocoon is made but the eggs are glued together and carried by the chelicerae of the mother till hatching. *Artema atlenta* often occurs in the same situations and has similar habits. *A. atlenta* is larger and stronger than *C. lyoni*, so that the former often kills the later and occupies its web. Both the species are nocturnal.

Material examined : 4 ♀, 1 ♂, Rangareddy, Dist. Rangareddy, Andhra Pradesh, India, 27.xii.2000, coll. B.K. Biswas & party; 4 ♀, Vijayawada, Dist. Vijayawada, Andhra Pradesh, India, 3.i.2001, coll. B.K. Biswas & party; 6 ♀, Osmania University Compound, Dist. Hyderabad, Andhra Pradesh, India, 29.xii.2000, coll. Kajal Biswas.

Distribution : India : Andhra Pradesh (Dists. Hyderabad, Rangareddy, Vijayawada), New record; West Bengal; Punjab; Rajasthan; Tamil Nadu; Gujarat; Maharashtra.

Elsewhere : Myanmar.

5. Family SALTICIDAE

Key to the genera of the family SALTICIDAE

1. Eyes are small in proportion to the spiders *Phidippus*
- Eyes are not small in proportion to the spiders 2

2. Labium little longer than wide; coxae of the I legs are separated by less than the width of the labium ***Plexippus***

Genus *Phidippus* Koch

1846. *Phidippus* Koch, *Die Arachn.*, 73 : 125.

1987. *Phidippus* : Biswas, Araneae : Spiders, *Fauna of Orissa, State Fauna Series*, 1(Part I) : 264.

Type-species : *Phidippus veriegatus* (Lucas)

Distribution : All tropical and subtropical countries of the world.

12. *Phidippus pateli* Tikader

1974. *Phidippus pateli* Tikader, *Proc. Indian Acad. Sci.*, 79(3) : 124.

1992. *Phidippus pateli* : Biswas & Biswas, Araneae : Spiders, *Fauna of West Bengal, State Fauna Series*, 3(Part III) : 395.

Diagnosis : Cephalothorax dark brown or black, legs olive brown, abdomen deep brown in colour. Cephalothorax longer than wide, convex clothed with fine grey black hair. Cephalic region flat and metallic black. Anterior row of eyes are recurved and anterior middle eyes very large and milky white, anterior eyes pearly-white and smaller than middle by about half. Middle row of eyes are very small and situated equidistant from anterior and posterior row of eyes; posterior row of eyes are median size and pearly white. Fovea on the middle and a pale longitudinal patch on the middle of thorax. Sternum oval and arrowed in front, clothed with hair. Abdomen longer than wide, narrowing posteriorly. Mid-dorsal with a longitudinal light patch extending from base to near end of abdomen.

Material examined : 1 ♀, Hyderabad, Dist. Hyderabad, Andhra Pradesh, India, 29.xii.2000, coll. Kajal Biswas; 2 ♀, 1 ♂, Nizamabad Forest Rest House, Dist. Nizamabad, Andhra Pradesh, India, 27.ix.2002, coll. B.J. Sarkar.

Distribution : India : Andhra Pradesh (Dists. Hyderabad, Nizamabad), New record; West Bengal; Orissa; All over India.

Elsewhere : Africa, Myanmar, Europe, Sri Lanka, and in all the warmer regions of the world.

6. Family THOMISIDAE

Genus *Runcinia*

1875 *Runcinia* Simon, *Ar. Fr.*, 2 : 254.

1965. *Runcinia* : Tikader, *Proc. Indian Acad. Sci.*, 61(5) : 277.

Type-species : *Runcinia lateralis* (Koch)

Distribution : Europe, Africa, Asia, Australia.

14. *Runcinia escheri* Reimoser

1934. *Runcinia escheri* Reimoser, *Revue suisse Zool.*, **41**(32) : 487.

1980. *Runcinia escheri* : Tikadar, *Fauna of India, Araneas : Spiders*, **1**(1) : 59.

Diagnosis : Cephalothorax nearly as long as wide, clothed with short hair and few spines. Lateral sides provided with deep brown longitudinal patch. Sternum heart-shaped, pale-yellow, spotted with black and clothed with hair. Legs are long, clothed with hair. Dorsally at each side provided with five parallel longitudinal muscular ridges, each ridges provided with a row of short hair. Mid-dorsally with a pair of brown spots.

Distribution : India : Andhra Pradesh (Dist. Mansigudi)–Type-locality.

7. Family HETEROPODIDAE

Genus *Heteropoda* Latreille

1804. *Heteropoda* Latreille, *Nouv. Diet. d" Hist. Nat.*, **34** : 135.

1977. *Heteropoda* : Tikader, *Rec. zool. Surv. India*, **72** : 189.

Type-species : *Heteropoda venatoria* (Linn.)

Distribution : From India eastwards to Australia, U.S.A., Chin, Japan, Hong-Kong, Sri Lanka, Myanmar, Sumatra, Java.

15. *Heteropoda venatoria* (Linnaeus)

1766. *Aranea venatoria* Linnaeus, *Syst. Nat.*, **12** : 1035.

1788. *Heteropoda venatoria* : Sethi & Tikader, *Rec. zool. Surv. India, Occ. Pap. No.*, **93** : 16.

Diagnosis : Cephalothorax nearly as long as wide- a little wider than long; cephalic region higher at the anterior end but flat posteriorly with the thoracic region on the top of the carapace, thoracic furrow longitudinal and distinct. Anterior row of eyes are procurved and posterior slightly recurved; laterals are equal in size. Chelicerae very strong, armed with two and four teeth on the outer and inner margin respectively. Sternum heart-shaped, dark brown in colour. Abdomen elongated, tapering at the posterior end with dark patches. Epigyne with lateral lobes directed inward posteriorly and at the middle they meet each other upto anterior end, no cavity in between the lateral lobes.

Material examined : 1F, Visakapatman, Dist. Visakhapatman, Andhra Pradesh, India, 7.i.2001, coll. B.K. Biswas & party.

Distribution : India : Andhra Pradesh (Dist. Visakhapatman), New record; West Bengal; Bihar; Tamil Nadu and almost all over India. It is a cosmopolitan species in the world.

8. Family GNAPHOSIDAE

Genus *Herpyllus* Hentz

1832. *Herpyllus* Hentz, *Silliman soum. Sci., & Arts.*, **21** : 102.

1992. *Herpyllus* : Biswas & Biswas, *Araneae : Spiders, Fauna of West Bengal, State Fauna Series*, 3(Part III) : 429.

Type-species : *Nerpyllus occlesiasticus* Hentz

Distribution : India, North America.

16. *Herpyllus bicolor* (Simon)

1885. *Melicymnis bicolor* Simon, *Bull. Soc. zool. Fr.*, **10** : 23.

1982. *Herpyllus bicolor* : Tikader, *Fauna of India, Araneae : Spiders*, **2(2)** : 458.

Diagnosis : Cephalothorax longer than broad, blunt and nearly truncated anteriorly, scarcely clothed with hair; thoracic region provided with fine longitudinal fovea. Posterior eyes are smallest, lateral eyes little larger than medians, both lateral subequal in size, anteriors are slightly procurved. Maxillae provided with a distinct depression from outside and distally convergent; pale yellowish, distal end with indistinct scopulae. Chelicerae moderately strong with no boss. Abdomen longer than wide, clothed with small hair, anterior end provided with large hair. Dorsum of the abdomen with two pairs of distinct sligilla and some black shades.

Material examined : 1 ♀, Visakhapatman, Dist. Visakhapatman, Andhra Pradesh, India. 7.iv.2001, coll. Bijan Biswas.

Distribution : India : andhra Pradesh (Dist. Visakhapatman), Type-locality (Guntakal).

9. Family OXYOPIDAE

Key to the genera of the family OXYOPIDAE

1. Posterior row of eyes strongly procurved and equidistant from each other *Oxyopes*
 Poterior row of eyes not strongly procurved and equidistant from each other 2
2. Cephalothorax not high, male palp with paracymbial process *Peucetia*

Genus *Oxyopes* Latreille

1804. *Oxyopes* Latreille, *hist. Nat. Arch. France*, **14(7)** : 144.

1981. *Oxyopes* : Tikader & Biswas, *Rec. zool. Surv. India, Occ. Pap. No.* **30(1)** : 60.

Type-species : *Oxyopes heterophthalmus* Latreilled.

Diagnosis : Africa, Asia, America, Australia, Europe.

17. *Oxyopes shweta* Tikader

1970. *Oxyopes shweta* Tikader, *Rec. zool. Surv. India*, **64**(1-4) : 78.

1992. *Oxyopes shweta* : Biswas & Biswas, Araneas : Spiders, *Fauna of West Bengal, State Fauna Series*, 3(Part 3) : 434.

Diagnosis : Cephalothorax longer than wide; convex, cephalic region high, clothed with fine hair; two longitudinal black lines of either side of cephalic region; centre of thorax with a prominent fovea. Eyes of posterior row are procurved and situated at equal distance, base of each eye encircled with black patch. Anterior row strongly recurved, anterior lateral are larger and median smaller. Legs are long and strong, clothed with fine hair and conspicuous long spines. Abdomen is long, narrow, anterior mid-dorsally with a lance-shaped brown patch; lateral sides with longitudinal blackish line extending from base to end of abdomen; dorsum of abdomen with minute net like chalk white patches.

Material examined : 1 ♀, Dakkili F.R.A., Dist. Nellore, Andhra Pradesh, India, 20.v.2000, coll. S.K.Chatterjee & party; 2 ♀, 4M, Ramasuigavaram, Dist. West Godavari, andhra Pradesh, India, 4.x.1998, coll. S.K.Mandal & party; 1 ♂, Chennur, Dist. Cuddapah, Andhra Pradesh, India, 31.xii.1999, coll. G. Sen & party.

Distribution : India : Andhra Pradesh (Dists. Nellore, West Godavari, Cuddapah), New record; West Bengal; West Sikkim.

18 *Peucetia viridana* Stoliczka

1869. *Peucetia viridana* Stoliczka, *J. Asia. Soc., Bengal*, **38** : 220.

1992. *Peucetia viridana* : Biswas & Biswas, Araneas : Spiders, *Fauna of West Bengal, State Fauna Series*, 3(Part 3) : 435.

Diagnosis : Cephalothorax longer than wide, moderately high, provided with brown spots and cephalic region high and broad clothed with few spines, centre provided with deep fovea. posterior row of eyes are slightly procurved and situated in equal distance. Anterior row strongly recurved and middle eyes are smallest and laterals largest. Legs are long and strong clothed with conspicuous black spots and black long spines. Abdomen is long, narrowing behind, clothed with fine hair; mid-dorsally with a longitudinal deep brown lines with lateral branches.

Material examined : 1 ♀, Kajipeta, Dist. Cuddapah, Andhra Pradesh, India, 30.xii.1999, coll. G.Sen & party; 1 ♂, Erpedu, Dist. Chittoor, Andhra Pradesh, India, 6.i.2000, coll. G. Sen & party.

Distribution : India : Andhra Pradesh (Dists. Cuddapah, Chittoor), New record; West Bengal; Orissa; Pondichery; Tamil Nadu.

Elsewhere : Sri Lanka.

10. Family LYCOSIDAE

Key to the genera of the family Lycosidae

1. Cephalic region not much elevated from the thoracic region ***Pardosa***
 Cephalic region much elevated from the thoracic region 2
2. The labium is longer than wide and the basal excavation is prominent ***Lycosa***

Genus ***Pardosa*** Koch

1848. *Pardosa* Koch, *Die. Arachnide*, 14 : 100.

1992. *Pardosa* : Biswas & Biswas, *Araneae : Spiders, Fauna of West Bengal, State Fauna Series, 3(Part III) : 442.*

Type-species : *Pardosa striatipes* Koch.

Distribution : Cosmopolitan except Australia.

Key to the species of the genus *Pardosa* Koch

1. Ocular area black and hairy and maxillae provided with inconspicuous scopulae
 ***annandalei***
 Ocular area not black and hairy and maxillae provided with distinct scopulae 2
2. Dorsal side of abdomen pale with few small dark brown spots ***atropalpis***
 Dorsal side of abdomen dark and without dark brown spots 3
3. No longitudinal black streak present on the dorsal side of patella; chelicerae uniform in colour ***birmanica***
 Longitudinal black streak present in the dorsal side of patella; chelicerae not uniform in colour 4
4. Maxillae provided with conspicuous scopulae; ocular area without black hairy
 ***sumatrana***

19. ***Pardosa annandalei*** (Gravely)

1924. *Lycosa annandalei* Gravely, *Rec. Indian Mus.*, 26 : 606.

1995. *Pardosa annandalei* : Biswas & Majumder, *Araneae : Spiders, Fauna of Meghalaya, State Fauna Series, 4(Part 2) : 110.*

Distribution : India : Andhra Pradesh; West Bengal; Meghalaya; Kerala; Madhya Pradesh; Assam; Bihar; Maharashtra; Tamil Nadu; Gujarat.

Elsewhere : Myanmar, Bangladesh, Pakistan.

20. *Pardosa atropalpis* Gravely

1924. *Pardosa atropalpis* Gravely, *Rec. Indian Mus.*, **26** : 610

1992. *Pardosa atropalpis* : Biswas & Biswas, Araneae : Spiders, *Fauna of West Bengal, State Fauna Series*, **3**(Part 3) : 444.

Distribution : India : Andhra Pradesh; West Bengal; Bihar; Orissa; Karnataka; Tamil Nadu.

21. *Pardosa birmanica* Simon

1884. *Pardosa birmanica* Simon, *Ann. Mus. civ. stor. nat. Genova*, **20** : 333.

1995. *Pardosa birmanica* : Biswas & Majumder, Araneae : Spiders, *Fauna of Meghalaya, State Fauna Series*, **4**(Part 2) : 110.

Distribution : India : Andhra Pradesh; West Bengal; Meghalaya; Bihar; Orissa; Maharashtra; Punjab; Gujarat; Uttar Pradesh; Himachal Pradesh; Tamil Nadu.

Elsewhere : Myanmar, Pakistan.

22. *Pardosa sumatrana* (Thorell)

1890. *Lycosa sumatrana* Thorell, *Ann. Mus. stor. nat. Genova*, **30** : 136.

1995. *Pardosa sumatrana* : Biswas & Majumder, Araneae : Spiders, *Fauna of Meghalaya, State Fauna Series*, **4**(Part 2) : 111.

Distribution : India : Andhra Pradesh; West Bengal; Meghalaya; Tripura; Karnataka; Arunachal Pradesh; Himachal Pradesh; Madhya Pradesh; Maharashtra; Gujarat; Rajasthan; Tamil Nadu; Kerala.

Elsewhere : Bangla Desh, Nepal, Sri Lanka, Sumatra.

Genus *Lycosa* Latreille

1804. *Lycosa* Latreille, *Nouv. Dist. d' Hist. Nat.*, **24** : 136.

1992. *Lycosa* : Biswas & Biswas, Araneae : Spiders, *Fauna of West Bengal, State Fauna Series*, **3** (Part 3) : 440.

Type-species : *Lycosa tarantula* Ross

Distribution : Cosmopolitan.

Key to the species of the genus *Lycosa* Latreille

1. Ventral side of abdomen provided with a broad dark brown patch extending from the epigastric fold to the base of spinnerets *chaperi*
 Ventral side of abdomen pale and without such patch 2
2. Dorsal side of abdomen uniform pale and without any patch. Carapace not provided with the mid-longitudinal broad pale brown band. Coxae is reddish brown *indagatrix*

23. *Lycosa chaperi* Simon

1885. *Lycosa chaperi* Simon, *Bull. Soc. zool. Fr.*, **10** : 8.

1980. *Lycosa chaperi* : Tikader & Malhotra, *Fauna of India*, Araneae : Spiders, **1(2)** : 387.

Distribution : India : Andhra Pradesh; Tamil Nadu; Pondichery; Chennai.

Elsewhere : Sri Lanka.

24. *Lycosa indagatrix* Walckenaer

1837. *Lycosa indagatrix* Walckenaer, *Ins. Apt.*, **1** : 339.

1980. *Lycosa indagatrix* : Tikader & Malhotra, *Fauna of India*,

Distribution : India : Andhra Pradesh; Coromondal coast, Dist. Chingbpul; chennai, Tamil Nadu.

Elsewhere : Sri Lanka.

11. Family TETRAGNATHIDAE**Genus *Tetragnatha* Latreille**

1804. *Tetragnatha* Latreille, *Nouv. Diet. d'Hist. Nat.*, **24** : 135.

1992. *Tetragnatha* : Biswas & Biswas, Araneae : Spiders, *Fauna of West Bengal, State Fauna Series*, **3(Part 3)** : 448.

Type-species : *Tetragnatha extens* Linn.

Distribution : Tropical countries of the world.

25. *Tetragnatha andamanensis* Tikader

1977. *Tetragnatha andamanensis* Tikader, *Rec. zool. Surv. India*, **72** : 175.

1992. *Tetragnatha andamanensis* : Biswas & Biswas, Araneae : Spiders, *Fauna of West Bengal, State Fauna Series*, **3 (Part III)** : 448.

Diagnosis : Cephalothorax longer than wide, narrowing in cephalic region; flat, cephalic region slightly high, centre of the cephalothorax depressed. Eyes are in two rows, both rows recurved but anterior row more recurved than the posterior row. Cheliceae as long as carapace and strongly divaricate. Outer row of chelicerae provided with ten teeth, first is larger others gradually diminishing in size. Inner margin is also provided with ten but first tooth is slightly curved than the others. Fang slender and unarmed. Legs are usually long, clothed with hair and spines. Abdomen long and nearly parallel sided, clothed with fine hair. Spinnerets are nearly posterior end of the abdomen. Abdomen decorated with minute silvery white dots.

Material examined : 4♂, Kajipetu, Dist. Cuddapah, Andhra Pradesh, India, 30.xii.1999, coll. G. Sen & party; 2♀, Alampur, Dist. Mehabubnagar, Andhra Pradesh, India, 28.xii.1999,

coll. G. Sen & party; 11 ♀, Dakkili, Dist. Nellore, Andhra Pradesh, India, 28.v.2000, coll. P.H. Roy & party; 2 ♀, Visakhapatman, Dist. Visakhapatman, Andhra Pradesh, India, 4.x.1998, coll. S.K. Mandal & party.

Distribution : India : Andhra Pradesh (Dists.—Cuddapah, Mehbubnagar, Nellore, Visakhapatman, West Godavari), New record; West Bengal; Andaman and Nicobar Islands.

SUMMARY

This faunistic work summerizes the two years (2002-2003) of the families Araneidae, Eresidae, Hersilidae, Pholcidae, Salticidae, Thomisidae, Heteropodidae, Gnaphosidae, Oxyopidae, Lycosidae, Tetragnathidae. The materials provided this work usually collected from the different districts of Andhra Pradesh. During the course of studies 500 specimens of these families were examined and identified. Although these, 25 species 17 genera under 11 families were treated here. Among these, 17 species 12 genera under 8 families are recorded here for the first time from Andhra Pradesh.

The synonymes, distributional records both in India and abroad, ecological observation are given as far as possible for each species. All the references cited in the text are listed in the bibliography which is arranged authorwise and chronologically.

REFERENCES

- Biswas Bijan 1987. Araneae : Spiders, *Fauna of Orissa, State Fauna Series*, 1(Part I) : 257-272.
- Biswas Bijan & Biswas Kajal 1992. Araneae : Spiders, *Fauna of West Bengal, State Fauna-Series*, 3(Part 3) : 357-500.
- Biswas Bijan & Majumder S.C. 1995. Araneae : Spiders, *Fauna of Meghalaya, State Fauna Series*, 4(Part 2) : 93-128.
- Biswas B. K. & Biswas A.T. 1997. Araneae : Spiders, *Fauna of Nanda Devi Biosphere-Reserve, Fauna of Conservation Areas*, 9 : 35-39.
- Biswas Bijan & Majumder S.C. 2000. Araneae : Spiders, *Fauna of Tripura, State Fauna Series*, 7(Part II) : 113-122.
- Bristowe, W.S. 1958. *The World of Spiders*, London.
- Comstock, J.H. 1940. *The Spider Book*, New York.
- Tikader, B.K. 1980. *Fauna of India*, Araneae : Spiders, 1(1) : 1-247.
- Tikader, B.K. & Biswas Bijan 1981. Spider *Fauna of Calcutta and vicinity, Rec. zool. Surv. India, Occ. Pap. No.* 30(1) : 1-149.
- Tikader, B. K. 1982. Araneae : Spiders, *Fauna of India*, 2(1-2) : 1-536.

INSECTA : APTERYGOTA : COLLEMBOLA

A.K. HAZRA, G.P. MANDAL and K.K. SUMAN

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The first taxonomic study of Collembola from Andhra Pradesh was made by Mandal & Hazra (2002), wherein they have recorded 8 species and 4 genera under 3 subfamilies. All these collections were made from the Sri Sai Venkateswara National Park, Tirupati. The first record of Collembola from India was made by Ritter (1911), since then numerous workers like Imms (1912), Salmon (1957) Yosii (1966), Prabhoo (1971), Mitra (1974 & 1976) and Hazra *et al.* (1995, 2002 & 2003) have studied the Collembola fauna from different States of India and also from the adjoining State of Andhra Pradesh, like Orissa, Tamil Nadu & Kerala. Therefore, this paper is the first consolidated taxonomic study of these primitive group of insects from Andhra Pradesh which deals with 22 species under 13 genera distributed over four families.

The present study mainly deals with the collections made from the coastal districts & Southern districts of Andhra Pradesh. Therefore, the areas like North & Western districts of Andhra Pradesh are yet to be explored. It can be concluded from this account that there remains an ample scope for the future workers for studying the Collembolan fauna from Andhra Pradesh. Fourteen species & one sub-order have been recorded for the first time from this State which have been marked in asterix. The key to the families, genera & species have been provided for easy identification of the taxa. Keys are not provided for the genus which deals with single species.

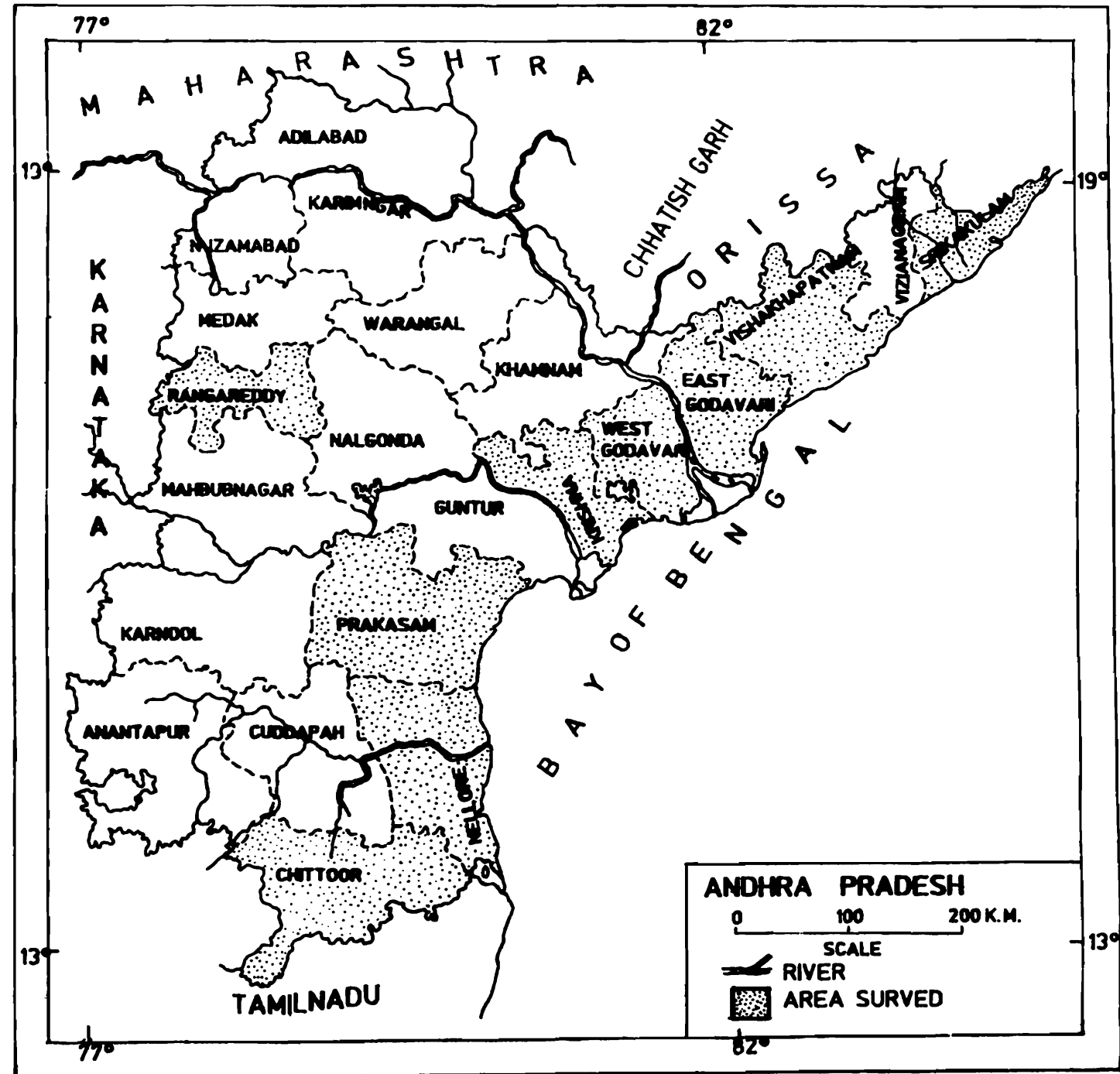
SYSTEMATIC ACCOUNT

Order COLLEMBOLA

Suborder ARTHROPLEONA

Key to the superfamilies of ARTHROPLEONA

First thoracic segment dorsally distinct and with dorsal setae
.....PODUROIDEA, Womersley, 1933



Map of Andhra Pradesh

First thorasic segment without dorsal setae and frequently more or less reduced or hidden dorsally by mesothorasic segment ENTOMOBRYOIDEA, Womersely, 1933

Key to the families of PODUROIDEA

Pseudocelli present, at least on antennal base or dorsum of fifth abdominal segment...
..... ONYCHURIDAE, Gervais, 1841

Pseudocelli absent HYPOGASTRURIDAE, Bourlet, 1839

Key to the families of ENTOMOBRYOIDEA

Hind coxae usually with trochanteral organ. Abdomen IV appreciably longer than abdomen III. Scales present or absent, often ciliated, Furcula well-developed
..... ENTOMOBRYIDAE, Tomosvary, 1882.

Hind coxae without trochanteral organ. Abdomen III & IV usually subequal; the abdomen IV never more than one and one half times as long as the abdomens III, the other posterior abdominal segments often fused subsequently. Scales usually not present
..... ISOTOMIDAE, Börner, 1913.

Key to the subfamilies of ENTOMOBRYIDAE

- 1 Dental spine simple or absent 2
 - Dental spine present on the basal portion of the dentes only TOMOCERINAE
2. Dentes dorsally crenulate and curving upward, basally in line with manubrium
..... ENTOMOBRYINAE.
 - Dentes not crenulate, straight and usually forming a basal angle with manubrium .. 3
3. Eyes and pigment absent; dens with large dorsal scales and without apical lobe
..... CYPHODERINAE
 - Eyes & pigment present; dens without dorsal scale, and with apical lobe.
..... PARONELLINAE

Family HYPOGASTRURIDAE

This family is best recognized by the absence of true pseudocelli and the simplicity of the sense organ of the third antennal segment.

This family represented by two genera and two species from Andhra Pradesh.

Genus *Hypogastrura* Bourlet, 1839

*1. *Hypogastrura indovaria* Salmon, 1970

1970. *Hypogastrura indovaria* Salmon, *Trans., Bioi. Sci.*, 12(13) : 149

Material examined : Khotavalsa garden under hey stack, Arakuvally Vizag distt., 23-xi-01, coll. A.K. Hazra, 20 exs.

Diagnostic characters : Body length upto 0.8 mm. Brownish black fields. Sparse to heavy clothing of short & long curved simple setae. Antennae shorter than head. P.A.O. very irregular consists of 4-12 indistinct disconnected lobes. With or without central boss. Abd IV with two long anal spines on papillae. Tenent hairs never clavate. Mucro finely granulate and spoon-shaped with two distinct lamellae.

Distribution : India : Andhra Pradesh, Manipur, Mizoram, Sikkim, Arunachal Pradesh.

Genus *Xenylla* Tullberg, 1869

*2. *Xenylla obscura* Imms, 1912
(Fig. I)

1912. *Xenylla obscura* Imms. *proc. Zool. Soc. London*, : 80-125.

1970. *Xenylla obscura* Salmon, *Roy. Soc. NZ. Biol. Sci.*, 12(13) : 145-152.

Material examined : Khuridongru hill top, Arauvally Vizag distt., 22-xi-01, coll. AK.Hazra, 2exs.

Diagnostic characters : Body length upto 1.4 mm; elongate in shape; colour indigo-blue, Segmental margins and ventral side pale. Antennal segments ratio as 10 : 12 : 12 : 14. P.A.O. absent. Unguis carinate; without lateral teeth, but with 1,1,1 inner tooth near the apex. Unguiculus absent. Ventral tube with 4 + 4 setae. Tenent hair 2, 2, 2 very long and capitate at the end. Dentes and mucro separated. Mucro short, obtuse, anal blunt on apex, with a narrow rounded lamella, which is often very obscure.

Distribution : India : Andhra Pradesh, Manipur, Nagaland, Sikkim, Arunachal, Pradesh & Maharashtra.

Family ENTOMOBRYIDAE

Subfamily ENTOMOBRYINAE Schaeffer, 1896

Dentes crenulated dorsally. Mucrone falcate with basal spine, it is short and hooklike. Body with hairs or scales or both, the chaetotaxy of head and trunk and eye numbers are useful in identifying the members of this family.

Genus *Lepidocyrtus* Bourlet, 1839

The genus is represented by five species from Andhra Pradesh.

Key to the species of *Lepidocyrtus*

1. Dentalobe with accessory apparatus.
..... *Lepidocyrtus (Acrocyrtus) malayanus* Yosii, 1959

- Dental lobe without accessory apparatus 2
- 2. Th. II is very prominent and protruded over the head, Abd. III : IV = 1 : 7 3
 - Th II is protruded considerably over the head. Abd. III : IV = 1 : 3
..... *L. medius* Schaeffer, 1893
- 3. Third abdominal segment heavily pigmented *L. neofasciatus* Wray, 1948
Third abdominal segment without pigment 4
- 4. Th. II is slightly protruded over the head. Th. II, III as 75:25. Abd. III : IV as 3 : 12
..... *L. (Acrocyrtus) heterolepis* Yosii, 1959
 - Mesothorax is moderately hanging over the head. Th. II : III as 2 : 1, Abd. III : IV as
1 : 4 *L. (S. Str.) curvicollis* Bourlet, 1839

3. *Lepidocyrtus* (*S. Str.*) *medius* Schaeffer, 1898 (Fig. II)

1898. *Lepidocyrtus* (*S.str.*) *medius* Schaeffer,

1913. *Lepidocyrtus* (*S.str.*) *medius* Boner, *Tijckhr. V. Entom.*, 56 : 44-61

1926. *Lepidocyrtus* (*S.str.*) *medius* Uchida, *Insecta Mat. Sap.*, 17 : 38-47.

Materials examined : Kasu Brahmananda National Park, Hyderabad, 14.vii.2000, Coll. AK.Hazra, 25 exs.; Embankment of paddy field about 5 km away from A. Kanduru, Krishna Distt. Coll. AK. Hazra, 118 exs; Nagapatla Reserve Forest, Chittor distt. Coll. A.K. Hazra, 3.xii.01, 2 exs.; Khotavalsa garden under hey stack, Arakuvally, Vizag distt., Coll. A.K. Hazra, 20 exs; Base of the Talakona hill stream, Chamla range, Chittor distt. Coll. AK. Hazra, 67 exs.

Diagnostic characters : Colour brownish white. Antennae pigmented purple distally. A median spot between eyes. Ant. seg. as 12 : 28 : 30 : 42. Th. II : III = 15 : 7. Abd. III : IV as 1 : 3. Manubrium: dens as 1 : 1. Mucro with apical tooth elongated, anteapical tooth is little smaller.

Distribution : India : Andhra Pradesh, Sikkim, Tripura,

Elsewhere : Singapore.

4. *Lepidocyrtus* (*Acrocyrtus*) *heterolepis* Yosii, 1959 (Fig. III)

1959. *Lepidocyrtus* (*Acrotyrtus*) *heterolepis* Yosii, *Contr. Biol. Lab. Kyoto. Univ.*, 10 : 33.

Material examined : Lotha vanka, Tirupati range, SVNP, Chittoor distt., 21.vii.2000, coll. A.K. Hazra, 3 exs. Kellarudu, Kondapalli range, Vijaywada, Divn., 30.xi.2001, coll. AK. Hazra. 100 exs.

Diagnostic characters : Body length upto 1.6 mm. Antennae with uniformly bluish pigment. A transverse stripe along the foremargin of head. Eyes black. Ant. segment ratio as 15 : 30 : 28 : 48. Th. II is slightly protruded over the head. Th. II, III as 75 : 25. Abd. III : IV as 3 : 12. Manubrium : Dens as 24 : 28. Mucro bidentate, two teeth subequal and with a basal spine.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Manipur.

Elsewhere : Singapore, Malay.

***5. *Lepidocyrtus (Acrocyrtus) malayanus* Yosii, 1959**

1959. *Lepidocyrtus (Acrocyrtus) malayanus* Yosii, *Contr. Biol. Lab. Kyoto. Univ.*, **10** : 28.

Material examined : Permadu Reserve Forest, Pulicat Range, 25.vii.2000. coll. A.K. Hazra, 4 exs., Saprai Base of the hill, Vizag distt. 22.xi.2001, coll. A.K. Hazra, 20 exs.

Diagnostic characters : Body length 2.5 mm. Ground colour brownish white, antennae distally with bluish pigment from Ant.II. Eyes 6 + 6. Scales are present dorsally upon Ant. I and Ant. II. Ratio of antennal segs. 9 : 18 : 11 : 23. Ths. II : III is 7 : 3; Abd. III : IV is 1 : 5. Manubrium : dentes = 9 : 8. Dorsal appendix of dental lobe is prominent, acutely pointed in profile.

Distribution : India : Andhra Pradesh, Manipur, Arunachal Pradesh

***6. *Lepidocyrtus (S. str.) curvicolis* Bourlet, 1839
(Fig. IV)**

1959. *Lepidocyrtus (S. str.) curvicolis* Yosii, *Contr. Biol. Lab. Kyoto Univ.*, **10** : 23.

Material examined : Nelapattu Bird Sanctuary, Nelapattu, Pulicat, 26.7.2000, coll. A.K. Hazra, 7 exs.

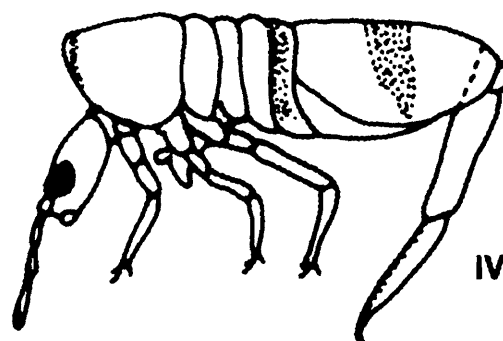
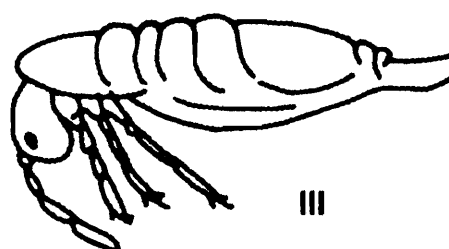
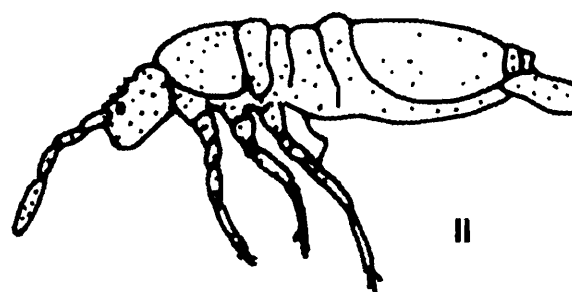
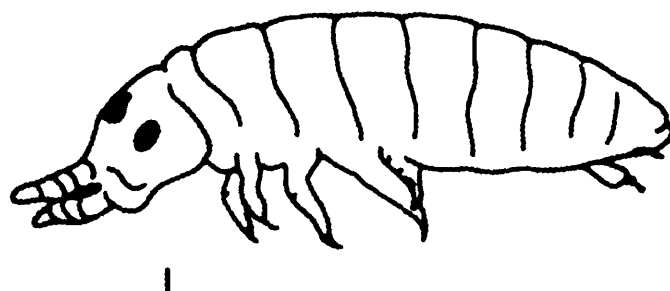
Diagnostic characters : Body upto 2.0 mm. Ground colour white with slight brownish tinge. Antennae bluish distally from Ant. II. Basal two segments of each legs slightly pigmented to blue. Eyes black. A black spot is present between eyes. Antennal segment ratio as 1 : 2 : 3. Antennae scaled from the base upto to the basal part of Ant. IV. Mesothorax is moderately hanging over the head. Th.II : III as 2 : 1. Abd. III : Abd. IV as 1 : 4. Legs are scaled until to the tibio-tarsus. Manubrium: Dens is 25:26. Dentes without dental appendix. Mucro bidentate and with a basal spine.

Distribution : India : Andhra Pradesh, Arunachal Pradesh.

Elsewhere : Singapore, Malay.

***7. *Lepidocyrtus neofasciatus* Wray, (1948)**

1967. *Lepidocyrtus neofasciatus* Snider, *Bull. Brooklyn. Ent. Soc.*, **43** : 44.



Figs. I-IV. I. *Xenylla obscura*; II. *Lepidocyrtus* (S. Str.) *medius*; III. *Lepidocyrtus* (*Acrocyrtus*) *heterolepis*; IV. *Lepidocyrtus* (S. Str.) *Curvicollis*

Material examined : Khotavalsa, under banana plantation, Vizag, distt. 23.xi.01, coll. A.K.Hazra, 20 exs.; Padmavati Garden, Vizag distt. 22.xi.01, coll. A.K. Hazra, 2 exs.

Diagnostic characters : Background yellow with dark blue pigment in transverse bands, one covering the second and most of the third abdominal segment; one across the middle of the fourth and one on the fifth abdominal segment; sometimes with scattered pigment on posterior margin of first abdominal segment; Mesothorax projecting prominently pushing head into ventral position. Unguis with 3 small inner teeth and large lateral and external teeth. Body length upto 1.5 mm.

Distribution : India : Andhra Pradesh.

Remarks : Recorded for the 1st time from India.

Genus *Entomobrya* Rondani

*8. *Entomobrya* sp.

Material examined : Road side *Eucalyptus* plantation side, Osmania Univ. Campus, Hyderabad, 15.vii.2000, coll. A.K. Hazra, 46 exs.

Diagnostic characters : Light ochre-yellow marked with patches of violet-black. The eyes on a large irregular black area on each side; Head slightly longer than broad, eyes 8+8; Antennal segment ratio 5 : 6 : 6 : 11. Trunk fusiform, clothed with short, curved plumose hairs; A single tenent hair in relation to each foot. The dentes a little longer than the manubrium, very slender, mucrone tri-dentate, with a curved terminal tooth, a stout, erect conical middle tooth and an oblique acicular posterior tooth.

Distribution : India : Andhra Pradesh, West Bengal.

Genus *Homidia* Boner, 1906

*9. *Homidia cingula* Boner, 1906 (Fig. VII)

1906. *Homidia cingula* Boner.

Material examined : Khuridongru hill top, Vizag distt. 22.xi.01, coll. A.K. Hazra, 55 exs.

Diagnostic characters : Back ground yellowish, Blue-black pigment forming transverse band on the III-rd and IV-th abdominal segments. Body not compressed. Dental spine '33' in numbers. Apical mucronal tooth smaller than anteapical.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Manipur, Sikkim.

Genus *Seira* Ritter, 1911

*10 *Seira indica* (Ritter) 1991 (Fig. VI)

1911. *Callistocyrtus indicus* Ritter. Gesammelt von Dr. Vzel. Wien. Ann. Nat. Hist. Hofmus, 24 : 379-398.

1966. *Seira indica* Yosii, *Kyoto. Univ. Sci. Expt.* Vol. 8 : 333-405.

Material examined : Khuridongru hill top, Vizag distt. 22.xi.01, coll. A.K. Hazra, 10 exs.

Diagnostic characters : Body length 1.8 mm. Slender in general form. Body colour brownish with bluish pigments. Yellowish brown pigments cover the whole of Abd. II, III as well as some spots of head & Th. II. Ant. ratio as 7 : 9 : 9 : 45. Antennal scaled dorsally until ant. III Ant. IV faintly annulated.

Distribution : India : Andhra Pradesh, Arunachal Pradesh & Maharashtra.

Subfamily CYPHODERINAE Bomer, 1913

Member of this subfamily may be distinguished from other Entomobryids by the reduced numbers of ocelli, dental foliate appendages and sometimes dental spines appendage.

Key to the genera of CYPHODERINAE

Unguis with theca, inner unguis teeth normal, not modified, fringed plate-like processes on external surface of unguis absent; molar area reduced, represented by 4-5 teeth; mucrones very small, usually with 2-3 teeth *Pseudocyphoderus* Imms.

Unguis with rightly developed tunica at apex, one of the inner unguis teeth modified into a tendril-like process, fringed plate-like process on external surface of unguis; molar area well developed; mucrones very long, subequal to dentes, with 2 teeth.
..... *Delamarerus* Mitra

Genus *Pseudocyphoderus* Imms, 1912

11. *Pseudocyphoderus annendelai* Imms, 1912

(Fig. V)

1912. *Pseudocyphoderus annendelai* Imms, *Proc. Zool. Soc. London*, : 80-125.

Material examined : Balapalli koneru from Termite mounds; Chittoor distt. 23.vii.2000, coll. A.K. Hazra, 120 exs.; Bank of the Tirumala Bhandala, Chamala range, SVNP, Chittoor distt. 22.vii.2000, coll. A.K. Hazra, 147 exs.; Anumokona on the bank of Kalyani dam, Chamala range, from Termite mounds, SVNP, Chittoor distt., 22.vii.2000, coll. A.K. Hazra, 220 exs.; Osmania Univ. Campus, Hyderabad, 15.vii.2000, coll. A.K. Hazra, 24 exs. Inside Zoo, Vizag from Termite mounds, 26.xi.2001, coll. A.K. Hazra, 38 exs.; padmavati garden, from Termite mounds, Araku Valley, 22.xi.2001, coll. A.K. Hazra. 2 exs.

Diagnostic characters : Body length upto 1 mm. Head considerably broader than long. antennal segments ratio 6 : 14 : 14 : 13 Body densely covered with small scales, Abd IV five times longer than third. A single tenent hair in relation to each foot. Furcula moderate in size. The manubrium divided imperfectly into proximal & distal portions. The dentes just about half the length of the manubrium. The mucro very small and armed with four teeth.

Distribution : India : Andhra Pradesh, Orissa.

Genus *Delamarerus* Mitra, 1976

12. *Delamarerus immsi* Mitra, 1976

1976. *Delamarerus immsi* Mitra, *Rev. Ecol. Biol. Sol.*, 13(4) : 645-652.

Material examined : Anumokona on the bank of Kalyani Dam. From Termite mounds, chamla range, Chittor distt., 21.vii.2000, coll. A.K. Hazra, 110 exs. Vijay vihar, Nagaljun Sagar from Termite Mounds, Sri Sailam distt. 18.vii.2000, coll. A.K. Hazra, 120 exs.; Cave of Termite mounds, Vizag, 26.xi.2001, coll. A.K. Hazra, 42 exs.

Diagnostic characters : White without trace of dark pigment Ths. I, II, Abds. I, II, III each medially and laterally with 1 + 1 short, smooth setae, Abds. IV, V, VI posteriorly with some long, thick setae; antennae uniformly clothed with short setae. Head triangular in out line, frontal area well developed, relative length index of Ants. I : II : III : IV = 2 : 8 : 4 : 7; antennae/body = 20/64. Relative length index of Ths. II : III = 35 : 18. Relative length index of Abds. I : II : III : IV : V : VI = 8 : 10 : 9 : 73 : 3 : 1. Ventral tube moderately developed with vesicles retracted; relative length index of manubrium : dentes : mucrone = 15:7:5; mucrone very long, Slender apically with 2 teeth; each dentes ventrally with 7 foliate plumose scales. Length (excluding appendages) : 1.6 mm.

Distribution : India : Andhra Pradesh, Orissa.

Subfamily PARONELLINAE Boner, 1913

This subfamily can be distinguished from other Entomobryids by the right and short dentes, presence of dental scale appendage on the terminal part of dentes. The mucrones in majority cases are plump, lobed into several teeth and is different in shape from the members of subfamily Entomobryinae.

Key to the genera of subfamily PARONELLINAE

1. Body covered with scale 2
 - Body not covered with scale 4
2. Eye 8 + 8 3
 - Eye reduced in number *Alloscopus* Boner
3. Basal seta of the outer maxillary ramus is blunt *Callyntrura* Boner
 - Basal seta of the outer maxillary ramus is pointed *Dicranocentroides* Schott
4. Mucro stout, usually tridented, dentes not annulated *Salina* MacGillivray

- Mucro vestigial, sometimes visible as hooklet, fused with dentes, dentes annulated...
..... *Yosiia* Mitra

Genus *Callyntrura* Bomer, 1906

The genus is represented by six species from Andhra Pradesh.

Key to the species of *Callyntrura*

1. Dental scale appendage present(*Handschinphysa*) 2
Dental scale appendage absent (*Callyntrura*) 5
2. Head, Ths. II, III, Abds. I-II entirely pigmented with deep blue-black pigment 3
 - Pigment variable, involving forms without pigment to darkly pigmented; Ths. II, III and Abds. I-VI chaetotaxic formula of Ths. n, III/Abd. I, n, III. = 18, 20-21/11, 10, 9
..... *C (H) lineata* (Parona) 1892
3. Abds. IV-VI medially neither with transverse pigmented bands, spot nor patches; chaetotaxic formula of Ths. II, III/Abds. I, II, III = 15, 18/12, 11, 10.
..... *C(B) vestita* (Handschin) 1925
 - Abds. IV-VI medially with either transverse pigmented bands or patches 4
4. Abd. III devoid of any pigmented band or spots 6
 - Abd. III laterally with conspicuous pigmented spot on each side, chaetotaxic formula of Ths. II, III, Abds. I, II, III = 24-26, 23/15, 12, 11 *C (H) delamarei* Mitra, 1974
5. Ventral side of mucro with many serrations *C. serrata* Salmon (1957)
 - Ventral side of mucro with distinct teeth *C. japonica* Kinoshita (1917)
6. Body with variable patternings, head, Th. II with dark blue-black pigment.
 - Body with faint purple to blue pigment, a narrow stripe present laterally
..... *C zaheri* Mitra, 1974

13. *Callyntrura japonica* (Kinoshita, 1917) (Fig. VIII)

1977 *Callyntrura japonica* Yosii, *Forest Res. Centre, Sepilok, Sand, East. Malaysia* : 1-37.

Material examined : Lower stream of Oodagamanudoddi, Tirupati range, SVNP, Chittoor distt. 21.vii.2000, coll. A.K. Hazra, 152 exs.

Diagnostic characters : Body length 3 mm. Ground colour of body is cremish white. Head is dark, the base of the antennae are more deeper in colour. Thorax is obscurely dusky all over the marginal area of each segments. Abd. IV bears a narrow transverse patch. Antennae scaled. Ventral tube deeply dark. Furca long, scaled dens without spines but with prominent dorsal vesicle. Mucro elongated with teeth.

Distribution : India: Andhra Pradesh, Arunachal Pradesh, Manipur, Meghalaya.

Elsewhere : Japan.

14. *Callyntrura (Handschinphysa) lineata* (Parona, 1892)

1892. *Entomobrya lineata* Parona, Atti. Soc. Hal. Milano., **34** : 132-135.

1912. *Paronella borneri* Imms. Proc. Zool. Soc. London, 80-126

1912. *Paronella phanolepis* Imms., Proc. Zool. Soc. London, 80-125

1957. *Handschinphysa lineata* Salmon. Acta. Zool. Cracov., **11**(14) : 313-362.

1974. *Callyntrura (Handschinphysa) lineata* Mitra, Rev. Ecol. Biol. Soc., **11**(3) : 397-439.

Material examined : Downstream of Ethiopothla water falls, Nagarjun Sagar, 17.vii.2000, coll. A.K. Hazra, 62 exs.

Diagnostic characters : Ground colour of body pale yellow with variable purple to blue-black pigment; Ocellar fields black. Head body and appendages clothed with setae & pseudoscales; ocelli, 8 + 8. Relative length index of Ths. II : III = 52 : 22; unguis elongate, unguis with paired inner and a distal unpaired teeth; Relative length index of Ads. Segs. is 13 : 24 : 8 : 130 : 12 : 5; rami of retinaculum each with 4 teeth; manubrium: mucrodens = 110 : 148; dens stout, slightly tapers distally; mucro plump, number of mucronal teeth in adults varies from 6-9, dental scale appendage well developed. Body length (excluding appendages) : 2.5-4 mm.

Distribution : India : Andhra Pradesh, Manipur, Sikkim.

*15. *Callyntrura (Handschinphysa) delamarei* Mitra, 1974

1974. *Callyntrura (Handschinphysa) delamarei* Mitra, Rev. Ecol. Biol. Soc., **11**(3) : 397-439.

Material examined : Khuridangru hill top, Araku Valley, 22.xi.01 coll. A.K. Hazra, 52 exs. Saprai base of the hill, Araku Valley, 22.xi.01, coll. A.K. Hazra, & party 20 exs.

Diagnostic characters : Pale-yellow in spirit, dark violet to blue-black patches covering head. Ths. II, III, Abd.I and Abd. II; Abd.IV just at the middle with a narrow transverse stripe; Body clothed with scales usually lanceolate in shape; Pear-shaped 4+4 dark frontal spines present; 8+8 ocelli present. Relative length index of Ths. II : III = 11.5 : 6; Relative length index of manubrium: mucrodens = 26:36; mucro deeply lobed into six teeth, dental scale appendage large. Body length (excluding appendages) : 2-2.5 mm.

Distribution : India : Andhra Pradesh, Orissa.

16. *Callyntrura vestita* (Handschin, 1925)

1925. *Microphysa vestita* Handschin, Treubia, **6** : 225-270.

1957. *Handschinphysa vestita* Salmon, *Acta. Zool. Cracov.*, **11**(14) : 313-362.

1974. *Callyntrura (Handschinphysa) vestita* Mitra, *Rev. Ecol. Biol. Soc.*, **11**(3) : 391-439.

Material examined : Upper course of hill-stream of Talakona, Chittor distt, 5.xii.01, coll. A.K. Hazra, 2 exs.

Diagnostic characters : Body clothed with flexed macrochaetae, acuminate non-flexed setae and scales; Head pear-shaped, ocelli 8 + 8, relative length index of Ants. I : II : III : IV = 43 : 40 : 27 : 60. Relative length index of Ths. II : III—63 : 31; tenent hair well developed, clavate, Relative length index of Abds. I : II : III : IV : V : VI = 18 : 31 : 14 : 172 : 22 : 9; manubrium : mucrodens = 45 : 53; mucro usually with 6 teeth, dental scale appendages small.

Distribution : India : Andhra Pradesh, Manipur, Meghalaya.

Elsewhere : Java.

17. *Callyntrura (Callyntrura) serrata* (Salmon, 1957)

1957. *Handschinphysa serrata* Salmon, *Acta. Zool. Cracov.*, **11**(14) : 313-362.

1964. *Aphysa serrata* Salmon, *Bull. Roy Soc., N.z.*, (7)**2** : 145-644.

1974. *Callyntrura (Callyntrura) serrata* Mitra, *Rev. Ecol. Soc.*, **11**(3) : 397-439.

Material examined : Borra cave entrance, Araku Valley, Vizag distt., 25.xi.01, coll. A.K. Hazra, 70 exs.

Diagnostic characters : Body length (excluding appendages) 1.4 m.m. Tergal margin of Ths. II, III, Abds. I, III with dark-blue pigment, ocelli 8+8. Manubrium to dens to mucro = 54 : 85 : 4. Mucro with two prominent apical teeth, one prominent subapical tooth on the posterior face, a large lateral tooth and a row of tooth like serration along the posterior edge which is most salient feature of the species.

Distribution : India : Andhra Pradesh, Nagaland, Tripura.

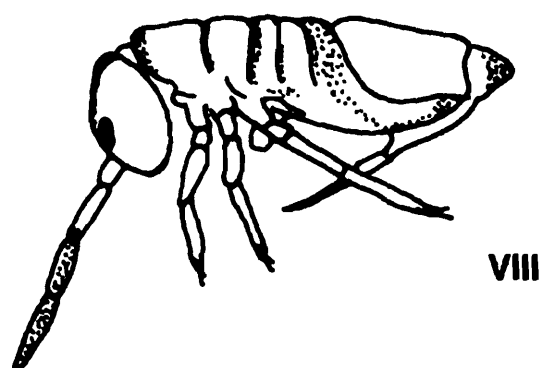
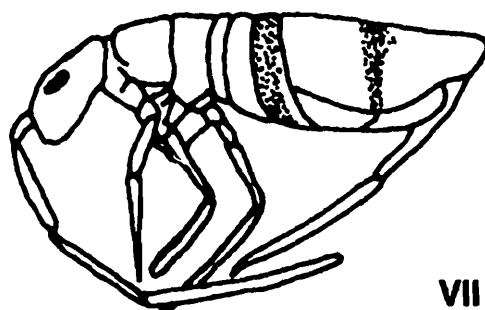
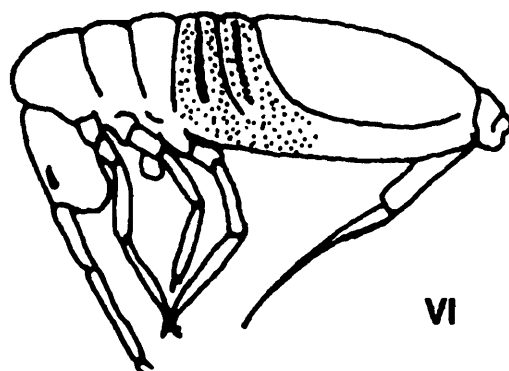
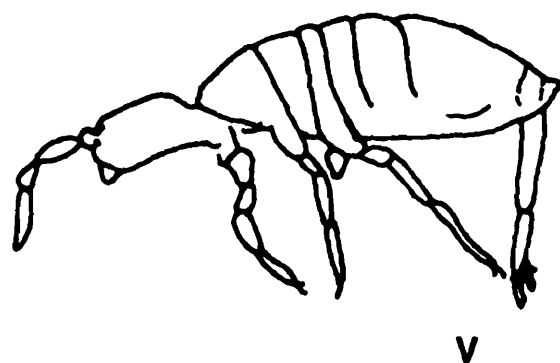
*18. *Callyntrura (Callyntrura) zaheri* Mitra, 1974

1974. *Callyntrura (Callyntrura) zaheri* Mitra, *Rev. Ecol. Biol. Soc.*, **11**(3) : 397-439.

Material examined : Borra-cave entrance, Araku Valley, 25.xi.01, coll. AK. Hazra, 54 exs.

Diagnostic characters : General ground colour pale-yellow with variable violet to blue black patches on head & body. Body clothed with ciliated setae & scales; Head pearshaped, 8+8 ocelli; Relative length index of Ths. II : III = 16 : 6.5; legs similar; tenent hair well developed, clavate, relative length index of manubrium : mucrodens = 37 : 44, mucro deeply lobed into 7 teeth, dental scale appendage absent.

Distribution : India : Andhra Pradesh, West Bengal.



Figs. V-VIII. V. *Pseudocyphoderus annendelai*; VI. *Siera indica*; VII. *Homidia cingula*; VIII. *Callyntrura japonica*.

Genus *Dicranocentroides* (Imms, 1912)*19. *Dicranocentroides indica* (Handschin, 1929)
(Fig. IX)1929. *Aphysa indica* Handschin, *Res. Suisse, Zool.*, **36** : 221-262.1975. *Dicranocentroides indica* Mitra, *Rèc. Zool. Surv. India.*, **71** : 57-95*Material examined* : Base of Talakona hill Stream, Chittoor dist., 4.xii.2001, coll. A.K. Hazra, 52 exs.*Diagnostic characters* : Ground colour brown with faint blue pigments all over the head and body. Head with two dark ocellar fields, each field containing '8' ocelli arranged in two longitudinal parallel rows, Ant. I : II : II : IV = 17 : 19 : 13 : 25; Ant. IV superficially annulated, apical sense knob not distinct. Th. II : III = 12 : 9; Abd. I : II : III : IV : V : VI = 6 : 6 : 3 : 29 : 3 : 1. Manubrium : mucrodens = 22 : 35; each dentes with two closely apposed rows of spines on inner margin; mucro short with six teeth.*Distribution* : India : Andhra Pradesh, Manipur, Nagaland, Mizoram & Kerala.Genus *Pseudosalina* Mitra, 1973*20. *Pseudosalina multiformes* Mitra, 19731973. *Pseudosalina multi formes* Mitra, *Rev. Ecol. Biol. Soc.*, **10**(3) : 359-377.*Material examined* : Padmavati garden, Araku Valley, 22.xi.01, coll. A.K. Hazra, 2 exs.*Diagnostic characters* : General ground colour of head and body varies from white to pale yellow, darker patches present on Ths.II, III and anteriorly on Abd.I; Body clothed with micro-and macro chaetae; micro chaetae acuminate and form the general clothing of the body. 8+8 ocelli in dark pigmented ocellar fields; relative length index of Ants. I : II : III : IV = 13 : 8 : 7 : 18; relative length index of Ths. II : III = 26 : 17; Unguis elongate, unguiculus lanceolate; tibiotarsal lobes present; tenent hair finely ciliated. Relative length index of Abds. I : II : III : IV : V : VI = 14 : 21 : 8 : 75 : 7.5 : 7; relative length index of manubrium: mucrodens = 59 : 66; mucro bidentate; dental scale appendage finely striated. Body length 1.3 mm.*Distribution* : India : Andhra Pradesh, Dehradun (Uttaranchal).

Family ISOTOMIDAE

Genus *Isotomurus* Boner*21. *Isotomurus balteatus* (Reuter) 1876
(Fig. X)1876. *Isotoma balteatus* Reuter. *Med. Soc. Fauna et. Flora, Fenn.*, **I** : 82.

1963. *Isotomurus balteatus* Yosii, *contr. Biol. Lab. Kyoto, Univ.*, 15 : 4

Material examined : Nagapatla Reserve Forest, Chittor dist., 02.xii.2001, coll. A.K. Hazra, 25 exs.

Diagnostic characters : Colour with a violettish-black pigment which from distinct transverse band on the anterior margin of tergites. Antennal ratio = 10 : 15 : 16 : 26; Ant. IV with two short sub apical sense rods. P.A.O. as large as anterior ocellus. Ocelli 8 + 8. Furcula reaches forward to the ventral tube. Segments as 5 : 12 : 1. Dens distinctly annulated with dorsal side; mucro with a small apical, 2 large subapical and a large external lateral teeth.

Distribution : India : Andhra Pradesh, Manipur, Tripura, Kerala.

*Suborder SYMPHYPLEONA

Body globular; anterior 4 abdominal segments fused dorsally; furcula always well developed.

Key to the families of SYMPHYPLEONA

1. Antenna shorter than head; eyes absent NEELIDAE
- Antenna longer than head, or at least 1 + 1 eyes (sometimes unpigmented) SMINTHURIDAE

Family SMINTHURIDAE

This family represents single genus & species from Andhra Pradesh.

Genus *Sminthurides* Boner, 1906

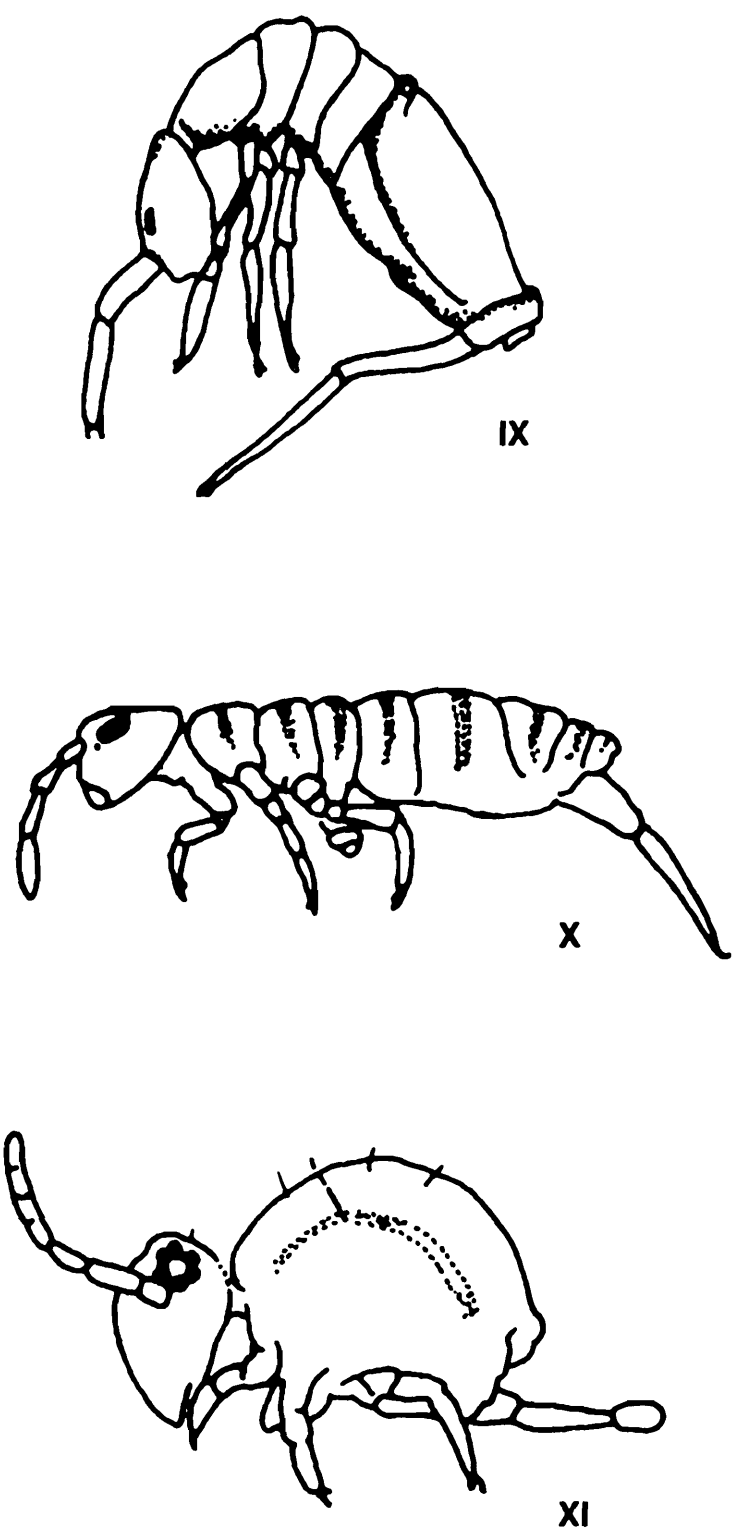
*22. *Sminthurides appendiculatus* Imms., 1912
(Fig. XI)

1912. *Sminthurides appendiculatus* Imms., *Proc. Zool. Soc. London*, : 80-125.

Material examined : Upper course of hill Stream, Talakona, Chittor dist., 5.xii.01, coll. A.K. Hazra, 2 exs.

Diagnostic characters : Trunk indigo-blue dorsally, with small pale yellow-markings. Antennae slender, segment ratio 8 : 11 : 22 : 32; Ventral tube short, without elongate vesicles. Furcula well developed, the dentes, equal in length to the abdomen; the mucrones very large. Body length (excluding appendages) : 0.5–0.75 mm.

Distribution : India : Andhra Pradesh, West Bengal.



Figs. IX-XI. IX. *Dicranocentroides indica*; X. *Isotomurus balteatus*; XI. *Sminthurides appendiculatus*.

ACKNOWLEDGEMENT

We express our sincere thanks to the Director, Zoological Survey of India, Kolkata for providing laboratory facilities.

REFERENCES

- Hazra, A.K. 1995. Insecta : Apterygota : Collembola. In : *Fauna of Meghalaya, State Fauna Series*, 1(Part 3) : 13-32.
- Hazra, A.K., Mandal, G.P., Mitra, S.K. & Miss. B. Bhattacharya, 2002. In : *Fauna of Mizoram, State Fauna Series*, 11 : 1-13.
- Hazra, A.K., Mandal, G.P., Mitra, S.K. & Miss. B. Bhattacharya, 2003. In : *Fauna of Sikkim, State Fauna Series* (Part 2) : 109-123.
- Imms, A.D. 1912. On some Collembola from India, Burma & Ceylon with a catalogue of Oriental Species of Order. *Proc. Zool. Soc. London*, : 80-125.
- Mandal, G.P. & Hazra, A.K., 2002. Collembola Insects from Sri Sai Venkateswara National Park, Tirupati, Andhra Pradesh, *Bionotes*. Vol. 4(4) : 89.
- Mitra, S.K. 1974. A critical study on some species of *Callyntrura* Boner, 1906 (Collembola : Entomobryidae : Paronellinae) from India. *Rev. Ecol. Bioi. Soc.*, 11(3) : 397-439.
- Mitra, S.K. 1976. A new genus & species of termitophilous Collembola (Entomobryidae: Cyphoderinae) from India. *Rev. Ecol. Bioi. Sol. Paris*, 13(4) : 645-652.
- Prabhoo, N.R. 1971. Bark & Moss inhabiting Collembola of South India. *Bull. Ent.*, 12(1) 41-47.
- Ritter, W. 1911. New Thysanuren and Collembolen aus Ceylon and Bombay. *Gesammelt von Dr. Uzel. Wien. Ann. Nat. Hist. Hofmus*, 24 : 379-398.
- Salmon, J.T. 1957. Some Paronellinae (Collembola) from India, *Acta. Zool. Cracov.*, 11 (14) : 313-363.
- Yosii, R. 1966. On some Collembola from Afgansitan, India and Ceylon, collected by Kuphe Expedition 1966. *Res. Kyoto. Univ. Sci. Exped. Karakoram & Hindukush*, 1955, 8 : 333-405.

INSECTA : THYSANURA (APTERYGOTA)

A. K. HAZRA, G.P. MANDAL and ANAND KUMAR A.

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The order Thysanura comprises popularly known insects of 'silver-fish' and 'bristle-tail' belonging to the Sub-Class Apterygota. There are two suborders under suborder Microcoryphia, there is one superfamily Machiloidea, which consist two families Machilidae and Meinertellidae. The suborder Zygentoma has one superfamily Lepismatoidea, under which there are three families Lepidotrichidae, Nicoletiidae and Lepismatidae. These insects generally have very long, many segmented antennae, cerci and median tail. Blind as well as eyed forms occur and most species are heavily clothed with scales which give these insects a mottled black, brown, silvery or golden appearance. The free living forms are found in the forest floor, under bark of trees, under rocks in the nests of ants and termites. Some species often cause damage to books, and other household articles.

Escherich (1903) studied the Indian Thysanuran fauna for the first time and Silvestri 1913, '38, '48) has contributed to our knowledge of Indian species. Since then works on Indian Thysanuran Fauna was neglected for a long time. After that Hazra (1980) has described a new species from West Bengal and Mendes (1990) described some zoogeographic affinities of Indian thysanura.

The paper deals with only 7 species under 5 genera distributed over 3 families under the sub-order Microcoryphia and Zygentoma of order Thysanura; of these genera *Ctenolepisma* and *Machilanus* are being recorded for the first time from Andhra Pradesh.

The work also provides key to families, genera and species. The classification followed in the present study is after Paclt, 1967.

SYSTEMATIC ACCOUNT

Order THYSANURA

Key to the families of THYSANURA

1. Eyes and ocelli absent.....NICOLETIIDAE

- Eyes present 2
- 2. Ocelli absent; scales present LEPISMATIDAE
- Ocelli present, compound eyes large, abdominal segments I-VII usually with one or two pairs of exsertile vesicles, stylets generally present on second and third thoracic coxae and on abdominal sternites II-IX. Thorax dorsally not flattened. Body always scaled MACHILIDAE (Bristle tails)

Family MACHILIDAE

Genus *Machilanus* Silvestri

1. *Machilanus lapidicola* Wygodzinsky (Fig.1)

1974. *Machilanus lapidicola* Wygodzinsky, *Amer. Mus. Nov.* No. 2555 : 3-21.

Diagnosis : Maximum body length observed 13 mm in female. Body colour yellowish-white, compound eyes large, below, the anterior margin of eyes a pair of ocelli. Thorax dorsally not flattened and convexed. Apical segment of maxillary palp of female 7 segmented, sub cylindrical and pointed distally, II-VII segments of maxillary palp with abundant setulae; apical segment of labial palp moderately widened, labial palp 3 segmented, 2nd and 3rd segment with setulae occupying entire disc; femora of all pairs of legs of female without spine like setae; abdomen with II-VI with a pair of stylets; 2+2 exsertile vesicle found between in II-V segment; posterior angle of sternum V approximately 110 degrees; ovipositor stout, secondary type, attaining level of middle of styli IX.

Material examined : Talakona water falls, Chamla Range, Tirupati, 22.7.2000, Coll. A.K.Hazra and Party, 5 exes.

Distribution : India : Andhra Pradesh, Sikkim (Ravangla), Kashmir.

Remarks : This species is the first record from the State of Andhra Pradesh, earlier recorded only from Kashmir and Sikkim.

Family LEPISMATIDAE

Key to the genera of LEPISMATIDAE

- 1. Dorsal and abdominal setae or bristles arranged singly 4
- Dorsal and abdominal setae or bristles arranged in 1 + 1 or 2 + 2 bristle combs 2
- 2. Last tergum not sharply pointed with only 1+1 bristle combs
..... *Ctenolepisma* Escherich, 1905

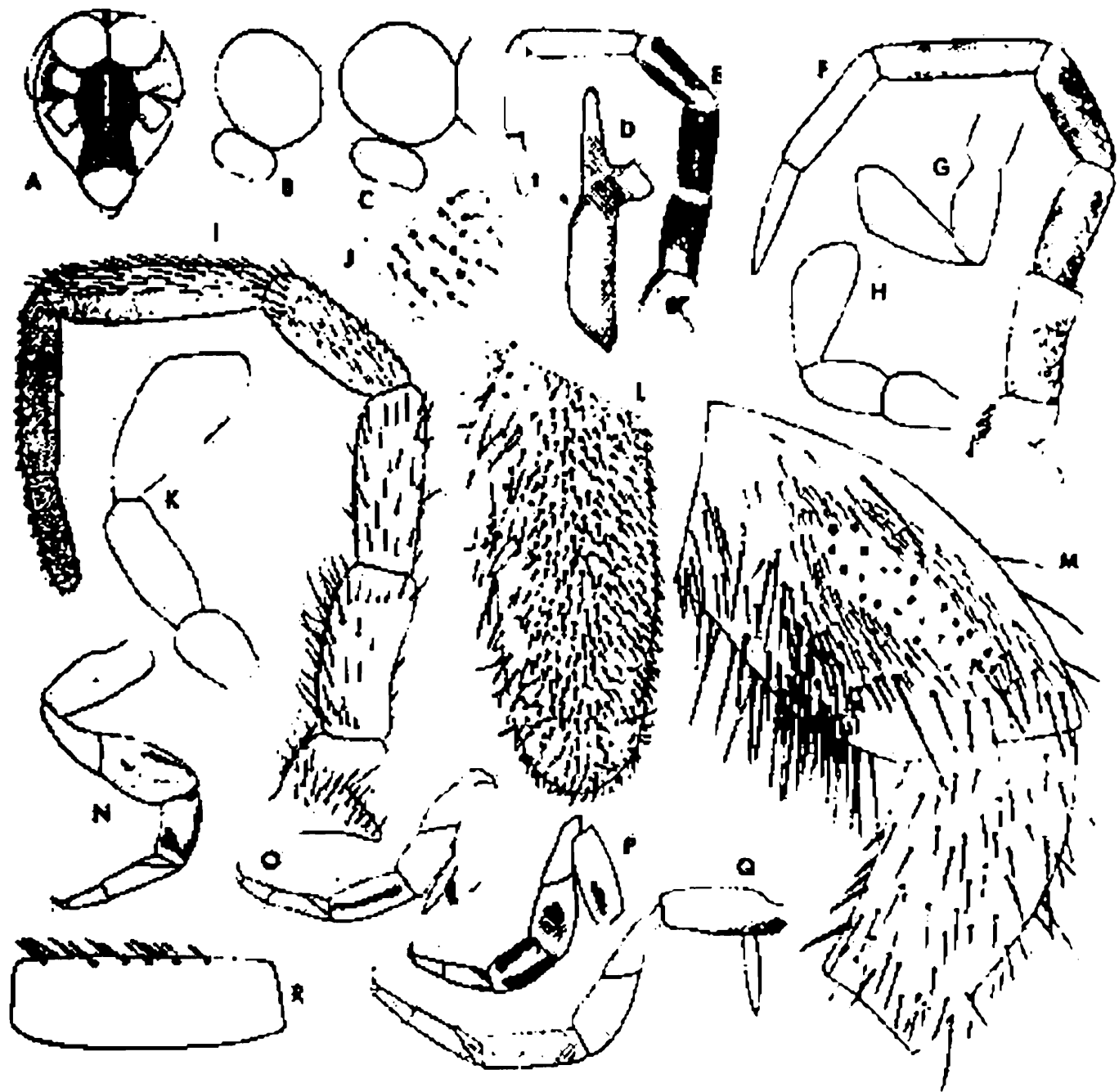


Fig. 1. *Machilanus lapidicola*. A. head, B. Eye and ocellus. C. Eye and Ocellus. D. mandible. E Maxillary palp of male. Pigment pattern. F. maxillary palp of female. G. labial palp. H. labial palp of female. I. Maxillary palp of male. J. setae of maxillary palp of male, K. labial palp of male. M. femur and tibia of foreleg of male, N. Foreleg of male. O. Hind leg of female. Q. Hind leg of male, R. Hind tibia of male.

- Last tergum sharply pointed with more than 1 + 1 bristle combs 3
3. Sub median fields of macrochaetae of head capsule narrowly elongated, not attaining the anterior border of head capsule *Acrotelsa* Escherich, 1905
- Dorsal and abdominal setae or bristle arranged singly. Tergite X of abdomen mostly longer than broad at base without any traces of bristle combs
 *Lepisma* Linnaeus 1756

Genus *Lepisma* Linnaeus 1758

2. *Lepisma saccharina* Linnaeus 1758

1758. *Lepisma saccharina* Linnaeus, *Syst. Natur.*, (ed. 10)1 : 806.

1984. *Lepisma saccharina*, Mendes, *Stoff. Heit. Naturk.* 9 : 372.

Diagnosis : Body color Silvery gray; Length–1/2 inch; Body long, narrow and slightly tapering. Head narrower than thorax without distinct neck; eyes present but not much protruding; prothorax the longest; maxillary palpi 5 segmented, long; labial palpi 4 segmented with swollen apical segment, which is wider than long. Stylets in two pairs on abdomen VIII and IX; addominal tergite with 1+1 bristle combs; tenth abdominal tergum rather elongate, distinctly longer than wide; abdominal sterna with median bristle combs in addition to sublateral ones; ovipositor of female hardly extends beyond apex of inner process of coxites IX.

Material examined : Bamboo clump litter, A.V. Campus, Vizag. Distt. Andhra Pradesh, 25.11.2001, Coll. A.K.Hazra and Party, 12 exs; Siddalairu Range, Tirupati, 23.7.2000, Coll. A.K.Hazra and Party, 8 exs.

Distribution : India : Andhra Pradesh, Sikkim.

Remarks : The above species is normally domestic and widely distributed in palaearctic, Ethiopian and Indian Regions.

Genus *Acrotelsa* (Fabricius, 1793)

3. *Acrotelsa collaris* (Fabricius, 1793)

1793. *Lepisma collaris* Fabricius, *Ent. Sys.*, II. : 64.

1873. *Lepisma mucronata* Packard, *Fifth Ann. Rept. Peabody Acad. Sci.*, : 23-51.

1913. *Acrotelsa collaris* Silvestri, *Rec. Ind. Mus.* (Calcutta) 9 : 58

Diagnosis : Body long and robust. Base of the body is light yellowish in colour and covered with dark brown scales. The macrochaetae in submedian field of the head capsule are arranged in a narrow elongated strip, which do not touch the anterior border of the head capsule). The prosternum is covered by the fore coxae. A bunch of solitary macrochaetae is present in the middle of the prosternum. The species can also be recognised by the arrangement

of macrochaetae on legs and cerci which are in distinct whirls, this type of arrangement of setae on these appendages are not found in other Lepismatids. Tergum X is triangular and sharply pointed with at least 5 pairs of bristle combs. Ovipositor with fossorial spines apically on posterior gonapophyses and male with parameres. Body length: 16 mm - 18 mm.

Material examined : Mahavir Harina Vansathali National Park, Hyderabad, 15.07.2000, Coll. A.K.Hazra and Party, 22 exs.

Distribution : INDIA : Andhrapradesh, West Bengal; USA, CARRIBEAN ISLANDS.

Remarks : It is a tropicopolitan species.

Genus *Ctenolepisma* Escherich 1905

Key to the species of Genus *Ctenolepisma* Escherich

1. Abdominal terga II-VI with 3+3 bristle comb 2
 - Abdominal terga II-VII with 3+3 bristle comb. Length within 10 mm. Ovipositor of female with fossorial spine apically *Ctenolepisma dubitalis* Wygodzinsky
2. Maximum length about 10 mm; antennae and caudal filaments not longer than body; distinct violaceous hypodermal pigment on head, body and appendages *Ctenolepisma ciliata* (Dufour)
 - Length 13-15 mm; antennae and caudal appendages longer than body; head, body and appendages practically without hypodermal pigment *Ctenolepisma longicaudata* Escherich

4. *Ctenolepisma dubitalis* Wygodzinsky, 1959

1959. *Ctenolepisma dubitalis* Wygodzinsky: In studies on the fauna of Curacao and other Caribbean Island, 9, No. 36 : 35.

Diagnosis : Body length 9 mm; body yellowish-white; antennae faintly and caudal appendages distinctly violaceous; thorax almost as long as abdomen, slightly wider than abdomen; antennae longer than body; Maxillary palp slender; labial palp with apical segment slightly wider than long, bearing 5 sensory papillae. Abdominal tergite II-VII with 3+3 bristle combs tergite X shorter than wide, broadly truncate, with 1 + 1 bristle comb; two pair of stylets present on VIII and IX segments; ovipositor of female short and stout with fossorial spine.

Material examined : Kellarudu, lower stream, Kondapalli range, Vijaywada distt. Andhra Pradesh, 30.11.2001, Coll. A.K.Hazra and Party, 3 exs; Permadu Reserve Forest, Pulicat Range, 25.7.2000, Coll. A.K.Hazra and Party, 14 exs.

Distribution : India : Andhra Pradesh, Sikkim, Manipur.

5. *Ctenolepisma ciliata* (Dufour)

1831. *Lepisma ciliata* Dufour *Ann. Sci. Nat.*, **22** : 420.

1890. *Lepisma ciliata* : Grassi et Rovelli, *Nat. Sci.*, **9** : 80.

1905. *Ctenolepisma ciliata*, Escherich, *Zoologica (Stuttgart)* **83** : 80.

Diagnosis : Body elongated, head broad, eyes clearly projecting; thorax broader than the abdomen; tergite IX small, half the length of tergite VIII; tergite X is as long as those of IX and VII together, trapezoidal shape, Hypodermal pigment on head, body and appendages; antennae and cerci shorter than body; abdominal terga II-VI with 3+3 bristle combs; stylets 2 pairs on VIII and IX. ovipositor long and slender. Body length : 10 mm.

Material examined : Under the Culvert, 1 km away from the base of the Simachalam hill, Vizag. Distt. Andhra Pradesh, 27.11.2001, Coll. A.K.Hazra and Party, 16 exs. Permadu Reserve Forest, Pulicat Range, 25.7.2000, Coll. A.K.Hazra and Party, 10 exs.

Distribution : INDIA: Andhra Pradesh, Sikkim, West Bengal, Delhi, Bihar and Manipur.

Remarks : It is widely distributed in Mediterranean.

6. *Ctenolepisma longicaudata* Escherich.

(Fig. 2)

1905. *Ctenolepisma longicaudata* Escherich, *Zoologica (Stuttgart)*, Vol. **43** : 83.

Diagnosis : Body long; the thorax is very little broader than the abdomen which is gradually tapering with relatively short segments; length ranges from 13 mm to 15 mm, whitish in colour without marked silvery shun; antennae, cerci, and median tail appendages are distinctly longer than the body length; abdominal tergum II-VI with 3+3 bristle combs, tergum X twice as long as tergite IX, and wide at base; Posteriorly last abdominal tergum distinctly truncate; long stylets are present on sternum VIII-IX, ovipositor long and slender.

Material examined : Base of Simachalam hill, Vizag. Distt. Andhra Pradesh, 27.11.2001, Coll. A.K.Hazra and Party, 5 exs. Permadu Reserve Forest, Pulicat Range, 25.7.2000, Coll. A.K.Hazra and Party, 4 exs.

Distribution : India : Andhra Pradesh, Sikkim, West Bengal, Uttar Pradesh, Bihar, Tripura, Manipur.

Remarks : This species is widely distributed in the tropics and sub-tropics of old and new world. This species is very common in houses and libraries and a very serious pest in India.

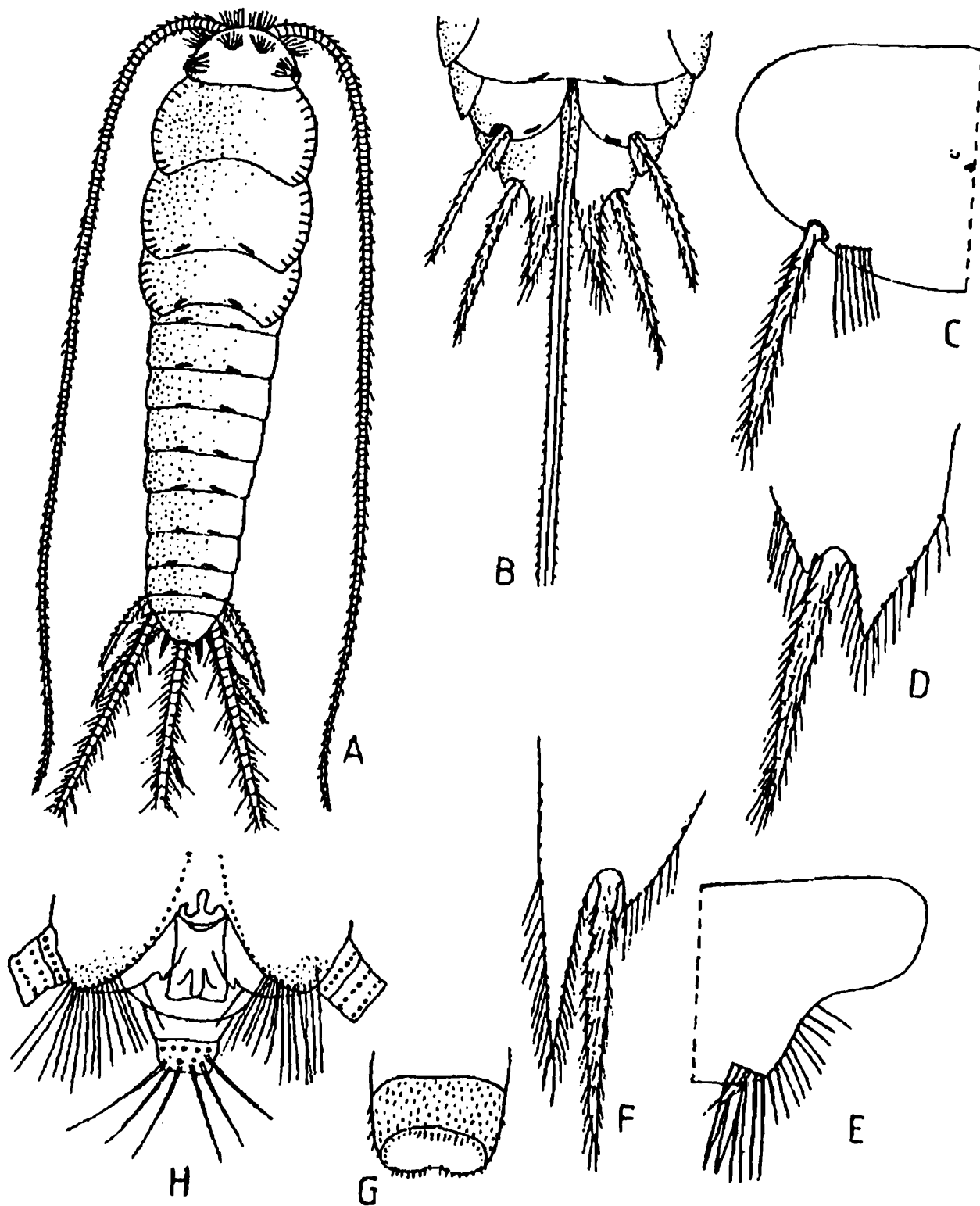


Fig. 2. *Ctenolepisma longicaudata* and their different parts of the body. A. General morphology; B. Female ovipositor; C. Sternum VIII, left half and stylet; D. Subcoxae and stylet of sternum IX of male, right half; E. Half of 'X' tergum; F. Subcoxae and stylet of sternum IX of female; G. Penis; H. anal plates

Family NICOLETIIDAE

Genus *Atelura* Vonheyden, 18557. *Atelura typhloponis* Silvestri, 1913

Diagnosis : Body color whitish yellow, covered with scales. Head dorsally with scales, anterior and lateral margins with isolated setae, four larger and isolated, with apex bifid. Antennae shorter than body. Thorax not much more widened than the anterior part of abdomen and about 1/3 shorter than abdomen, the hind margin of terga without any setae, the lateral margin with two short setae. Abdomen gradually narrower posterior, the hind margin of the terga with only one robust bifid seta, the other shorter. Tergum 'X' is 1/3 wider at the base than long and hind margin gradually thinner, and the margin is deeply sinuate, the posterior angles acute with a long and strong apical seta. Sternum II with a pair of median vesicles, the sterna III-VII with a pair of sub median setae. Sterna V-IX with stylets and the VIIth with pseudo vesicle stylus elongated in the IX, where they are clearly stronger and more than twice longer than in the VIII. Ovipositor robust attains more or less the half of the length of IX stylets, not conspicuously annulated and with short setae. Body length : 3 mm.

Material examined : Termite Mounds inside Indira Gandhi Zoo, Vizag. Distt. Andhra Pradesh, 26.11.2001, Coll. A.K.Hazra and Party, 4 exs; Balapalli Koneru, Teak Plantation centre (from Termite Mounds), Tirupati, 23.7.2000, Coll. A.K.Hazra and Party, 22 ex.

Distribution : INDIA : Andhra Pradesh, West Bengal.

SUMMARY

The present paper deals with 7 species of Thysanura under 5 genera distributed over 3 families recorded from different districts of Andhra Pradesh. This paper is the first detailed attempt on this order from India.

ACKNOWLEDGEMENT

We express our sincere thanks to the Director, Zoological Survey of India for providing laboratory facilities.

REFERENCES

- Dufour, L. 1931. Descriptions et figures de deux especes nouvelles du genre *Lemisma*. *Ann. Sci. natur. (Zool.)* 22 : 419-421.
- Escherich, K. 1903. Beitrage zur kenntnis der Thysanurcn. 1. *Reihe. Zool. Anz.*, 26(697) : 345-366.
- Escherich, K. 1905. Das System der Lepismatiden. *Zoologica* (Stuttgart), 43 : 1-164.

- Hazra, A. K. 1980. On a new species of *Stylifera* (Lepismatidae : Thysanura : Insecta) from India. *Bull. Zool. Surv. India*, 2(2 & 3) : 187-191.
- Mendes, L.F. 1988. Revisao Do Genero *Lepisma* Lin., 1758 S. Lat. (*Zygentoma*, Lepismatidae), *Suplemento No. 2 ao Bolm Soc. Port. Ent.* 1-236.
- Mendes, L.F. 1990. On the Zoogeographic affinities of the Thysanurans (*Microcoryphia* and *Zygentoma* from India. In: *Advances in Management and Conservation of soil fauna* (eds. G.K. Veeresh *et al.*) : 15-24.
- Oudemans, J.T. 1890. *Apterygota des indischen Archipelagus* Weber *Zool. Ergeb.* Bd. 1.
- Paclt, J. 1967. Thysanura. Fam. *Lepidotrichidae*, *Maindroniidae*, *Lepismatidae*. In: *Wytzman., P. Genera Insectorum*, fase, 218 : 3-86.
- Slabaugh, R.E.A. 1940. A new Thysanuran and a key to the domestic species of Lepismatidae: Thysanura). *Ann. Mus. Zool. Polonici*, 9 : 341-349.
- Silvestri, F. 1913. On some Thysanura in the Indian Museum. *Rec. Ind. Mus.*, 9 : 51-62.

ODONATA

M. PRASAD

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

Andhra Pradesh is the fifth largest State in India, occupy an area of 2,76,754 Sq. Km. This coastal state is the largest in peninsular India. Andhra Pradesh may be divided into three geographical zones-(i) the coastal plain, (ii) the eastern Ghats which form a part of the eastern and northern borders and (iii) the Deccan plateau. Andhra Pradesh is bounded by Madhya Pradesh and Orissa in the north, the Bay of Bengal in the east, Tamil Nadu and Karnataka in the south and Maharashtra in the west.

In Andhra Pradesh summer is very hot which is followed by tropical rains and pleasant winter. This state is fed by south-west monsoon and north-east monsoon contributing about one third of the rainfall. The annual rainfall varies from 500mm to 1,400mm. In the deltas of the rivers Krishna and Godavari finest qualities of rice are grown, therefore, this state is known as "The rice bowl of South"

Odonata (damselfly and dragonfly) are true amphibiotic insects found in almost all the environmental conditions, which may be higher mountain ranges, deserts or sea coasts. Eggs and larvae of Odonata are aquatic and adults are aerial in habits. However, as per habitat, these insects are commonly found in the vicinity of the aquatic bodies, whether permanent or temporary. Odonata are carnivorous insect and their feeding habits are in some way beneficial to human beings. The larvae of odonates generally serve as food for fishes and ducks, while the adults are preyed upon by other carnivorous insects, lizards, birds etc.

ODONATA FAUNA

Extensive consultation of available literature reveals that there is no consolidated account on the odonata fauna of Andhra Pradesh. In sporadic contribution, published by Fraser (1933, 1934 and 1936), Krishnamoorthy *et al.* (1961), Mitra (1976), Joseph and Satyarani (1988), Lahiri (1987), Prasad and Varshney (1995), Satyarani (1998) and Prasad (2000) have reported a total of 51 species/subspecies from Andhra Pradesh.

At present various developmental programmes are being undertaken by both Governmental and non-Governmental Organizations dwindling the natural habitats of dragonflies. To record the existing fauna therefore, this study becomes essential. It is part of the State Fauna Series, which has been undertaken by the Zoological Survey of India. In this study odonata materials brought by various parties of Zoological Survey of India covering almost all districts of the Andhra Pradesh State are studied. Details of material studied and indicated under each species.

In the light of present study, the odonata fauna of the State of Andhra Pradesh comprised of 68 species/subspecies spread over 41 genera and 10 families. Of these 12 species/subspecies are recorded for the first time from this state in the present study.

GENERAL MORPHOLOGY

Detailed morphology of both adult and larvae are described by Fraser (1933, 1934, 1936 and 1956) and Tillyard (1917). Adults (Figs 1-8) are air breathing insects with a large head, which is connected by a small connection with thorax, antennae minute, filiform; eyes large covering major portion of head in Libellulids dragonflies and other families of suborder Anisoptera. In suborder Zygoptera it is not so large and separated by wide gap. Prothorax, mesothorax and metathorax are fused, angled forwardly, so are their respective legs. Wings are paired, may be membranous, coloured or clear, reticulated, almost of same shape and size in suborder Zygoptera, while in most of suborder Anisoptera the posterior pair (hind-wing) of wings wider, specially in their anal area. Abdomen lies behind thorax is long, slender, ten segmented terminating in paired anal appendages (Superior anal appendages and inferior anal appendages). Males in Zygoptera possess paired superior and inferior appendages, while in males of Anisoptera possess a pair of superior and inferior appendages. Most characteristic feature of male genitalia (accessory genitalia) is that these are shifted to the underneath of second and third abdominal segments, while gonopore are in their usual position. Ovipositors are simple for exophytic forms (most of Anisoptera) or strong serrated for endophytic forms (most of Zygoptera).

Larvae (Figs 9 and 10) are long, elongated cylindrical and stout, broad bodied in benthic forms. These have extensile, prehensile labium. Zygopterans have abdominal gills and caudal filament, which are lacking in Anisopterans and these breathe by cloacal chamber suited for necessary exchange of dissolved oxygen.

DEFINITION OF MORPHOLOGICAL PARTS USED IN CLASSIFICATION

A list of terms used in the key and text etc., are arranged alphabetically.

Anal appendage : Present at the end of 10th abdominal segment. Males of Suborder Zygoptera possess paired superior and inferior appendages; while in males of Suborder Anisoptera possess a pair of superior and single inferior anal appendages.

- Anal triangle*** : A triangular area present at extreme base of hind-wing in Anisoptera.
- Antenodal nervures*** : Short transverse nervures running from the costal to radius, proximal to node.
- Caudal gills*** : Accessory respiratory organs at the distal end of zygoteran larvae.
- Cubital space*** : A name used for the anal crossing. It is present posterior to basal space and extending to the base of discoidal cell.
- Discoidal cell*** : A well defined triangular or quadrilateral space present near the wing base, distal to cubital space.
- Discoidal field*** : Space lying distal to discoidal cell and bounded outwardly by the wing border. Nervures MA and Cu₁ constitute its anterior and posterior borders respectively.
- Hypertrigone*** : Narrow triangular cell above discoidal cell of Anisopterans.
- Imago*** : Adult
- Nodal index*** : Count of ante and postnodal nervures in fore and hind-wings.
- Node*** : A thick part of the wing present at costal margin near base of Zygoptera but in middle of Anisoptera.
- Ocellus*** : Simple eye, three uniformly in all odonata, disposed in a line in front of vesicle or in a triangle around vesicle on the vertex of head.
- Postnodal nervures*** : Nervures present between the costa and the radius on the distal side of the node.
- Pterostigma*** : Small thickened spot on the apical side on costal border.
- Radius*** : From the base of wing, lying between the subcosta and media.
- Sector of arc*** : Origins of nervures R₄₊₅ and MA.
- Subcosta*** : Present below the costa, but upto the node.
- Subnode*** : An oblique vein descending from the node extending obliquely outward into the body of the wing and traversing the space present between R₁ and R₂.
- Teneral*** : Freshly emerged adult.
- Tornus*** : Part of basal and posterior part of wing, may be angular or rounded in Anisoptera.
- Vertex*** : Dorsal surface of head, bearing vesicle and ocelli.
- Vesicle*** : Small protuberance present on vertex of head.

Vulvar scale : Sheath covering ovipositor, formed of two plates attached to ventral segments of 8th and 9th abdominal segments.

MATERIALS AND METHODS

Collection techniques

A. *For adult* : Specimens are collected with the help of a butterfly net, then they are killed in a bottle of Benzene or cyanide fumes. The specimens are taken out from the jar and exposed to air for drying. The abdomen of the specimen is to be straightened and wings are to be kept spread out. The dried specimens are put in a paper envelope containing blotting paper to soak the body fluid emitted by the dead specimen. The envelope must contain a label giving the collection data, locality, name of collector, altitude and habitat etc.

B. *For larvae* : Collection of Odonata larvae is very different from collection adults. Different methods and equipments are used depending on the habits and habitats of the group concerned.

Normally larvae are collected by a water net fitted with wire mesh. Collection of larvae is made by pulling this net from the weedy ponds, bank of streams etc., then spreading the material on the bank on a smooth surface or on white rexine cloth. Larvae are also collected by means of an ordinary basket. Those larvae which remain attached to the lower surface of pebbles and stones lying at the bottom of the hill streams. Stones and pebbles are turned over to remove the larvae attached on their lower surface. Larvae of family Gomphidae generally burrow in the sand and between the small pebbles and stones. These sands and pebbles are stirred with the foot. Larvae can then be collected from the disturbed sand, by placing a net a little down streams.

Study technique : Imagos are made ready for study by usual process of relaxing, properly spreading wings, setting and pinning. Set specimens are examined under binocular/microscope by fixing it at desirable angle, level over plasticine cone/mounds fixed on side or over convenient size of pith/thermocool plates.

A CLASSIFIED LIST OF ODONATA

A classified list of Odonata known from Andhra Pradesh is provided and is arranged systematically. Species marked with an asterisk (*) are recorded for the first time from the State.

Order ODONATA

Suborder ZYGOPTERA

Superfamily COENAGRIONOIDEA

Family COENAGRIONIDAE

1. *Ceriagrion coromandelianum* (Fabricius)

- *2. *Ceriagrion olivaceum* Laidlaw
- *3. *Pseudagrion decorum* (Rambur)
- *4. *Pseudagrion malabaricum* Fraser
- 5. *Pseudagrion microcephalum* (Rambur)
- 6. *Pseudagrion rubriceps rubriceps* Selys
- 7. *Pseudagrion spencei* Fraser
- 8. *Aciagrion hisopa hisopa* (Selys)
- 9. *Aciagrion occidentale* Laidlaw
- *10. *Aciagrion pallidum* Selys
- 11. *Enallagma parvum* Selys
- 12. *Ischnura aurora aurora* (Brauer)
- 13. *Ischnura elegans elegans* (Vander Linden)
- 14. *Ischnura senegalensis* (Rambur)
- *15. *Rhodischnura nursei* (Morton)
- *16. *Agriocnemis dabreui* Fraser
- *17. *Agriocnemis femina* (Brauer)
- 18. *Agriocnemis pygmaea* (Rambur)
- 19. *Agriocnemis splendidissima* Laidlaw
- *20. *Onychargia atrocyana* Selys

Family PLATYCNEMIDIDAE

- 21. *Copera vittata deccanensis* Laidlaw

Family PROTONEURIDAE

- 22. *Caconeura obscura* (Fraser)
- 23. *Prodasineura verticalis annandalei* (Fraser)

Superfamily LESTOIDEA

Family LESTIDAE

- 24. *Lestes concinnus* Hagen in Selys
- *25. *Lestes elatus* Hagen in Selys
- 26. *Lestes umbrinus* Selys
- 27. *Lestes viridulus* Rambur

Superfamily CALOPTERYGOIDEA

Family CALOPTERYGIDAE

- 28. *Vestalis gracilis gracilis* (Rambur)

Family CHLOROCYPHIDAE

*29. *Rhinocypha (Heliocypha) bisignata* (Selys)

Suborder ANISOPTERA

Superfamily AESHNOIDEA

Family GOMPHIDAE

30. *Paragomphus lineatus* (Selys)

31. *Ictinogomphus rapax* (Rambur)

Family AESHNIDAE

32. *Anax guttatus* (Burmeister)

33. *Hemianax ephippiger* (Burmeister)

34. *Gynacantha bayadera* Selys

Superfamily LIBELLULOIDEA

Family CORDULIIDAE

35. *Epoptalmia vittata vittata* Burmeister

36. *Macromia cingulata* Rambur

Family LIBELLULIDAE

37. *Brachydiplax sobrina* (Rambur)

38. *Orthetrum glaucum* (Brauer)

39. *Orthetrum pruinosum neglectum* (Rambur)

40. *Orthetrum sabina sabina* (Drury)

41. *Orthetrum taeniolatum* (Schneider)

*42. *Orthetrum triangulare triangulare* (Selys)

43. *Potamarcha congener* (Rambur)

44. *Acisoma panorpoides panorpoides* Rambur

45. *Brachythemis contaminata* (Fabricius)

46. *Bradinopyga geminata* (Rambur)

47. *Crocothemis servilia servilia* (Drury)

48. *Diplacodes lefebvrei* (Rambur)

49. *Diplacodes nebulosa* (Fabricius)

50. *Diplacodes trivialis* (Rambur)

51. *Palpopleura sexmaculata sexmaculata* (Fabricius)

52. *Indothemis carnatica* (Fabricius)

53. *Neurothemis intermedia degener* Selys

54. *Neurothemis intermedia intermedia* (Rambur)

55. *Neurothemis tullia tullia* (Drury)
56. *Rhodothemis rufa* (Rambur)
57. *Trithemis aurora* (Burmeister)
58. *Trithemis kirbyi kirbyi* Selys
59. *Trithemis pallidinervis* (Kirby)
60. *Rhyothemis variegata variegata* (Linn.)
61. *Hydrobasileus croceus* (Brauer)
62. *Pantala flavescens* (Fabricius)
63. *Tramea basilaris burmeisteri* Kirby
64. *Tramea limbata similata* (Rambur)
- *65. *Tramea virginia* (Rambur)
66. *Tholymis tillarga* (Fabricius)
67. *Zyxomma petiolatum* Rambur
68. *Urothemis signata signata* (Rambur)

Superfamily COENAGRIONOIDEA

Diagnostic characters : Small to medium sized damselflies, some times they may be very small in size. Shape of posterior lobe of prothorax variable, in males with anterior hamules quadrate. Wings petiolated, only 2 antenodal nervures present; postnodal nervures in strict alignment with cross veins beneath. Usually nervures IR₃ and R₄₊₅ originate closer to the nodus than the Arc; intercalated sectors usually absent.

Distribution : Cosmopolitan.

Key to the families of Superfamily COENAGRIONOIDEA

1. 1A, Cuii reduced, former even absent PROTONEURIDAE
- 1A, Cuii neither reduced nor absent 2
2. Discoidal cell with costal and hinder side subequal, inner distal angle obtuse PLATYCNEMIDIDAE
- Discoidal cell with costal side much shorter than hinder side, inner distal angle acute or subacute COENAGRIONIDAE

Family COENAGRIONIDAE

Diagnostic characters : Nervures 1A and Cuii of normal length; medio-anal link almost always angulated; no accessory cross vein basal to AC in the cubital space; discoidal cell with

costal margin much shorter than inner margin and with the inner angle subacute or acute; subdiscoidal cell free from inner wing margin.

Distribution : India, outside India : Both old and New World.

Key to the genera of families COENAGRIONIDAE

1. Are situated distal to the level of the distal antenodal nervure *Agriocnemis* Selys
 - Are situated at the level of the distal antenodal nervure 2
2. Vein ab arising from the hind border of the wing at the point where ac meets it 3
 - Vein ab arising from the hind border of the wing more or less proximal to the point where ac meets it 5
3. A prominent ridge on the frons present; no postocular coloured spot on the head; head and thorax uniform colour *Ceriagrion* Selys
 - No ridge on the frons; postocular coloured spot always present; head and thorax not of uniform colour 4
4. Pterostigma in fore and hind wings of the same size; abdomen not unduly long and slender; female without a ventral spine on apical border of segment 8 *Pseudagrion* Selys
 - Pterostigma in fore wing longer than that in the hind wing; abdomen usually very long and slender; female with an apical ventral spine on segment 8 *Aciagrion* Selys
5. Pterostigma of the same colour and shape in fore wing and hind wing of male; dorsal apical tubercle on segment 10 of male absent 6
 - Pterostigma differing in shape and size in fore and hind wings of male; dorsal apical tubercle on segment 10 of male present 7
6. Female with a robust ventral apical spine on segment 8 *Enallagma* Charp.
 - Female without a ventral apical spine on segment 8; tarsal claw-hook of equal length *Onychargia* Selys
7. Postocular coloured spot always present in adult stage; tubercles on apical border of segment 10 closely opposed *Ischnura* Charp.
 - Postocular coloured spot absent in the adult stage; tubercles on apical border of segment 10 widely separated by a shallow notch *Rhodischnura* Laidlaw

Genus *Ceriagrion* Selys

1876. *Ceriagrion* Selys, *Bull. Acad. Belg. Sci.*, 43 : 525.

1933. *Ceriagrion* Fraser, *Fauna Brit, India, Odon.*, 1 : 313.

1967. *Ceriagrion* Asahina, *Jap. J. Zool.*, 5 : 255.

Diagnostic characters : Medium sized damselflies; may be yellow, orange, olivaceous or rarely bluish sometimes partly marked with black or red. Frons with a well-developed ridge, posterior lobe of prothorax generally simple and rounded. Male anal appendages subequal to or more and usually shorter than 10th abdominal segment. Terminal fold of penis generally unbranched; no vulver spine in females. Wings hyaline; pterostigma rectangular, 9-16 postnodals in fore wing and 8-14 in hind wing. Arc situated at or slightly distal to the level of distal antenodal nervures; discoidal cell with inner margin about twice as long as costal margin, Ab arising from inner wing margin at a point where Ac meets it or rarely slightly proximal to that point.

Distribution : India.

Elsewhere : Algeria, Angola, Australia, Austria, Bangladesh, Belgium, Benin, Botswana, Burkina, Faso, Central Africa, Congo, Coted'ivoire, Egypt, Ethiopea, France, Gabon, Germany, Ghana, Great Britain, Guinea, Guinea-Bissan, Hong Kong, Hungary, Indonesia, Italy, Japan, Kampuchea, Kenya, Korea, Laoeop, Dem Republic, Liberia, Madagascar, Malayasia, Malawi, Mali, Mauritius, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, Niger, Nigeria, Pakistan, Papua-New Guinea, Philippines, Reunion, Republic China, Senegal, Scychelles, Singapore, Sirerra Leone, Solomon Islands, Somalia, South Africa, Sudan, Syria, Swaziland, Tiwan, Tanzania, Thailand, Togo, Vietnam, Zaire, Zambia and Zimbabwe.

Key to the species of the genus *Ceriagrion* selys

1. Abdomen uniformly dull olivaceous in colour *C. olivaceum* Laidlaw
- Abdomen bright citron yellow *C. coromandelianum* (Fabricius)

1. *Ceriagrion coromandelianum* (Fabricius)

1798. *Aciagrion coromandelianum* Fabricius, *Ent. Syst. Suppl.*, : 287.

1933. *Ceriagrion coromandelianum*, Fraser, *Fauna Brit. India, Odon.*, 1 : 315-316.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	27.00–30.00 mm	18.50–20.00 mm	18.00–19.50 mm
Female :	27.50–31.00 mm	18.00–20.00 mm	18.00–19.00 mm

Material examined : 1 ♀, Zoo Garden, Hyderabad, district Rangareddi, 28.1.1985, coll. P. Parui; 1 ♀, Nandyal near Chinna Charu, district Kurnool, 23.6.1985, coll. P. Parui; 1 ♂, Nellore, 25.10.1986, coll. M.S. Shishodia; 1 ♀, Zoo Garden, Hyderabad district Rangareddi, 28.10.1986, coll. M.S. Shishodia; 2 ♂ ♂, Hyderabad dist Rangareddi, 29.10.1986, coll. M.S. Shishodia; 1 ♂, Suryapeta, district Nalgonda, 7.11.1986, coll. M.S. Shishodia; 2 ♂ ♂, 1 ♀,

Palair district Khammam, 11.11.1986, coll. M.S. Shishodia; 1♂, Madhira district khammam, 13.11.1986, coll. M.S. Shishodia; 1♀, Sanskrit School campus, Rajahmundry district East Godavari, 17.11.1986, coll. M.S. Shishodia; 1♀, Rajahmundry district East Godavari, 18.11.1986, coll. M.S. Shishodia; 2♂♂, Ganga Sagaram district Chittoor, 13.10.1997, coll. B.C. Das; 2♂♂, Narga Mangalam district Chittoor, 16.10.1997, coll. B.C. Das; 2♂♂, 2♀♀, Mutukar, district Cuddapah, 18.10.1997, coll. B.C. Das; 2♂♂, 1♀, Muddadugi district Cuddapah, 19.10.1997, coll. B.C. Das; 1♂, 2♀♀, Hyderabad district Rangareddi, 22.10.1997, coll. B.C. Das; 2♂♂, Kaikalur district Krishna, 23.1.1998, coll. R.S. Mridha and D.K. Kundu; 1♀, Ichchapuram district Srikakulam, 4.2.1998, coll. M. Prasad; 2♂♂, Sompeta district Srikakulam, 5.2.1998, coll. M. Prasad; 1♂, Palasa district Srikakulam, 7.2.1998, coll. M. Prasad; 2♂♂, Palasa district Srikakulam, 10.2.1998, coll. M. Prasad; 1♂, Sumadevi district Srikakulam, 12.2.1998, coll. M. Prasad; 1♀, Kashibugga, Palasa district Srikakulam, 13.2.1998, coll. M. Prasad; 1♀, Vizianagaram district Vizianagaram, 16.2.1998, coll. M. Prasad; 2♂♂, 1♀, Pendutri district Vishakhapatnam, 18.2.1998, coll. M. Prasad; 1♀, Kailashgiri district Vishakhapatnam, 19.2.1998, coll. M. Prasad; 1♀, Kolleru district West Godavari, 3.10.1998, coll. S.K. Mandal; 2♀♀, Ramasaingrvaram district West Godavari, 4.10.1998, coll. S.K. Mandal; 1♀, Mettabhumi, Vijaywada district Krishna, 3.1.1999, coll. B.C. Das and 1♂, 1♀, Araku Valley, district Vishakhapatnam, 11.1.1999, coll. B.C. Das.

Distribution : Throughout India.

Elsewhere : Combodia, China, Indo-China, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam.

Remarks : It is very common species and found throughout the year near temporary and permanent water bodies. It can easily be separated from other species of the genus by having pale yellow abdomen.

2. *Ceriagrion olivaceum* Laidlaw

1914. *Ceriagrion olivaceum* Laidlaw. *Rec. Indian Mus.*, 8 : 345.

1933. *Ceriagrion olivaceum*, Fraser, *Fauna Brit. India, Odon.*, 1 : 324–326.

Material examined : 4♀♀, Nagarjun Sagar Tiger Reserve Mannanur district Mahbubnagar, 11.4.1985, coll. S. Chatterjee.

Measurements :

	Abdomen	Forewing	Hindwing
Female :	35.00–36.00 mm	22.00 mm	21.00 mm

Distribution : India (Arunachal Pradesh, Assam, Kerala, Manipur, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, South Andaman, Uttar Pradesh and West Bengal).

Elsewhere : Bangladesh, Cambodia, Kampuchea, Laos, Malaysia, Myanmar, Nepal, thailand and Vietnam.

Remarks : There are 12 postnodals in forewings and 10 in hindwings. Specimens of this species can easily be found within long grasses near water bodies. It is distinguishable from all other species of the genus in having uniform olivaceous colour of the abdomen.

Genus *Pseudagrion* Selys

1867. *Pseudagrion* Selys, *Bull. Acad. Belg. Sci.*, (2) 42 : 490.

1933. *Pseudagrion*, Fraser, *Fauna Brit. India, Odon.*, 1 : 274–276.

Diagnostic Characters : Medium sized, marked with black, green, orange or red, occasionally partly pruinose; postocular coloured spots usually present. Frons without ridge; posterior lobe of prothorax simple and rounded in males, with a forwardly directed ungulated processes. Male anal appendages may be as long as or shorter than 10th abdominal segment. Terminal fold of penis often deeply bifid and usually with a short projection on either side; female without vulver spine. Wing hyaline, 8-17 postnodal nervures in forewing and 7-14 in hindwing; pterostigma narrow and rectangular; arc situated at the level of the distal antenodal nervures; ab arising from inner wing margin at the point where Ac meets it.

Distribution : India.

Elsewhere : Angola, Australia, Bangladesh, Cameroon, Celebes, China, Ivory coast, Java, Luzon, Madagascar, Marques Islands, Mayotte Islands, Myanmar, Natpal, Nigeria Palestine, Papua, Philippines, Senegal, Siberia, Sierra Leone, Solomon Islands, Sunda Islands, Syria, Sri Lanka, Timor, Transvaal, Upper Congo, West Africa, Zambia, Zambezi and Zimbabwe.

Key to the species of genus *Pseudagrion* Selys

1. Face, frons and vertex reddish orange *P. rubriceps rubriceps* Selys
- Face, frons and vertex not reddish orange 2
2. Thorax pale blue; three fine black lines on mid dorsal carinal ridge
..... *P. decorum* (Rambur)
- Thorax sky blue or green 3
3. Superior anal appendages not bifid and shorter than segment 10th
..... *P. malabaricum* Fraser
- Superior anal appendages bifid at the apex 4
4. A long robust spine in the inner side of the base of superior anal appendages present
..... *P. spencei* Fraser
- Two to three small spines in the inner side of the superior anal appendages present ...
..... *P. microcephalum* (Ramb.)

3. *Pseudagrion decorum* (Rambur)

1842. *Agrion decorum* Rambur, *Ins. Neurop.*, : 258.

1933. *Pseudagrion decorum*, Fraser, *Fauna Brit. India, Odon.*, 1 : 268-269.

Material examined : 1 ♀, Narsampeta, district Warangal, 5.7.1985, coll. P. Parui; 1 ♂, Khammam, district Khammam, 9.11.1986, coll. M.S. Shishodia; 4 ♂ ♂, Palair, district khammam, 11.11.1986, coll. M.S. Shishodia; 1 ♂, 3 ♀ ♀, Jamikunta, district Karimnagar, 8.12.1987, coll. B.N. Nandi; 1 ♀, 1 km north of P.W.D. (J. B.) Kadiri, district Anantpur, 17.12.1987, coll. B.N. Nandi; 2 ♂ ♂, 1 ♀, Cumbum, district Prakasam, 29.12.1987, coll. B.N. Nandi; 1 ♂, 1 ♀, Mutukar, district Cuddapah, 18.10.1997, coll. B.C. Das; 1 ♂, Sompeta, district Srikakulam, 5.2.1998, coll. M. Prasad; 1 ♂, 1 ♀, Pendurti, district Vishakhapatnam, 18.2.1998, coll. M. Prasad; 1 ♀, Madherpuri, Rajahmundry, district East Godavari, 19.10.1998, coll. S.P. Chakraborty and 1 ♀, Madhavaram Reserve Forest, 47 kms from cuddapah district Cuddapah, 28.11.1998, coll. P.H. Roy.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	29.00-31.50 mm	19.50-20.50 mm	19.00-20.00 mm
Female :	31.00-32.00 mm	20.00 mm	19.00-20.00 mm

Distribution : Throughout continental India.

Elsewhere : Nepal, Myanmar and Sri Lanka.

Remarks : It is a common species under this genus. There are 10 post nodal nervures in forewings and 8 to 9 in hindwings. Pterostigma pale yellow in colour and covers about a cell.

4. *Pseudagrion malabaricum* Fraser

1924. *Pseudagrion malabaricum* Fraser, *Rec. Indian Mus.*, 26 : 428, 494-45.

1933. *Pseudagrion malabaricum*, Fraser, *Fauna Brit. India, Odon.*, 1 : 284-286.

Material examined : 1 ♂, Bendkonda, Srikakulam, 11.2.1998, coll. M. Prasad.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	33.00 mm	20.50 mm	20.00 mm

Distribution : India (Bihar, Tamil Nadu, Western Ghat and West Bengal).

Elsewhere : Sri Lanka.

Remarks : Pterostigma light pale brown in colour and covers less than a cell. There are 10 postnodal nervures in forewings and 8 in hindwings. It can easily be separated from others by its non-bifid superior anal appendages.

5. *Pseudagrion microcephalum* (Rambur)

1842. *Agrion microcephalum* Rambur, *Ins. Neurop.*, : 259.

1933. *Pseudagrion microcephalum*, Fraser, *Fauna Brit. India, Odon.*, 1 : 278–280.

Distribution : Throughout Plains of India.

Elsewhere : Australia, Indonesia, Myanmar and Sri Lanka.

Remarks : It is found in plains as well as submontane zones. Males are easily distinguishable by characteristic markings of abdomen. Females are distinguishable by the black bifid marking on 9th abdominal segment and by the orange suffusion on the vertex and upper part of the eyes.

6. *Pseudagrion rubriceps rubriceps* Selys

1876. *Pseudagrion rubriceps* Selys, *Bull. Acad. Belg.*, (2) 42 : 510.

1933. *Pseudagrion rubriceps*, Fraser, *Fauna Brit. India, Odon.*, 1 : 296-299.

1991. *Pseudagrion rubriceps rubriceps*, Tsuda, *A distributional list of world Odonata.*, : 46.

Distribution : Throughout India.

Elsewhere : Bangladesh, Palon, Hong Kong, Indo-China, Indonesia, Myanmar, Nepal, Pakistan, Philippines, Thailand and Taiwan.

Remarks : A male specimen of this species was observed at a temporary water body with grassy vegetation near the side of pond at palasa by the author. But author was unable to collect the specimen during the survey tour to Palasa. Male can easily be differentiated from the other species of the genus by the brilliant reddish-orange face.

7. *Pseudagrion spencei* Fraser

1922. *Pseudagrion spencei* Fraser, *Mem. Dept. Agric. india (Ent.)*, 7(7) : 47–48.

1933. *Pseudagrion spencei*, Fraser, *Fauna Brit. India, Odon.*, 1 : 292-294.

Material examined : 1 ♂, Mahabubabad, district Warangal, 12.11.1986, coll. M.S Shishodia.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	Incomplete (damaged)	18.00 mm	17.00 mm

Distribution : India (Assam, Bihar, Central India, Chandigarh, Meghalaya, Uttar Pradesh and West Bengal).

Elsewhere : Bangladesh, Hong Kong, Nepal and Pakistan.

Remarks : Pterostigma yellow in colour and covers less than a cell. There are 9 postnodal nervures in forewings and 8 in hindwings. It can easily be separated from the other species of the genus by the presence of a long robust spine in the inner side of the base of superior anal appendages.

Genus *Aciagrion* Selys

1867. *Pseudagrion* Selys, *Bull. Acad. Belg. Sci.*, (2)42 : 502 (Pars).

1891. *Aciagrion*, Selys, *Ann. Mus. Civ. Genova* (2), 10(32) : 509-511.

1933. *Aciagrion*, Fraser, *Fauna Brit. India, Odon.*, 1 : 333-334.

Diagnostic characters : Medium sized damselflies, very slender built, colour may be bluish, reddish or marked with black, sometimes partly pruinose; postocular colour spots present. In male superior anal appendages shorter than 10th abdominal segment, may be triangular or squarish, shallowly notched and sometimes with a prominent tooth at apex. Wings hyaline and narrow. 9-14 postnodal nervures in forewing and 8-11 in hindwing. Arc situated at the level of distal antenodal nervure. Ab arising from the inner wing margin from the point where Ac meets it.

Distribution : India.

Elsewhere : Angola, Africa, Australia, Bangladesh, Botswana, China, Congo, Cote d'Ivoire, Gabon, Indonesia, Japan, Kampuchea, Korea, Liberia, Malaysia, Malawi, Mozambique, Myanmar, Nepal, Papua New Guinea, Pakistan, Singapore, Sri Lanka, Taiwan, Thailand, Tanzania, Uganda, Zaire, Zambia and Zimbabwe.

Key to the species of genus *Aciagrion* Selys

1. Ground-colour pale brown, without black markings on head and thorax
..... *A. pallidum* Selys
- Ground-colour blue, with black markings on head thorax and abdomen 2
2. Very small species; very slender built; abdominal segment 8 with a black elongate dorsal triangular mark *A. occidentale* Laidlaw
- Slightly larger species, more robust built, abdominal segment 8 without any black marking; posterior lobe of prothorax not crenate behind *A. hisopa hisopa* (Selys)

8. *Aciagrion hisopa hisopa* (Selys)

1876. *Pseudagrion hisopa* Selys, *Bull. Acad. belg.*, (20)42 : 509.

1933. *Aciagrion hisopa*, Fraser, *Fauna Brit. India, Odon.*, 1 : 340-342.

1991. *Aciagrion hisopa hisopa*, Tsuda, *A distributional list of world Odonata*, : 18.

Material examined : 1♂, 1♀, 1 km north of P.W.D.(I.B.) Kadiri, district Anantpur, 17.12.1987, coll. B.N. Nandi; 1♂, 1♀, 5 kms North of Kadiri, district Anantpur, 18.12.1987, coll. B.N. Nandi and 1♂, Phoolbagh, district Vizianagaram, 15.2.1998, coll. M. Prasad.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	27.00 mm	17.50 mm	17.00 mm
Female :	26.00–27.00 mm	17.00 mm	16.50 mm

Distribution : India (Karnataka and Kerala).

Elsewhere : Myanmar, Malaysia and Sri Lanka.

Remarks : There are 11 postnodal nervures in forewings and 9 in hindwings. Pterostigma dark-brown in colour and covers about a cell.

9. *Aciagrion occidentale* Laidlaw

1919. *Aciagrion hisopa* (Selys)? race *occidentalis* Laidlaw, *Rec. Indian Mus.*, **16** : 186.

1933. *Aciagrion occidentale*, Fraser, *Fauna Brit. India, Odon.*, **1** : 335-337.

Material examined : 1♂, Pokhal forest, district Warangal, 4.7.1985, coll. P. Parui.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	damaged	17.00 mm	16.00 mm

Distribution : Throughout South India.

Elsewhere : Sri Lanka.

Remarks : Pterostigma pale yellowish brown in colour and covers less than a cell. Pterostigma of forewings are nearly double in the size as compared with the pterostigma of hindwings. There are 9 postnodal nervures in forewings and 8 in hindwings.

10. *Aciagrion pallidum* (Selys)

1891. *Aciagrion pallidum* Selys, *Ann. Mus. Civ. Genova*, (2), **10** : 512, 513.

1933. *Aciagrion pallidum*, Fraser, *Fauna Brit. India, Odon.*, **1** : 344-345

Material examined : 1♂, 1♂, Araku Valley, district Vishakhapatnam, 11.1.1999, coll. B.C. Das.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	30.00 mm	18.50 mm	17.50 mm
Female :	29.00 mm	20.00 mm	19.00 mm

Distribution : India (Bihar, Eastern and Western Himalaya, Orissa, Maharashtra, Uttar Pradesh and Western ghats).

Elsewhere : Kampuchea, Myanmar, Nepal, Thailand and Vietnam.

Remarks : It is most common species under this genus. Specimens of this species are found dry areas within and sides of long vegetation. Sometimes these were observed in the deep forest far away from the aquatic bodies in the dry grasses. There are 11-12 postnodal nervures in forewings and 10 in hindwings.

Genus *Enallagma* Charpentier

1840. *Enallagma* Charpentier, *Lib. Europ.*, : 21.

1933. *Enallagma*, Fraser, *Fauna Brit. India, Odon.*, 1 : 371-372.

Diagnostic characters : Small sized damselflies; blue or green marked with black, sometimes may be partly pruinosed; postocular colour spots present; posterior lobe of prothorax simple and rounded. Anal appendages of male variable; superior anal appendages shorter than 10th abdominal segment. Inferior anal appendages as long as or longer than superior anal appendages. Wings hyaline, 7-15 postnodal nervures in forewing and 6-13 in hindwing. Arc situated at the level of distal antenodal nervures; ab arising from the inner wing margin well proximal to the point where Ac meets it.

Distribution : India.

Elsewhere : Afghanistan, America (North, Central and South), Cameroon, Caucasus, Cuba, Germany, Japan, Madagascar, Maldives, Mongolia, Rhodesia, Russia, Sri Lanka and Zanzibar.

Remarks : This genus has a single species in Andhra Pradesh, hence no key is provided.

11. *Enallagma parvum* Selys

1876. *Enallagma parvum* Selys, *Bull. Acad. Belg.* (2) 41 : 537.

1933. *Enallagma parvum*, Fraser, *Fauna Brit. India, Odon.*, 1 : 376-378.

Material examined : 1♂, Nandyal near summer reservoir, district Kurnool, 23.6.1985, coll. P. Parui; 1♀, Cumbum, district Prakasam, 26.12.1987, coll. B.N. Nandi and 2♀♀, Cumbum, district Prakasam, 28.12.1987, coll. B.N. Nandi.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	16.50 mm	12.00 mm	11.00 mm
Female :	16.00-17.00 mm	10.50-11.50 mm	10.00-11.00 mm

Distribution : Throughout India.

Elsewhere : Myanmar, Nepal, Pakistan, Sri Lanka and Thailand.

Remarks : Pterostigma very small and yellowish in colour. It covers less than a cell. There are 6 postnodal nervures present both fore and hindwings. It is found almost throughout the year near weedy waterbody. It can easily be distinguish from other species of the genus; in shape of anal appendages and the postocular spots.

Genus *Ischnura* Charpentier

1840. *Ischnura* Charpentier, *Lib. Europ.*, : 20.

1933. *Ischnura*, Fraser, *Fauna Brit. India, Odon.*, 1 : 346-347.

Diagnostic characters : Small sized damselflies; body colour may be yellow, blue, green or reddish, marked with black. Postocular colour spots present; in male a pair of dorsal tubercle present at the apex of 10th abdominal segment. Wings hyaline; 8-12 postnodal nervures in forewing and 6-9 in hindwing. Arc situated at or slightly distal to the level of distal antenodal nervure. In males pterostigma differing in shape and colour in fore and hindwing, Ab arising from the inner wing margin well proximal to the point where Ac meets it.

Distribution : Cosmopolitan.

Key to the species of *Ischnura* Charpentier

1. Abdominal segments 3-6 lemon-colour on dorsal side; 2 not steely metallic blue on dorsal side *I. aurora aurora* (Brauer)
- Abdominal segments 3-6 black on dorsal side; segment 2 steely metallic blue on dorsal side 2
2. Posterior lobe of prothorax greatly prolonged at the middle *I. elegans elegans* (Vander Lind.)
- Posterior lobe of prothorax not prolonged at the middle *I. senegalensis* (Rambur)

12. *Ischnura aurora aurora* (Brauer)

1858. *Agrion delicatum* Hagen, *Verh. Zool.-bot. Ges. wien.*, 8 : 479.

1865. *Agrion aurora*, Brauer, *Verh. zool.-bot. Ges. wien.*, 15 : 360-362.

1955. *Ischnura aurora*, Lieftinck, *Treubia*, 22 : 74.

1991. *Ischnura aurora aurora*, Tsuda, *A distributional list of world odonata*, : 34.

Material examined : 8♂♂, 4♀♀, Nagarjun Sagar Tiger reserve, Mannanur, district Mahbubnagar, 11.4.1984, coll. S Chatterjee; 6♂♂, Gudur, district Chittor, 24.10.1986, coll. M.S. Shishodia; 1♂, Nellore, district Nellore, 25.10.1986, coll. M.S. Shishodia; 2♀♀, Zoo Garden, Hyderabad, district Rangareddi, 28.10.1986, coll. M.S. Shishodia; 2♂♂, Deer Park, Hyderabad, district Rangareddi, 30.10.1986, coll. M.S. Shishodia; 1♂, Deer park, Hyderabad, district Rangareddi, 31.10.1986; 1♀, Nalgonda, district Nalgonda, 6.11.1986, coll. M.S.

Shishodia; 3♂♂, Suryapet, district Nalgonda, 7.11.1986, coll. M.S. Shishodia; 3♀♀, Khammam, district Khammam, 7.11.1986, coll. M.S. Shishodia; 2♂♂, Dornakal, district Warangal, 10.11.1986, coll. M.S. Shishodia; 1♂, Suryapet, district Nalgonda, 11.11.1986, coll. M.S. Shishodia; 1♂, Mahabubabad, district Warangal, 12.11.1986, coll. M.S. Shishodia; 1♀, Rajahmundry, district East Godavari, 15.11.1986, coll. M.S. Shishodia; 2♀♀, Mutukar, district Cuddapah, 18.10.1997, coll. B.C. Das; 1♂, Muddadugi, district Cuddapah, 19.10.1997, coll. B.C. Das; 1♂♂, 1♀, Hyderabad, district Rangareddi, 21.10.1997, coll. B.C. Das; 1♂, Chevella, Hyderabad, district Rangareddi, 28.10.1997, coll. P. Mukhopadhyay; 1♂, Kondapelle, district Krishna, 31.10.1997, coll. P. Mukhopadhyay; 1♀, Vizianagaram, district Vizianagaram, 15.2.1998, coll. M. Prasad; 1♂, Vizianagaram, 15.2.1998, coll. M. Prasad; 1♂, Vizianagaram, district Vizianagaram, 16.2.1998, coll. M. Prasad; 6♂♂, Madhuvaram Reserve Forest, 47 kms. from Cuddapah, district Cuddapah, 28.11.1998, coll. P.H. Roy; 1♂, 2♀♀, Araku Valley, district Vishakhapatnam, 12.1.1999, coll. B.C. Das and 1♀, Vishakhapatnam, 14.10.1999, coll. B.C. Das.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	15.00–16.50 mm	10.00–11.00 mm	10.00–11.00 mm
Female :	16.50–18.00 mm	13.00–41.50 mm	13.00–14.00 mm

Distribution : Throughout India.

Elsewhere : Afghanistan, Australia, Bangladesh, China, Indonesia, Iran, Japan, Malaysia, Micronesia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand, Tahiti and Taiwan.

Remarks : It is one of the smallest species of the genus. Male can easily be separated from others by the kite shaped, rose-red for its proximal half and hyaline distal half pterostigma and 10th abdominal segment with broad quadrate black dorsal spot. It is most common species found almost throughout the year around water body. Sometimes specimens were also observed far away from the water bodies within the grassy patch of lands.

13. *Ischnura elegans elegans* (Vander Liden)

1823. *Agrion elegans* Vander Linden, *Opusc. Sci.*, 4 : 104.

1933. *Ischnura elegans*, Fraser, *Fauna Brit. India, Odon.*, 1 : 351-354.

1991. *Ischnura elegans elegans*, Tsuda, *A distributional list of world odonata*, : 34.

Distribution : India (Andhra Pradesh and Orissa).

Elsewhere : From Europe to East Asia.

Remarks : This species can easily be separated from others by the presence of truncate lobule of the middle of the posterior lobe of prothorax.

14. *Ischnura senegalensis* (Rambur)

1842. *Agrion senegalensis* Rambur, *Ins. Neurop.*, : 276

1933. *Ischnura senegalensis*, Fraser, *Fauna Brit. India, Odon.*, 1 : 348-351.

Material examined : 2 ♀ ♀, Nargamangalam, district Chittoor, 16.10.1997, coll. B.C. Das; 1 ♀, Mutukar, district Cuddapah, 18.10.1997, coll. B.C.Das; 1 ♀, Chevella, Hyderabad, Rangareddi, 28.10.1997, coll. P. Mùkhopdhayay; 1 ♀, Sompeta, district Srikakulam, 5.2.1998, coll. M. Prasad; 1 ♀, Palasa, district Srikakulam, 7.2.1998, coll. M. Prasad; 1 ♂, 1 ♀, Vajrapukotturu, district Srikakulam, 9.2.1998, coll. M. Prasad; 1 ♀, Sumadevi, district Srikakulam, 12.2.1998, coll. M. Prasad; 12 ♂ ♂, 10 ♀ ♀, Kolleru, district West Godavari, 3.10.1998, coll. S.K. Mandal; 1 ♀, Samsabad, Vindanagar, district Mahbubnagar, 10.10.1998, coll. S.P. Chakraborty; 1 ♂, Vontimitta, 25kms. from Cuddapah, district Cuddapah, 27.11.1998, coll. P.H. Roy and 1 ♂, Mettabhumi, Vijaywada, district Krishna, 3.1.1999, coll. B.C. Das.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	22.50–25.00 mm	17.00–18.50 mm	16.50–18.50 mm
Female :	21.50–25.50 mm	17.50–18.50 mm	16.50–17.50 mm

Distribution : Throughout India.

Elsewhere : Africa, Indonesia, Japan, Myanmar, Philippines and Sri Lanka.

Remarks : It is most common species and found almost throughout the year near water bodies.

Genus *Rhodischnura* Laidlaw

1919. *Rhodischnura* Laidlaw, *Rec. Indian Mus.*, 16 : 171.

1933. *Rhodischnura*, Fraser, *Fauna Brit. India, Odon*, 1 : 368–369.

Diagnostic characters : Very small sized damselflies, colours non-metallic, bright red and yellow or green with black markings; Wings hyaline; Pterostigma shape and colour different in fore and hindwing; sectors of arc arising from the lower end of arc and divergent from origins; Arc situated at the level of distal antenodal nervure; ab always present and complete.

Distribution : India.

Elsewhere : Bangladesh and Pakistan (Tsuda, 1991).

This genus has a single species, hence no key is provided.

15. *Rhodischnura nursei* (Morton)

1907. *Ischnura nursei* Morton, *Trans. ent. Soc. Lond.*, : 306-307.

1933. *Rhodischnura nursei*, Fraser, *Fauna Brit. India, Odon.*, 1 : 369-371.

Material examined : 1♂, Birsai pet, Jennaram, district Adilabad, 31.8.1999, coll. S.K. Mandal.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	15.00 mm	10.00 mm	10.00 mm

Distribution : India (Bihar, Gujarat, Madhya Pradesh, Rajasthan, West Bengal and Uttar Pradesh).

Elsewhere : Bangladesh, Pakistan (Karachi, Sind and Hyderabad).

Genus *Agriocnemis* Selys

1869. *Agriocnemis* Selys, *Pollen and Van Dam, Fauna Mad. Ins.*, : 24.

1933. *Agriocnemis*, Fraser, *Fauna Brit. India, Odon.*, 1 : 379-380.

Diagnostic characters : Small in size, may be whitish, bluish or reddish in colour and marked with black, sometimes it may be pruinose; postocular colour spot present; females are polychromatic, posterior lobe of prothorax usually differing in shape in male and female. Wings hyaline, Arc situated widely distal to the level of the distal antenodal nervures, pterostigma small in size, rectangular, sometimes differs in male and female. Ab arising from inner wing margin much proximal to the point where Ac meets it.

Distribution : India.

Elsewhere : Afghanistan, Angola, Australia, Bangladesh, Botswana, Cameroon, Central African Republic, China, Congo, Coted'ivoire, Djibouti, Egypt, Ethiopia, Fiji, Garbon, Hong Kong, Indonesia, Israel, Japan, Kampuchea, Kenya, Liberia, Libya, Madagascar, Malawi, Malaysia, Mali, Mauritius, Mozambique, Myanmar, Namidia, Nepal, New caledonia, Pakistan, Papua, New Guinea, Philippines, Reunion, Rwanda, Samoa, Senegal, Seychelles, Sierra Leone, Singapore, Solomon Islands, South Africa, Sri Lanka, Sudan, Swaziland and Zambia.

Key to the species of the genus *Agriocnemis* Selys

1. Labrum metallic blue 2
- Labrum non-metallic 3
2. Superior anal appendages longer than inferiors *A. pygmaea* (Rambur)
- Superior anal appendages shorter than inferiors *A. femina* (Brauer)
3. Black dorsal marking on segment 2, without blue eye-spots
..... *A. splendidissima* Laidlaw

- Black dorsal marking on segment 2, with a pair of blue eye spots; abdominal segment 8 ochreous, with a black anchor-shaped marking on dorsum *A. dabreui* Fraser

16. *Agriocnemis d'abreui* Fraser

1919. *Agriocnemis d'abreui* Fraser, *Rec. Indian Mus.*, **16** : 405-455.

1933. *Agriocnemis d'abreui*, Fraser, *Fauna Brit. India, Odon.*, **1** : 396-398.

Material examined : 2♂♂, Gudur, district Chittoor, 24.10.1986, coll. M.S. Shishodia.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	15.00 mm	9.50 mm	9.00 mm

Distribution : India (Assam and Madhya Pradesh).

17. *Agriocnemis femina* (Brauer)

1868. *Ischnura femina* Brauer, *Verh. zool.-bot. Ges. Wien.*, **18** : 554.

1890. *Agriocnemis femina*, Kirby, *Cat. Odon.*, : 158.

1933. *Agriocnemis femina*, Fraser, *Fauna Brit. India, Odon.*, **1** : 402-404.

Material examined : 1♀, Nagarjun Sagar Tiger Reserve, Mannaur, district Mahbubnagar, 11.4.1985, coll. S. Chatterjee.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	18.00 mm	11.00 mm	10.00 mm

Distribution : India (Andaman Islands, Assam, and West Bengal).

Elsewhere : Annam, Amboina, Indonesia, Philippines, South China, Taiwan and Torres Straits (Dornley Islands).

Remarks : Pterostigma light pale yellow and covers less than a cell. There are 6 postnodal nervures in forewings and 5 in hindwings.

18. *Agriocnemis pygmaea* (Rambur)

1842. *Agriion pygmaeum* Rambur, *Ins. Neurop.*, : 278.

1933. *Agriocnemis pygmaea*, Fraser, *Fauna Brit. India, Odon.*, **1** : 398-401.

Material examined : 3♂♂, Nagarjun Sagar Tiger Reserve, Mannanur, district Mahbubnagar, 11.4.1985, coll. S. Chatterjee; 1♂, Gudur district Chittoor, 24.10.1986, coll. M.S. Shishodia; 1♀, palair, district Khammam, 11.11.1986, coll. M.S. Shishodia; 1♀, Mahabubabad, district Warangal, 12.11.1986, coll. M.S. Shishodia; 1♀, Rajahmundry, district East Godavari,

18.11.1988, coll. 1 ♀, 2 ♀ ♀, Nellore, 25.11.1986, coll. M.S. Shishodia; 1 ♂, 2 ♀, Mutukar, district Cuddapah, 18.10.1997, coll. B.C. Das; 1 ♂, Muddadugi district Cuddapah, 19.10.1997, coll. B.C. Das; 3 ♂ ♂, 1 ♀, Hyderabad, district Rangareddi, 21.10.1997, coll. B.C. Das, 2 ♂ ♂, Medchal, Hyderabad, district Rangareddi, 27.10.1997, coll. P. Mukhopadhyay; 1 ♀, Kondapelli, district Krishna, 31.10.1997, coll. P. Mukhopadhyay; 1 ♀, Kottavalasa, district Vishakhapatnam, 7.11.1997, coll. P. Mukhopadhyay; 3 ♂ ♂, 3 ♀ ♀, Bheemunipatnam, district Vishakhapatnam, 9.11.1997, coll. P. Mukhopadhyay; 2 ♂ ♂, Sompeta, district Srikakulam, 5.2.1998, coll. M. Prasad; 6 ♂ ♂, 5 ♀ ♀, Palasa District Srikakulam, 7.2.1998, coll. M. Prasad; 2 ♂ ♂, 1 ♀, Vajrapukotturu, district Srikakulam, 9.2.1998, coll. M. Prasad; 1 ♂, Palasa, district, Srikakulam, 10.2.1998, coll. M. Prasad; 1 ♂, 5 ♀ ♀, Sumadevi, district Srikakulam, 12.2.1998, coll. M. Prasad; 3 ♂ ♂, 3 ♀ ♀, Kashibugga, district Srikakulam, 13.2.1998, coll. M. Prasad; 2 ♂ ♂, 2 ♀ ♀, Vizianagaram, district Vizianagaram, 16.2.1998, coll. M. Prasad; 5 ♂ ♂, 1 ♀, Kolleru, district West Godavari, 3.10.1998, coll. S.K. Mandal; 2 ♂ ♂, 4 ♀ ♀, Ramasaigavaram, district West Godavari, 4.10.1998, coll. S.K. Mandal; 4 ♂ ♂, 5 ♀ ♀, Madhuvaram Reserve Forest, 47 kms. from Cuddapah, district Cuddapah, 28.11.1998, coll. P.H. Roy and 1 ♀, Kolleru, Rajahmundry, district East Godavari, 16.1.1999, coll. B.C. Das.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	16.00–17.00 mm	10.00–11.50 mm	10.00–11.00 mm
Female :	16.00–18.00 mm	10.50–12.00 mm	10.00–11.50 mm

Distribution : Throughout India.

Elsewhere : Afghanistan, Australia, Bangladesh, Bharno, China, Indonesia, Kampuchea, Malaysia, Myanmar, Nepal, Pakistan, Palon, Papua, Philippines, Reinbode, Seychelles Islands, Singapore, Sri Lanka, Taiwan and Thailand.

Remarks : It is very common species and found throughout the year near water bodies, sometimes this species occurs far away from the water bodies with the grasses.

19. *Agriocnemis splendidissima* Laidlaw

1919. *Agriocnemis splendidissima* Laidlaw, *Rec, Indian Mus.*, **16** : 180-182.

1933. *Agriocnemis splendidissima*, Fraser, *Fauna Brit. India, Odon.*, **1** : 392-394.

Material examined : 1 ♀, Guddur, district Chittoor, 24.10.1986, coll. M.S. Shishodia.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	damaged	10.50 mm	10.00 mm

Distribution : India (Bihar, Madhya Pradesh, South India and West Bengal).

Remarks : There are 6 postnodals nervures in forewings and 5 in hindwings.

Genus *Onychargia* Selys

1865. *Onychargia* Selys, *Bull, Acad, Belg.*, (2) 20 : 416.

1933. *Onychargia*, Fraser, *Fauna Brit, India, Odon.*, 1 : 416-417.

Diagnostic characters : Small size damselfly with black or bronzed in colour and marked with bright citron yellow in subadult stage; wings hyaline, 11 to 18 postnodal nervures in forewings and 11 to 15 in hindwings; discoidal cell actually pointed at distal end; Arc situated opposite the distal antenodal nervure; ab always present and complete.

Distribution : Southern Asia from Western Ghats of India to the Philippines and New Guinea.

This genus is represented by a single species in Andhra Pradesh, hence no key is provided.

20. *Onychargia atrocyana* Selys

1865. *Onychargia atrocyana* Selys, *Acad. Belg.*, (2) 20 : 416.

1933. *Onychargia atrocyana*, Fraser, *Fauna Brit, India, Odon.*, 1 : 417-418.

Material examined : 2♂♂, Phoolbag, Vizianagaram, 15.2.1998, coll. M. Prasad.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	24.00 mm	19.50 mm	19.00 mm

Distribution : India (Assam, Bihar, Orissa, South India and West Bengal).

Elsewhere : Myanmar and Sri Lanka.

Remarks : Pterostigma yellow and covers more than a cell. There are 11 postnodal nervures in forewings and 10 in hindwings. Specimens of this species were seen in colony near small bushes and sometimes they are found near waterbody within small grassy vegetations.

Family PLATYCNEMIDIDAE

Genus *Copera* Kirby

1863. *Psilocnemis* Selys, *Bull, Acad. Belg. Sci.*, (2) 16 : 168 (nom. Pracoc.).

1890. *Copera*, Kirby, *Syn. Cat. Neur. Odon.*, : 129.

1933. *Copera*, Fraser, *Fauna Brit. India, Odon.*, 1 : 191.

Diagnostic characters : Medium sized damselflies, whitish, bluish, or seldom partly reddish, marked with black or brown colour. Posterior lobe of prothorax simple in male and rounded or deeply notched in female, wings hyaline, petrostigma a little longer than broad; 11-15 postnodal in forewings and 9-13 in hindwings, discoidal cell with costal and inner margin subequal.

Distribution : India.

Elsewhere : Bangladesh, China, Hong Kong, Indonesia, Japan, Kampuchea, Laos, Malaysia, Myanmar, Nepal, Philippines, Taiwan, Vietnam and Thailand.

21. *Copera vittata deccanensis* Laidlaw

1923. *Copera vittata deccanensis* Laidlaw, *Rec. Indian Mus.*, 13 : 322, 337-339.

1991. *Copera vittata deccanensis*, Tsuda, *A. distributional list of World Odonota*, : 53.

Material examined : 1 ♂♂, Achampeta, district Mahbubnagar, 3.11.1986, coll. M.S. Shishodia.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	26.00-27.00 mm	17.00-18.00 mm	16.00-17.50 mm

Remarks : There are 12 postnodal nervures in forewings and 10 in hindwings.

Family PROTONEURIDAE

Genus *Caconeura* Kirby

1890. *Caconeura*, Kirby, *Cat. Odon.*, : 132.

1933. *Caconeura*, Fraser, *Fauna Brit. India, Odon.*, 1 : 210-212.

Diagnostic characters : Small to moderate size damselfly; colour black marked with blue; wings hyaline, narrow, very long and subfalcate at apices; ab present but incomplete; 1A absent.

Distribution : Peninsular India.

This genus is represented by a single species in Andhra Pradesh, hence no key is provided.

22. *Caconeura obscura* (Fraser)

1933. *Indoneura obscura*, Fraser, *Fauna Brit. India, Odon.*, 1 : 257-258.

1991. *Caconeura obscura*, Tsuda, *A. distributional list of world odonata*, : 8.

Distribution : India (Andhra Pradesh, Eastern Ghats and Orissa).

Genus *Prodasineura* Cowley

1860. *Alloneura* Selys, *Mem. cour. Acad. R. Belg.*, (B), 38 : 160, 176 (nom. Praecoc.).

1890. *Caconeura*, Kirby, *Sy. Cat. Neurop. Odon.*, : 134 (Nom. nov.).

1934. *Prodasineura*, Cowley, *Entomologist.*, 67 : 202.

Diagnostic characters : Medium sized damselfly, black marked with bright red, orange, blue, whitish or yellow; wings hyaline, pterostigma about one and half times as long as broad, 12-17 postnodal nervures in forewings and 11-15 in hindwings. Ab usually absent, if present then incomplete and curved to meet margin of wing.

Distribution : India.

Elsewhere : Bangladesh, China; Congo, Coted'ivoire, Equatorial Guinea, Hong Kong, Indonesia, Liberia, Malaysia, Myanmar, Nepal, Nigeria, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam and Zimbabwe.

This genus is represented in Andhra Pradesh by a single species, hence no key is provided.

23. *Prodasineura verticalis annandalei* (Fraser)

1921. *Caconeura annandalei* Fraser, *J. Bombay nat. Hist. Soc.*, 27 : 543, 544.

1933. *Caconeura verticalis annandalei*, Fraser, *Fauna Brit. India, Odon.*, 1 : 214-216.

1991. *Prodasineura verticalis annandalei*, Tsuda, *A distributional list of world Odonata.*, : 14.

Material examined : 1♂, Suryapet, district Nalgonda, 7.11.1986, coll. M.S. Shishodia.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	28.00 mm	19.00 mm	18.00 mm

Distribution : India (Western Ghats upto 4,000; Mahabaleswar, Coorg, Malabar, Nilgiri and Wynaad).

Remarks : Pterostigma black, covers one cell, anteclypeus dark brown and rest of the head mat black, Prothorax and thorax black. There are 13 postnodal nervures in forewings and 11 in hindwings.

Superfamily LESTOIDEA

Family LESTIDAE

Genus *Lestes* Leach

1815. *Lestes* Leach, in *Burmeister, Edinb. Encycl.*, 9 : 137

1933. *Lestes*, Fraser, *Fauna Brit. India, Odon.*, 1 : 29.

Diagnostic characters : Medium to large size damselfly; may be blue, green, yellow, or orange in colour. It may be marked with brown, black or metallic green, sometimes partly pruinosed; posterior lobe of prothorax rounded or shallowly tripartite; wings hyaline, sometimes partly enfumed, 9-16 postnodal nervures in fore and hindwings. Ab arising from the inner wing margin from or slightly proximal to the point where Ac meet it.

Distribution : Cosmopolitan in distribution.

Key to the species of genus *Lestes* Leach

1. Thorax without metallic markings, vertex pale brown *L. umbrinus* Selys
- Thorax with green metallic antehumeral stripe 2
2. Thorax with a uniform narrow antehumeral stripe *L. viridulus* Rambur
- Thorax with narrow, deeply scalloped or crenulate antehumeral stripe 3
3. Abdomen never more than 33.00 mm long *L. concinnus* Selys
- Abdomen more than 34.00 mm long *L. elatus* Hagen in Selys

24. *Lestes concinnus* Selys

1862. *Lestes concinnus* Hagen : Selys, *Bull. Acad. Belg. Sci.*, (2)13 : 321 (partim).

1890. *Lestes concinnus*, Selys : Kirby, *Syn. Cat. Neur. Odon.*, : 162 (partim).

1963. *Lestes concinnus*, Lieftinck, *Mem. Soc. Ent. Ital.*, 38 : 232.

Distribution : India (Andhra Pradesh), Gujarat, Maharashtra, Meghalaya, Uttar Pradesh and West Bengal).

Elsewhere : Australia, China, Indonesia, Myanmar and Philippines (Lahiri, 1987).

Remarks : This species is included here on the basis of literature review. Lahiri (1987) has reported this species from Andhra Pradesh.

25. *Lestes elatus* Hagen in Selys

1858. *Lestes elata* Hagen in Selys, *Verh. zool.-bot. Ges. Wien.*, 8 : 478.

1890. *Lestes elatus*, Kirby *Cat. Odon.*, : 162.

1991. *Lestes elatus*, Tsuda, *A distributional list of world Odonata*, : 61.

Material examined : 1 ♀, 1 km. North of Kadiri, district Anantpur, 17.12.1987, coll. B.N. Nandi; 2 ♂♂, 2 ♀♀, Muddadugi, district Cuddapah, 19.10.1997, coll. B.C. Das; 1 ♀, Araku Valley, district Vishakhapatnam, 11.1.1999, coll. B.C. Das; 1 ♂, 1 ♀, Araku Valley, district Vishakhapatnam, 11.1.1999, coll. B.C. Das and 3 ♂♂, 1 ♀, Vishakhapatnam, 14.1.1999, coll. B.C. Das.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	32.00-33.50 mm	22.00-23.50 mm	21.00-22.50 mm
Female :	31.00-32.00 mm	22.00-23.00 mm	21.50-22.50 mm

Distribution : India (Peninsular India and Orissa).

Elsewhere : Sri Lanka.

Remarks : There are 10 postnodal nervures in both the wings of male and 11 postnodals in both the wings of female. It is most common species and found almost throughout the year in Peninsular India. It is most abundant around ponds and tank during monsoon period. During drier seasons it hide in scrub-jungle.

26. *Lestes umbrinus* Selys

1891. *Lestes umbrina* Selys, *Ann. Mus. Cir., Genova*, (2) 10 : 497-498.

1933. *Lestes umbrina*, Fraser, *Fauna Brit. India, Odon.*, 1 : 53-55.

1991. *Lestes umbrinus*, Tsuda, *A distributional list of world Odonata*, : 63.

Material examined : 1 ♀, Jamikunta, district Karimnagar, 8.12.1987, coll. B.N. Nandi.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	31.00 mm	21.00 mm	20.00 mm

Distribution : India (Andhra Pradesh, Bihar, Chandigarh, Gujarat, Madhya Pradesh, Maharashtra, Orissa, Uttar Pradesh and West Bengal).

Elsewhere : China and Myanmar.

27. *Lestes viridulus* Rambur

1842. *Lestes viridula* Rambur, *Hist. Nat. Ins. Neurop.*, : 252-253.

1993. *Lestes viridula*, Fraser, *Fauna Brit. India, Odon.*, 1 : 45-46.

1991. *Lestes viridulus*, Tsuda, *A distributional list of world Odon.*, : 64.

Material examined : 1 ♀, Hyderabad, district Rangareddi, 21.10.1997, coll. P. Mukhopadhyay and 2 ♂ ♂, 2 ♀ ♀, Phoolbagh, district Vizianagarm, 15.2.1998, coll. M. Prasad.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	35.00 mm	24.00 mm	23.00 mm
Female :	33.50 mm	24.00 mm	23.00 mm

Distribution : Thorughout India.

Remarks : Pterostigma dark brown in colour and covers 2 cells. There are 12 postnodal nervures in forewings and 11 in hindwings. It is also a very common species and found in sometimes in colony. During dry seasons it become commonest among long dry grasses.

Superfamily CALOPTERYGOIDEA

Family CALOPTERYGIDAE

Genus *Vestalis* Selys

1853. *Vestalis* Selys, *Syn. Cat.*, : 24.

1934. *Vestalis*, Fraser, *Fauna Brit. India, Odon.*, 1 : 224-125.

Diagnostic characters : Large sized, metallic bronze, blue or green marked with yellow or black, rarely pruinosed; Wings moderately broad, hyaline and tinted with yellow or opaque black at spices; 17-37 antenodals and 36-85 postnodal nervures present in both pairs of wing. Pterostigma absent; are oblique, situated at about the level of 4th antenodal nervures.

Distribution : India.

Elsewhere : Bangladesh, China, Indonesia, Kampuchea, Laos, Malaysia, Myanmar, Philippines, Thailand and Vietnam.

This genus is represented in Andhra Pradesh by a single species, hence no key is provided.

28. *Vestalis gracilis gracilis* (Rambur)

1842. *Calopteryx gracilis* Rambur, *Ins. Neurop.*, : 224.

1853. *Vestalis gracilis*, Selys, *Syn. Cal.*, : 26.

1934. *Vestalis gracilis gracilis*, Fraser, *Fauna Brit. India. Odon.*, 2 : 126-128.

Distribution : India (Andaman and Nicobar Islands, Andhra Pradesh, Assam, Bihar, Eastern Ghats, Gujarat, North East India, West Bengal (locality unknown) and Western Ghats).

Elsewhere : Malaysia, Myanmar, Thailand and Vietnam.

Remarks : This species is included on the basis of literature review.

Family CHLOROCYPHIDAE

Genus *Rhinocypha* Rambur

1842. *Rhinocypha* Rambur, *Hist nat. Ins. Neurop.*, : 232.

1934. *Rhinocypha*, Fraser, *Fauna Brit. India, Odon.*, 1 : 5-7.

Diagnostic characters : Medium size damselfly, red or black marked with yellow, green or blue in colour; epistome moderately developed; wings moderately narrow or well dilated, hyaline or partly opaque portion may be marked with metallic blue, violet, green or coppery. 12-23 antenodal and 20-48 postnodal nervures in both the pairs of wings; Arc angulated, usually situated at the level of distal primary antenodal nervure. Sectors of arc arising from about its middle, separated at origin.

Distribution : India.

Elsewhere : Australia, Bangladesh, China, Hong Kong, Japan, Laos, Myanmar, Nepal, Papua, New Guinea, Philippines, Ryukyu, Solomon Islands, Taiwan, Thailand, Tibet, and Vietnam.

This genus has a single species in Andhra Pradesh, hence no key is provided.

29. *Rhinocypha (heliocypha) bisignata* (Selys)

1853. *Rhinocypha bisignata* Selys, *Syn. Cal.*, : 62.

1934. *Rhinocypha bisignata*, Fraser, *Fauna Brit. India, Odon.*, 2 : 49-52.

1991. *Rhinocypha (heliocypha) bisignata*, Tsuda, *A distributional list of world Odonata*, : 76.

Material examined : 1 ♀, Pulsunanila, Nallamali forest, 20 kms from Atmakur, district Anantpur, 21.11.1998, coll. P.H. Roy.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	25.00 mm	26.00 mm	25.00 mm

Distribution : India (Maharashtra and South India).

Suborder ANISOPTERA

Superfamily AESHNOIDEA

Family GOMPHIDAE

Genus *Paragomphus* Cowley

1905. *Mesogomphus* Forster, *Jahrb. Nassau. Ver. Naturk., Wiesb.*, 59 : 323.

1934. *Mesogomphus*, Fraser, *Fauna Brit. India, Odon.*, 2 : 228-230.

1934. *Paragomphus* Cowley, *Entomologist*, 67 : 201.

Diagnostic characters : Medium sized dragonfly, black marked with greenish-yellow or orange; wings hyaline, tornus of the wings in male angulated, but in female round; 12-16 antenodal nervures in forewings and 9-11 in hindwings; 6-10 postnodal nervures in both pairs of wing. Only one cubital nervure in both the wings.

Distribution : India.

Elsewhere : Afghanistan, Algeria, Bangladesh, Botswana, Cameroon, Central Africa Republic, China, Congo, Coted'ivoire, Egypt, Equatorial Guinea, Ethiopia, France, Gabon, Indonesia, Iran, Italy, Kenya, Laos, Liberia, Madagascar, Malawi, Malyasia, Morocco, Mozambique, Myanmar, Namibia, Philippines, Portugal, Saudi Arabia, Somalia, South Africa, Spain, Swaziland, Syria, Tanzania, Thailand, Turkey, Yeman, Zambia, Zaire and Zimbabwe.

This genus has a single species in Andhra Pradesh, hence no key is provided.

30. *Paragomphus lineatus* (Selys)

1850. *Gomphus lineatus* Selys, *Rev. Odon.*, : 386.

1934. *Mesogomphus lineatus*, Fraser, *Fauna Brit. India, Odon.*, 2 : 230-234.

1985. *Paragomphus lineatus*, Davies & Tobin, *Soc. int. Odonatol. rapid comm. (Suppl.)*, No. 5 : 47

Material examined : 1 ♀, Mahabubabad, district Warangal, 12.11.1986, coll. M.S. Shishodia, and 1 ♂, Borra, district Vishakhapatnam, 15.10.1998, coll. S.K. Mandal.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	34.00 mm	25.50 mm	25.00 mm
Female :	35.00 mm	26.00 mm	25.00 mm

Distribution : India (Andhra Pradesh, Bihar, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Meghalaya, Nilgiris, Orissa, Sikkim, Uttar Pradesh, Tamil Nadu and West Bengal).

Elsewhere : Afghanistan, Bangladesh, Iran, Myanmar, Nepal, Sri Lanka, Syria and Turkey.

Remarks : Pterostigma pale yellow and covers 5 cells.

$$\text{Nodal index } \frac{6-14}{7-9} \bigg| \frac{13-7}{10-7} \text{ to } \frac{8-14}{9-10} \bigg| \frac{13-8}{10-8}$$

It is a common species found near water bodies.

Genus *Ictinogomphus* Cowley

1842. *Ictinus* Rambur, *Ins. Neurop.*, : 171.

1934. *Ictinus*, Fraser, *Fauna Brit. India, Odon.*, 2 : 370-372.

1981. *Ictinogomphus*, Davies & Tobin, *soc. int. Odonatol. rapid, comm.*, No. 3 : 34.

Diagnostic characters : Large size dragonfly; mat black, marked with bright citron-yellow or greenish-yellow; Wings hyaline, base of hindwings deeply excavated; anal triangle 5 celled; Arc present in between first and second antenodal nervures; 2 to 4 cubital nervures in forewings and 2 in hindwings; Subtrigone 2 celled in forewings, entire or rarely 2 celled in hindwings.

Distribution : India.

Elsewhere : Africa, Australia, East Palaearctic and South-east Asia.

This genus has a single species in Andhra Pradesh, hence no key is provided.

31. *Ictinogophus rapax* (Rambur)

1842. *Diastatomma rapax* Rambur, *Ins. Neurop.*, : 169.

1934. *Ictinus rapax*, Fraser, *Fauna Brit. India, Odon.*, 2 : 373-376.

1991. *Ictinogomphus rapax*, Tsuda, *A distributional list of World Odonata.*, : 99.

Distribution : Throughout India.

Elsewhere : Malaysia, Myanmar, Nepal and Sri Lanka.

Remarks : It is most common species of this genus and found near permanent water bodies. Specimens of this species were observed either resting on any aquatic plants, twigs etc. near water bodies or petrolling in the ponds, lakes etc. This species is included here on the basis of literature review.

Family AESHNIDAE

Genus *Anax*

1815. *Anax* Leach, *Edinb. Encyd.*, 9 : 137.

1936. *Anax*, Fraser, *Fauna Brit. India, Odon.*, 3 : 134-136.

Diagnostic characters : Very large size and robust built dragonflies. Wings hyaline, sometimes tinted with yellow or pale brown; Head large and glabular; eyes broadly contiguous, Wings long and broad, apices pointed base straight, tornus rounded in male and female, subtriangle absent; arc situated nearer to the primary antenodal nervure; anal triangle absent; 4 to 7 cubital nervures in all the wings; oreillets absent.

Distribution : Cosmopolitan.

Only one species of this genus occurs in Andhra Pradesh, hence no key is provided.

32. *Anax guttatus* (Burmeister)

1839. *Aeschna guttatus* Burmeister, *Handb. Ent.*, 2 : 840.

1936. *Anax guttatus*, Fraser, *Fauna Brit. India, Odon.*, 3 : 140-142.

Distribution : Extends from Seychelles to Samoa in the Pacific. Common throughout the plains of India, except desert areas.

Remarks : This species is included here on the basis of literature review.

Genus *Hemianax*

1871. *Cyrtosoma* Selys (nom. Preoc.) *Trans. Ent. Soc. Lond.*, : 412.

1936. *Hemianax*, Fraser, *Fauna Brit. India, Odon.*, 3 : 146-147.

Diagnostic characters : Large size dragonflies, coloured variable yellow and blue marked with brown and black; head large and globular; thorax robust; Wings pointed at apices, base straight, tornus rounded in both the sexes, 4 to 5 cubital nervures in both pairs of wings; basal space entire.

Distribution : India.

Elsewhere : Australia, North Africa, Papua, South Asia and South Europe.

Only one species is found in India, therefore, no key is provided.

33. *Hemianax ephippiger* (Burmeister)

1839. *AAeschna ephippiger* Burmeister, *Handb. Ent. Band, 2* : 840.

1936. *Hemianax ephippiger*, Fraser, *Fauna Brit. India, Odon.*, 3 : 147-149.

Distribution : India.

Elsewhere : From South Europe to North Asia (Iraq, Egypt, Mesopotamia and Morocco).

Remarks : *Hemianax ephippiger* (Burmeister) is the only representative of the genus in India. This species is included here on the basis of literature review.

Genus *Gynacantha* Rambur

1842. *Gynacantha* Rambur, *Ins. Neurop.*, : 209.

1933. *Gynacantha*, Fraser, *Fauna Brit. India, Odon.*, 3 : 94-96.

Diagnostic characters : Large sized dragonflies; brown or black with maroon, yellow or green; 3rd abdominal segment in male usually constricted; male superior anal appendages long and narrow, about 2 to 3 times as long as 10 abdominal segment; inferior anal appendages less than half the length of superior, narrow and triangular; in female anal appendages lanceolate and usually longer in comparison with male superior anal appendages; ovipositor large usually extending to apex of abdomen; wings hyaline, sometimes tinted with yellow or brown; in male base of hindwing obtusely notched, tornus angulated, anal angle 3-celled. 13-14 antenodal and postnodal nervures present. Pterostigma narrow and 4-5 times as long as broad, braced; discoidal cell 5-9 celled and situated 2-3 cells distal to the level of arc; median space entire; hypertrigone and cubital space basal to subtrigone traversed by 4-9 and 6-10 veins respectively; generally 8-17 cells in anal loop; usually one row of cells between Cu₁ and 1A.

Distribution : India.

Elsewhere : Angola, Argentina, Australia, Bangladesh, Bahamas, Benin, Botswana, Brazil, Burkina Faso, Cameroon, Cayman Islands, Central Africa, Comoron, Congo, Coted'ivoire, Cuba, China, Costa Rica, Ecuador, Equatorial Guinea, El Salvador, Fiji, French, Gabon, Guatemala, Guinea, Guyana, Haiti, Honduras, Hong Kong, Indonesia, Japan,

Kampuchea, Kenya, Korea, Liberia, Madagascar, Malawi, Malaysia, Mexico, Mauritius, Mozambique, Nepal, New Caledonia, Nicaragua, Nigeria, Panama, Papua new Guinea, Paraguay, Peru, Puerto Rico, Philippines, Samoa, Sierra Leone, Singapore, Somalia, South Africa, Taiwan, Thailand, Tanzania, Tonga, Trinidad and Tobago, United States of America, Venezuela, Vanuatu, Zaire and Zambia.

This genus has a single species in Andhra Pradesh, hence no key is provided.

34. *Gynacantha bayadera* Selys

1891. *Gynacantha bayaders* Selys, *Ann. Mus. Civ. Genova*, **30** : 47.

1936. *Gynacantha bayadera*, Fraser, *Fauna Brit. India, Odon.*, **3** : 103-104.

Material examined : 1 ♀, Borra, district Vishakhapatnam, 15.10.1998, coll. S.K. Mandal.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	48.00 mm	43.00 mm	42.00 mm

Distribution : India [Bengal (Fraser, 1936), Meghalaya (Lahiri, 1987 and Mitra, 1999) and Sikkim].

Elsewhere : Bangladesh (Tsuda, 1991), Celebes, China, Myanmar, Nepal, New Guinea, Philippines, Singapore, Sundaic Archipelago, Taiwan and Thailand.

Remarks : Pterostigma yellow in colour and covers 3 cells; 7 cubital nervures in forewings

and 6 in hindwings; discoidal cell 5 celled in both pairs of wings. Nodal index $\frac{15-21}{18-15} \bigg| \frac{22-16}{15-19}$

Superfamily LIBELLULOIDEA

Family CORDULIIDAE

Genus *Macromia* Rambur

1842. *Macromia* Rambur, *Ins. Neurop.*, : 137.

1936. *Macromia*, Fraser, *Fauna Brit. India, Odon.*, **3** : 161-162.

Diagnostic characters : Dragonflies of large size, coloured dark metallic green or blue, marked with citron yellow; head very large, eyes globular and contiguous; prothorax small, thorax large and robust, naked, wings long, pointed at apices; base of hindwings deep emarginate and markedly angulated; reticulation closed; hypertrigones traversed once; arc situated between the 1st and 2nd antenodal nervures; sectors of arc shortly fused at origin in forewing, with a longer fusion in the hindwing; 2 to 3 cubital nervures in both pairs of wings; oreillets present on the sides of 2nd abdominal segment.

Distribution : India.

Elsewhere : Angola, Australia, Bangladesh, Benin, Botswana, Brunei, Cameroon, Central Africa, China, Congo, Coted'ivoire, Egypt, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea-Bissau, Indonesia, Japan, Kenya, Korea, Laos, Liberia, Malaysia, Mali, Malawi, Mexico, Mozambique, Namibia, Nigeria, Nepal, Philippines, Portugal, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Tanzania, Taiwan, Thailand, United States of America, Vietnam, Zaire and Zambia.

This genus is represented by a single species in Andhra Pradesh, hence no key is provided.

35. *Macromia cingulata* Rambur

1842. *Macromia cingulata* Rambur, *Ins. Neurop.*, : 137.

1936. *Macromia cingulata*, Fraser, *Fauna Brit. India, Odon.*, 3 : 179-182.

Material examined : 1 ♀, Rajahmundry, district East Godavari, 18.11.1986, coll. M.S. Shishodia.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	41.00 mm	37.00 mm	36.00 mm

Distribution : India (Submontane areas of Peninsular India).

Remarks : Wings hyaline, Pterostigma black and covers 1½ cells, Membrane brownish white in colour; 4 cubital nervures in forewings and 3 in hindwings; discoidal field begins

with 2 rows of cells. Nodal index $\frac{6-13}{8-9} \bigg| \frac{14-6}{9-10}$. It is purely a riverine species and is usually found hawking over shallow, rippling water flowing over clean, gravelly bottoms (Fraser, 1936).

Genus *Epophthalmia* Burmeister

1839. *Epophthalmia* Burmeister, *Handb. ent.*, 2 : 844.

1936. *Epophthalmia*, Fraser, *Fauna Brit. India, Odon.*, 3 : 192-193.

Diagnostic characters : Very large sized dragonflies; coloured ochreous, dark reddish-brown or blackish with cupreous dark green or dark green metallic reflex, marked with bright yellow spots or stripes; prothorax small, entirely concealed by head; wings long and pointed at apices; reticulation closed; hypertrigones traversed once or more; arc situated in between 1st and 2nd antenodal nervures or sometimes opposite to the second; 4 cubital nervures in forewings and 2 to 3 in hindwings; anal triangle 2 celled.

Distribution : India.

Elsewhere : China, Indonesia, Malaysia, Myanmar and Sri Lanka.

This genus is represented by a single species in Andhra Pradesh, hence no key is provided.

36. *Epophthalmia vittata vittata* Burmeister

1839. *Epophthalmia vittata* Burmeister, *Handb. Ent.*, 2 : 845.

1936. *Epophthalmia vittata vittata*, Fraser, *Fauna Brit. India, Odon.*, 3 : 194-196.

Material examined : 2♂♂, Addatigola Forest Rest House Compound, district East Godavari, 7.4.1996, coll. T.P. Bhattacharya.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	55.00 mm	50.00 mm	49.00 mm

Distribution : India (Andhra Pradesh, Karnataka, Maharashtra, West Bengal and Tamil Nadu), Fraser (1936) has mentioned that this species is widely distributed throughout the whole of Peninsular India save in desert and montane tracts. This species breeds in the plains.

Remarks : Out of these two specimen one was collected at light. Wings hyaline, apices of wings slightly enfumed, tornal angle of hindwing with a bright amber yellow markings. Pterostigma small in size and narrow, black and covers more than 1½ cells. Membrane large with whitish border; anal triangle 2 celled; hypertrigone traversed 3 times in forewings and 2 times in hindwings; 6 cubital nervures in forewings and 3 in hindwings, Nodal index

$\frac{6-16}{9-11} \bigg| \frac{15-7}{12-8}$ to $\frac{7-15}{9-11} \bigg| \frac{15-7}{11-10}$ It can easily be differentiated with other species of the

genus by the dark ochreous colour of this dragonfly together with the broad yellow annules on the abdomen.

Family LIBELLULIDAE

Key to genera of Family LIBELLULIDAE

1. Borders of anal loop meet posterior border of wing; apex of loop open 2
- Borders of anal loop converging and meet before posterior border of wing; apex of loop closed 3
2. Abdomen not tumid at base; male with an opalescent white spot in centre of hindwing *Tholymis* Hagen
- Abdomen very tumid at base, then abruptly narrowed and very slim and cylindrical at the end; an opalescent white spot at the centre of hindwing absent in male *Zyxomma* Rambur

3. Distal antenodal nervure in forewing complete 4
 - Distal antenodal nervure in forewing incomplete 7
4. Lobe of prothorax large and fringed with long hairs 5
 - Lobe of prothorax small and usually naked; 8th and 9th abdominal segments marked with black dorsally *Urothemis* Brauer
5. Frons metallic above *Brachydiplax* Brauer
 - Frons non-metallic above 6
6. Only 6 antenodal nervures in forewings; 1-6 abdominal segments are dilated and 7 to 10 slim *Acisoma* Rambur
 - Not less than 12 antenodal nervures in forewings, shape of abdominal segments are variable but never resembling with above genus *Orthetrum* Newman
7. Lobe of prothorax large and fringed with long hairs 8
 - Lobe of prothorax small and usually naked 10
8. Cuii widely separated from posterior angle of discoidal cell in hindwings; eyes meeting at a point only *Rhodothemis* Ris
 - Cuii arising from posterior angle of discoidal cell in hindwings, eyes more or less broadly contiguous 9
9. Eyes contiguous for a short space; discoidal cell in hindwing entire; frons non metallic above; discoidal field in forewing beginning with 2 rows of cells *Diplacodes* Kirby
 - Eyes more broadly contiguous, discoidal cell in hindwing traversed; frons metallic above; discoidal field in forewing with 3 rows of cells *Palpopleura* Rambur
10. Sectors of arc in forewing separated and diverging at origin, body very dark metallic; frons metallic above *Rhyothemis* Hagen
 - Sectors of arc in forewing arising from a common and rather long stalk; body and frons non metallic 11
11. Discoidal field with borders converging strongly at wing margin 12
 - Discoidal field with borders parallel or widely divergent at wing margin 13
12. Discoidal cell in forewing very narrow, its costal side only about one-fourth to one-third the length of basal; a conspicuous supplementary nervure (IRii) present between Rii and Riii *Pantala* Hagen
 - Discoidal cell in forewing broader; its costal side about one-half the length of basal; no supplementary nervure (IRii) present between Rii and Riii *Trithemis* Brauer

13. Discoidal field in forewing adjacent to discoidal cell only 2 cell wide *Indothemis* Ris
- Discoidal field in forewing adjacent to discoidal cell 3 or more wide 14
14. Hindwing very broad at base and rather tapered at apex; pterostigma very short and usually unequal in fore and hindwings 15
- Hind wing not wide at base and apex not markedly tapered; pterostigma variable and usually of equal size in fore and hindwings 16
15. Pterostigma in fore and hindwings of almost equal size; distal and apical angles of anal loop equal in size *Hydrobasileus* Kirby
- Pterostigma of forewing longer than hindwings; apical angle or anal loop much more acute than the distal *Thamea* Hagen
16. Pterostigma bicolorous, black with white ends; 2 rows of cells between IRiii and Rspl *Bradinopyga* Kirby
- Pterostigma unicolorous, one or rarely 2 rows of cells between IRiii and Rspl 17
17. Wings coloured may be amber-yellow at base, dark reddish brown and black; more than one cubital nervure in all wings *Neurothemis* Brauer
- Wings usually uncoloured or with a small basal yellow marking in hindwing (a broad medial fascia in *Brachythemis*); only one cubital nervure in all wings 18
18. Variable coloured and darker species, may be partly red or ochreous; Arc situated between the first and second antenodal nervure *Potamarcha* Karsch
- Red or ochreous species with basal or medial yellow markings to wings 19
19. Wings with small basal yellow markings; face and frons red; 9½ to 10½ antenodal nervures in forewings *Crocothemis* Brauer
- Wings with broad reddish yellow medial fascia; face, frons and abdomen never red; 6½ to 7½ antenodal nervures in forewings *Brachythemis* Brauer

Genus *Brachydiplax* Brauer

1968. *Brachydiplax* Brauer, *Verh. Zool.bot.Ges. Wien.*, **18** : 172, 386, 725.

1936. *Brachydiplax*, Fraser, *Fauna Brit. India, Odon.*, **3** : 323-325.

Diagnostic characters : Rather small sized dragonflies; eyes contiguous for a long distance; Prothorax with moderate to large posterior bole and fringed with long hairs; wings hyaline, long and narrow; subtrigone in forewings 3 celled; hypertrigones and discoidal cell in hindwings entire; arc situated in between 1st and 2nd antenodal nervures; one cubital nervure in both the wings; one row of cells between IRiii and Rspl; discoidal field begins with two rows of cells.

Distribution : India.

Elsewhere : Australia, Bangladesh, China, Hong Kong, Indonesia, Japan, Malaysia, New Guinea, Nepal, Philippines, Singapore, Solomon, Sri Lanka, Thailand and Vietnam.

This genus is represented by a single species in Andhra Pradesh, hence no key is provided.

37. *Brachydiplax sobrina* (Rambur)

1842. *Libellula sobrina* Rambur, *Ins. Neurop.*, : 144.

1893. *Brachydiplax sobrina*. Kirby, *J. Linn. Soc. Zool.*, **24** : 551.

1936. *Brachydiplax sobrina.*, Fraser, *Fauna Brit. India, Odon.*, **3** : 325-327.

Material examined : 1 ♀, Vijrapukotturu, district Srikakulam, 9.2.1998, coll. M. Prasad.

Measurements :

	Abdomen	Forewing	Hindwing
Female :	22.00 mm	26.00 mm	25.00 mm

Distribution : India (Andhra Pradesh, Assam, Bihar, Chandigarh, Himachal Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Rajasthan, Uttar Pradesh, West Bengal and Western Ghats).

Elsewhere : Bangladesh, Myanmar, Nepal, Palon, Sri Lanka, Teinzo, Toungoo and Thailand.

Remarks : Anal triangle in forewings 3 celled, Discoidal cell entire and Discoidal field begins with 2 rows of cells, one row of cells in between IRiii and Rspl. Pterostigma pale

yellow in colour and covers 1½ cells. Nodal index $\frac{6-7}{5-6} \bigg| \frac{7-6}{5-7}$ This species was collected from the bushes present nearby water body. It is very commonly found at the pond and tanks etc.

Genus *Orthetrum* Newman

1833. *Orthetrum* Newman, *Ent. Mag.*, **1** : 511.

1936. *Orthetrum*, Fraser, *Fauna Brit. India, Odon.*, **3** : 291-292.

Diagnostic characters : Small to medium size dragonfly; colour white, yellow, green, orange, red or brown, marked with black sometimes markings obscured by pruinescens; posterior lobe prothorax large provided with tuft or hairs; Wings hyaline, enfumed with brown and marked at base with golden yellow, amber or blackish brown; 11-21 and 8-15 antenodal nervure in forewings and hindwings respectively; and 8-16 postnodal nervures in both pairs of wing; sector of arc at a common stalk, only one cubital nervures in both the pairs of wings.

Distribution : Cosmopolitan.

Key to the species of genus *Orthetrum* Newman

1. Males violaceous-red, due to thin over-lying pruinescence; frons blue black anteriorly *O. pruinsum neglectum* (Rambur)
- Males coloured brown or black with yellow markings; often pruinose 2
2. Abdomen enormously swollen at the base and then abruptly slimmed and compressed laterally to the end; black marked with greenish-yellow; never pruinose *O. sabina sabina* (Drury)
- Abdomen variable but never very slim nor compressed laterally; mostly with pruinose abdomen and thorax 3
3. Base of hindwing a large black triangular marking .. *O. triangulare triangulare* (Selys)
- Base of hindwing without a black triangular marking 4
4. Moderately large species with face black or frons blackish anteriorly; membrane black *O. glaucum* (Brauer)
- Small species with face and frons greyish green or bluish, membrane dark brown bordered with black *O. taeniolatum* (Schn.)

38. *Orthetrum glaucum* (Brauer)

1865. *Libellula glauca* Brauer, *Verh. Zool.-bot. Ges. Wien.*, **15** : 1012.

1936. *Orthetrum glaucum*, Fraser, *Fauna Brit. India, Odon.*, **3** : 307-309.

Material examined : 1 ♀, Venkateswara University campus, district Chittoor, 30.9.1998, coll S.K. Mondal.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	30.50 mm	37.00 mm	36.00 mm

Distribution : India [Andhra Pradesh, (Lahiri 1987), Arunachal Pradesh, Himachal Pradesh, Maharashtra, Mizoram, Orissa, Sikkim, Uttar Pradesh, West Bengal and Western Ghats].

Elsewhere : China, Hong Kong, Indonesia, Japan, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Taiwan, Tennasserim, Thailand, Tongoo and Vietnam.

Remarks : Wings hyaline; perostigma deep yellow and covers 2 cell; anal triangle 3 celled; 2 rows of cells in between IR_{iii} and Rs_{pl}; discoidal field begins with 3 rows of cells, in forewings; membrane brown; base of hindwings marked with deep brown. Nodal index

$\frac{11-13}{11-10} \bigg| \frac{12-13}{10-11}$ It is a common species under the genus *Orthetrum* and found mostly near hill streams.

39. *Orthetrum pruinsum neglectum* (Rambur)

1842. *Libellula neglecta* Rambur, *Ins. Neurop.*, : 86.

1936. *Orthetrum pruinsum neglectum*, Fraser, *Fauna Brit. India, Odon.*, 3 : 311-313.

Material examined : 1 ♂, Hyderabad, district Rangareddi, 29.10.1986, coll M.S. Shishodia and 1 ♂, Nallamala forest, Sri Sailam, district Kurnool. 25.11.1998, coll. H.P Roy.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	30.00 mm	35.00 mm	34.00 mm

Distribution : India [Andhra Pradesh, Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir (Ris 1909), Madhya Pradesh, Manipur, Maharashtra, Meghalaya, Mizoram, Nagaland, Orissa, Rajasthan, Tamil Nadu, West Bengal and Western India].

Elsewhere : Afghanistan, Annam, Bangladesh, Hong Kong, Indo-China, Japan, Laos, Myanmar, Malaysia, Nepal, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Tibet, Vietnam and Yunnan.

Remarks : Adult male of this species can easily be recognised by its unique violet-coloured abdomen.

40. *Orthetrum sabina sabina* (Drury)

1770. *Libellula sabina* Drury, *III. Exot. Ins.*, 1 : 114.

1936. *Orthetrum sabina sabina*, Fraser, *Fauna Brit. India. Odon.*, 3 : 300-302.

Material examined : 1 ♀, Nellore, district Nellore, 25.10.196, coll. M.S. Shishodia; 2 ♂ ♂, 1 ♀, Tirupati, district Chittoor, 26.10.1986, coll M.S. Shishodia; 1 ♂, Zool. garden, Hyderabad, district Rangareddi, 28.10.1986, coll. M.S. Shishodia; 3 ♂ ♂, 1 ♀, Khammam, district Khammam, 9.11.1986, coll. M.S. Shishodia; 1 ♀, Mahbubabad, district Warangal, 12.11.1986, coll. M.S. Shishodia; 1 ♀, 1 ♀, Kaikalur district Krishna, 20.4.1997, coll. T.P. Bhattacharya; 1 ♀, Kakalur, district Krishna, 21.4.1997, coll. T.P. Bhattacharya; 2 ♂ ♂, 1 ♀, Gangasagar, district Chittoor, 13.10.1997, coll. B.C. Das; 1 ♂, Mutukar, district Cuddapah, 18.10.1997, coll. B.C. Das; 1 ♀, Muddadugi, district Cuddapah, 19.10.1997, coll. B.C. Das; 1 ♂, 1 ♀, Chevella, Hyderabad, district Rangareddi, 28.10.1997, coll. P. Mukhopadhyaya; 1 ♀, Mandavalli, district Krishna, 1.11.1997, coll. P. Mukhopadhyaya; 1 ♂, Bendkonda, district Srikakulam, 11.2.1998, coll. M. Prasad; 1 ♀, Kailashgiri, district Vishakhapatnam, 19.2.1998, coll. M. Prasad; 4 ♀ ♀, Golkonda, Hyderabad district Rangareddi, 27.9.1998, coll. S.K. Mondal; 1 ♂, 3 ♀ ♀, Kolleru, district West Godavari, 3.10.1998, coll. S.K. Mondal; 1 ♀, 4 ♀ ♀, Ramsainagavaram, district West Godavari, 4.10.1998, coll. S.K. Mondal; 1 ♀, Shivlingapuram, district Vishakhapatnam, 11.10.1998, coll. S.K. Mondal; 3 ♀ ♀, Rajendranagar, district Rangareddi, 9.10.1998, coll. S.P. Chakraborty; 1 ♂, Samsabad (Bibinagar) district Mahbunagar, 10.10.1998, coll. S.P.

Chakraborty; 2♂♂, Pattancheru, Golabasti, district Medak (Sangareddi), 11.10.1998, coll. S.P. Chakraborty; 1♂, 1♀, Bhongiri, district Nalgonda, 12.10.1998, coll. S.P. Chakraborty; 1♂, 2♀♀, Golkonda, Hyderabad district Rangareddi, 13.10.1998, coll. S.P. Chakraborty; 3♀♀, 1♀, Machilipatnam, district Krishna 15.10.1998, coll. S.P. Chakraborty; 1♂, 1♀, Revulapalem, Rajahmundry, district East Godavari, 20.10.1998, coll. S.P. Chakraborty; 1♀, Anandapuram, district Vishakhapatnam, 23.10.1998, coll. S.P. Chakraborty; 1♀, Kottavalsa, district Vishakhapatnam, 24.10.1998, coll. S.P. Chakraborty; 3♂♂, 5♀♀, Nallamale Reserve Forest, 10 kms. from Kurnool, district Kurnool, 19.11.1998, coll. P.H. Roy; 3♂♂, 2♀♀, Pulsunanila, Nallmale Forest, 20 kms. from Atmakur, district Kurnool, 21.11.1998, coll. P.H. Roy; 1♀, Srisilam Forest areas, district Kurnool, 23.11.1998, coll. P.H. Roy; 2♂♂, Nallmale Forest, Sri Sailam, district Kurnool, 25.11.1998, coll. P.H. Roy; 3♂♂, Madhavaram Reserve Forest district Cuddapah, 28.11.1998, coll. P.H. Roy and 1♂, Vishakhapatnam, 8.1.1999, coll. B.C. Das.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	35.00-37.00 mm	32.00-34.00 mm	31.00-34.00 mm
Female :	33.00-34.50 mm	32.00-34.00 mm	31.00-33.00 mm

Distribution : Throughout India.

Elsewhere : Afghanistan, Algeria, Angola, Australia, Bangladesh, China, Celebes, Ceram (Ris, 1909), Cyprus, Egypt, Hong Kong, Indonesia, Iran, Iraq, Laos, Malayasia, Micronesia (Oceania) Myanmar, Most of African continent, New Guineas, Nepal, Papua, Philippines, Samoa, Islands, Singapore, Sri Lanka, Sudan, Thailand, Tunisia, Turkey and Vietnam.

Remarks : It is very common species and found almost throughout the year.

41. *Orthetrum taeniolatum* (Schneider)

1845. *Libellula taeniolata* Schneider, Stett.Ent. Zeit., 6 : 111.

1890. *Orthetrum taeniolatum*, Kirby, Cat. Odon., : 37.

1936. *Orthetrum taeniolatum*, Fraser, *Fauna Brit. India, Odon.*, 3 : 296-298.

Material examined : 1♂, Phoolbagh, Vizianagaram, 15.2.1998, coll. M. Prasad.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	19.00 mm	25.00 mm	24.50 mm

Distribution : Throughout India and "found sparingly in countries bordering the Mediterranean and become increasingly common towards the east" (Fraser, 1936).

42. *Orthetrum triangulare triangulare* (Selys)

1878. *Libella triangularis* Selys, Mitt. Mus, Dresden., : 314.

1936. *Orthetrum triangulare traingulare*, Fraser, Fauna Brit. India, Odon., 3 : 305-307.

Material examined : 1♂, Pulsunanila, Nellamala forest, 20 kms. from Atmakur, district Anantapur 21.11.1998, coll. P.H. Roy.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	33.00 mm	36.00 mm	35.00 mm

Distribution : India (Arunachal Pradesh, Assam, Bihar, Haryana, Karnataka, Kerala, Manipur, Meghalaya, Mizoram, South Indian Hills, Tamil Nadu, West Bengal and Western Hinalaya).

Elsewhere : Afghanistan, China, Laos, Leito, Myanmar, Nepal, Sri Lanka, Tennasserim, Thailand and Vietnam.

Remarks : It is commonly found near marshy pools of slow running hills streams in India. It can easily be differentiated from the other species of the genus by the presence of triangular marking at the base of hindwings.

Genus *Potamarcha* Karsch

1889. *Postamarcha* Karsch, Berlin Ent. Zeit., 33 : 370.

1936. *Potamarcha*, Fraser, Fauna Brit. India, Odon., 3 : 288-289.

Diagnostic characters : Medium sized dragonflies; may be black or brown, marked with yellow; sometimes obscured by pruinosed; vesicle shallowly bifid; posteriod lobe of prothorax not erected as a collar and tuft of hairs absent; wings narrow and hyaline, with apices clouded with brown and costal area tinted with yellow; $13\frac{1}{2}$ – $14\frac{1}{12}$ and 9–12 antenodal nervures in fore and hindwings respectively; 9–12 postnodal nervures in both pair of wings; pterostigma 5-6 times as long as broad; arc situated in between 2nd and 3rd antenodal nervures; hypertrigone entire; subtrigone 3 celles.

Distribution : India.

Elsewhere : Australia, Bangladesh, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Taiwan and Thiland.

It is monotypic genus, therefore, no key is provided.

43. *Potamarcha congener* (Rambur)

1842. *Libellula obscura* Rambur, Hist. Nat. Ins. Neurop., : 64.

1842. *Libellula congener*, Rambur, *Hist. nat. Ins. Neurop.*, : 70.
 1890. *Potamarcha Obscura*, Karsch, *Berlin Ent. Zeit.*, **33** : 371.
 1891. *Potamarcha congener*, Selys, *Anal. Soc., Esp. Hist. nat.*, **20** : 221.
 1971. *Potamarcha congener*, Lieftinck, *Ent. Scand. Suppl.*, **1** : 202

Material examined : 2♂♂, 1♀, Phoolbagh, district Vizianagaram, 15.2.1998, coll. M. Prasad.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	30.00 mm	34.00 mm	33.00 mm
Female :	29.00 mm	33.50 mm	33.00 mm

Distribution : India (Andhra Pradesh, Bihar, Himachal Pradesh, Kerala, Karnataka, Madhya Pradesh, Manipur, Meghalaya, Maharashtra, Nagaland, Orissa, South Andaman Islands, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal).

Elsewhere : Australia, Bangladesh, China, Hong Kong (Mitra, 1999), Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Papua, Philippines, Sri Lanka, Taiwan, Thailand and Vietnam (Tsuda, 1991).

Remarks : Tips of both the wings in male and female are brownish; and triangle 3 celled; 2 rows of cells in between IRii and Rspl; pterostigma dark brown in colour and covers 2½

cells. Nodal Index $\frac{10-13\frac{1}{2}}{11-10} \bigg| \frac{13\frac{1}{2}-9}{10-12}$ in male and $\frac{10-14\frac{1}{2}}{11-10} \bigg| \frac{14\frac{1}{2}-11}{10-12}$ in female.

Specimens of this species are found near seasonal monsoon ponds. Sometimes they were observed perching on vegetation around small slow running streams. In Andhra Pradesh adults were collected from the small bushes within the dry forest at phoolbagh.

Genus *Acisoma* Rambur

1842. *Acisoma* Rambur, *Hist. nat., Ins. Neurop.*, : 28.
 1936. *Acisoma*, Fraser, *Fauna Brit. India, Odon.*, **3** : 329-330.

Diagnostic characters : Small sized dragonflies; black or brown marked with blue or green; vesicle low, rounded above; posterior lobe of prothorax large, emarginate as a colour and provided with specialised tuft of hairs; abdomen markedly dilated from segment 1st to 6th and then markedly narrowed upto the end; wings hyaline, sometimes marked with golden yellow or blackish-brown at base; 6-8½ and 5-6 antenodal nervures in fore and hindwings respectively and 6-8 postnodal nervures in both pairs of wings; pterostigma about 3-4 times as long as broad; arc situated in between the first and second antenodal nervures; hypertrigone entire; subtrigone entire or 3-4 celled; only one cubital nervure in both the wings.

Distribution : India.

Elsewhere : Afghanistan, Algeria, Angola, Bangladesh, Botswana, Cameroon, Celebes, Central Africa, China, Congo, Cote'divorie, Egypt, Guinea, Hong Kong, Indonesia, Japan, Kenya, Liberia, Libya, Madagascar, Malaysia, Mali, Mozambique, Myanmar, Nepal, Nigeria, Philippines, Senegal, Singapore, Sierra Leone, Sri Lanka, South Africa, Taiwan, Tanzania, Thailand, Tunisia, Zaire, Zambia and Zimbabwe.

44. *Acisoma panorpoides panorpoides* Rambur

1842. *Acisoma panorpoides* Rambur, *Hist. nat. Ins. Neurop.*, : 28.

1936. *Acisoma panorpoides panorpoides* Fraser, *Fauna Brit. India Odon.*, 3 : 330-331.

Material examined : 1 ♀, Hyderabad, district Rangareddi 29.10.1986, coll. M.S. Shishodia and 1 ♀, Vizianagaram district Vizianagaram, 16.2.1998, coll. M. Prasad.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	17.00-18.00 mm	21.00-22.00 mm	20.00-21.00 mm

Distribution : India [Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Great Nicobar Islands (Mitra, 1995); Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Orissa, Punjab, Rajasthan, South India, Uttar Pradesh and West Bengal].

Elsewhere : Bangladesh, Bhamo Loo-Choo (Selys, 1891), Celebes (Lieftinck, 1971), China, Indonesia, Japan, Molucca (Lieftinck, 1971), Myanmar, Nepal, Palon (Selys, 1891), Philippines, Sri Lanka, Taiwan, Thailand and Toungo (Selys, 1891).

Remarks : It has very weak and short flight and found within the herbage and reeds in the heavily weeded perennial ponds and tank. It can easily be identified by the shape of its abdomen.

Genus *Brachythemis* Brauer

1868. *Brachythemis* Brauer, *Verh. Zool.-bot. Ges. Wien.*, 18 : 736.

1936. *Brachythemis*, Fraser, *Fauna Brit. India Odon.*, 3 : 363-364.

Diagnostic characters : Small to medium sized dragonflies; black brown or red marked with yellow; vesicle high, notched at apex; wings hyaline, sometimes partly coloured may be reddish, yellow or blackish-brown; 6½ to 7½ and 5–6 antenodal nervures in fore and hindwings respectively; 5–6 postnodal nervures in both pairs of wings, pterostigma about 4 to 5 times as long as broad, not braced; arc situated in between the 1st and 2nd antenodal nervures; hypertrigone entire; subtrigone 3 celled; only one cubital nervure in both the wings.

Distribution : India.

Elswehere : Algeria, Angola, Bangladesh, Botswana, Benin, China, Cote'd ivoire, Eygpt, Ethiopea, Equatorial Guinea, Guinea, Hong Kong, Indonesia, Iran, Isreal, Italy, Japan, Laos, Madagascar, Malawi, Mali, Malaysia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nigar, Philippines, Portugal, Saudi Arabia, Senegal, Singapore, Somalia, South Africa, Sri Lanka, Sudan, Syria, Spain, Taiwan, Tanzania, Thailand, Tunisia, Togo, Zaire, Zambia and Zimbabwe.

Only one species in found in India as well as in Andhra Pradesh, hence no key is provided.

45. *Brachythemis contaminata* (Fabricius)

1793. *Libellula contaminata* Fabricius, *Ent. Syst.*, 2 : 382.

1936. *Brachythemis contaminata*, Fraser, *Fauna Brit. India, Odon.*, 3 : 365-366.

Material examined : 2♂♂, 1♀, Palair, district Khammam, 11.11.1986, coll. M.S. Shishodia; 1♂, 1♀, Kaikalur, district Krishna, 21.4.1996, coll. S.K. Chatterjee; 1♂, 1♀, Tirupati, district Chittoor, 9.10.1997, coll. B.C. Das; 3♀♀, Cheepurupalli, district Vizianagaram, 12.10.1997, coll. B.C. Das; 1♀, Gangasagaram, district Chittoor, 13.10.1997, coll. B.C. Das; 3♂♂, 1♀ Ramapuram, district Chittoor, 14.10.1997, coll. B.C. Das; 1♀, Nargamangalan, district Chittoor, 16.10.1997, coll. B.C. Das; 1♂, 4♀♀, Mutukar, district, Cuddapah, 18.10.1997, coll. B.C. Das; 1♂, 1♀, Muddadugi, district Cuddapah, 19.10.1997, coll. B.C. Das; 1♂, Kottavalasa, district Vishkhaptanam, 7.11.1997, coll. P. Mukhopadhyaya; 1♀, Sompeta, district Srikakulam, 5.2.1998, coll. M. Prasad; 1♀, Vajrapukatturu, district Srikakulam, 9.2.1998, coll. M. Prasad; 1♂, Bendkonda, district Srikakulam, 11.2.1998, coll. M. Prasad; 1♂, Summadevi, district Srikakulam, 12.2.1998, coll. M. Prasad; 1♀, Vizianagram, district Vizianagaram, 16.2.1998, coll. M. Prasad; 5♂♂, 7♀♀, Kolleru, district West Godavari, 3.10.1998, coll. S.K. Mondal; 1♂, Golkonda, Akbarpura, district Rangareddi, 13.10.1998, coll. S.P. Chakraborty; 1♂, Kaikalur, district Krishna, 23.10.1998, coll. R.S. Mirdha and 2♂♂, 1♀, Madhuvaram Reserve Forest, 47 kms. from Cuddapah, district Cuddapah, 28.11.1998, coll. P.H. Roy.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	18.50-20.00 mm	23.00-24.00 mm	22.00-24.00 mm
Female :	18.00-19.00 mm	22.00-23.00 mm	21.00-22.00 mm

Distribution : Throughout India.

Elsewhere : Bangladesh, China, Hong Kong (Tsuda, 1919), Indo-China, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Taiwan, and Thailand.

Remarks : It is most common species found very commonly in large number flying over the water surface and muddy ground near the larval habitates. Wings of male with bright orange fascia from base to within 2/3 cells to pterostigma; fascia absent in female.

Genus *Crocothemis* Brauer

1868. *Crocothemis* Brauer, *Verh. Zool.-bot. Ges. Wien.*, 18 : 367, 736.

1936. *Crocothemis*, Fraser, *Fauna Brit. India Odon.*, 3 : 343-345.

Diagnostic characters : Medium sized dragonflies; red or yellow marked with brown or black, vesicle low, rounded; Wings hyaline, sometimes marked with amber yellow at the base or enfumed with brown at apex; $10\frac{1}{2}$ to $12\frac{1}{2}$ and 8–9 antenodal nervures in fore and hindwings respectively; 8–9 postnodal nervures in both the pairs of wings, pterostigma about 5 to 6 times as long as broad, not braced; hypertrigon entire; subtrigone 3 celled; only one cubital nervures in both the wings.

Distribution : India.

Elsewhere : Afghanistan, Algeria, Angola, Australia, Austria, Bangladesh, Benin, Botswana, Belgium, Bulgaria, Burkina Faso, Cape Verde, Central Africa, Checkoslovakia, China, Cote'divorie, Cyprus, Cameroon, Ethiopia, France, Gabon, Germany, Great Britain, Greece, Guinea, Hong Kong, Hungary, Indonesia, Iraq, Iran, Italy, Japan, Jordan, Kenya, Korea, Laos, Lesotho, Liberia, Luxemboury, Madagascar, Malawi, Malaysia, Mozambique, Myanmar, Namibia, Nepal, Netherlands, Niger, Nigeria, Oman, Papua, New Guinea, Philippines, Portugal, Rhodesia, Russia, Saudi Arabia, Senegal, Sierra Leone, Singapore, Sri Lanka, South Africa, Sudan, Swaziland, Switzerland, Solomon Island, Taiwan, Tanzania, Thailand, Togo, Tunisia, United States of America, Yugoslavia, Zaire, and Zimbabwe.

This genus is represented by a single species in Andhra Pradesh, hence no key is provided.

46. *Crocothemis servilia servilia* (Drury)

1770. *Libellula servilia* Drury, *Ill. ex. Ins.*, 1 : 112.

1936. *Crocothemis servilia servilia*, Fraser, *Fauna Brit. India, Odon.*, 3 : 345-347.

Material examined : 1♂, Nandyal, near summer reservior, district Kurnool, 23.6.1985, coll. P. Parui; 1♀, Nandyal near Chinna Charru, district Kurnool, 23.6.1985, coll. P. Parui; 2♂♂, 2♀♀, Khammam district Khammam, 9.11.1986. coll. M.S. Shishodia; 1♀, Kaikalur district Krishna, 21.4.1996, coll. S.K. Chatterjee; 1♂, Kaikalur, district Krishna, 23.1.1998, coll. R.S. Mirdha; 1♂, Sompeta, district Srikakulam, 5.2.1998, coll. M. Prasad; 1♀, Benkonda, district Srikakulam, 11.2.1998, coll. M. Prasad; 1♂, 3♀♀, Kolleru, district West Godavari, 3.10.1998, coll. S.K. Mondal; 1♀, Madhuvaram Reserve Forest, 47 kms. from Cuddapah, district Cuddapah, 28.11.1998, coll. P.H. Roy and 1♂, Araku Valley, district Vishakhapatnam, 12.1.1999, coll. B.C. Das.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	28.00-30.50 mm	30.50-32.00 mm	30.00-31.50 mm
Female :	24.00-25.00 mm	29.50-30.50 mm	29.00-30.00 mm

Distribution : Throughout India.

Elsewhere : Afghanistan, Bangladesh, Basara, China, Florida, Indonesia, Iran, Iraq, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Philippines, Rockhampton, Singapore, Sri Lanka, Taiwan, Thailand, Titayavan, Turkey and Yunnan.

Remarks : Pterostigma dark pale yellow in colour and covers $1\frac{1}{2}$ cells, Membrane dark-brown, only one cubital nervure present in both pairs of wings. Discoidal cell traversed only once, Discoidal field begins with one row of cells in forewings, one row of cells in between

IRiii and Rspl. Nodal index $\frac{11-11\frac{1}{2}}{11-9} \bigg| \frac{11\frac{1}{2}-11}{9-4}$ to $\frac{10-11\frac{1}{2}}{11-9} \bigg| \frac{11\frac{1}{2}-10}{9-10}$. It is one of the most common species of dragonflies of India. It is found almost throughout the year.

Genus *Bradinopyga* Kirby

1893. *Bradinopyga* Kirby, *J. Linn. Soc., Zool.*, **24** : 553.

1936. *Bradinopyga*, Fraser, *Fauna Brit. India. Odon.*, **3** : 340-349.

Diagnostic characters : Medium sized dragonflies; with cryptic colouring in black, grey and white; head moderately large; prothorax with small rounded posterior lobe; wings hyaline, long, and narrow, reticulation close; sectors of arc with wide fusion; arc situated in between first and second antenodal nervures; $10\frac{1}{2}$ to $12\frac{1}{2}$ antenodal nervures in fore and hindwings respectively; only one cubital nervures in both the wings.

The genus is represented by a single species in Andhra Pradesh, hence no key is provided.

Distribution : Peninsular India.

Elsewhere : Africa.

47. *Bradinopyga geminata* (Rambur)

1842. *Libellula geminata* Rambur, *Ins. Neurop.*, : 90.

1936. *Bradinopyga geminata*, Fraser, *Fauna Brit. India, Odon.*, **3** : 349-350.

Material examined : 1 ♀, Vajrapukotturu, district Srikakulam, 9.2.1998, coll. M. Prasad; 1 ♀, Phoolbagh, district Vizianagaram, 15.2.1998, coll. M. Prasad and 2 ♂♂, Bimli, district Vishakhapatnam, 8.10.1998, coll. S.K. Mondal.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	26.50 mm	34.00 mm	33.00 mm
Female :	24.00-25.00 mm	32.00-35.00 mm	31.00-34.00 mm

Distribution : India [Andhra Pradesh, Bihar, Delhi, East Himalaya, Madhya Pradesh, Peninsular India (from sea level to 450 mtrs.), Uttar Pradesh and West Bengal].

Remarks : Pterostigma black at centre and white at distal and proximal ends. A male specimen collected from Bimli (Vishakhapatnam) has brownish white marking at distal and proximal ends to Pterostigma Thorax in this specimen is deeply pruinose. Anal triangle 3 celled, Discoidal field begins with 3 rows of cells; 2 rows of cells in between IRiii and Rspl.

Nodal index varies from $\frac{9-11\frac{1}{2}}{10-9} \bigg| \frac{11\frac{1}{2}-9}{9-11}$ to $\frac{9-11\frac{1}{2}}{9-8} \bigg| \frac{11\frac{1}{2}-7}{8-8}$ It can easily be differentiated from others by presence of bicolorous pterostigma.

Genus *Diplacodes* Kirby

1889. *Diplacodes* Kirby, *Trans. Zool. Soc. Lond.*, **12** : 307.

1936. *Diplacodes*, Fraser, *Fauna Brit. India, Odon.*, **3** : 331-333.

Diagnostic characters : Small to medium sized dragonflies; coloured yellow, brown or red and marked with black, the markings sometimes obscured by pruinosity; vesicle high, rounded or shallowly notched; posterior lobe of prothorax large, subrectangular, emerginate and provided with specialised tuft of hairs; wings hyaline, sometimes partly marked with yellow, black or blackish brown; $5\frac{1}{2}$ to $9\frac{1}{2}$ and 5–6 antenodal and 5–7 and 4–6 postnodal nervures present in fore and hindwings respectively; pterostigma 4 to 5 times long as broad, not braced; hypertrigon entire; subtrigone may be entire, or 2–3 celled in forewing; sector of arc forming a common stalk.

Distribution : India.

Elsewhere : Afghanistan, Algeria, Australia, Bangladesh, Benin, Botswana, Burkina, Cameroon, China, Cote'd'Ivoire, Egypt, Fiji, Guinea, Guinea-bissau, Indonesia, Italy, Iraq, Japan, Kampuchea, Kenya, Laos, Liberia, Libya, Malawi, Mali, Madagascar, Malaysia, Morocco, Mauritius, Mozambique, Marina Is., Myanmar, Namibia, Nepal, New Guinea, Niger, Oman, Papua New Guinea, Palau, Pacific Islands, Portugal, Philippines, Reunion, Ryukyu, Samoa, Saudi Arabia, Senegal, Seychelles, Somaliland, Spain, Sudan, Sri Lanka, Swaziland, Syria, Taiwan, Tanzania, Thailand, Togo, Tunisia, Turkey, Vanuatu, Vietnam, Zambia and Zimbabwe.

Key to the species of genus *Diplacodes* Kirby

1. Apices of wings tipped with black *D. nebulosa* (Fabr.)
- Apices of wings hyaline 2
2. Adults entirely black, with markings, wings palely suffused with brown towards apices, anal appendages black *D. lefebvrei* (Ramb.)
- Adults black marked with yellow or pruinose, dark blue throughout; wings uncoloured except at base; anal appendages yellow *D. trivialis* (Rambur)

48. *Diplacodes Lefebvrei* (Rambur)

1842. *Libellula lefebvrei* Rambur, *Ins. Neurop.*, : 122.

1890. *Diplacodes lefebvrei*, Kirby, *Cat, Odon.*, : 42.

1936. *Diplacodes lefebvrei*, Fraser, *Fauna Brit. India, Odon.*, 3 : 333-335.

Distribution : India (Andhra Pradesh, Chandigarh, Rajasthan and West Coast of India),

Elsewhere : Africa and Mesopotamia.

This species is included here on the basis of literature review.

49. *Diplacodes nebulosa* (Fabricius)

1793. *Libellula nebulosa* Fabricius, *Ent. Syst.*, 2 : 379.

1889. *Diplacodes nebulosa*, Kirby, *Trans. Zool. Soc. Lond.*, 12 : 308.

1936. *Diplacodes nebulosa*, Fraser, *Fauna Brit. India, Odon.*, 3 : 335-336.

Material examined : 1♂, Palasa, district Srikakulam, 10.2.1998, coll. M. Prasad.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	17.00 mm	20.00 mm	19.00 mm

Distribution : India (Andhra Pradesh, Assam, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal).

Elsewhere : Australia, China, Indonesia, Kampuchea, Malaysia, Myanmar, Nepal, Palon, Papua region, Sri Lanka, Tennasserim, Thailand and Toungoo.

Remarks : Browns markings at the tips of both wings extended upto pterostigma, pterostigma brown and covers 1½ cells; one row of cells present in between IRiii & Rspl; discoidal field

begins wiith 3 rows of cells. Nodal index $\frac{5-7\frac{1}{2}}{6-5} \bigg| \frac{7\frac{1}{2}-5}{5-6}$

It can easily be separated from other species of the genus by the presence of dark brown markings on the apices of the wings in male. In female face and frons are creamy white.

50. *Diplacodes trivialis* (Rambur)

1842. *Libellula trivialis* Rambur, *Hist. nat. Ins. Neurop.*, : 115

1936. *Diplacodes trivialis* Fraser, *Fauna Brit. India, Odon.*, 3 : 336-338.

Material examined : 1♂, 1♀ Pakhal forest, district Warangal, 4.7.1985, coll. P. Parui; 3♂♂, 3♀♀, Gadur, district Chittoor, 24.10.1986, coll. M.S Shishodia; 2♂♂, Nellore, district Nellore, 25.10.1986, coll. M. S. Shishodia; 1♀, Hyderabad, district Rangareddi, 29.10.1986,

coll. M. S. Shishodia; 2♂♂, 2♀♀, Patalganga, Srisailam, district Kurnoor, 2.11.1986, coll. M. S. Shishodia; 2♂♂, Achampeta, district Mahbubnagar, 3.11.1986, coll. M. S. Shishodia; 5♀♀, Suryapeta, district Nalgonda, 7.11.1986, coll. M. S. Shishodia; 2♀♀, Dornakal, district Warangal, 10.11.1986, coll. M. S. Shishodia; 1♂, Palair, district Khammam, 11.11.1986, coll. M.S. Shishodia; 1♀, Mahabubabad, district Warangal, 12.11.1986, coll. M. S. Shishodia; 1♀, Mirthipadu, Rajahmundry, district East Godavari, 16.11.1986, coll. M. S. Shishodia; 4♀♀, Sanskrit school Campus, Rajahmundry, district East Godavari, 17.11.1986, coll. M. S. Shishodia; 1♀, Rajahmundry, district East Godavari, 18.11.1986, coll. M. S. Shishodia; 1♂, Tirupati, district Chittoor, 9.10.1997, coll. B. C. Das; 1♀, Gangasagaram, district Chittoor, 13.10.1997, coll. B. C. Das; 1♂, 2♀♀, Nargh Mangalam, district Chittoor, 16.10.1997, coll. B. C. Das; 1♂, 1♀, Mutukar, district Cuddapah, 18.10.1997, coll. B. C. Das; 7♂♂, 7♀♀, Hyderabad, district Rangareddi, 21.10.1997, coll. B. C. Das; 1♀, Medchal, Hyderabad, district Rangareddi, 27.10.1997, coll. P. Mukhopadhyay; 1♀, Cherella, Hyderabad, district Rangareddi, 28.10.1997, coll. P. Mukhopadhyay; 1♂, 1♀, Kondapelle district Krishna 31.10.1997, coll. P. Mukhopadhyay; 1♂, Mandavelli, district Krishna, 1.11.1997, coll. P. Mukhopadhyay; 1♀, Badangiri, district Vizianagaram, 3.11.1997, coll. P. Mukhopadhyay; 1♂, Elamanchili, district Vishakhapatnam, 8.11.1997, coll. P. Mukhopadhyay; 1♀, Vajrapukotturu, district Srikakulam, 9.2.1998, coll. M. Prasad; 1♀, Palasa, district Srikakulam, 10.2.1998, coll. M. Prasad; 2♀♀, Bendkonda, district Srikakulam, 11.2.1998, coll. M. Prasad; 1♂, 3♀♀, Nagarjun Sagar Tiger reserve, Mannanur district Mahbubnagar, 15.4.1998, coll. S. K. Chatterjee; 2♂♂, Dornal district Prakasam, 22.9.1998, coll. S. K. Mondal; 5♂♂, 4♀♀, Mannanur, district Mahbubnagar, 24.9.1998, coll. S. K. Mondal; 1♂, Domlapenta, district Prakasam, 25.9.1998, coll. S. K. Mondal; 2♂♂, 8♀♀, Golkonda, Hyderabad, district Rangareddi, 27.9.1998, coll. S. K. Mondal; 1♂, 2♀♀, Venkateshwara University campus district Chittoor, 30.9.1998, coll. S. K. Mondal; 1♂, Venkateshwara National Park, district Chittoor, 1.10.1998, coll. S. K. Mondal; 2♂♂, 3♀♀, Ramasaingavaran, district West Godavari, 4.10.1998, coll. S. K. Mondal; 1♂, 1♀, Rangapuram, district West Godavari, 4.10.1998, coll. S. K. Mondal; 1♀, Bimli, District Vishakhapatnam, 8.10.1998, coll. S. K. Mondal; 4♂♂, 1♀, Tagarapuvolesea, district Vishakhapatnam, 9.10.1998, coll. S. K. Mondal; 2♂♂, 1♀, Rajendranagar, district Rangareddi, 9.10.1998, coll. S. P. Chakraborty; 2♀♀, Samsabad, Bibinagar, district Mahbubnagar, 10.10.1998, coll. S. P. Chakraborty; 2♀♀, Samsabad, Bibinagar, district Mahbubnagar, 10.10.1998, coll. S. P. Chakraborty; 2♂♂, Vizianagaram, district Vizianagaram, 10.10.1998, coll. S. K. Mondal; 6♂♂, 2♀♀, Shivlingapuram, district Vishakhapatnam, 11.10.1998, coll. S. K. Mondal; 3♂♂, 1♀, Pathamcheru, district Medak, 11.10.1998, coll. S. P. Chakraborty; 2♂♂, Bhonpiri, district Nalgonda, 12.10.1998, coll. S. P. Chakraborty; 1♀, Golkonda, district Rangareddi, 13.10.1998, coll. S. P. Chakraborty; 2♂♂, 2♀♀, Golkonda, Akbarpura, district Rangareddi, 13.10.1998, coll. S. P. Chakraborty; 2♀♀, Borra, district Vishakhapatnam, 15.10.1998, coll. S. K. Mondal. 2♂♂, 1♂, Vijaywada Forest Rest House Campus, district Krishna 15.10.1998, coll. S. P. Chakraborty (At light); 2♀♀, Machilipatnam, district Krishna, 15.10.1998, coll. S.P. Chakraborty; 3♂♂, 1♀, Adabinekkalam, district Krishna, 16.10.1998, coll. S.P. Chakraborty, 1♂, 3♀♀, Madherpuri, Rajahmundry, district East Godavari, 19.10.1998,

coll. S. P. Chakraborty; 1 ♂, 1 ♀, Revulapalem, Rajahmundry, district East Godavari, 20.10.1998, coll. S. P. Chakraborty; 5 ♂♂, 6 ♀♀, Simhachalam, district Vishakhapatnam, 22.10.1998, coll. S. P. Chakraborty 2 ♂♂, 1 ♀, Petta Waltair Road, district Vishakhapatnam, 23.10.1998, coll. S. P. Chakraborty; 2 ♀♀, Kottavalsa, district Vishakhapatnam, 24.10.1998, coll. S. P. Chakraborty; 1 ♂, 2 ♀♀, Nallamalla Reserve Forest, 10 kms. from Atmakur, district Karnool. 19.11.1998, coll. P. H. Roy; 2 ♂♂, Javakona forest, Tirupati, district Chittoor, 21.11.1998, coll. P. H. Roy; 2 ♀♀, Srisilam Forest area, Chintola, district Kurnool. 23.11.1998, coll. P. H. Roy; (Ex at light); 1 ♂, 1 ♀, Nallamulla Forest, district Kurnool, 24.10.1998, coll. P. H. Roy; 4 ♂♂, Madhavram Reserve Forests, 47 kms. from Cuddapah, district Cuddapah, 28.11.1998, coll. P. H. Roy; 3 ♂♂, 1 ♀, Sidhavatau Forest, 32 kms. from Cuddapah, district Cuddapah, 29.11.1998, coll. P. H. Roy; 1 ♀, Vishakhapatnam, district Vishakhapatnam, 8.1.1999, coll. B. C. Das and 1 ♀, Araku Valley district Vishakhapatnam 10.1.1999, coll. B. C. Das.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	19.00-23.00 mm	22.50-24.00 mm	22.00-23.50 mm
Female :	18.00-20.00 mm	20.50-22.50 mm	20.00-22.00 mm

Distribution : Throughout India.

Elsewhere : Australia, Bangladesh, Bhama, China, Fiji, Hong Kong, Indonesia, Iraq, Japan, Laos, Mandalaya, Malayasia, Micronesia, Myanmar, Nepal, New Guinea, Pacific Islands, Papua, Philippines, Rockhampton, Ryukyu, Seychelles, Sri Lanka, Taiwan, Thailand, Tennasserim and Vietnam.

It is most common species and found almost throughout the year.

Genus *Indothemis* Ris

1901. *Indothemis* Ris, *Cat. Coll. Selys, fasc.*, 9 : 29.

1936. *Indothemis*, Fraser, *Fauna Brit. India, Odon.*, 3 : 338-339.

Diagnostic characters : Small to medium sized dragonflies, coloured black in the adult or black marked with yellow in subadult; vesicle high, slightly notched; prothorax with small posterior lobe; wing hyaline, are situated in between the first and second antenodal nervures; 8½ to 12½ antenodal nervures in both the wings; subtrigone in forewing 3 celled.

Distribution : India.

Elsewhere : Malacca, Myanmar, Sri Lanka and Thailand.

This genus is represented by a single species in Andhra Pradesh, hence to key is provided.

51. *Indothemis carnatica* (Fabricius)

1842. *Libellula caesia* Rambur, *Ins. Neurop.*, : 95.

1884. *Diplax meridionalis*, Selys, *Ann. Soc. Ent. Belg.*, 28 : 36.

1991. *Indothemis carnatica*, Tsuda, *A distributional list of World Odon.*, : 157.

Distribution : India (Andhra Pradesh, Maharashtra, Western Ghats and West Bengal).

Elsewhere : Thailand.

This species is included here on the basis of the literature review.

Genus *Palpopleura* Rambur

1842. *Palpopleura* Rambur, *Ins. Neurop.*, : 26, 129.

1936. *Palpopleura* Fraser, *Fauna Brit. India, Odon.*, 3 : 316-317.

Diagnostic characters : Small sized dragonflies, coloured yellow with dark markings; abdomen, short depressed, fusiform and pruinose blue in adult; prothorax with large posterior lobe, quadrate and fringed with long hairs; wings short, moderately broad or may be narrow, often broadly and strikingly marked and coloured in both the sexes, sometimes partly yellowish, amber, tinted brown or black; sectors of arc separated or but shortly fused in forewing, fused in hindwings; are lying in between the first and second antenodal nervures; 10½ to 12½ antenodal nervures present last antenodal nervure incomplete; only one cubital nervure in both the wings; pterostigma large; membrane short.

Distribution : India.

Elsewhere : Afghanistan, Angola, Bangladesh, Benin, Botswana, Burkina Faso, China, Coted'ivoire, Ethiopia, Gabon, Guinea, Hong Kong, Kenya, Laos, Liberia, Malawi, Madagascar, Mali, Mozambique, Malaysia, Myanmar, Namibia, Niger, Nigeria, Nepal, Sierra Leone, Senegal, Somalia, South Africa, Sri Lanka, Sudan, Swaziland, Tanzania, Thailand, Tibet, Togo, Vietnam and Zaire.

This genus is represented by a single species in Andhra Pradesh, hence no key is provided.

52. *Palpopleura sexmaculata sexmaculata* (Fabr.)

1787. *Libellula sexmaculata* Fabricius, *Mant. Ins.* 1 : 338.

1936. *Palpopleura sexmaculata sexmaculata*, Fraser, *Fauna Brit. India, Odon.*, 3 : 318-320.

Distribution : Throughout India.

Elsewhere : Afghanistan, Annam (Ris 1910), China, Hong Kong, Indo-China, Laos, Leito, Malaysia, Montscharin, Myanmar, Nepal (Ashina 1955, Mahto 1998, St. Quentin 1970), Puepoli, Sri Lanka, Yunnan (Moore 1878) and Vietnam.

This species is included here on the basis of literature reviews.

Genus *Neurothemis* Brauer

1842. *Polyneura* Rambur, *Ins. Neurop.*, : 26.

1867. *Neurothemis*, Brauer, *Verh. Zool-bot. Ges. Wien.*, 17 : 289.

1936. *Neurothemis*, Fraser, *Fauna Brit. India, Odon.*, 3 : 350-352.

Diagnostic characters : Medium to small sized dragonflies, colour may be black, red or brown, partly marked with yellow or green; vesicle high, rounded or shallowly notched; posterior lobe of prothorax a little emarginate; wings sometimes with close secondary reticulation, hyaline or partly or wholly colored with orange, black or opalescent white; usually 10½ to 15½ and 8-12 antenodal nervures in fore and hindwings respectively and 7-12 postnodal nervures; pterostigma 4-5 times as long as broad, not braced; hypertrigone and cubital space 3-6 celled.

Distribution : India.

Elsewhere : Australia, Bangladesh, China, Hong Kong, Indonesia, Japan, Kampuchea, Laos, Malayasia, Myanmar, Nepal, Pacific Islands, Papua New Guinea, Philippines, Russia, Singapore, Solomon Islands, Sri Lanka, Taiwan, Thailand and Vietnam.

Key to the species of the genus *Neurothemis* Brauer

1. Base of wings of male broadly black, black basal area of wings edged outwardly with an opalescent white band *N. tullia tullia* (Drury)
- Base of wings tinted with pale or golden-yellow; opalescent white band in the wings absent 2
2. Wings pale golden-yellow from base to within 2 cells proximal of pterostigma present; humeral stripe on the thorax absent *N. intermedia degener* Selys
- Yellow area at the base of wings not very sharply defined and rather pale in colour; a pale brown humeral stripe on the thorax present *N. intermedia intermedia* (Rambur)

53. *Neurothemis intermedia degener* Selys

1879. *Neurothemis degener* Selys, *Ann. Mus. Civ. Genova*, 15 : 290, 296.

1911. *Neurothemis intermedia degener*, Ris, *cat. Coll. Selys, face.*, 13 : 552, 564, 565.

1936. *Neurothemis intermedia degener*, Fraser, *Fauna Brit., India, Odon.*, 3 : 359-360.

Distribution : India (Andhra Pradesh, Assam, Sikkim and West Bengal).

Elsewhere : Myanmar.

This speceis is included here on the basis of literature review.

54. *Neurothemis intermedia intermedia* (Rambur)

1842. *Libellula intermedia* Rambur, *Ind-Neurop.*, : 91.

1936. *Neurothemis intermedia intermedia*, Fraser, *Fauna Brit. India, Odon.*, 3 : 357-358.

Material examined : 1♂, Phoolbagh, district Vizianagaram, 15.2.1998, coll. M. Prasad; 1♀, Vishakhapatnam, district Vishakhapatnam, 8.1.1999, coll. B.C. Das; 1♂, Kothavasala, Araku Valey, district Vishakhapatnam, 10.1.1999, coll. B.C. Das; 1♂, 2♀, Araku Valley, 11.1.1999, coll. B.C. Das and 1♂, Vishakhapatnam, district Vishakhapatnam, 14.1.1999, coll. B.C. Das.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	22.00-23.00 mm	27.00-28.00 mm	26.00-27.00 mm
Female :	22.00-23.50 mm	27.00-28.00 mm	26.00-27.00 mm

Distribution : Throughout India.

Elsewhere : Bangladesh, China, Myanmar, Nepal and Thailand.

54. *Neurothemis tullia tullia* (Drury)

1773. *Libellula tullia* Drury, III. Exot., Ins., 2 : 85.

1936. *Neurothemis tullia tullia*, Fraser, Fauna Brit. India Odon., 20 : 360-363.

Material examined : 1♂, 2♀, Nandyal near summer reservoir, district Kurnool, 23.6.1985, coll. P. Parui; 4♂, Thorrudu, Rajahmundry, district East Godavari, 16.11.1986, coll. M. S. Shishodia; 1♂, 1♀, Mirthipadu, Rajahmundry, district East Godavari, 16.11.1986, coll. M. S. Shishodia and 1♀, Sanskrit School campus, Rajahmundry, district East Godavari, 17.11.1986, coll. M. S. Shishodia.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	17.00-20.00 mm	18.00-20.00 mm	17.00-19.00 mm
Female :	19.00 mm	20.00 mm	20.00 mm

Distribution : India (Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Orissa, Madhya Pradesh, Maharashtra, Meghalaya, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Bhama, China, Hainan, Hong Kong, Indo-China Malaysia, Myanmar, Sri Lanka, Taiwan and Thailand.

Remarks : This subspecies can easily be differentiated from other species of the genus by the presence of black base of the wings with opalescent white outer border in male. In female apices of wings are black. Specimens of this subspecies are usually found in large colonies near swampy areas or heavily weeded tanks.

Genus *Rhodothemis* Ris

1909. *Rhodothemis* Ris. Cat. Coll. Selys, fascs., 9 : 29.

1936. *Rhodothemis*, Fraser, *Fauna Brit. India, Odon.*, 3 : 366-368.

Diagnostic characters : Rather large sized dragonfly with homogeneous scarletred colour; head relatively small; eyes meeting only at a point; prothorax with large posterior lobe, emarginate, forming two rounded lobes which fringed with long hairs; wings large and broad; arc entire; sectors of arc with a long fusion in forewings and in hindwings arc situated in between first and second antenodal nervures; $10\frac{1}{2}$ - $12\frac{1}{2}$ antenodal nervures, distal one incomplete; only one cubital nervures in both the wings.

Distribution : India (Western India).

Elsewhere : Australia, Myanmar, Sri Lanka and Sundaic Archipelago.

It is monotypic genus, hence no key is provided.

56. *Rhodothemis rufa* (Rambur)

1842. *Libellula rufa* Rambur, *Ins. Neurop.*, : 71.

1911. *Rhodothemis rufa* Ris, *Cat. coll. Selys, fasc.*, 13 : 592, 593.

1936. *Rhodothemis rufa*, Fraser, *Fauna Brit. India, Odon.*, 3 : 368, 369.

Distribution : India (Andhra Pradesh, West coast of India).

Elsewhere : Australia, Indonesia, Malaysia, Myanmar, and Sri Lanka.

This species is included here on the basis of literature review.

Genus *Trithemis* Brauer

1868. *Trithemis* Brauer, *Verh. Zool.,-bot. Ges. Wien.*, 18 : 176.

1936. *Trithemis*, Fraser, *Fauna Brit., India, Odon.*, 3 : 381-382.

Diagnostic characters : Small to medium sized dragonflies, colour black or reddish marked with yellow, green, metallic blue or violet; sometimes partly pruinose; vesicle depressed; posterior lobe of prothorax not eracted as a collar and usually not provided with specialised tuft of hairs; wings hyaline, sometimes enfumed with brown at apex and usually marked with yellow, brown or black at base for variable extent with reddish or black neuration; $7\frac{1}{2}$ to $18\frac{1}{2}$ and 6-14 antenodal nervures in fore and hindwings respectively; 6-14 postnodal nervures in both the wings; pterostigma 4-5 times as long as broad; not braced; hypertrigone entire; subtrigone 3 celled, one or rarely two cubital nervures in both the wings; arc situated in between 1st and 2nd antenodal nervures.

Distribution : India.

Elsewhere : Algeria, Angola, Bangladesh, Botswana, Benin, Burkina Faso, Cameroon, China, Congo Verde, Coted ivoire, Egypt, Ethiopea, Gabon, Greece, Guinea, Hong Kong, Indonesia, Iraq, Italy, Iron, Isreal, Japan, Jordan, Kampuchea, Keny, Laos, Liberia, Libya, Madagascar, Malawi, Malayasia, Mauritius, Malo, Morocco, Mozambique, Myanmar, Namibia,

Nepal, Niger, Oman, Pakistan, Papua New Guinea, Philippines, Portugal, Qatar, Reunion, Saudi Arabia, Senegal, Sierra Leone, Somalia, South Africa, Spain, Sri Lanka, Sudan, Syria, Swaziland, Tanzania, Taiwan, Thailand, Tibet, Tunisia, Turkey, United Arab Emirates, Vietnam, Zambia and Zimbabwe.

Key to the species of genus *Trithemis* Brauer

1. Legs very long and spidery; pterostigma bicolorous; body yellow marked with black.
..... *T. pallidinervis* (Kirby)
- Legs ordinary length; pterostigma unicolorous; body colour variable 2
2. Thorax and abdomen bright vermilion-red; base of hindwing bright orange; neuration yellow *T. kirbyi kirbyi* Selys
- Thorax and abdomen violaceous crimson; base of hindwing with small reddish-brown spot; neuration crimson *T. aurora* (Burmeister)

57. *Trithemis aurora* (Burmeister)

1839. *Libellula aurora* Burmeister, *Handb. Ent.*, 2 : 859.

1936. *Trithemis aurora*, Fraser, *Fauna Brit. India, Odon.*, 3 : 383-385.

Material examined : 1 ♀, Pakhal forest, district Warangal, 4.7.1985, coll. P. Parui; 1 ♀, Pakhal forest, district Warangal, 5.7.1985, coll. P. Parui and 1 ♂, Khammam, district Khammam, 9.11.1986, coll. M. S. Shishodia.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	23.00 mm	27.00 mm	26.50 mm
Female :	22.00 mm	25.50 mm	25.00 mm

Distribution : Throughout India.

Elsewhere : Bhamo, Celebes, (Lieftinck, 1971), China, Hong Kong, Indonesia, Japan, Kampuchea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand (Titayavan, 1979), Tibet, Timor and Vietnam.

Remarks : Pterostigma dark brown in colour and covers more than one cell, membrane dark brown; only one cubital nervure in both the wings, anal triangle 3 celled; Discoidal field begins with 3 rows of cells, 2 rows of cells in between IRiii and Rspl. Nodal index

$$\frac{9-12\frac{1}{2}}{11-9} \bigg| \frac{13\frac{1}{2}-10}{9-11}$$

58. *Trithemis kirbyi kirbyi* Selys

1886. *Trithemis aurora* Kirby (Pars) *Zool. Soc. Lond.*, : 327.

1891. *Trithemis kirbyi*, Selys Ann. Mus., Civ. Genova, 30 : 465.

1936. *Trithemis kirbyi kirbyi* Fraser, Fauna Brit. India, Odon., 3 : 385-387.

Material examined : 1 ♂, Hyderabad district Rangareddi, 29.10.1986, coll. M. S. Shishodia.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	Damaged	26.00 mm	25.00 mm

Distribution : India (Himachal Pradesh, Maharashtra, South India and Uttar Pradesh).

Remarks : Pterostigma dark brown covers 1½ cells, membrane, white 2 rows of cells in between IRiii and Rspl. anal triangle 3 celled, discoidal cells of forewings traversed only once, basal portion of both the wings bright reddish yellow.

59. *Trithemis pallidinervis* (Kirby)

1889. *Sympetrum pallidinervis* Kirby, Trans. Zool. Soc., Lond., 12 : 327.

1936. *Trithemis pallidinervis*, Fraser, Fauna Brit. India, Odon., 3 : 389-391.

Material examined : 1 ♀, Sompeta, district Srikakulam, 5.2.1998, coll. M. Prasad; 1 ♀, Bendkonda, district Srikakulam, 11.2.1998; 3 ♀ ♀, Pendutri, Vishakhapatnam, 18.2.1998, coll. M. Prasad and 1 ♀, Kolleru, district West Godavari, 3.10.1998, coll. S. K. Mondal.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	26.00-27.00 mm	33.50-35.00 mm	33.00-34.50 mm

Distribution : Throughout India.

Elsewhere : Bhama, China, Indonesia, Malayasia, Myanmar, Nepal, Palon, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Tongoo and Tibet.

Remarks : Pterostigma of female black in colour and covers 1½ cells, membrane white and basal side black, 2 rows of cells in between IRiii and Rspl. discoidal field begins with 3 rows of cells, Nodal index $\frac{8-6\frac{1}{2}}{8-6} \bigg| \frac{6\frac{1}{2}-8}{6-9}$ Specimen of this species were found perched on the top of the tall reed, elevating itself by its long spidery legs.

Genus *Rhyothemis* Hagen

1867. *Rhyothemis* Hagen, Steet. Ent., Zeit., 28 : 232.

1936. *Rhyothemis*, Fraser, Fauna Brit. India, Odon., 3 : 419-420.

Diagnostic characters : Medium sized dragonflies, body colour metallic and wings partly or wholly coloured, black and golden-yellow or steelly blue-black, vesicle large, broad, rounded prothorax with small posterior lobe; thorax narrow and small; wings variable broad

at base, pointed at apex, reticulation close, broadly marked with black and golden amber or with steely blue-black; sector of arc separated at origin in forewings; shortly fused at origin in the hindwings, arc situated in between first and second antenodal nervures; only one cubital nervure in both the wings.

Distribution : India.

Elsewhere : Algeria, Angola, Australia, Bangladesh, Benin, Botswana, Cameroon, China, Cote d'Ivoire, Egypt, Fiji, Gabon, Guam, Guinea-Bissau, Hong Kong, Indonesia, Japan, Korea, Liberia, Madagascar, Malawi, Mauritius, Mauritania, Mozambique, Myanmar, Namibia, Nepal, New Calendonia, Oman, Papua New Guinea, Philippines, Reunion, Samoa, Senegal, Sierra Leone, Singapore, Seychelles, Solomon Is. Sri Lanka, Serbia, Taiwan, Tanzania, Vanuatu, Vietnam, Zaire, Zambia and Zimbabwe.

This genus is represented by a single species in Andhra Pradesh, hence no key is provided.

60. *Rhythemis variegata variegata* (Linnaeus)

1763. *Libellula variegata* Linnaeus, *Amoenitates Acad.*, 6 : 412.

1936. *Rhythemis variegata variegata*, Fraser, *Fauna Brit. India, Odon.*, 3 : 423-424.

Material examined : 1 ♀, Ramapuram, district Chittoor, 14.10.1997, coll. B. C. Das; 1 ♀, Kolleru Lake, district West Godavari, 24.1.1998, coll. R. S. Mirdha and 2 ♀ ♀, Machilipatnam, district Krishna, 15.10.1998, coll. S. P. Chakraborty.

Measurements :

	Abdomen	Forewing	Hindwing
Female :	21.00-24.00 mm	32.00-35.00 mm	32.00-34.00 mm

Distribution : India (Andhra Pradesh, Assam, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa and West Bengal).

Elsewhere : Bangladesh, Bhama, China, Indonesia, Myanmar, Nepal, Sri Lanka, Teinzo, Vietnam and Yunnan.

Genus *Hydrobasileus* Kirby

1889. *Hydrobasileus kirby*, *Trans. Zool. Soc. Lond.*, 12 : 258, 266.

1936. *Hydrobasileus*, Fraser, *Fauna Brit., India, Odon.*, 3 : 428-429.

Diagnostic characters : Large sized dragonflies, wings partly coloured and body ochreous or ferruginous colour; vesicle high rather deeply notched or with two points at apex; prothorax with small posterior lobe; wings long and broad, especially at base, and pointed at apices; sectors of arc fused for a short distance in forewings and much longer distance in hindwing; arc situated in between the first and 2nd antenodal nervures; one cubital nervures in both the wings.

Distribution : India.

Elsewhere : Australia, Bangladesh, China, Indonesia, Japan, Kampuchea, Malaysia, Myanmar, Papua New Guinea, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam.

This genus has a single species in India as well as Andhra Pradesh, hence no key is provided.

61. *Hydrobasileus croceus* (Brauer)

1867. *Tremea croceus* Brauer, *Verh. Zool.-bot. Ges., Wien.*, 17 : 813.

1890. *Hydrobasileus croceus*, Karsch, *Berlin Ent. Zeit.*, 33 : 351.

1936. *Hydrobasileus croceus*, Fraser, *Fauna Brit. India, Odon.*, 3 : 429-430.

Distribution : India (Andhra Pradesh, Assam, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya and Rajasthan).

Elsewhere : Bangladesh, China, Indonesia, Japan, Kampuchea, Malaysia, Myanmar, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam.

This species is included here on the basis of literature review.

Genus *Pantala* Hagen

1861. *Pantala* Hagen, *Dyn. Neur. Amer.*, : 141.

1936. *Pantala*, Fraser, *Fauna Brit. India, Odon.*, 3 : 413-414.

Diagnostic characters : Medium sized, yellow or reddish brown with restricted black markings; vesicle moderately high, rounded; posterior lobe of prothorax not erected as a collar, specialised tuft of hairs absent; wings hyaline, sometimes suffused with brown and marked at base with brown or golden yellow; 12½-15½ and 7-8 antenodal nervures and 6-8 and 8-10 postnodal nervures present in both the wings respectively; pterostigma smaller in hindwing, about 3-5 times as long as broad, not braced, arc situated in between the first and second antenodal nervures; hypertrigone entire, subtrigone ill defined and sectors of arc forming a common stalk.

Distribution : Cosmopolitan.

62. *Pantala flavescens* (Fabricius)

1798. *Libellula flavescens* Fabricius, *Suppl. Ent. Syst.*, : 285.

1936. *Pantala flavescens*, Fraser, *Fauna, Brit. India, Odon.*, 3 : 414-416.

Material examined : 1♂, 3♀♀, Sri Sailam, district kurnool. 1.11.1986, coll. M.S. Shishodia; 1♀, Dormala, district kurnool, 4.11.1986, coll. M.S. Shishodia; 1♂, Nizamabad, district Nizamabad, 6.11.1986, coll. S. Chakraborty; 1♀ Rajahmundry, district East Godavari,

18.11.1986, coll. M.S. Shishodia; 1 ♀, Mutukar, district Cuddapah, 18.10.1997, coll. B.C. Das; 1 ♀, Muddadugi, district Cuddapah, 19.10.1997, coll. B. C. Das; 1 ♀, Gundipel, Hyderabad, district Rangareddi 26.10.1997, coll. P. Mukhopadhyaya; 2 ♂♂, 1 ♀, Cheepurupalle, district Vizianagaram, 4.11.1997, coll. P. Mukhopadhyay; 1 ♀, Ankapalli, district Vishakhapatnam, 1.2.1998, coll. R. S. Mirdha; 1 ♀, Domopapenta, district Prakasmam, 25.9.1998; coll. S. K. Mondal; 1 ♂, Samsabad (Undanagar) district Mahbubnagar, 10.10.1998, coll. S. P. Chakraborty; 1 ♂, Machilipatnam, district Krishna, 15.10.1998, coll. S. P. Chakraborty; 1 ♂, Borra, district Vishakhapatnam, 15.10.1998, coll. S. K. Mondal; 1 ♀, Adabinedhalan, district Krishna, 16.10.1998, coll. S. P. Chakraborty; 1 ♂, Medherpuri, Rajahmundry, district East Godavari, 20.10.1998, coll. S. P. Chakraborty; 1 ♂, Revulapalam, Rajahmundry, district, East Godavari, 20.10.1998, coll. S. P. Chakraborty; 2 ♂♂, 1 ♀, Simlachalam, district Vishakhapatnam, 22.10.1998, coll. S. P. Chakraborty; 1 ♂, 1 ♀, Pettawaltair, district Vishakhapatnam, 23.10.1998, coll. S. P. Chakraborty; 2 ♂♂, Anandapuram, district Vishakhapatnam, 23.10.1998, coll. S. P. Chakraborty; 1 ♂, 1 ♀, Golkunda, Fort area, Hyderabad, district Rangareddi, 18.11.1986, coll. P. H. Roy; 1 ♂, Nallamula Forest, Chintala, Sri Sailam, district Kurnool, 24.11.1998, coll. P. H. Roy and 6 ♂♂, 1 ♀, Nallamula Forest, Sri Sailam, district Kurnool, 25.11.1998, coll. P. H. Roy.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	30.50-33.00 mm	38.00-41.00 mm	37.00-40.00 mm
Female :	31.00-34.00 mm	38.00-41.00 mm	

Distribution : Cosmopolitan.

Remarks : It is most common species and found in marshes and weedy tanks and ponds which may be permanent or temporary. Sometimes swarms of this species were observed in the sky.

Genus *Tramea* Hagen

1861. *Tramea* Hagen, *Syn. Neur. Amer.*, : 114.

1936. *Tramea*, Fraser, *Fauna Brit., India, Odon.*, 3 : 431-432.

Diagnostic characters : Large sized and robust build dragonflies, variable colour; vesicle high, and variable; prothorax with small posterior lobe; wings hyaline, long and very broad at base; rather pointed at apex; base of hindwing marked with irregular opaque spot; arc situated in between 1st and 2nd antenodal nervures; sectors of arc with a long fusion at origin; only one cubital nervures in both the wings; pterostigma small unequal in fore and hindwing.

Distribution : India.

Elsewhere : Angola, Argentina, Australia, Bangladesh, Bhama, Barbados, Barmuda, Belize, Benin, Bolivia, Botswana, Brazil, Burkina Faso, Cameroon, Cayman Island, Central Africa, Congo, Costa Rica, Coted'ivoire, Cuba, Dominica, Ecuador, Fiji, French Guina, Guatemala, Guyana, Malaysia, Mali, Marshal Is., Mariana Islands, Mauritiana, Mauritius, Mexico, Mozambique, Micronesia, Myanmar, New Guinea, Nomibia, Niger, Nigeria, New Caledonia, New Guinea, Nepal, New Zealand, Palau, Panama, Papua, Paraguay, Reunion, Saint Lucia, Senegal, Seychelles, Sierra leone Somalia, South Africa, Sri Lanka, Tanzania, Thiland, Tobago, Togo, Trinidad, United States of America, Vanuatu, Venezuela, Vietnam, Zaire, Zambia and Zimbabwe.

Key to the species of genus *Tramea* Hagem

1. Two large black spots at the base of hindwing surrounded by a golden-yellow areola *T. basilaris burmeisteri* Kirby
- Only a single black spot of variable size at the base of hindwing 2
2. Black spot in hindwing confined to base, vaery narrow, not invading base of anal loop *T. limbata similata* (Rambur)
- Spot in hindwing dark reddish-brown, very large, extending distally to distal end of discoidal cell and involving nearly whole of anal loop *T. virginia* (Rambur)

63. *Tramea basilaris burmeisteri* Kirby

1839. *Libellula chinensis* Burmeister, *Handb. Ent.*, 2 : 852.

1889. *Tramea burmeisteri*, Kirby, *Trans. Zool. Soc. Lond.*, 12 : 316.

1936. *Tramea basilaris burmeisteri*, Fraser, *Fauna Brit. India, Odon.*, 3 : 432-434.

Material examined : 2♂♂, Jamikunta, district Karimnagar, 4.12.1987, coll. B. N. Nandi, 1♂, Jamikunta, district Karimnagar, 6.12.1987, coll. B. N. Nandi; 1♀, Gadwal, district Mahbubnagar, 12.12.1987, coll. B. N. Nandi; 1♂, Tuni, district East Godavari, 3.1.1988, coll. B. N. Nandi; 1♀, Nallamala Forest, Sri Sailam, district, Kurnool, 25.11.1998, coll. P. H. Roy and 1♂, Sidhavtam forest, 32 kms, from Cuddapah, district Cuddapah, 29.11.1998, coll. P. H. Roy.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	35.50 mm	44.00 mm	43.00 mm
Female :	35.00 mm	44.00 mm	43.00 mm

Distribution : India (Andhra Pradesh, Bihar, Central India, Himachal Pradesh, Kerala, Maharashtra, Meghalaya, Nilgiri Hills, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Indo-Malaya, Japan, Nepal, Myanmar, Sri Lanka, Tibet, Thailand and Vietnam.

Remarks : Pterostigma yellow and covers 11/2 cells; membrane pure white, discoidal field begins with 4 rows of cells. Nodal index $\frac{10-11\frac{1}{2}}{12-7} \bigg| \frac{11\frac{1}{2}-10}{7-13}$

64. *Tramea virginia* (Rambur)

1773. *Libellula chinensis* De Geer, *Mem. Ins.*, 3 : 556.

1842. *Libellula virginia*, Rambur, *Ins. Neurop.*, : 33.

1936. *Tramea virginia*, Fraser, *Fauna Brit., India, Odon.*, 3 : 435-436

Material examined : 2♂, Suryapet, district Nalgonda, 7.12.1986, coll. M.S. Shishodia and 1♂, Mondavalli, district Krishna, 1.11.1997, coll. P. Mukhopadhyay.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	32.50 mm	42.00 mm	41.00 mm

Distribution : India (Bihar, Himachal Pradesh, Jammu and Kashmir, Mizoram, Tamil Nadu and Uttar Pradesh).

Elsewhere : Bangladesh, China, Micronesia, Myanmar, Nepal, South Japan, Taiwan, Thailand and Vietnam.

Remarks : Pterostigma yellow and covers 2 cells, membrane white, Discoidal begins with 4 rows of cells, Nodal index varies from $\frac{10-12\frac{1}{2}}{12-6} \bigg| \frac{12\frac{1}{2}-9}{6-12}$ to $\frac{10-11\frac{1}{2}}{12-7} \bigg| \frac{10\frac{1}{2}-10}{7-12}$

65. *Tramea limbata similata* (Rambur)

1832. *Libellula limbata* Desjardins, *Repport Soc., Maurice*, : 1.

1842. *Libellula similata*, Rambur, *Ins. Neurop.*, : 36.

1920. *Tramea limbata race similata*, Fraser, *J. Bombay nat. Hist. Soc.*, 27 : 53, 54.

1995. *Tramea limbata similata*, Prasad and Varshney, *Oriental Ins.*, 29 : 413.

Material examined : 3♂♂, Tuni, district East Godavari, 3.1.1988, coll. B. N. Nandi.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	34.00 mm	46.00 mm	45.00 mm

Distribution : India (South India).

Elsewhere : Sri Lanka.

Genus *Tholymis* Hagen

1867. *Tholymis* Hagen, *Ent. Ztg.*, **28** : 221

1936. *Tholymis*, Fraser, *Fauna Brit. India, Odon.*, **3** : 410-411.

Diagnostic characters : Medium sized dragonflies; reddish, marked with yellow or green; vesicle flat or shallowly rounded; wings hyaline, marked with golden brown at base in forewing upto nearly in hindwing, where in males sometimes posses a opalescent white distal band; $9\frac{1}{2}$ to $11\frac{1}{2}$ and 7 antenodal nervures in fore and hindwing respectively and 7-10 postnodal nervures in both the wings; hypertrigone entire; subtrigone 3-4 celled; only one cubital nervure in both the wings.

Distribution : India.

Elsewhere : Angola, Australia, Bangladesh, Botswana, Brazil, Burkina Faso, Cameroon, Central Africa, Chile, China, Colombia, Costra Rica, Coted'ivorie, Cuba, Dominican, Republic, Ecuador, Guatemala, Guinea Bisau, Gyana, Indonesia, Japan, Jamaica, Kampuchea, Kenya, Laos, Liberia, Madagascar, Malawi, Mariana Is., Malaysia, Marshall Island, Mauretius, Mexico, Mozambique, Micronesia, Myanmar, Namibia, Nepal, Niger, Nigeria, Panama, Palau, Papua New Guinea, Peru, Philippines, Purerto Rico, Reunion, Samoa, Senegal, Seychelles, Singapore, Samalia, Sri Lanka, South Africa, South America, Tanzania, Trinidad, Togo, Veneguela, Vietnam, Zaire, Zambia and Zimbabwe.

66. *Tholymis tillarga* (Fabricius)

1798. *Libellula tillarga* Fabricius, *Suppl. Est. Syst.*, : 285.

1936. *Tholymis tillarga*, Fraser, *Fauna Brit., India, Odon.*, **3** : 411-413.

Material examined : 1 ♀, Phoolbagh, district Vizianagaram, 15.2.1998, coll. M. Prasad; 1 ♀, Domlapenta, district Prakasam, 25.9.1998, coll. S.K. Mondal; 1 ♂, Vijaywada, district Krishna, 15.10.1998, coll. S.P. Chakraborty and 1 ♂, 1 ♀ Anandapuram, Yamashuvala, district Vishakhaptnam, 23.10.1998, coll. S.P. Chakraborty.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	29.50-30.50 mm	34.00-35.00 mm	32.50-34.00 mm
Female :	30.00 mm	34.00 mm	33.00 mm

Distribution : Throughout India.

Elsewhere : Africa, Australia, Bangladesh, Bhamo, Cameroon, China, Ethiopea, Garamba National Park (Pinhey, 1966), Indo-china, Indonesia, Japan, Kampuchea, Laos, Madagascar, Malawi, Malaysia, Mauritius, Micronesia, Myanmar, Philippines, Somali, Sri Lanka, South America, North America, Tanzania, Taiwan, Thialnd and Vietnam.

Remarks : Pterostigma yellow and covers $2\frac{1}{2}$ cells, anal triangle 3 celled, 2 rows of cells in between IRiii and Rspl; discoidal cell traversed only once. Nodal index $\frac{7-9\frac{1}{2}}{8-7} \bigg| \frac{8\frac{1}{2}-7}{7-10}$

Genus *Zyxomma* Rambur

1842. *Zyxomma* Rambur, *Ins., Nuerop.*, : 26, 30.

1936. *Zyxomma*, Fraser, *Fauna Brit. India, Odon.*, 3 : 407-408.

Diagnostic characters : Moderate size dragonflies; apex of anal loop in hindwing open; vesicle hood-shaped; posterior lobe of prothorax small; wings long, rounded at apices; sectors of arc fused for a very short distance in forewing, rather long in hindwings; arc present in between first and second antenodal nervures; $9\frac{1}{2}$ to $15\frac{1}{2}$ antenodal nervures in forewing; only one cubital nervure in both the wing; abdomen enormously dilated at segments 1st and 3rd abdominal segments and abruptly contracted and very slim and cylindrical to the end of abdomen.

Distribution : Africa, Australia, New Guinea, Philippines, Seychelles, South Asia and Sundaic Archipelago.

67. *Zyxomma petiolatum* Rambur

1842. *Zyxomma petiolatum* Rambur, *Ins. Neurop.*, : 30.

1936. *Zyxomma petiolatum*, Fraser, *Fauna Brit. India, Odon.*, 3 : 409-410.

Material examined : 1 ♀, Sompeta, district Srikakulam, 5.2.1998, coll. M. Prasad and; 1 ♂, Chennas district Adilabad, 28.10.1998, coll. S.P. Chakraborty.

Measurements :

	Abdomen	Forewing	Hindwing
Male :	35.00 mm	31.00 mm	30.00 mm
Female :	40.00 mm	35.00 mm	34.00 mm

Distribution : Throughout India.

Elsewhere : Myanmar and Sri Lanka.

Remarks : Pterostigma dark-brown and covers $1\frac{1}{2}$ cells, apices of both pair of wings marked with dark-brown, anal triangle 3 celled, discoidal field begins with 3 rows of cells

in forewings, only one row of cells in IRiii and Rspl. Nodal index varies from $\frac{7-9\frac{1}{2}}{8-7} \bigg| \frac{10\frac{1}{2}-6}{7-8}$

to $\frac{7-11\frac{1}{2}}{9-8} \bigg| \frac{11\frac{1}{2}-9}{8-8}$

Genus *Urothemis* Brauer

1868. *Urothemis* Brauer, *Verh. zool.-bot. Ges. wien.*, **18** : 175,366, 737.

1936. *Urothemis*, Fraser, *Fauna Brit. India, Odon.*, **3** : 441-442.

Diagnostic characters : Moderately large sized dragonflies; colour may be ochreous, reddish or black; wings partly coloured at the base; vesicle high broad; posterior lobe of prothorax small; wings long and moderately broad, reticulation rather open; sectors of arc separated at origin, arc situated between the first and second antenodal nervures; 7 antenodal nervures and distal one complete; only one cubital nervure in both the wings; only one row of cells in between IRiii and Rspl.

Distribution : India.

Elsewhere : Australia, Algeria, Bangladesh, Botswana, Burkina Faso, China, Coted'ivoire, Egypt, Ethiopia, Guinea, Indonesia, Israel, Kampuchea, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Namibia, Niger, Nigeria, Nepal, Oman, Papua New Guinea, Philippines, Senegal, Sierra Leone, Singapore, Somalia, South Africa, Sudan, Sri Lanka, Taiwan, Tanzania, Thailand, Tunisia and Vietnam.

68. *Urothemis signata signata* (Rambur)

1839. *Libellula sanguinea* Burmeister, *Handb. Ent.*, **2** : 858.

1842. *Libellula signata*, Rambur, *Ins. Neurop.*, 117.

1913. *Urothemis signata signata*, Ris, *Cat. Coll. Selys, fasc.*, **16** : 1023.

1936. *Urothemis signata signata*, Fraser, *Fauna Brit., India, Odon.*, **3** : 442-444.

Distribution : India (Assam, Meghalaya, Orissa, Southern India, Uttar Pradesh, West Bengal and Western India).

Elsewhere : China, Indo-China, Malaysia, Myanmar, Nepal, Sri Lanka, Taiwan, Thailand and Vietnam.

Remarks : One adult specimen of this species was observed during my field trip to Andhra Pradesh in February, 1998 at Vizianagaram. I was unable to collect the specimen.

SUMMARY

Odonata fauna of Andhra Pradesh has been studied comprehensively. Altogether 68 species/subspecies belonging to 41 genera under 10 families and two suborders are recorded from there. Of these, 12 species/subspecies are recorded for the first time from Andhra Pradesh. Keys, collection data, distributional range within India and outside India, body measurements and notes on taxonomic importance wherever applicable have been provided.

ACKNOWLEDGEMENT

The author is thankful to the Director, Zoological Survey of India, Calcutta, for providing opportunity to carry out this study. I am also grateful to Dr. G. K. Srivastava, Scientist-SG and Dr. S. K. Mitra, Scientist-SF, Zoological Survey of India, Calcutta for providing various facilities for the present work.

REFERENCES

- Asahina, S. 1955. Dragonflies. Flora and Fauna of Nepal (Ed. H. Kihara), : 291-300.
- Fraser, F. C. 1993. Fauna of British India, including Ceylon and Burma, Odonata. *Taylor and Francis, London*, **1** : xiii + 423.
- Fraser, F. C. 1934. Fauna of British India, including Ceylon and Burma, Odonata. *Taylor and Francis, London*, **2** : xxiii + 398.
- Fraser, F. C. 1936. Fauna of British India, including Ceylon and Burma, Odonata., *Taylor and Francis, London*, **3** : xi + 461.
- Fraser, F. C. 1956. Taxonomist's Glossary of genitalia in insects. Copenhagen, *Ejnar Munkegaard*. Odonata (Ed. S. L. Tuxen), : 25-30.
- Krishnamoorthy, C., Dharma Raju, E. and Lakshmi Narayana, K.V. 1961. A systematic catalogue of the main identified Entomological collection of the insects at the Agricultural College, Bapatla, Andhra Pradesh, Department of Agriculture, Hyderabad, : 26-28 and 93.
- Lahiri, A. R. 1987. Studies on the Odonata fauna of Meghalaya. *Rec. zool. Surv. India, Occ. Pap. No.*, **99** : 1-402.
- Lieftinck, M. A. 1971. Odonata from Ceylon. *Ent. Scand. Suppl.*, **1** : 188-207.
- Mahato, M. 1998. Dragonfly inventory of the Surveys in eastern and midwestern Nepal, with records of five species new to the fauna of Nepal (Odonata). *Opusc. Zool. flumin.*, **29** : 1-9.
- Joseph, A.N.T. and Satyarani, I. 1988, On a small collection of Odonata from Andhra Pradesh, India *Rec. zool. Surv. India*, **85**(3) : 439-450.
- Mitra, T. R. 1976. On a small collection of Odonata (Insecta) from Waltair. *News. zool. Surv. India*, **2**(6) : 265-267.
- Mitra, T. R. 1995. Additional to the Odonate fauna of the Great Nicobar Island. Indian Ocean. *Opusc. Zool. Flumin.*, **129** : 1-6.
- Mitra, T. R. 1999. Geographical distribution and Zoogeography of Odonata (Insecta) of Meghalaya India. *Rec. zool. Surv. India Occ. Pap. No.*, **170** : 1-63.

- Moore, F. 1878. Neuroptera. J. Anderson (1878) Zoological Results of two expeditions to the Western Yunnan in 1868-1875 London, **1** : 915-916.
- Pinhey, E. C. G. 1966. Check-list of dragonflies (Odonata) from Malawi with descriptions of a new *Teinobasis* Kirby. *Arnoldia*, **2** : 1-24.
- Prasad, M. 2000. Additions to species of dragonflies and damselflies known from Andhra Pradesh. *Bionotes*, **2**(3) : 50.
- RIS, F. 1909. Libellulinen. 2. *Catl. Coll. Selys fasc.*, **10** : 120-224.
- RIS, F. 1910. Libellulinen. 3. *Cat. Coll. Selys fasc.*, **11** : 244-384.
- Satyarani, I. 1998. Studies on the Odonates of Andhra Pradesh, India, *9th, Int. Symp. odonatol.*, Madurai, : 37-38 (Abstract).
- Selys-longchamps, E. De, 1891. Odonates in Viaggio Di Leonardo Fea in Birmania Regioni Vicine. *Ann. Del. Mus. Civ. dist. nat. Serie 2a.*; **10** : 433-518.
- St. Quentin, D. 1970. *Odonata aus Nepal, Khumbu Himal.*, **3** : 389-411.
- Tillyard, R. J. 1917. The biology of dragonflies (Odonata or paraneuroptera) : xiii + 396.
- Titayavam, M. 1979, A Note on the Odonata of the Chiany Mai Valley, Northern Thailand. *Notul., Odonatol.*, **1** : 65-67.
- Tsuda, S. 1991. A distributional list of World Odonata. 1991. Osaka. : 1-362.

INSECTA : ORTHOPTERA : ACRIDOIDEA

S. K. MANDAL and K. YADAV

Zoological Survey of India, 'M' Block, New Alipore, Kolkata-700 053

INTRODUCTION

The short-horned grasshoppers of superfamily Acridoidea belong to order orthoptera. Under this superfamily there are about 6,400 species, distributed under 1148 genera known so far from world, of which 350 species under 157 genera are known from India. Many species of Acridoidea are serious pest of crops, forest plants and pastures in Indian region.

The Acridoidea of Indian region is known through the works of Kirby (1914), Bolivar (1917), Uvarov (1921, 1929 and 1942), and Henry (1940). In recent years Tandon (1975), Bhowmik (1986), Tandon and Shishodia (1969 and 1989), Mandal and Shishodia (1990), have made contributions on the Indian Acridoidea. A perusal of the existing literature shows that no comprehensive work is available on the grasshoppers of Andhra Pradesh. Therefore, an attempt has been made here to make a detailed study of the Acridoidea of the state. This study is based on large collections of grasshoppers made by different parties of Zoological Survey of India. Earlier collections of grasshoppers of the state present in the National Zoological collections were also studied.

The present paper deals with 55 species, distributed under 2 families and 25 genera. It is provided with key to families, genera and species.

SYSTEMATIC ACCOUNT

Order ORTHOPTERA

Superfamily ACRIDOIDEA

Family PYRGOMORPHIDAE

1. *Atractomorpha crenulata* (Fabricius)
2. *Chrotogonus* (Ch.) (*tr.*) *trachypterus* (Blanchard)
3. *Chrotogonus* (Ch.) *oxypterus* (Blanchard)

4. *Poecillocerus pictus* (Fabricius)
5. *Aularches miliaris* (Linnaeus)
6. *Pyrgomorpha bispinosa bispinosa* (Walker)
7. *Pyrgomorpha conica* (Olivier)
8. *Neorthacris a. acuticeps* (Bolivar)

Family ACRIDIDAE

Subfamily TRUXALINAE

9. *Truxalis indica* (Bolivar)

Subfamily GOMPHOCERINAE

10. *Dnopherula (Aulacobothrus) socius* Bolivar
11. *Dnopherula (Aulacobothrus) collinus* Uvarov
12. *Donopherula (Aulacobothrus) decius* (Walker)
13. *Donopherula (Aulacobothrus) luteipes* (Walker)
14. *Leva indica* (Bolivar)
15. *Leva cruciata* Bolivar
16. *Mesopsis cylindricus* (Kirby)
17. *Dhimbama dawsoni* Henry

Subfamily ACRIDINAE

18. *Acrida exaltata* (Walker)
19. *Gelastorrhinus semipictus* (Walker)
20. *Gonista filata* (Walker)
21. *Orthochtha indica* Uvarov
22. *Phlaeoba infumata* Brunner
23. *Aiolopus thlassinus tamulus* (Fabricius)
24. *Oedaleus abruptus* (Thunberg)

Subfamily OEDIPODINAE

25. *Oedaleus senegalensis* (Krauss)
26. *Gastrimargus africanus africanus* (Saussure)
27. *Morphacris citrina* Kirby

28. *Morphacris fasciata sulcata* (Thunberg)

29. *Trilophidia annulata* (Thunberg)

30. *Acrotylus humbertianus* Saussure

31. *Dittopternis venusta* (Walker)

32. *Heteropternis respondens* (Walker)

Subfamily OXYINAE

33. *Oxya hyla hyla* Serville

34. *Oxya fuscovittata* (Marschall)

35. *Oxya nitidula* (Walker)

Subfamily COPTACRIDINAE

36. *Coptacra punctaria* (Walker)

37. *Eucoptacra saturata* (Walker)

38. *Epistaurus sinetyi* Bolivar

Subfamily TROPIDOPOLINAE

39. *Tristria pulvinata* (Uvarov)

Subfamily EYPREPOCNEMIDINAE

40. *Heteracris pulchra* (Bolivar)

41. *Choroedocus illustris* (Walker)

42. *Eyprepocnemis alacris alacris* (Serville)

43. *Eyprepocnemis rosea* Uvarov

44. *Tylotropidius varicornis* (Walker)

Subfamily CYRTACANTHACRIDINAE

45. *Anacridium flavescens* (Fabricius)

46. *Chondracris rosea* (De Geer)

47. *Cyrtacanthacris tatarica* (Linnaeus)

48. *Pachyacris vinosa* (Walker)

49. *Patanga succincta* (Johansson)

Subfamily CALLIPTAMINAE

50. *Brachy xenia scutifera* (Walker)

Subfamily HEMIACRIDINAE

51. *Leptacris vittata* (Fabricius)
52. *Spathosternum prasiniferum prasiniferum* (Walker)
53. *Hieroglyphus banian* (Fabricius)
54. *Hieroglyphus nigrorepletus* Bolivar

Subfamily CATANTOPINAE

55. *Catantops pinguis innotabilis* (Walker)
56. *Xenocatantops karnyi* (Kirby)
57. *Pirithoicus ophthalmicus* (Karny)

Order ORTHOPTERA

Superfamily ACRIDOIDEA

Key to the families

1. Foveolae of the vertex contiguous, superior and forming the extremity of the fastigium; stridulatory mechanism absent pyrgomorphidae
- Foveolae lateral or inferior, never forming the tip of the fastigium; stridulation mechanism present Acrididae

Family PYRGOMORPHIDAE

Key to family PYRGOMORPHIDAE

1. Anterior margin of prosternum strongly reflexed and dilated..... *Chrotogonus* Serville
- Anterior margin of prosternum neither reflexed nor dilated 2
2. Antennae remote from the eyes, placed in front of the ocelli 3
- Antennae near the eyes and inserted below the ocelli 4
3. Tegmina long and narrow, body moderately slender *Atractomorpha* Saussure
- Tegmina rather absent *Neorthacris*
4. Posterior lobe of pronotum on the level of anterior lobe; abdomen without callosities 5
- Posterior lobe of pronotum convex, raised above the level of anterior lobe, with strong rugae; abdomen with dorsal callosities *Aularches* Stål

5. Outer apical spine of posterior tibiae absent or difficult to detect; body small and slender *Pyrgomorpha* Serville
- Outer apical spine of posterior tibiae very distinct; body large and robust *Poekilocerus* Serville

Family ACRIDIDAE

Key to the subfamilies

1. Prosternal process or tubercle usually absent; if present, then antennae ensiform and body strongly elongate 2
- Prosternal process or tubercle present ; antennae filiform 5
2. Sound producing mechanism represented by articulated or non articulated stridulatory serrations or pegs on inner side of hind femur 3
- Sound producing mechanism not represented by such serration or pegs on inner side of hind femur 4
3. Sound producing mechanism represented by unarticulated serration on inner side of hind femur *TRUXALINAE*
- Sound producing mechanism represented by a row of articulated stridulatory pegs on inner side of hind femur *GOMPHOCERINAE*
4. Head with acute in profile and with acute angle of frons; tegmina without intercalary vein (if present, weak, irregular and not serrated even in male) *ACRIDINAE*
- Head rounded in profile, face almost verticle, oblique and tegmina always with an intercalary vein in median area (mostly well developed) *OEDIPODINAE*
5. Radial area of tegmina with a series of regular, parallel stridulatory veinlets *HEMIACRIDINAE*
- Radial area of tegmina stridulatory veinlets absent; if apterous, then tympanum (at least rudimentary) present 6
6. Lower external lobe of hind knee with spine like apex *OXYINAE*
- Lower external lobes of hind knee with apex rounded, angular or sub-acute but not spine like 7
7. Last abdominal tergite in male (in majority of genera) with well developed furcula; supranal plate mostly with attenuate or trilobate apex; subgenital plate with transverse fold *COPTACRIDINAE*

- Last abdominal tergite in male without well developed furcula; supra-anal plate variable; subgenital plate without transverse fold 8
- 8. Mesosternal interspace closed TROPIDOPOLINAE
- Mesosternal interspace open 9
- 9. Mesosternal lobes rounded or obtuse or acute angular, but not rectangular 10
- Mesosternal lobes rectangular CYRTACANTHACRIDINAE
- 10. Male cercus pincers like, strong, regularly incurved CALLIPTAMINAE
- Male cercus variable, but not pincer like 11
- 11. Dorsum of pronotum flat or weakly tectiform, with median and lateral carinae linear (lateral carinae some-times obliterated); male cercus with strongly compressed, lobiform or sub-acute down curved apex EYPREPOCNEMIDINAE
- Dorsum of pronotum of variable shape; lateral carinae if present, not linear; male cercus variable, but not with strongly compressed, lobiform or sub-acute down curved at apex CATANTOPINAE

Family PYRGOMORPHIDAE

Subfamily PYRGOMORPHINAE

Genus *Chrotogonus* Serville, 1839

1. *Chrotogonus (Chrotogonus) trachypterus trachypterus* (Blanchard)

1836. *Ommexecha brachypterus* Blanchard, Ann. Soc. ent. France, 5 : 618.

1959. *Chrotogonus (Chr.) tr. trachypterus* : Kevan, publoes cult. Co. Diam. Angola, No. 43 : 147.

Material examined : Kurnool district : 1 ♂, 2 ♀, Nallamallai 1.xi.1986, coll. M. S. Shishodia.

Distribution : India (Andhra Pradesh, Bihar, Goa, Karnataka, Kerala, Madhya Pradesh, Orissa and Rajasthan).

Elsewhere : Bangladesh, Nepal, Pakistan and Sri Lanka.

Remarks : This species is the pest of varous types of crops of economic importance, especially of short type of nature.

2. *Chrotogonus (Chr.) oxypterus* (Blanchard)

1798. *Gryllus Scaber* Fabricius, Suppl. Ent. Syst., : 196, no. 62-3.

1836. *Ommexecha oxypterus* Blanchard, Annls. Soc. ent. France, 5 : 622.

1959. *Chrotogonus* (Chr.) *oxypterus* : Kevan, *Publcoes cult. Co. Diam. Angola*, No. 43 : 48.

Material examined : *Mehbubnagar district* : 2 ♀ ♀, 1 ♂ n, Mannanur, 15. iv. 1985, & 1 ♂, 19. iv. 1985, coll. S. Chatterjee ; 1 ♀, Achampet, 3. xi. 1986, coll. M. S. Shishodia. *Warangal district* : 3 ♂ ♂, 3 ♀ ♀, Dornakal 10. xi. 1986, coll. M. S. Shishodia. *Nalgonda district* : 2 ♂ ♂, 3 ♀ ♀, Suryapeta, 7. xi. 1986, coll. M. S. Shishodia ; *Nellore district* : 2 ♂ ♂, 1 ♀, Nellore. 25. x. 1986, coll. M. S. Shishodia ; *Chitoor district* : 6 ♀ ♀, Tirupati, 26. x. 1986, coll. M. S. Shishodia ; *Khammam district* : 1 ♂, 1 ♀, Palair, 11. xi. 1986, coll. M.S. Shishodia ; 1 ♀, R. V. nagar, 24. viii. 1985, coll. T. K. Mukherjee.

Diagnosis : Hind wings infumated to dark fuscous at basal part & extend nearly two-third as long as tegmina.

Distribution : India (Andhra Pradesh, Bihar, Goa, Gujrat, Karnataka, Kerala, South east of Maharashtra, South of Madhya Pradesh, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Bengladesh, Srilanka.

Remarks : It is a pest of various crops, vegetables & prefer the places where the amount of water is less in soil.

Genus *Atractomorpha* Fabricius, 1793

3. *Atractomorpha crenulata* (Fabricius)

1793. *Truxalis crenulatus* Fabricius, *Ent. Syst.*, 2 : 28.

1861. *Atractomorpha crenulata* : Saussure, *Annl. Soc. ent. France*, 4 : 475.

1969. *Atractomorpha crenulata* : Kevan and Chen, *Zool. J. Linn. Soc.*, 48 : 187.

Material examined : *Mehbubnagar district* : 19 ♂ ♂, 4 ♀ ♀, Mannanur, 11 & 13. iv. 1985, coll. S. Chatterjee & S. K. Mondal ; 3 ♂ ♂, 2 ♀ ♀, Gundem falls, 14. iv. 1985, coll. S. Chatterjee & S. K. Mandal. *Nalgonda district* : 1 ♀, 20 Kms. distance from Nagarjun Sagar Dam, Coll. P. Parui. *Kurnool district* : 1 ♂, Domlapenta. 25. ix. 1998, coll. S. K. Mandal. *Prakasam district* : 1 ♀, Dornala, 22. iv. 1998, coll. S. K. Mandal, 2 ♀ ♀, Chinnarutla, 23. ix. 1998, coll. S. K. Mandal. *Cuddapah district* : 1 ♂. Rajempet, 8. ix. 1998, coll. S. K. Mandal. *West Godavari district* : 2 ♂ ♂, 1 ♀ Ramasangavaram, 30. ix. 1998, coll. S. K. Mandal. *East Godavari district* : 1 ♂, 3 ♀ ♀, Rajahmundry, 15. x. 1986, coll. S. K. Mandal ; 1 ♂, Mirthipadu, 16. xi. 1986, coll. M. S. Shishodia ; 1 ♂, Rajamundry, 17. x. 1998, coll. S. P. Chakrabarty. *Vishakhapatnam district* : 1 ♂, Paderu, 20. xi. 2000, coll. P. H. Roy ; *Srikakulam district* : 1 ♂, Srikakulam, 12. ii. 1998, coll. M. Prasad.

Diagnosis : Medium size and slender ; lateral pronotal lobe always with a membranous area near posterior margin ; hind femora not clearly convex ; hind wings normally tyrian pink to light mallow purple at base.

Distribution : India (Andhra Pradesh, Andaman & Nicobar Islands, Bihar, Goa, Jammu & Kashmir, Kerala, Orissa Lakshadweep Islands, Rajasthan, West Bengal).

Elsewhere : Bangladesh, Myanmar, N. W. Sumatra, Pakistan, South Vietnam and Sri Lanka.

Remarks : It is widely distributed in India. Colour of the wings at base depend upon the maturation of the specimens.

Genus *Poecilocerus* Serville, 1831

4. *Poecilocerus pictus* (Fabricius)

1775. *Gryllus pictus* Fabricius, *Syst. Ent.*, : 289.

1966. *Poecilocerus pictus* : Akbar, *Sind. Univ. Sci. Res. Journal*, Karachi, : 1.

Material examined : *Hyderabad district* : 1♂, Hyderabad, 22. xii. 1999. coll. G.C. Sen. *Kurnool District* : 1♂, 1♀, Atmakur, 26. xii. coll. G.C. Sen ; 2♂♂, 3♀♀, Kadumura, 27.xii.1999. coll G.C. Sen. *Cuddaph district* : 1♂. 4♀♀, Kajipetta, 30.xii.1999, coll. G.C. Sen ; 3♀♀, Vempelle, 2.i.2000, coll. G.C. Sen; 2♂♂. Kudru, 4.i.2000, coll. G.C. Sen. *Nellore district* : 2♂♂. Nellore 25. x. 1986. coll. M.S. Shishodia. *Chitoor district* : 3♂♂, 5♀♀, Tirupati, 26.x.1986. coll. M.S. Shishodia; 2♂♂. 2♀♀ Chitoor, 6.i.2000, coll. G.C. Sen. *Prakashan district* : 3♂♂, Srisilum, 23.ix.1998. coll. S.K. Mandal. *Vishakhapattanam district* : 4♂♂, 6♀♀ Waltair, 8.x.1998, coll. S.K. Mandal.

Diagnosis : Large size with finely rugose integument ; head and pronotum with faint median carina ; antennae blue black with yellow beyond the basal third of their length ; lateral carinae of pronotum obsolete.

Distribution : India (Andhra Pradesh, Hariyana, Bihar, Delhi, Jammu and Kashmir, Karnataka, Orissa, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

Remarks : It is generally found on AK plants (*Calotropis procera*) but it also feeds on various crops and vegetables. It is first time recorded here from this state.

Genus *Aularches* Stal, 1873

5. *Aularches miliaris* (Linnaeus)

1758. *Gryllus (Locusta) miliaris* Linnaeus, *Syst. Nat.*, (ed. 10) 1 : 432.

1793. *Gryllus scabiosae* Fabricius, *Ent. Syst.*, 2 : 51.

1963. *Aularches miliaris* : Kevan, *Ark. Zool.*, 16 : 75.

Material examined : *Mehbub-nagar district* : 1♀, Timulbhanda, Gundem falls, 23. viii. 1985, coll. T.K. Mukherjee; 2♀♀, R. V. Nagar, 24. viii. 1985, coll. T. K. Mukherjee.

Diagnosis : Head yellowish, some-time brown above ; pronotum yellow on the sides, the space between the sulci with several strong pointed conical tubercles on each sides; tegmina thickly reticulated with yellow nervures & with a variable number of large & small yellow spots; wings purple brown, darker towards the base.

Distribution : India (Andhra Pradesh, Orissa, Jammu and Kashmir, Sikkim, Tamil Nadu, Uttar Pradesh & West Bengal, Else where); Java; Indonesia; Nepal & Srilanka.

Remarks : It is apparently confined to thick forest. It is first time recorded here from this state.

Genus *Pyrgomorpha* Serville, 1831

Key to species

1. Lateral carinae of pronotum well marked *conica* (Olivar)
- Lateral carinae of pronotum broken *bispinosa bispinosa* (Walker)

6. *Pyrgomorpha bispinosa bispinosa* (Walker)

1870. *Pyrgomorpha bispinosa* Walker, *Cat. Derm. Salt. Brit. Mus.*, 3 : 499.

1975. *Pyrgomorpha bispinosa bispinosa* : Kevan, *Acrida*, 4 : 58, 65.

Material examined : *Mehbub-nagar district* : 1 ♀, Achampet, 3. xi. 1986, coll. M.S. Shishodia. *Nalgonda district* : 2 ♀ ♀, Nagarjun-konda, 29. vi. 1985, coll. P. Parui. *Karnool district* : 1 ♀, Nandayal, 22. vi. 1985, and 1 ♀, 29. vi. 1985, coll. P. Parui. *Khammam district* : 1 ♀, khammam, 13. xi. 1986, coll. M. S. Shishodia; *East Godavari district* : 31 ♂ ♂, 4 ♀ ♀, Rajamundry, 17. xi. 1986, coll. M.S. Shishodia.

Diagnosis : Body moderately slender ; postero-ventral point of lateral pronotal lobe generally short but distinct.

Distribution : India (Andhra Pradesh, Tamil Nadu, Orissa).

Remarks : It is recorded for the first time from Andhra Pradesh.

7. *Pyrgomorpha conica* (Olivier)

1791. *Acrydium conicum* Olivier, *Encycl. Meth. Ins.*, 6 : 230.

1914. *Pyrgomorpha conica* : Kirby, *Fauna Brit. India, Orth.*, (Acrididae) : 175.

Material examined : *Hyderabad district* : 1 ♂, 4 ♀ ♀, Hyderabad, coll. S.K. Mandal. *Kurnool district* : 1 ♂, Domlapenta, 24.ix.1998, coll. S.K. Mandal. *Prakashan district* : 1 ♂, 1 ♀, Dornala, 22.ix.1998, coll. S.K. Mandal; 1 ♂, Chinarutla, 23.ix.1998, coll. S.K. Mandal.

Diagnosis : Lateral carinae of pronotum well marked ; wings hyaline, generally pink

towards the base and along nervures; hind tibiae above with an outer apical spine; abdomen spotted with black above.

Distribution : India : Andhra Pradesh, Karnataka, Rajasthan, West Bengal.

Elsewhere : N.W. Africa, W. Asia; S. Europe.

Remarks : *Pyrgomorpha conica* is rather limited in distribution and confined to Central and South Central region of the state. It is recorded for the first time from the state.

Neorthacris Kevan

8. *Neorthacris acuticeps acuticeps* (Bolivar)

1902. *Orthacris acuticeps* Bolivar, *Ann. Soc. ent. France*, **70** : 608, 610.

1964. *Neorthacris acuticeps*, *acuticeps*, Kevan & Singh, *Entomologist.*, **97** : 175.

Material examined : Hyderabad district : 3♂♂, 5♀♀, Hyderabad, Deer park, 30. x. 1986, coll. M. S. Shishodia.

Diagnosis : Body elongate, side of the body with a distinct broad black (some times dark green) band bordered both above & below by much narrower yellow stripes uniform and unbroken ; male cerci as long as, but not sufficiently longer than epiproct ; female epiproct longer than its band width.

Distribution : India (Andhra Pradesh and Tamil Nadu).

Remarks : This species is recorded for first time from Andhra Pradesh. It seems to be rare in Andhra Pradesh, as we have found only in Hyderabad district.

Family ACRIDIDAE

Subfamily TRUXALINAE

Genus *Truxalis* Fabricius, 1775

9. *Truxalis indica* (Bolivar)

1902. *Acrida* (*Acridella*) *unguiculate* Rambur, var. *indica* Bolivar. *Annls. Soc. ent. France*, **70** : 589.

1951. *Truxalis indica* : Dirsh, *Eos. Madr.*, Tomo extraord, (1950) : 178.

Material examined : Kurnool district : 1♀, Nallamallai, 23. xi.27.xii. 81, coll. A.K. Hazra.

Diagnosis : Fastigium of vertex broad, apex truncate ; antennae lanceolate; hind femora with articulated pegs on internal surface; basal part of wing intensely bright pink.

Distribution : India (Andhra Pradesh, Bihar, Orissa, Madhya Pradesh, Maharashtra, Tamil Nadu).

Elsewhere : Myanmar and Sri Lanka.

Remarks : We have found this species in collection from a single locality in Kurnool district. It is first time recorded from Andhra Pradesh.

Subfamily GOMPHOCERINAE

Key to genera

1. Head conically ascending ; fastigium long, laminate rounded or truncate at apex ; antennae filiform 2
 - Head not ascending; fastigium narrow and not truncate at apex ; antennae not filiform 3
2. Fastigial foveolae of vertex not visible from above, apex more or less angular *Leva* Bolivar
 - Fastigial foveolae visible from above, apex not pointed *Aulacobothrus* Bolivar
3. Tegmina longer than hind-femur extending beyond the abdomen in both sexes *Mesopsis* Bolivar
 - Tegmina in male shorter than hind femur and much shorter in male *Dhimbama* Henry

Genus *Dnopherula* Karsch, 1896

Subgenus *Aulacobothrus* Bolivar, 1902

10. *Dnopherula (Aulacobothrus) socius* (I. Bolivar)

1902. *Aulacobothrus socius* Bolivar, *Annl. Soc. ent. France.*, **70** : 599.

1914. *Aulacobothrus socius* : Kirby, *Faun. Brit. India Orth.*, (Acrididae) : 124.

1971. *Dnopherula (Aulacobothrus) socius* : Jago, *Proc. Acad. nat. sci. philad.*, **123**(8) : 243.

Material examined : *Mehbubnagar district* : 1♂, 3♀, Gundem falls, 14.iv.1985, coll. S.K. Chatterjee and S.K. Mandal.

Diagnosis : Lateral carinae of pronotum wavy, median carina straight ; hind femora with three oblique dark bands and the knee dark brown ; hind tibiae red.

Distribution : India (Andhra Pradesh, Haryana, Himachal Pradesh, Maharashtra, Orissa and Tamil Nadu).

Remarks : This species is included on the basis of the literature review Shishodia and Mandal (1990).

11. *Dnopherula (Aulacobothrus) collinus* Uvaorv

1929. *Aulacobothrus collinus* Uvarov, *Revue suisse Zool.*, **36** : 345.

1985. *Dnopherula (Aulacobothrus) collinus* : Bhowmik, *Rec. zool. Surv. India, Occ. Paper No.*, 78 : 21.

Material examined : *Mehbubnagar district* : 1 ♀, Gundem falls, 14.iv.1985, coll. S. K. Chatterjee and S. K. Mandal.

Distribution : India (Andhra Pradesh, Karnataka & Tamilnadu).

Remarks : It seems to be rare in Andhra Pradesh, as we have found only one example in Mehbubnagar district. This species fully resembles the description given by Uvarov (1929).

12. *Dnopherula (Aulacobothrus) decius* (Walker)

1871. *Stenobothrus decius* Walker, *Cat. Derm. Salt. Br. Mus.* 5 Suppl., : 80.

1921. *Aulacobothrus decius* : Uvarov, *Ann. Mag. nat. Hist.*, (9)7 : 482.

1971. *Dnopherula (Aulacobothrus) decius* : Jago, *Proc. Acad. Sci. nat. Philad.*, 123(8) : 24.

Material examined : *Mehbubnagar district* : 1 ♂, 2 ♀ ♀, Gundem falls, 14. iv. 1985, coll. S. K. Chatterjee & S. K. Mandal.

Diagnosis : Size small ; a pale stripe usually runs starting from fastigium of vertex to end of pronotum ; tegmen rufo-testaceous ; abdomen carinated above.

Distribution : India (Andhra Pradesh, Maharashtra and West Bengal).

Remarks : It seems to be rare in Andhra Pradesh.

13. *Dnopherula (Aulacobothrus) luteipes* (Walker)

1871. *Stenobothrus luteipes* Walker, *Cat. Derm. Salt. Brit. Mus.*, 5 Suppl., : 82.

1921. *Aulacobothrus luteipes* Uvarov, *Ann. Mag. nat. Hist.*, (9)7 : 482.

1971. *Dnopherula (Aulacobothrus) luteipes* Jago, *Proc. Acad. Sci. nat. Philad.*, 123(8) : 243.

Material examined : *Mehbubnagar district* : 2 ♂ ♂, 24. ix. 1998, coll. S. K. Mandal. *Chitoor district* : 1 ♂, 20. xi. 1998, coll. S. K. Mandal; 1 ♂, Venkateshwara National Park, 30. ix. 1998, coll. S. K. Mandal; 1 ♂, Tirupati, 30. ix. 1998, coll. S. K. Mandal; 1 ♂, Chitoor, 1. x. 1998, coll. S. K. Mandal. *Prakasan district* : 1 ♂, Srisilum 22. ix. 1998, coll. S. K. Mandal; 6 ♂ ♂, 6 ♀ ♀, Chinnarutla, 23. ix. 1998, coll. S. K. Mandal; 2 ♂ ♂, Srisilum 23. ix. 1998, coll. S. K. Mandal.

Diagnosis : Size small; hind femur with three black band on the dorsal surface & with a black one at distal end; hind tibiae reddish in the apical part.

Distribution : India (Andhra Pradesh, Assam, Arunachal Pradesh, Bihar, Karnataka, Maharashtra, Madhya Pradesh, Tamil Nadu).

Elsewhere : Maynnamar; China; Europe; Japan; North America; Srilanka.

Remarks : It is reported as a minor pest on the foliage of teak.

14. *Leva indica* (Bolivar)

1902. *Gymnobothrus indicus* Bolivar, *Annls. Soc. ent. France*, **70** : 596.

1921. *Leva indica* : Uvarov, *Ann. Mag. nat. Hist.*, **7(9)** : 485.

Material examined : *Mehbubnagar district* : 2♂♂, Mannanur, 24. ix. 1998, coll. S. K. Mandal; *Prakasan district* : 1♀, Chinnarutla, 17, xi. 1986, coll. M. S. Shishodoia; *Kurnool district* : 1♂, Domlapenta, 25. ix. 1998, coll. S. K. Mandal; *Chitoor district* : 1♂, 3♀♀, Tirupati, 26. x. 1986, coll. M. S. Shishodia; *East Godavari district* : 1♀, Rajahmundry, 17. xi. 1986, coll. M. S. Shishodia; *Vishakhapattanam district* : 1♀, Borrah, 15. x. 1998, coll. S. K. Mandal; 10, Vishakhapattanam; 22. x. 1998, coll. S. P. Chakrabarty.

Diagnosis : Small size; fastigium of vertex long, angular with acute apex; foveolae visible from above; lateral carinae in prozona, divergent in metazona; median sulcus cut by three sulcus in middle.

Distribution : India (Andhra Pradesh, Bihar, Delhi, Orissa, Tamilnadu, Tripura.

Elsewhere : Sri Lanka.

Remarks : It is fairly distributed in Andhra Pradesh and occurs in association with *Leva cruciata*.

15. *Leva cruciata* Bolivar

1914. *Leva cruciata* Bolivar, *Trab. Mus. Cienc. nat. Madr.*, **20** : 66.

1929. *Leva cruciata* : Uvarov, *Revue suisse Zool.*, **36** : 450.

Material examined : *Mehbubnagar district* : 2♂♂, Gundem falls, 14. iv. 1985, coll. S. Chatterjee; 1♀, Mannanur, 19. iv. 1985, coll. S. Chatterjee; 1♂, 1♀, Achampet, 3. xi. 1986, coll. M. S. Shishodia. *Kurnool district* : 1♂, Nandayal, 22. vi. 1985, coll. P. Parui; 3♀♀, Srisilum, 1. xi. 1986, coll. M. S. Shishodia. *Nellore district* : 1♀, Nellore, 25. x. 1986, coll. M. S. Shishodia. *Hyderabad district* : 1♀, Hyderabad deer park, 3. x. 1986, coll. M. S. Shishodia. *Khammam district* : 1♂, 1♀, 9. xi. 1986, coll. M. S. Shishodia; 1♀, Palair, 11. xi. 1986, coll. M. S. Shishodia. *Warrangal district* : 1♂, 2♀♀, Dornala, 10. xi. 1986, coll. M. S. Shishodia. *East Godavari district* : 1♂, Rajahmundry, 18. xi. 1986, coll. M. S. Shishodia; 2♀♀, Rajahmundry, Sanskrit School campus, 19. xi. 1986, coll. M. S. Shishodia; *Vishakhapattanam district* : 1♀, Arkuvally 15. x. 1998, coll. S. K. Mandal.

Diagnosis : Fastigium angularly produced, in female subtransverse; inferior foveolae indistinct; dorsum of pronotum constricted; anteriorly truncate; median carina produced; lateral carinae excurved in prozona & metazona to form 'X' shaped marking.

Distribution : India (Andhra Pradesh, Bihar, Karnataka, Orissa, Tamilnadu and West Bengal); Oriental region.

Remarks : It is well distributed in Andhra Pradesh.

Mesopsis Bolivar, 1906**16. *Mesopsis cylindricus* (Kirby)**

1914. *Aswathammanus cylindricus* Kirby, *Faun. Brit. India*, 1 : 101.

1921. *Mesopsis cylindricus* : Uvarov, *Ann. Mag. nat. Hist.* (9) 7 : 482.

Material examined : Vishakhapattanam district : 4 ♀ ♀, N, Parvatipuram, 20. ix. 1985, coll. H.K. Bhowmik.

Diagnosis : Tegmina very long, narrow & pointed, subhyaline nervures; wings hyaline long narrow & pointed but much shorter than the tegmina ; hind tibiae red.

Distribution : India (Andhra Pradesh and West Bengal).

Remarks : Common on grass.

17. *Dhimbama* Henry 1940***Dhimbama deawsoni* Henry**

1940. *Dhimbama dawsoni* Henry, *Trans R. ent. Soc. London*, 90 : 507.

Material examined : Mehbubnagar district : 1 ♂, 14.iv.1985, coll. S. Chatterjee & S. K. Mandal.

Diagnosis : Head elongate, conical much longer than pronotum ; median carinae continued throughout the length of head ; antennae reaching upto the hind femur, segments 3 to 9 flattened ; wings less than half as long as tegmina ; abdomen extending far beyond hind femur ; supra anal plate triangular, shallowly sulcate medially; subgenital plate conical with strong dorsal carina.

Distribution India (Andhra Pradesh and Tamilnadu).

Remarks : This specimens from Andhra Pradesh agree with the description of Henry (1940). It is first time recorded here from Andhra Pradesh.

Subfamily ACRIDINAE

1. Fastigium of vertex horizontally produced, and forming an angle with the frontal ridge 2
 - Fastigium of vertex rounded in front, which is nearly vertical 3
2. Head large; tegmina longer than abdomen 4
 - Head small; its length considerably shorter than pronotum; tegmen shorter than abdomen *Gonista*

3. Head length with considerably greater than the pronotum; eyes situated on the anterior part of the head *Acrida* Linnaeus
 - Head length with equal to less than or some-what greater than that of pronotum; eyes situated nearly in the middle part of head *Gelastorrhinus* Brunner
4. Dark brown stripe runs behind the eye laterally, which continue to pronotum and tegmina; posterior tibiae red *Orthochtha* Karsch
 - No dark brown stripe present behind the eye, pronotum and tegmina lateral; posterior tibiae not red *Phlaeoba* Brunner

Subfamily ACRIDINAE

Acride Linnaeus, 1758

18. *Acrida exaltata* (Walker)

1859. *Truxalis exaltata* Walker, *Ann. Mag. nat. Hist.*, (3)4 : 222.

1914. *Acrida exaltata* : Kirby, *Faun. Brit. India Orth.*, (Acrididae) : 99.

1954. *Acrida exaltata* : Dirsh, *Bull. Soc. Fouad. Ent.*, 38 : 49.

Material examined : Adilabad district : 1 ♂, Polemaru, 26. viii. 1999, coll. S. K. Mandal; 1 ♂, Jenaram, 29.viii.1999, coll. S. K. Mandal; 1 ♂, Jenaram, 31.viii.1999, coll. S. K. Mandal. Warangal district : 1 ♂, Dornakal, 10. xi. 1986, coll. M. S. Shishodia; Hyderabad district : 1 ♂ ♂, Golconda, 27. ix. 1998, coll. S. K. Mandal; Mehabubnagar district : 1 ♀, Dronachallam, coll. G. C. Sen; 1 ♂, Kodemum, 27.xii.coll. G. C. Sen. Cuddapah district : 1 ♂, Cherron, 31.xii.1999, Coll. G. C. Sen. Chitoor district : 1 ♂, Venkateshwara University campus, 30.ix.1998, coll. S. K. Mandal. West Godavari district : 1 ♂, 1 ♀, Ramsaingavaram, 4.x.1998, coll. S. K. Mandal. East Godavari district : 2 ♂ ♂, 2 ♀ ♀, Rajahmundry, 19.x.1998, coll. S. P. Chakrabarty; 1 ♂, Gokavaram forest area, 25.xi.2000, coll. P. H. Roy. Krishna district : 1 ♂, Adabinekkalam, 16.x.1998, coll. S.P. Chakrabarty. Vishakhapattanam district : 2 ♂ ♂, 2 ♀ ♀ Vishakhapattanam, 15.x.1998, coll. S.K. Mandal; 2 ♀ ♀, Shivalingapuram, 11.x.1998, coll. S.K. Mandal; 1 ♀, Kotavalva, 24.x.1998, coll. S. P. Chakrabarty.

Diagnosis : Head conically ascending, basal part narrow ; male subgenital plate, in profile, comparatively long with more elongated part, the upper margin with small projection.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Andaman & Nicobar Island, Jammu & Kashmir, Kerala, Madhya Pradesh, Meghalaya, Rajasthan, Tamil Nadu, West Bengal).

Elsewhere : Afghanistan; Bangladesh; Saudi Arabia; Yemen; S. E. Tibet & West Aden.

Remarks : This species is widely distributed throughout plains and hilly regions of Indian subcontinent.

Genus *Gelastorrhinus* Brunner, 189319. *Gelastorrhinus semipictus* (Walker)

1870. *Opomala semipicta* Walker, *Cat. Derm. Salt. Brit. Mus.*, 3 : 512.

1914. *Gelastorrhinus semipictus* : Kirby, *Fauna Brit. India. Orthopt.*, (Acridiae) : 217.

Material examined : Mehabubnagar district : 1♂, Mannanur, 11. iv. 1985, coll. S. Chatterjee & S. K. Mandal; 1♀, Gundem falls, 14. iv. 1985, coll. S. K. Mandal.

Diagnosis : Fastigium is separated from vertex by an arched sulcus; antennae thickened and flattened at base, and as long as head and pronotum; tegmina is not uniformly green.

Distribution : India (Andhra Pradesh, Tamil Nadu).

Elsewhere : Sri Lanka.

Remarks : This species is very rare in collection and we have found one male and one female from two localities. It is found in long grass. It is first time recorded here from Andhra Pradesh.

Genus *Gonista* Bolivar, 189820. *Gonista filata* (Walker)

1870. *Mesops filatus* Walker, *Cat. Derm. Salt. Brit. Mus.*, 3 : 502.

1914. *Gelastorrhinus* (?) *filatus* : Kirby, *Faun. Brit. India*, : 216-217.

1976. *Gonista filata* : Bhowmik, *Rec. zool. surv. India, Occ. Paper No. 78* : 10.

Material examined : Mehabubnagar district : 1♀, Araku valley, 6. ix. 1983, coll. H. K. Bhowmik.

Diagnosis : Fastigium of vertex rather long, obtusely angulated at the extremity ; antennae more than half of the length of the body ; head about as long as pronotum ; pronotum with two distinct carinae ; lateral carinae parallel, with a straight dark line running backwards from the eye; tegmina long & very acute, hyaline.

Distribution : India (Andhra Pradesh, Northern India).

Elsewhere : China.

Remarks : The genus is nearly related to *Gelastorrhinus* and differ principally in the hind knees, which from above are not at all produced into small spines ; The occurrence of this grass hoppers from Andhra Pradesh is very interesting from the point of view of its distributional range.

Orthochtha Karsch, 189121. *Orthochtha indica* Uvarov

1942. *Orthochtha indica* Uvarov, *Ann. Mag. Nat. Hist.*, 9 (11) : 587.

Material examined : *Mehabubnagar district* : 1 ♂, 5 ♀ ♀, Araku valley, 5. ix. 1983, coll. H. K. Bhowmick.

Diagnosis : Lateral carinae of pronotum not appreciably diverging in female ; knees of posterior femora of females black on sides & brown in upper carinae like males.

Distribution : India (Andhra Pradesh, Maharashtra, Delhi).

Remarks : This unique species was described from Delhi & Nagpur.

***Phlaeoba* Stål, 1860**

22. *Phlaeoba infumata* Brunner

1893. *Phlaeoba infumata* Brunner, von Wattenwyl, *Annali Mus. civ. stor. nat. Giacomo Doria*, **33** : 124.

1914. *Phlaeoba infumata* : Kirby, *Fauna British India*, Orthopt., (Acrididae) : 103.

Material examined : *Mehabubnagar district* : 2 ♀ ♀, Wangsara, 20. viii. 1985, coll. T. K. Mukherjee; 1 ♂, 1 ♀, Gundem falls, 23-24.viii.1985, coll. T. K. Mukherjee. *Vishakhapattanam district* : 1 ♂, 1 ♀, Shivlingapuram, 11.x.1998, coll. S. K. Mandal.

Diagnosis : Body more slender ; antennae unicolours, ensiform in male, more distinct in female ; pronotum with the median carina and lateral carinae distinct, surface finely punctured.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Delhi, Bihar, Himachal Pradesh, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Tamil Nadu, West Bengal).

Elsewhere : Bangladesh; S. Chian; Hainan; S & N Kangtung ; Malacca ; Tennasserian.

Remarks : It is a very common species in India and is known to occur both in plains and hilly regions. It is a minor pest of paddy and maize.

Subfamily OEDIPODINAE

Key to genera

1. Median carina of pronotum entire or slightly intersected by the transverse groove. (foveolae trapezoidal)..... ***Aiolopus* Fieber**
- Median carina of pronotum very distinctly interrupted by transverse groove 2
2. Median carina of pronotum cut by one groove 3
- Median carina of pronotum cut by two grooves 6
3. Thorax rather short 4
- Thorax long 5
4. Wings without well-marked fascia 7

- Wings with well marked fascia *Oedaleus* Fieber
- 5. Pronotum with strong crest or acutely tectiform, without black mark at apex
..... *Gastrimargus* Saussure
- Pronotum with well-marked median carina, and with numerous longitudinal rugae
..... *Morphacris* Walker
- 6. Pronotum with well-marked crest, angulated behind; median carina of pronotum distinctly interrupted in the prozona by 2 transverse grooves and seems to be bidentate; occiput with a pair of tubercles between the eyes; wings without dark band
..... *Trilophidia* Stål
- Pronotum without distinct crest ; median carina indistinctly interrupted by the transverse grooves, not bidentate in the prozona; occiput without a pair of tubercles between the eyes ; wings with dark band in the middle *Acrotylus* Fieber
- 7. Internal calcaria of posterior tibiae not greatly unequal, normal
..... *Dittopternis* saussure
- Internal calcaria of posterior tibiae unequal, the lower one much longer than the upper, apex acute and abruptly hooked *Heteropternis* Stål

Genus *Aiolopus* Fieber, 1853

23. *Aiolopus thalassinus tamulus* (Fabricius)

1798. *Gryllus tamulus* Fabricius. *Ent. Sys., Suppl.*, : 195.

1968. *Aiolopus thalassinus tamulus* : Hollis, *Bull. Br. Mus. nat. Hist. (Ent.)*, **22**(7) : 347.

Material examined : Adilabad district : 1♂, Adilabad, 24. viii. 1999, coll. S. K. Mandal ; 1♀, Jenaram, 31.viii.1999, coll. S. K. Mandal ; 3♂♂, Jenaram, 2.ix.1999, coll. S. K. Mandal. *Mehbubnagar district* : 3♂♂, 2♀♀, & 1♂, 4♀♀, Mannanur, 11 & 13. iv. 1985, coll. S. Chatterjee & S. K. Mandal. *Nalgonda district* : 1♂, 1♀, Suryapetta, 7.xi.1986, coll. M. S. Shishodia. *Karnool district* : 1♀, Dornala, 4.xi.1986, coll. M. S. Shishodia. *Khammam district* : 3♂♂, 4♀♀, Khammam, 9.xi.1986, coll. M. S. Shishodia. *West Godavari district* : 1♀, Rajamundry, Mirthipadu, 16.xi.1986, coll. M. S. Shishodia. *Vishakhapatnam district* : 2♀♀, Paderu, 20.xi.2000, coll. P. H. Roy. *Vizianagram* : 1♀, Vizianagram, 15.ix.1983, coll. H. K. Bhowmick.

Diagnosis : Fastigium with front angle more acute; foveolae narrowly trapezoid, about twice as long as wide; frontal ridge gradually narrowing and almost angular towards fastigial end, sparsely punctured; pronotum somewhat saddle-shaped, posterior margin rounded; posterior tibiae usually with red colouration in apical fourth and broadly separated from black band by a wide bluish grey band.

Distribution : India (Andhra Pradesh, Andaman & Nicobar Islands, Bihar, Delhi, Himachal Pradesh, Karnataka, Madhya Pradesh, Meghalaya, Rajasthan, Tamil Nadu & West Bengal).

Elsewhere : Australia, Bangladesh, Borneo, Celebes, China, Hainan, Hong Kong, Japan, Java, Lombok, Papua, Malaya, Myanmar, New Guinea, Philippines, Singapore, Sri Lanka, Sumatra, Taiwan, Thailand and Tumor.

Remarks : It is found in grasses and cultivated fields. This species causes considerable damage to paddy plants, feeding on green leaves.

Genus *Oedaleus* Fieber, 1853

Key to the species

1. Posterior margin of pronotum angulated..... *abruptus* Thunberg
- Posterior margin of pronotum rounded *senegalensis* Krauss

24. *Oedaleus abruptus* (Thunberg)

1815. *Gryllus abruptus* Thunberg, *Mem. Acad. Sci. St. -petersb*, 5 : 233.

1981. *Oedaleus abruptus* : Ritchie, *Bull. Br. Mus. nat. Hist. (Ent.)*, 42(3) : 104-107.

Material examined : *Hyderabad district* : 2♂♂, 2♀♀, Hyderabad deer park, 30. x. 1986, coll. M. S. Shishodia. *Mehbubnagar district* : 2♀♀, Gundem falls, 14. iv. 1985, coll. S. Chatterjee & S. K. Mandal. 10, 1♀, Mannanur, 24. ix. 1998, coll. S. K. Mandal ; *Kurnool district* : 1♀, Nallamalli, 23. xi. -27. xii-1981, coll. A. K. Hazra ; 1♂, Dornala, 4.xi.1986, coll. M. S. Shishodia ; *Prakasan district* : 1♂, 1♀, Chinnarutla, 23. ix. 1998, coll. S. K. Mandal ; 1♂, Srisilum, 23, ix. 1998, coll. S. K. Mandal ; *Chitoor district* : 2♂♂, Venkateswara University campus, 30. ix. 1998, coll. S. K. Mandal. *Cuddapah district* : 2♂♂, Siddavatam forest, 29, x. 1998. coll. P. H. Roy. *West Godavari district* : 1♀, Shivalingapuram, 11.x.1998. coll. S. K. Mandal. *East Godavari district* : 1♀, Rajahmundry, 25.xi.2000, coll. P. H. Roy.

Diagnosis : Pronotum low tectiform, median carina low arcuate, not intersected by posterior sulcus ; hind margin obtusely angular ; pronotal X-marking always with anterior and posterior arms separate ; hind tibiae with 13 inner and 12 out spines, straw or red coloured with dark basal ring and thicker subbasal pale ring.

Distribution : India (Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Meghalaya, Orissa, Rajasthan, Tamilnadu, Uttar Pradesh, including Uttaranchal, West Bengal.

Elsewhere : Afghanistan, Bangladesh, China, Indo-China, Myanmar, Nepal, Sri Lanka, Pakistan, and Thailand.

Remarks : This species is widely distributed in India.

25. *Oedaleus senegalensis* (Krauss)

1877. *Pachytylus senegalensis* Kraus, *Sitz-Akad. Wiss. Wien.*, 76(1) : 56.

1981. *Oedaleus senegalensis* Ritchie, *Bull. Br. Mus. nat. Hist. (Ent.)*, **42**(3) : 94.

Material examined : Hyderabad district : 1 ♂, 4 ♀ ♀, Nalla-Mallai 23. xi. -27, xi. 1981, coll. A. K. Hazra.

Diagnosis : Tegmina long and narrow, sub hyaline; wings greenish hyaline towards the base ; hind tibiae dark.

Distribution : India (Andhra Pradesh, Kashmir, Punjab, Tamil Nadu.

Elsewhere : Afghanistan; North Africa and Western Russia.

Remarks : Five specimens of this species are collected from single locality. It is first time recorded from Andhra Pradesh.

Genus *Gastrimargus* Saussure, 1884

26. *Gastrimargus africanus africanus* (Saussure)

1888. *Oedaleus (Gastrimargus) marmoratus* var. *africana* Saussure, *Mem. Soc. Phys. Hist. Nat. Geneve.*, **30**(1) : 39.

1982. *Gastrimargus africanus africanus* : Ritchie, *Bull. Br. Mus. nat. Hist. (Ent.)*, **44**(4) : 248.

Material examined : Prakasan district : 1 ♂, 1 ♀, Srisilum, 1, 2. xi. 1986, coll. M. S. Shishodia ; 1 ♂, Dornal, 22. ix. 1998, coll. S. K. Mandal ; 2 ♂ ♂, Srisilum, 1. xii. 1998, coll. S. K. Mandal ; Hyderabad district : 1 ♀, Golconda, 13.x.1998, coll. S. K. Mandal ; East Godavari district : 1 ♂, Rajahmundry, 15.xi.1986, coll. S. K. Mandal ; 3 ♂ ♂, 1 ♀, Rajahmundry, 25.xi.2000, coll. P. H. Roy ; Cuddapah district : 2 ♂ ♂, 1 ♀, Siddavatam forest, 29.xi.1998, coll. S. K. Mandal.

Diagnosis : Pronotum tectiform with high sharp median carina; metazona of pronotum with X marking; without pale striae; tegmen surpassing hind knee by one quarter to one-half of hind femur length, basal pale transverse band sometimes reduced or absent; wings with complete fascia; basal area usually bright yellow, apex variable infumate.

Distribution : India (Andhra Pradesh, Bihar, Delhi, Goa, Himachal Pradesh, Madhya Pradesh, Orissa, Sikkim, Uttar Pradesh including Uttaranchal, West Bengal).

Elsewhere : Nepal; Saudi Arabia; Sri Lanka; Thailand; Tibet; Yemen A.R.

Remarks : This species is fairly well distributed in the State. It is widely distributed in India.

Genus *Morphacris* Walker, 1870

Key to genus

1. Wings light sulphur-yellow at base, bordered by a broad blackish band *citrina* Kirby
– Wings yellow at base, and with dark transverse fascia *fasciata sulcata* (Thunb)

27. *Morphacris citrina* Kirby

1815. *Gryllus fasciata* Thunberg, *Mem. Acad ; Sci. St. Ptersb.*, 5 : 29.

1914. *Morphacris citrina* : Kirby, *Fauna. Brit. India. Orthopt.*, (Acrididae) : 137.

Material examined : Adilabad district : 1 ♂, 3 ♀ ♀, Adilabad, 27.viii.1999, coll. S.K. Mandal ; Warangal district : 1 ♂, Pakhal forest, 6.vi.1985, coll. P. Parui; Mehbubnagar district : 1 ♀, Mannanur, 19.iv.1985, coll. S. Chatterjee & S. K. Mandal ; West Godavari district : 1 ♀, Ramasaingavaram, 4.x.1998, coll. S. K. Mandal; Vishakhapattanam district : 1 ♂, Tagarvalse, 9.x.1998, coll. S. K. Mandal.

Diagnosis : Size medium ; pronotum brown with 9 black band on pleura, marked below with a raised yellowish line, tectiform, without lateral carinae, median carina sharp and high, dorsum of pronotum covered with parallel shap longitudinal ridges ; wings light yellow at base, covered by a broad blackish band.

Distribution : India (Andhra Pradesh, Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tamilnadu).

Elsewhere : Ethiopia; Sri Lanka; Syria.

Remarks : It is found in dry grasses and cultivated fields.

28. *Morphacris fasciata sulcata* (Thunberg)

1815. *Gryllus fasciata* Thunberg, *Mem. Acad. Sci. St.-Petersb.*, 5 : 230.

1929. *Morphacris fasciata sulcata* : Uvarov, *Revue Suisse Zool.*, 36 : 546.

Material examined : Vishakhapattanam district : 1 ♂, Araku valley, Padmapuram, 5.i.1983, coll. H. K. Bhowmick; 1 ♂, Vizianagaram, Pravatipuram, 21.ix.1983, coll. H. K. Bhowmick.

Diagnosis : Antennae longer than head and pronotum together; pronotum tectiform without lateral carinae; wings light yellow at base & with dark transverse fascia.

Distribution : India (Andhra Pradesh, Bihar, Goa, Kerala, Madhya Pradesh, Maharashtra, Tamilnadu).

Elsewhere : Africa; S. W. Asia & Sri Lanka.

Remarks : In Andhra Pradesh this species is rare in collection as we have found only two male specimens from Vishakhapattanam district.

Genus *Trilophidia* Stål, 1873**29. *Trilophidia annulata* (Thunberg)**

1815. *Gryllus annulatus* Thunberg, *Mem. Acad. Sci. St.-Petersb.*, 5 : 234.

1965. *Trilophidia annulata* : Hollis, *Trans. R. ent. Soc. Lond.*, 117(8) : 251.

Material examined : *Mehabubnagar district* : 3♂♂, Mannanur, 11. iv. 1985, coll. S. Chatterjee and S. K. Mandal ; 3♂♂, 1♀, Gundam falls, 14. iv. 1985, coll. S. K. Mandal and S. Chatterjee; 7♂♂, 2♀♀, Achampet, 3. xi. 1986, coll. M. S. Shishodia ; 1♂, Mannanur, 24. ix. 1998, coll. S. K. Mandal. *Kurnool district* : 1♂, Allaguddu, 25. vi. 1985, coll. P. Parui; 1♂, Nagarjun Sagardam area, 27. vi. 1985, coll. P. Parui ; *Nalgonda district* : 2♂♂, Nalgonda, 28. vi. 1985, coll. P. Parui; 3♂♂, Nagarjunekonda, 29. vi. 1985, coll. P. Parui ; 6♂♂, 3♀♀, Surjapetta, 7. xi. 1986, coll. M. S. Shishodia. *Hyderabad district* : 2♂♂, 1♀, Hyderabad. 29. x. 1986, coll. M. S. Shishodia ; *Warangal district* : 1♂, 2♀♀, Warangal, 10. xi. 1986, coll. M. S. Shishodia ; *Khammam district* : 2♂♂, Madhera, 11. xi. 1986, coll. M. S. Shishodia. *Adilabad district* : 4♀♀, Janaram, 21. ix. 1998, coll. S. K. Mandal. *Prakashan district* : 1♀, Srisilum, 23. ix. 1998, coll. S. K. Mandal ; 1♂, 1♀, Chinarutla, 23. ix. 1998, coll. S. K. Mandal ; *Chitoor district* : 2♀♀, Venkateswara university campus, 30. ix. 1998, coll. S. K. Mandal ; *West Godavari district* : 3♂♂, Ramasaingavaram, 4. x. 1998, coll. S. K. Mandal; *East Godavari district* : 4♂♂, 2♀♀, Rajahmundry, 12 & 19. 1996, coll. M. S. Shishodia; *Srikakulam district* : 2♂♂, Srikakulam, 12. xii. 1998, coll. M. Prasad. *Vishakhapattanam district* : 1♂, Vishakhapattanam 8. x, 1998, coll. S. K. Mandal; 1♂, 1♀, Vishakhapattanam, 23. x. 1998, coll. S. P. Chakrabarty; 1♀, Anandapuram, 23. x. 1998, coll. S. P. Chakrabarty; *Medak district* : 1♀, Pathanchery, 11. x. 1998, coll. S. P. Chakrabarty; *Krishna district* : 1♀, Krishna, 17. x. 198, coll. S. P. Chakrabarty.

Diagnosis : Brown or grey with black markings; pronotum rugose with a high median carina, forming two teeth in front & with lateral carinae; tegmina grey, sometime with two indistinct brown bands; hind wing with a pale band towards the base.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Karnataka, Kerala, Himachal Pradesh, Madhya Pradesh, Orissa, Rajasthan, Tamilnadu, Uttar Pradesh including Uttaranchal).

Elsewhere : Bangladesh; Myanmar; Hong Kong; Japan; Java; Korea; Malayasia; Mongolia; Pakistan; Sarawak; Singapore; Sri Lanka; Sumatra; Taiwan.

Remarks : *Trilophidia annulata* occurs almost throughout the state. It mainly occurs on bare ground adjoining Kachcha road.

Genus *Acrotylus* Fieber, 1853

30. *Acrotylus humbertianus* Saussure

1884. *Acrotylus humbertianus* Saussure, *Mem. Soc. Phys. Hist. nat. Geneva*, 28(9) : 189.

1914. *Acrotylus humbertianus* : Kirby, *Fauna Brit. India. Orthopt.*, : 153.

Material examined : *Mehabubnagar district* : 2♂♂, 1♀, Mannanur, 11, 14, 19, iv. 1985, coll. S. Chatterjee & S. K. Mandal; 1♀, Mannanur 24. ix. 1998, coll. S. K. Mandal. *Nalgonda district* : 1♂, Malgonda 6. xi. 1986, coll. M. S. Shishodia ; *Prakashan district* : 2♂♂, Dornala,

10.ix.1998, coll. S. K. Mandal; 1 ♀, Srisilum, 22. ix. 1998, coll. S. K. Mandal. *West Godavari district* : 2 ♀ ♀, Rajahmundry, 17.xi.1986, coll. M. S. Shishodia ; 1 ♂, 1 ♀, Sidhavaram, 29. xi.1998, coll. P. H. Roy; *Kishna district* : 1 ♂, Krishna valley, 29-30, iv. 1913, coll. S. P. A. *Vishakhapattanam district* : 1 ♂, Waltair, 22. iv. 1962, coll. S. W. K; 1 ♂ Araku, 15. x. 1998, coll. S. K. Mandal.

Diagnosis : Size small ; body pilose; tip of vertex conical ; prozona with two fuscous fascia, the lateral margin white below; tegmina with two oblique white fascia or spots; wings hyaline; yellow at the base; the radial area with a semilunar fuscous fascia.

Distribution : India : Andhra Pradesh, Assam, Bihar, Delhi, Goa, Madhya Pradesh, Maharashtra, Rajasthan, Tamilnadu, and West Bengal.

Remarks : It is widely distributed throughout India.

Genus *Dittopternis* Saussure, 1884

31. *Dittopternis venusta* (Walker)

1870. *Oedipoda venusta* Walker, *Cat. Derm. Salt. Brit. Mus.*, 4 : 740.

1914. *Dittopternis venusta* : Kirby, *Fauna Brit. India.*, Orthopt., : 140.

Material examined : *Mehabubnagar district* : 1 ♀, Mannanur, 11. iv. 1985, coll. S. Chatterjee & S. K. Mandal ; 1 ♀, Gundem falls, 14. iv. 1985, coll. S. Chatterjee & S. K. Mandal; 5 ♀ ♀, Mannanur, 24. ix. 1998, coll. S. K. Mandal ; *Prakashan district* : 1 ♀, 22. ix. 1998, coll. S. K. Mandal; *Cuddapah district* : 1 ♀, Siddavata forest, 29. ix. 1998, coll. P. H. Roy; *Chittoor district* : 3 ♂ ♂, Venkateshwara University, Tirupati, 30. ix. 1998. coll. S. K. Mandal; 1 ♀ Venkateshwara National Park, 1.x.198, coll. S. K. Mandal ; *West Godavari district* : 1 ♂, 1 ♀, Gekavaram forest area, Rajahmundry, 25. xi. 2000, coll. P. H. Roy ; *Vishakhapattanam district* : 5 ♂ ♂, 5 ♀ ♀ Araku valley, 6. ix. 1983, coll. H. K. Bhowmik; 1 ♀, Vishakhapattanam, 8. x. 1998, coll. S. K. Mandal ; 1 ♀, Shivalingapuram, 11. x. 198, coll. S. K. Mandal. *Prakashan district* : 1 ♀, Dornal, 22. ix. 1998, coll. S. K. Mandal.

Diagnosis : Brown, pale beneath; pronotum rugose, granulated and strongly carinated, cut by principal sulcus before the middle, obtusely angulated behind; wings yellow at base, with a broad blackish band behind; hind tibiae black at base, followed by a light yellow band, then blue.

Distribution : India : Andhra Pradesh, Karnataka, Madhya Pradesh, Meghalaya, Orissa, Tamilnadu, West Bengal.

Elsewhere : Sri Lanka.

Remarks : This species is found mainly amongst short grasses and occasionally in cultivated fields.

Genus *Heteropternis* Stal. 187332. *Heteropternis respondens* (Walker)

1859. *Acrydium respondens* Walker, *Ann. Mag. nat. Hist.*, (3)4 : 223.

1914. *Heteropternis respondens* : Kirby, *Faun. Brit. India, Orth.*, (Acrididae) : 141.

Material examined : Vishakhapatnam district : 1 ♂, Araku valley, 6-7. ix. 1983, coll. H. K. Bhowmick.

Diagnosis : Antennae slender, longer than head and pronotum together ; lateral lobe of pronotum in lateral half slopping but straight making a well marked right angle with the posterior margin; yellowish near the base.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Bihar, Orissa Uttar Pradesh including Uttaranchal, Tamilnadu, West Bengal).

Remarks : In Andhra Pradesh we have found in collection, only from Araku valley.

Subfamily OXYINAE

Genus *Oxya* Serville, 1831Key to species *Oxya*

1. Supraanal plate with a tubercle on each side of a median apical process in male ; ovipositor valves with long teeth, the apical one curved in female 2
- Supraanal plate without lateral tubercle in male ; ovipositor valves with short teeth in female *nutidula* (Walker)
2. Cercus laterally compressed, hardly narrowing towards apex, weakly bifurcate at apex in male ; ventral surface of subgenital plate almost completely flat or weakly concave, appearing widely posteriorly in female *fuscovittata* (Marschall)
- Cercus conical, narrowing towards apex and obtuse or truncate apically in male; ventral surface of subgenital plate flat or concave only median posterior half, not widening posteriorly in female *hyla hyla* Serville

33. *Oxya hyla hyla* Serville

1831. *Oxya hyla* Serville, *Ann. Sci. nat. (Zool)*, 22 : 287.

1971. *Oxya hyla hyla* : Hollis, *Bull. Br. Mus. nat. Hist.*, 26(7) : 282.

Material examined : Mehbubnagar district : 2 ♂ ♂, 2 ♀ ♀, Mannanur, 11. iv. 1985, coll. S. Chatterjee & S. K. Mandal ; Nalgonda District : 1 ♀, Talla Palli, 27. vi. 1985, coll. P. Parui; 2 ♂ ♂, Suryapetta, 7. xi. 1986, coll. M. S. Shishodia ; Karnool district : 1 ♀, Nalla-malli, 23.

xi. 1981. coll. A. K. Mandal ; *Khammam district* : 2♂♂, 2♀♀, Khammam, 9. xi. 1986, coll. M. S. Shishodia ; *East Godhavari district* : 1♀, Rajhundry, 16.xi.1986. coll. M. S. Shishodia; *Vishakhapattanam district* 1♂, Vishakhapattanam, 22.x.1998, coll. S. P. Chakrabarty.

Diagnosis : Body finely rugose ; supra-anal plate trapezoidal with triangular apical projection and a tubercle on each side of a median apical process; cercus with subacute apex; subgenital plate of female with two longitudinal ridges extending forwards from posterior margin.

Distribution : India : Arunachal Pradesh, Assam, Goa, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Tamilnadu, Tripura, Uttar Pradesh including Uttaranchal, West Bengal.

Elsewhere : Afghanistan; Africa; Bangladesh; Iran; Madagascar; Maldives Island; Nepal; Pakistan.

34. *Oxya fuscovittata* (Marschall)

1836. *Gryllus fuscovittatus* Marschall, *Ann. Wien. Mus. Viena*, 1(2) : 211.

1971. *Oxya fuscovittata* : Hollis, *Bull. Br. Mus. nat. Hist.*, (Ent.) 26(7) : 289.

Material examined : *Mehbubnagar district* : 3♂♂, Hyderabad Zoological garden, 28.x.1986, coll. M. S. Shishodia. *Kurnool district* : 2♂♂, Dornala, 4.xi.1986, coll. M. S. Shishodia. *East Godavari district* : 1♂, 1♀, Rajahmundry, 16.xi.1986, coll. M. S. Shishodia. *Krishna District* : 1♀, Krishna 16.x.1998, coll. S. P. Chakrabarty.

Diagnosis : Integument finely pitted and shiny ; cercus of male compressed and weakly bifurcate at apex ; ventral surface of subgenital plate of female almost completely flat or weakly concave.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Rajasthan, Uttar Pradesh including Uttaranchal and West Bengal).

Elsewhere : Afghanistan; Bangladesh; Pakistan; and U.S.S.R. (South West).

Remarks : This species is associated with paddy and grasses adjoining cultivated fields.

35. *Oxya nitidula* (Walker)

1870. *Acridium nitidula* Walker, *Cat. Derm. Salt. Brit. Mus.*, 4 : 631.

1971. *Oxya nitidula* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.), 26(7) : 315.

Material examined : *Warangal district* : 1♂, Pakhal forest, 5. vii. 1985, coll. P. Parui ; *Hyderabad district* : 1♂, 2♀♀, Hyderabad, Zoological Garden, coll. M. S. Shishodia ; *Mehbubnagar district* : 7♀♀, 11. iv. 1985, & 4♀♀, 1N, 13. iv. 1985, Mannanur, coll. S. Chatterjee & S. K. Mandal ; *Nalgonda district* : 5♂♂, 1♀, 20 kms. from Nagarjun Sagar Dam, 28. iii. 1985, coll. P. Parui ; *Kurnool district* : 1♂, Nandayal, 23. vi. 1985, coll.

P. Parui ; *Nellore district* : 1♂, Nellore, 25.x.1986, coll. M. S. Shishodia ; *Khammam district* : 1♂, 1♀, Khammam, 9.xi.1986, coll. M. S. Shishodia ; *East Godavari district* : 1♂, Joredu 16.xi.1986, coll. M. S. Shishodia ; 1♂, Rajahmundry, 28.x.1998, coll. S. P. Chakrabarty.

Diagnosis : Pronotum narrowing forwards, posterior margin of metazona rounded ; supra-anal plate roundly triangular ; cercus conical, with acutely truncate apex ; ventral surface of subgenital plate of female, with a subapical teeth on each side of median apical spine.

Distribution : India : Andhra Pradesh, Goa, Karnataka, Orissa, Rajasthan, Tamilnadu and West Bengal.

Elsewhere : Sri Lanka.

Subfamily COPTACRIDINAE

Key to genera

1. Frontal costa parallel-sided, not wider between antennae and vertex *Coptacra* Stål
- Frontal costa distinctly widened between antennae ; wider than vertex between eyes
..... *Eucoptacra* Bolivar

Genus *Coptacra* Stål, 1873

36. *Coptacra punctaria* (Walker)

1870. *Acridium punctarium* Walker, *Cat. Derm. Salt. Brit. Mus.*, 4 : 630.

1929. *Coptacra punctaria* : Uvarov, *Revue suisse Zool.*, 36 : 561.

Material examined : *Mehbubnagar district* : 2♂♂, Vetverapally, 17.iv.1985, coll. S. Chatterjee and S. K. Mandal.

Diagnosis : Head rugosely punctate ; fastigium of vertex extend beyond the eyes, bounded by lateral carinae, frontal costa between antennae equal to interocular space, punctate, parallel sided throughout; pronotum rugosely punctate with raised granulate and crassate; prosternal tubercle stumpy and obtusely pointed at apex; hind femur with a distinct or indistinct black spot on the superio-external face, just before the middle; hind tibiae red.

Distribution : India (Andhra Pradesh, Madhya Pradesh).

Remarks : Walker (1870) recorded this species from S. India. Only two male examples of this species have been collected from Mehbubnagar district.

Genus *Eucoptacra* Bolivar, 1902

37. *Eucoptacra saturata* (Walker)

1870. *Acridium saturatum* Walker, *Cat. Derm. Salt. Brit. Mus.*, 4 : 628.

1921. *Eucoptacra sasturata* : Uvarov, *Ann. Mag. nat. Hist.*, (9)7 : 503.

Material examined : Warangal district : 1♂, 2♀♀, Pakhal forest, 4. vii. 1985, coll. P. Parui; 1♂, Pakhal forest, 5. viii. 1985, coll. P. Parui; *Mehbubnagar district* : 1♀, Vetvera pally, 17. iv. 1985, coll. S. Chatterjee and S. K. Mandal.

Diagnosis : Ferruginous in colour ; prosternal tubercle stout and slightly acute ; hind femora black beneath, as long as the abdomen ; hind tibiae red ; tegmina with numerous small marks ; hind wings hyaline or grey, tinged with blackish.

Distribution : India (Andhra Pradesh, Assam, Madhya Pradesh, Orissa ; Uttar Pradesh including Uttaranchal, West Bengal).

Genus *Epistaurus* Bolivar, 1889

38. *Epistaurus sinetyi* Bolivar

1902. *Epistaurus sinetyi* Bolivar, *Anns. Soc. ent. France*, **70** : 623.

1914. *Epistaurus sinetyi* : Kirby, *Fauna of British India*, Orthopt., (Acrididae) : 242.

Material examined : *Mehbubnagar district* : 1♂, Gundem falls, 11. iv. 1985, coll. S. Chatterjee & S. K. Mandal. *Chitoor district* : 2♀♀, Venkateshwara university campus, 30. ix. 1998, coll. S. K. Mandal. *Khammam district* : 2♀♀, Madhera, 13. xi. 1986, coll. S. K. Chatterjee. *East Godavari district* : 1♀, Gokavaram forest area, 25. xi. 2000, coll. P. H. Roy. *Vishakhapattanam district* : 2♂♂, 3♀♀, Vizianagram, 21. ix. 1983, coll. H. K. Bhowmick ; 1♂, Vishakhapattanam, 8. x. 1998, coll. S. K. Mandal.

Diagnosis : Pale reddish in colour ; median carina of vertex in-distinct ; wings yellowish ; hyaline ; hind femora obliquely trifaciate ; tibiae clothed with long grey hairs, brown at base, ringed with pale then red ; abdomen red, spotted on the back.

Distribution : India (Andhra Pradesh, Orissa, Tamilnadu and West Bengal).

Remarks : This species is generally found in fallen dry leaves.

Subfamily TROPIDOPOLINAE

Genus *Tristria* Stål, 1873

39. *Tristria pulvinata* (Uvarov)

1921. *Tapinophyma pulvinata* Uvarov, *Ann. Mag. nat. Hist.*, **7(9)** : 497.

1929. *Tristria pulvinata* : Uvarov, *Revue Suisse Zool.*, **36** : 559.

Material examined : *Mehbubnagar district* : 4♂♂, 2♀♀, Vetverapally, 17. iv. 1985, coll. S. Chatterjee & S. K. Mandal. *Prakashan district* : 1♂, Nagarjun Sagar Tiger Reserve, 19. iv. 1985, coll. S. Chatterjee & S. K. Mandal. *Chitoor district* : 1♂, Venkateshwara university campus, 30. ix. 1998, coll. S. K. Mandal.

Diagnosis : Fastigium of vertex parabolic, moderately narrow; prosternal tubercle curved backwards, strongly widened apically, with slightly concave apical surface; tegmina and wings extending upto the apex of subgenital plate or shorter; male cercus in apical third incurved, down-curved and laterally flattened; female subgenital plate with an angular projection on the anterior margin on either side of mid-line; male subgenital plate almost linear, compressed knife-like.

Distribution : India (Andhra Pradesh, Assam, Bihar, Karnataka, Maharashtra, Orissa, Tamilnadu, Uttar Pradesh including Uttaranchal and West Bengal).

Elsewhere : Sri Lanka.

Subfamily EYPREPOCNEMIDINAE

Key to genera

1. Male cercus wide, compressed on apical half, apex rounded 2
 - Male cercus narrow, may be slightly compressed at base but acute to subacute at apex 3
2. Size medium ; subgenital plate with wide, some times bilobate at apex *Heteracris* Walker
 - Size large ; subgenital plate conical, slightly recurved, truncate, subtruncate or rounded at apex *Choroedocus* Bolivar
3. Posterior femur moderately long, produced beyond abdomen, neither inflated basally nor strongly narrowing on apical half ; prosternal tubercle with rounded or inflated at apex *Eyprepocnemis* Fieber
 - Posterior femur long, produced far beyond apex of abdomen, inflated basally and strongly narrowing at apical half ; prosternal tubercle almost spathulate with rounded or sometimes slightly inflated apex *Tylotropidius* Stål.

Genus *Heteracris* Walker, 1870

40. *Heteracris pulchra* (Bolivar)

1902. *Euprepocnemis pulchra* Bolivar, *Annls. Soc. ent. France*, 70 : 630.

1958. *Heteracris pulchra* : Dirsh, *Tijdschr. Ent.*, 101 : 54.

Material examined : Kurnool district : 2♂♂, 3♀♀, Srisilum, 2.x.1986, coll. Not known ; Vishakhapattanam district : 1♀, Shivalingapuram, 11.x.1998, coll. S. K. Mandal; 1♂, Rishkonda, 23.xi.2000, coll. P. H. Roy.

Diagnosis : Colour olivaceous in general ; pronotum with velvety black stripes on the back ; hind tibiae brown at the base, the apical half dull red ; Cercus compressed & curved.

Distribution : India (Andhra Pradesh, Orissa, Tamilnadu, Uttar Pradesh including Uttranchal and West Bengal).

Elsewhere : Sri Lanka.

Remarks : This species is readily indentified from other members of the genus in the absence of longitudinal black stripe on the external side of hind femora. This species is first time recorded from Andhra Pradesh.

Genus *Choroedocus* Bolivar, 1914

41. *Choroedocus illustris* (Walker)

1870. *Choroedocus illustris* Walker, *Brit. Mus. Nat. Hist.* part iv : 662, 663.

1870. *Heteracris illustris* Walker, *Brit. Mus. Nat. Hist.* part iv : 662, 663.

1914. *Heteracris illustris* : Kirby, *Fauna of British India*, Orth., 1 : 263.

1921. *Choroedocus illustris* : Uvarov, *Trans. ent. Soc. London*, 69(1 & 2) : 109.

Material examined : Vishakhapattanam district : 8♂♂, 7♀♀, Vizianagram, 5-9, ix. 1983, coll. H. K. Bhowmick. Srikakulam district : 1♂, palkonda, 24. ix. 1983, coll. H. K. Bhowmick.

Diagnosis : Tegmina with small scattered brownish dots throughout disc excluding costal anal area ; subgenital plate conical and upcurved in male.

Distribution : India (Andhra Pradesh, Tamilnadu and Uttar Pradesh including Uttaranchal).

Remarks : This large brightly coloured species is specialized for life on leaves of thick tropical vegetation.

Genus *Eyprepocnemis* Fieber, 1853

Key to species

1. Hind wings colourless at base ; hind tibiae bluish grey, some-time with reddish tip ...
..... *alacris alacris* (Serville)
- Wing pinkish at the base ; hind tibiae red *rosea* Uvarov

42. *Eyprepocnemis alacris alacris* Uvarov

1839. *Acridium alacre* Serville, *Hist. Nat. Ins. Orth.*, : 682.

1958. *Eyprepocnemis alacris alacris* : Dirsh, *Proc. R. ent. Soc. Lond.*, (B) 27(3-4) : 40.

Material examined : Vishakhapattanam district : 2♂♂, 3♀♀, Araku valley, 5.ix.1983, coll. H. K. Bhowmik ; 1♂, Rushikonda, 23.xi.2000, coll. P. H. Roy.

Diagnosis : Pronotum above with a characteristic narrow dark spot ; lateral carinae of

pronotum converging forwards ; male cercus gradually narrowing towards apex, incurved and down curved.

Distribution : India (Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Kerala, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamilnadu).

Elsewhere : Afghanistan ; Bangladesh ; East Persia; Pakistan and Sri Lanka.

Remarks : This species has been reported in the Fauna of Meghalaya, Sikkim, and West Bengal.

43. *Eyprepocnemis rosea* Uvarov

1942. *Eyprepocnemis roseus* Uvarov, *Ann. Mag. nat. Hist.*, (11)9 : 597.

1976. *Eyprepocnemis rosea* : Tandon, *Rec. Zool. Surv. India. Occ. Paper No.*, 3 : 13.

Material examined : Vishakhapattanam district : 3♂♂, 4♀♀, Araku valley, Vizianagram, 8. ix. 1983, coll. H. K. Bhowmik.

Diagnosis : The original description of the species hold good for the specimens ; prosternal tubercle tongue shaped ; last tergite with a broad and shallow median excision, flanked by weak projections ; wings light rose basally ; hind tibiae red in colour.

Distribution : India (Andhra Pradesh, Himachal Pradesh, Meghalaya, Uttar Pradesh including Uttaranchal).

Remarks : In Andhra Pradesh *Eyprepocnemis rosea*, is rare, however in Z.S.I. collection we have found only few specimens from Araku valley, Vishakhapattanam district.

Genus *Tylotropidius* Stål, 1873

44. *Tylotropidius varicornis* (Walker)

1870. *Heteracris varicornis* Walker, *Cat. Derm. Salt. Brit. Mus.*, 4 : 667.

1914. *Tylotropidius varicornis* : Kirby, *Fauna British India, Orthopt.*, (Acrididae) : 265.

Material examined : Mehbubnagar district : 3♂♂, 1♀, Gudem falls, 3♂♂, 1♀, 14. iv. 1985, coll. S. Chatterjee & S. K. Mandal ; Vishakhapattanam district : 1♀, N. Arakuvalley, 8.ix.1983, coll. H. K. Bhowmik.

Diagnosis : Concavity of fastigium of vertex distinct, with a low apical carinula, separating it from frontal ridge ; pronotum above with a characteristic narrow dark spot ; lateral carinae converging forwards ; hind tibiae bluish grey with two whitish ring at the base and reddish at apex ; male cercus gradually narrowing towards apex, incurved and down curved.

Distribution : India (Andhra Pradesh, Bihar, Delhi, Goa, Haryana, Himachal Pradesh, Karnataka, Kerala. Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Rajasthan, Tamilnadu, and West Bengal).

Elsewhere : Afghanistan; Bangladesh; E. Iran; Pakistan and Sri Lanka.

Reported : It is reported as a minor crop pest.

Subfamily CYRTACANTHACRIDINAE

Key to genera

1. Prosternal process straight, vertical or slightly inclined backwards in the direction of mesosternum, far from reaching the latter, conical or compressed 2
 - Prosternal process strongly curved backwards, touching or almost touching mesosternum, inflated in the middle, with acutely or subacutely apex 3
2. Frontal ridge in both sexes slightly expanded above the median ocellus, its margins almost parallel to each other; subgenital plate in male conical, pointed without apical incisions *Anacridium* Uvarov
 - Frontal ridge in both sexes not expanded above median ocellus, its margin almost parallel to each other ; subgenital plate in male conical, pointed without apical incisions 4
3. Pronotum strongly tectiform ; integument strongly rugose ; median carina of pronotum sharp ; male cercus incurved at base, about half as wide as its length *Chondracris* Uvarov
 - Pronotum moderately tectiform, slightly constricted ; integumen fairly rugose, almost smooth ; male cercus with subacute apex *Cyrtacanthacris* (Walker)
4. Tegmina with oblique venation in apical part, transverse veins situated obliquely to principal veins ; prosternal process conical, male cercus elongate conical and subgenital plate acuminate, apex pointed *Pachyacris* Uvarov
 - Tegmina with straight venation in apical part, transverse, veins forming almost right angle with principal veins ; prosternal process almost cylindrical, with rounded apex *Patanga* Uvarov.

Genus *Anacridium* Uvarov

45. *Anacridium flavescens* (Fabricius)

1793. (*Gryllus*) *flavescens* Fabricius, *Ent. Sys.*, 2 : 52.

1923. *Anacridium flavescens* : Uvarov, *Ann. Mag. nat. Hist.*, (9) 11 : 488.

Material examined : *Khamam district* : 1 ♂, Khamam, 9. xi. 1986, coll. M. S. Shishodia ; *Mehbubnagar district* : 2 ♂ ♂, 4 ♀ ♀, Alampur, 28. xii. 1999, coll. G. C. Sen.

Diagnosis : *A. flavescens* can easily be separated in having wing base yellow with black fascia towards the hind margin.

Distribution : India (Andhra Pradesh, Bihar, Orissa, and Tamilnadu).

Elsewhere : Sri Lanka.

Remarks : This species is rather limited in distribution in Andhra Pradesh and we have found only from Khammam and Mehbubnagar district.

Genus *Chondracris* Uvarov

46. *Chondracris rosea* (De Geer)

1773. *Acrydium roseum* De Geer, *Mem. Hist. Ins.*, 3 : 488.

1923. *Chondracris rosea* : Uvarov, *Bull. ent. Res.*, 14 : 39.

Material examined : Khammam district : 1 ♀, N, Araku valley, 18.ix.1983, coll. H. K. Bhowmik and Bobbili.

Diagnosis : Size large, body robust; median carina of pronotum raised in prozona and low straight in profile in metazona; uniformly green, wings hyaline with the base rose; hind tibiae and tarsi red.

Distribution : India (Andhra Pradesh, Assam, Bihar, Orissa, Madhya Pradesh, Manipur, Sikkim, Tamilnadu, Uttar Pradesh, Tripura).

Elsewhere : Bangladesh; Bhutan; China; Hainan; Indonesia; Java; Korea; Manchuria; Philippines; Tawain; Thailand & Vietnam.

Remarks : This species is widely distributed in India. The occurrence of this species in Andhra Pradesh further extends the range of its distribution in India in the southern region.

Genus *Cyrtacanthacris* Walker, 1870

47. *Cyrtacanthacris tatarica* (Linnaeus)

1758. *Gryllus Locusta tataricus* Linnaeus, *Systema Naturae* (10th ed.) : 432.

1932. *Cyrtacanthacris tatarica* : Uvarov, *Bull. Ent. Res.*, 14 : 39.

Material examined : Guntur district : 1 ♂, 1 ♀, Nagarjun Konda, 2. x. 1963, coll. B. Nath : 1 ♂ & 1 ♀, Nandikonda, Tiger valley, 4 & 5, x. 1963, coll. B. Nath. Nalgonda district : 1 ♂, 1 ♀, Madhewaram, 12 & 13. x. 1963, coll. B. Nath. Kurnool district : 2 ♂ ♂, 1 ♀, Nalla-malli, 23-27. x. xii. 1981, coll. A. K. Hazra. Meh-bubnagar district : 1 ♀, Mannanur, 15. iv. 1985, coll. S. Chatterjee & S. K. Mandal ; 1 ♀, Alampur, 28. xii. 1999, coll. G. C. Sen. Kurnool district : 1 ♂, 5 ♀ ♀, Srisailum, Patalganga, 2. xi. 1986, coll. M. S. Shishodia ; 1 ♂, 1 ♀, Dornala, 8. xi. 1986, coll. M. S. Shishodia. Warrangal district : 1 ♂, Domlapenta, 10. xi. 1986, coll. A. K. Hazra. Khammam district : 1 ♂, Madhera, 13. xi. 1986, coll. M. S. Shishodia. Hyderabad district : 3 ♂ ♂, Golconda fort, 27. ix. 1998, coll. S. K. Mandal. Cuddapah district : 1 ♀, Vempalli, 2. i. 2000, coll. G. C. Sen ; 1 ♀, Kudros, 4. i. 2000, coll. G. C. Sen.

Diagnosis : Size large; pronotum on both sides above with a broad velvety blackish brown band; tegmina with dense and thick reticulation and transverse oblique fasciae or irregular spots; wings hyaline or some-times yellowish at base; hind tibiae bluish or brown with yellow or brown spines, tips black.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Haryana, Himachal Pradesh, Orissa, Jammu and Kashmir, Karnataka, Kerala, Rajasthan, Tamilnadu, Uttar Pradesh including Uttaranchal, West Bengal).

Elsewhere : Africa (except N. Africa) and Sahara, Hainan, Madagascar, Philippines, Seychelles, Sri Lanka), Sumatra and Thailand.

Remarks : It is widely distributed in different parts of Indian sub-continent and Africa (except North Africa). It is widely distributed throughout India.

Genus *Pachyacris* Uvarov, 1923

48. *Pachyacris violascens* (Walker)

1870. *Acridium violascens* Walker, *Cat. Derm. Salt. Brit. Mus.* part 3 : 587.

1914. *Orthacanthacris violascens* : Kirby, *Faun. Brit. India*, : 229.

1923. *Pachyacris violascens* : Uvarov, *Ann. Mag. nat. Hist.*, (9)11 : 47.

Material examined : Vishakhapattanam district : 2♂♂, 2♀♀, Vizianagram, 18.ix.1983, col. H. K. Bhowmik.

Diagnosis : Light brown with yellow stripe running from the fastigium of vertex over the pronotum; tegmina brown with the inner margin yellow; wings smoky hyaline, tinged towards the base with pale violate.

Distribution : India (Andhra Pradesh, Tamilnadu).

Remarks : In our present study we have found few specimens in collection from Vizianagram of Andhra Pradesh.

Genus *Patanga* Uvarov, 1923

49. *Patanga succincta* (Johansson)

1763. *Gryllus Locusta succinctus* Johansson, *Amoen, Acad.*, 4 : 398.

1923. *Patanga succincta* : Uvarov, *Ann. Mag. nat. Hist.*, (9)12 364.

Material examined : Kurnool district : 1♀, Nalla-Mallai, 23-27.xi.1981, coll. A. K. Hazra. Prakasan district : 1♂, 23.xi.1998, coll. P. H. Roy. Cuddapah district : 1♀, Siddevatam forest, 29.xi.1998, coll. P. H. Roy.

Diagnosis : Tegmina with straight venation in apical part, transverse veins forming almost

right angle with principal veins; wings base tinge with pink colour; male subgenital plate long, curved upwards, apex pointed.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Goa, Himachal Pradesh, Jammu and Kashmir, Laccadive Islands, Maharashtra, Meghalaya, Orissa, Rajasthan, Tamilnadu, Uttar Pradesh including Uttaranchal, West Bengal.

Elsewhere : China, S. Arabia ; Borneo ; Hainan ; Japan ; Malaysia ; Myanmar ; Philippines ; Sri Lanka ; Sumatra ; Taiwan ; Tonkin.

Remarks : *Patanga succincta* is popularly known as Bombay Locust and is widely distributed throughout in India. In the past, this species was a major pest of many crops in swarming phase but now it is found in solitary phase or non-swarming phase and is less harmful. It is first time recorded from Andhra Pradesh.

Subfamily CALIPTAMINAE

Brachyenia Kirby, 1914

50. *Brachyenia scutifera* (Walker)

1870. *Caloptenus scutifera* Walker, *Cat. Derm. Salt. Brit. Mus.* iv, : 704.

1914. *Brachyenia scutifera* : *Faun. Brit. India*, : 256.

Material examined : *Guntur district* : 1 ♀, Firangemote hill, North Konda valley, 13.xi.1963, col. K. Reddiah ; *Prakasan district* : 2 ♂♂, 2 ♀♀, Nall-Malli, 23.xi.27. xii.1981. coll. A. K. Hazra; *Khammam district* : 1 ♀, Khammam, 9.xi.1986, coll. M. S. Shishodia.

Diagnosis : Body broad and heavy head, abdomen and hind femora whitish, granules in the pronotum and the raised stria on the hind femora yellowish ; tegmina with traces of dusky markings towards the base and before the tips.

Distribution : India (Andhra Pradesh, Orissa and Tamilnadu).

Remarks : This genus is endemic to India and is known by only this species.

Subfamily HEMIACRIDINAE

Key to genera

1. Mesosternal lobes meeting with each other in a short straight line; posterior femora much shorter than abdomen; thorax with white lateral stripe..... *Leptacris* Walker
 - Mesosternal lobe more or less separated with a gap ; posterior femora not shorter than abdomen ; thorax without lateral stripe 2
2. Prosternal tubercle or process spatulate fastigium of vertex parabolic or obtusely angular; pronotum distinctly tricarinate *Spathosternum* Krauss

- Prosternal tubercle or process acutely conical fastigium of vertex trapezoidal or rounded; pronotum without lateral carinae *Hieroglyphus*

Genus *Leptacris* Walker

51. *Leptacris vittata* (Fabricius)

1787. *Truxalis vittatus* Fabricius, *Mantissa Insectorum*, 1 : 231.

1870. *Opomala convergens* Walker, *Cat. Derm. Salt. Brit. Mus.*, 3 : 511.

1953. *Leptacris vittata* : Willemse, *Ergebn der Sumba Expd. des Museums fur Volken. Kund und des Naturh. Meseums in Basel*, : 93.

Material examined : Vishakhapattanam district : 1 ♀, Parvatipuram, Vizianagram, 20. ix. 1983, coll. H. K. Bhowmik.

Diagnosis : Body slender; antennae with basal segments ensiform, apical filiform; fastigium of vertex produced in front of eye; foveolae large, triangular & visible from above; pronotum cut by three transverse sulci, median carina distinct; tegmina longer than posterior femora; prosternum smooth; supraanal plate somewhat tongue shaped with a median longitudinal groove; subgenital plate very long.

Distribution : India (Andhra Pradesh, West Bengal).

Elsewhere : China; Indonesia; Pakistan; Sri Lanka.

Remarks : We have found this species in Z.S.I. collection from a single locality.

Genus *Spathosternum* Krauss, 1877

52. *Spathosternum prasiniferum prasiniferum* (Walker)

1871. *Heteracris prasinifera* Walker, *Cat. Derm. Salt. Brit. Mus.*, 5 Suppl., : 65.

1936. *Spathosternum prasiniferum prasiniferum* : Tinkham, *Lingnan. Sci. Journ. Canton.*, 15 : 51.

Material examined : Adilabad district : 5 ♂♂, 3 ♀♀, Adilabad, Kobbai, 27.viii.1999, coll. S. K. Mandal; 3 ♂♂, 1 ♀, Adilabad, Bela, 29.viii.1999, coll. S. K. Mandal. Warangal district : 3 ♀♀, Warangal, 10.xi.1986, coll. M. S. Shishodia. Hyderabad district : 1 ♂, Hyderabad, 29.x.1986, coll. M. S. Shishodia. Mehbubnagar district : 1 ♂, 1 ♀, Mannanur, 11.iv.1985, coll. S. Chatterjee & S. K. Mandal ; 2 ♂♂, Achampet, 3.xi.1986, coll. M. S. Shishodia. Nalgonda district : 1 ♂, Surjapetta, 7.xi.1986, coll. M. S. Shishodia. Kurnool district : 2 ♂♂, Srisailum, 23.ix.1998, coll. S. K. Mandal. Prakashan district : 2 ♂♂, Srisailum, 23.ix.1998, coll. S. K. Mandal. Cuddapah district : 3 ♂♂, 4 ♀♀, 1.i.2000, coll. G. C. Sen. Nellore district : 1 ♂ Nellore, 25.x.1986, coll. M. S. Chatterjee. Chittoor district : 1 ♂, Tirupati, 29.ix.1998, coll. S. K. Mandal; 2 ♂♂, 3 ♀♀, Venkateshwara University campus, Chittoor, 30.ix.1998, coll. S. K. Mandal; 1 ♂, Chittoor, 5.i.2000, coll. G. C. Sen ; 2 ♂♂, Erpedu, Chittoor, 6.i.2000, coll. G.

C. Sen. *Khammam district* : 2♂♂, 3♀♀, Khammam, 9.xi.1980, coll. M. S. Shishodia. *West Godavari district* : 3♂♂, 5♀♀, Ramsaingavaram, 4.x.1998, coll. S. K. Mandal. *East Godavari district* : 2♂♂, 1♀, Rajahmundry, 16. i. 1986, coll. M. S. Shishodia ; *Krishna district* : 1♀, Machalipattanam, Krishna, 15.x.1998, coll. S. P. Chakrabarty; 1♀, Adebinekkalam. 16.x.1998, coll. S. K. Mandal. *Vishakhapattanam district* : 1♂, Vishakhapattanam, 10.x.1998, coll. S. K. Mandal; 1♂, 1♀, Shivalingapuram, 11.x.1998, coll. S. K. Mandal.

Diagnosis : Broad blackish or dark green stripe runs behind the lower part of the eye and below the lateral carinae of pronotum; central area of tegmen with a longitudinal black streak which is well marked in female and almost obsolete in male.

Distribution : India (Andhra Pradesh, widely distributed).

Elsewhere : Bangladesh; China; Indo-China; Myanmar; Sri Lanka; Thailand and Vietnam.

Remarks : This species is associated with grassy habitats.

***Hieroglyphus* Krauss, 1877**

Key to genera

1. Cercus bifurcate at apex in male; subgenital plate with parallel ridges in female *banian* Fabricius
- Cercus with elongate acute apex in male; oblique on upper margin; subgenital plate without parallel ridges *nigrorepletus* Bolivar

53. *Hieroglyphus banian* (Fabricius)

1798. *Gryllus banian* Fabricius, *Entom. System. Suppl.*, : 194.

1973. *Hieroglyphus banian* : Mason, *Bull. Brit. Mus. nat. Hist.*

Material examined : *Adilabad district* : 1♂, Maola, 25. viii. 1999. coll. S. K. Mandal; 1♂, Polemaru, 26.viii.1999, coll. S. K. Mandal ; 1♂, 1♀, Jennaram, 1.ix.1999, coll. S. K. Mandal; *Krishna district* : 1♂, Ambapuram, 17.x.1998, coll. S. P. Chakrabarty. *Vishakhapattanam district* : 1♀, Parvatipuram, 21.ix.1983, coll. H. K. Bhowmik; 4♂♂, 4♀♀, Araku valley, 8.ix.1983, coll. H. K. Bhowmik.

Diagnosis : Male cercus with apex bifurcate, relatively slender, with upper branch of fork recurved anteriorly towards head & lower branch elongate & acute. Lower valves of ovipositor long and slender with external lateral projection well defined and acute.

Distribution : India (Andhra Pradesh, Himachal Pradesh, Orissa, Rajasthan, Tamilnadu and West Bengal).

Elsewhere : Bangladesh; Bhutan; Myanmar; China; Nepal; Thailand and Vietnam.

Remarks : *H. banian* is a major pest of paddy in India.

54. *Hieroglyphus nigrerepletus* Bolivar

1912. *Hieroglyphus nigrerepletus* Bolivar, *Trab. Mus. nac. Cienc. nat. Madr.*, No., 6 : 56.

1973. *Hieroglyphus nigrerepletus* : Mason, *Bull. Brit. Mus. nat. Hist. (Ent)*, 28(7) : 526.

Material examined : Hyderabad district : 7♂♂, 9♀♀, Golconda, Hyderabad, 27. ix. 1998, coll. S. K. Mandal.

Diagnosis : Large and robust in size, female is slightly larger than male; fastigium of vertex one and a half time as broad as long; frontal ridge parallel sided; female subgenital plate with very acute median lobe.

Distribution : India (Andhra Pradesh, Assam, Bihar, Karnataka, Kashmir, Orissa, Punjab and Uttar Pradesh including Uttaranchal).

Elsewhere : Pakistan.

Remarks : Mason (1973) has described in detail. We have found this species from a single locality in Hyderabad district of Andhra Pradesh. This species is first time recorded from Andhra Pradesh.

Subfamily CATANTOPINAE

Key to genera

1. Pronotum not constricted in the middle; prosternal process cylindrical and rounded at apex *Catantops* Schaum
 - Pronotum slightly constricted in the middle : prosternal process neither cylindrical nor with rounded apex 2
2. Frons in profile straight ; male cercus scarcely upcurved, almost straight *Xenocatantops* Dirsh
 - Frons in profile in curved ; male cercus slightly downcurved *Pirithoicus* Uvarov

Catantops Schaum, 185355. *Catantops pinguis innotabilis* (Walker)

1870. *Acridium innotabile* Walker, *Cat. Derm. Brit. Mus.*, 4 : 629.

1953. *Catantops pinguis innotabilis* : Dirsh and Uvarov. *Tijdschr. Ent.*, 96(3) : 233.

Material examined : Mehbubnagar district : 1♀, Gundam falls, 14. iv. 1985, coll. S. Chatterjee & S. K. Mandal : 1♂, Achampet, 3. xi. 1986, coll. M. S. Shishodia : 1♂, Alampur, 28. xii. 1999, coll. G. C. Sen. Warangal district : 1♂, 1♀, Dornala, 10. xi. 1986, coll. M. S. Shishodia. Nalgonda district : 3♂♂, Yadagirigutta, 23. xii. 1999, coll. G. C. Sen. Hyderabad district : 4♂♂, 4♀♀, Golconda, 27. ix. 1998, coll. S. K. Mandal. Prakashan district : 1♂

1 ♀, Dornala, 22. ix. 1998, coll. S. K. Mandal : 1 ♂, Srisilum, 22. ix. 1998, coll. S. K. Mandal : 1 ♂, Srisilum tiger Project area, 23. ix. 1998, coll. S. K. Mandal : 4 ♂ ♂, 3 ♀ ♀, Srisilum, 23. ix. 1998, coll. S. K. Mandal : 5 ♂ ♂, 7 ♀ ♀, Chinarutla, 23. ix. 1998, coll. S. K. Mandal. *Cuddapah district* : 1 ♂, 2 ♀ ♀, Kajipet, 30. xii. 1999, coll. G. C. Sen. *Chitoor district* : 11 ♂ ♂, 8 ♀ ♀, Venkateshwara university campus, 30. ix. 1998, coll. S. K. Mandal. *West Godavari district* : 1 ♂, Ramasiangavaram, 4. x. 1998, coll. S. K. Mandal. *Krishna district* : 1 ♂, Ambapuram, 17. x. 1998, coll. S. P. Chakrabarty. *Vishakhapattanam district* : 1 ♀, Vishakhapattanam, 2. x. 1998, coll. S. K. Mandal ; 1 ♂, anandapuram, Vishakhapattanam, 22. x. 1998, coll. S. P. Chakrabarty; 2 ♀ ♀, Jadayapattanam, Vishakhapattanam, 22. xi. 2000, coll. P. H. Roy.

Diagnosis : Lateral lobe of pronotum without coloured pattern ; external disc of hind femur without black median spot below the upper carinula ; male cercus more upcurved, with more broadened apex and more projecting upper apical angle.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Goa, Laccadive Islands, Himachal Pradesh, Jammu & Kashmir, Kerala, Madhya Pradesh, Meghalaya, Orissa, Sikkim, Tamilnadu, Uttar Pradesh including Uttaranchal, West Bengal.

Elsewhere : Afghanistan; Bangladesh; Borneo; China; Hongkong; Indo-China; Japan; Java; Kambodia; Korea; Malaya; Maldives; Island; Myanmar; Nepal; New Guinea; Pakistan; Philippines; Sumatra; Thailand; Tibet; Yunnan.

Remarks : This species is widely distributed in India and we have found it in almost all the district of Andhra Pradesh.

Xenocatantops Dirsh & Uvarov, 1953

56. *Xenocatantops karnyi* (Kirby)

1910. *Catantops karnyi* Kirby, Syn. Cat. Orthopt., 3 : 483.

1982. *Xenocatantops karnyi* : Jago, Trans. Am. ent. Soc., 108(3) : 455.

Material examined : *Warangal district* : 6 ♂ ♂, 3 ♀ ♀, Pakhal forest, 4.vii.1985, coll. P. Parui. *Mehbubnagar district* : 2 ♂ ♂, Mannanur, 19.iv.1985, coll. S. Chatterjee ; *Nalgonda district* : 1 ♀, Nagarjun Sagar dam, 28.vi.1985, coll. P. Parui. *Kurnool district* : 2 ♂ ♂, Alagedi, 22.vi.1985, coll. P. Parui. *Khamma district* : 7 ♂ ♂, 2 ♀ ♀, Madhera, 13.xi.1986, coll. M. S. Shishodia. *East Godavari district* : 2 ♂ ♂, 5 ♀ ♀, Rajahmundry, 15.xi.1986, coll. M. S. Shishodia.

Diagnosis : A black spot, approximating to square form in the middle of lateral lobe of pronotum; apical bifurcation of cercus bluntly pointed and subequal.

Distribution : India : Andhra Pradesh, Delhi, Himachal Pradesh, Tamilnadu and Uttar Pradesh including Uttaranchal.

Remarks : This species closely resembles *X. zernyi* (African species).

Genus *Pirithoicus* Uvarov57. *Pirithoicus ophthalmicus* (Karny)

1907. *Catantops ophthalmicus* Karny, S. B. *Akad. wiss. wien. Vienna*, **116** : 313, 330.

1953. *Pirithoicus ophthalmicus* : Dirsh & Uvarov, *Tijdschr. Ent.*, **96**(3) : 236.

Material examined : Cuddapah district : 1♂, Vempali, 5.viii.1929, coll. H. S. Pruthi.

Diagnosis : *P. ophthalmicus* is very close to *Xenocatantops* but differ in having incurved frons, antennae longer than head and pronotum together, male cercus slightly downcurved & rounded at apex.

Distribution : India : Andhra Pradesh, Orissa, Tamilnadu.

Elsewhere : Sri Lanka.

Remarks : The occurrence of this species in Andhra Pradesh extend the range of this rare species in India.

SUMMARY

A detail report of the Acridoidea fauna of Andhra Pradesh is given here for the first time. It is based on collections made by scientists of the Zoological Survey of India. In all 57 species belonging to 2 families and 45 genera are reported of which 13 species are recorded for the first time from Andhra Pradesh.

Keys to families, genera and species have been provided, distribution of each species has also been given.

ACKNOWLEDGEMENTS

The authors are grateful to the Director, Zoological Survey of India, Calcutta, for providing necessary laboratory facilities to carry out this study. Thanks are due to Dr. J.K. Jonathan, Additional Director, and Dr. A.K. Hizra, Joint Director (Entomology Division In-charge), for going through the manuscript and giving suggestions.

REFERENCES

- Bhowmik, H. K. 1986. Grasshopper fauna of West Bengal, India (Orthoptera : Acrididae) *Technical Monograph, zool. Surv. India*, No., **14** : 1-180.
- Bolivar, I. 1918. Contribucion al conocimiento de la fauna Indica. Orthoptera (Locustidae Vel Acrididae). *Revista r. Acad. Cient. exact. (fisic. y. mat.) Madrid*, **16** : 278-472 (1917).
- Henry, G. M. 1940. New and little known South Indian Acrididae (Orthoptera) *Trans. R. ent. Soc. Lond.*, **90** : 497-540.

- Kirby, W. F. 1914. *The Fauna of British India including Ceylon and Burma*. Orth. (Acrididae).
- Shishodia, M. S. and Mandal, S. K. 1990. New records of Orthoptera (Insecta) from the Nagarjuna Sagar Tiger Reserve Forest, Andhra Pradesh, India. *Rec. zool. Surv. India*, **87**(1) : 65-76.
- Tandon, S. K. 1975. On the genus *Chondracris* Uvarov (Orthoptera : Acridoidea) *J. zool. Soc. India*, Dr. B. S. Chauhan *Comm. volume*, : 359-402.
- Tandon, S. K. and Shishodia, M. S. 1969. A note on a collection of Acridoidea (Orthoptera) from Nagarjuna Sagar dam area. *Orient. Insects*, Delhi, **3**(3) : 265-267.
- Tandon, S. K. and Shishodia, M. S. 1989. Insecta : Orthoptera. Acridoidea. *Fauna of Orissa, State Fauna Series*, **2** (Part-2) : 93-145.
- Uvarov, B. P. 1921. Records and descriptions of Indian Acrididae. *Ann. Mag. nat. Hist. London*, **9**(7) : 480 to 509.
- Uvarov, B. P. 1929. Acriden (Orthoptera) aus sud- Indian. *Rev. suisse zool. Geneva*, **36** : 533-563.
- Uvarov, B. P. 1942. New Acrididae from India and Burma. *Ann. Mag. nat. Hist. London*, (11) **9**(56) : 487-607.

INSECTA : MANTODEA

T. K. MUKHERJEE* and A. K. HAZRA

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

Eco-geographical status of Andhra Pradesh indicates insect diversity. Large dry areas, hilly areas of low altitudes are not suitable for insect abundances. However, some areas, particularly hills with 3000 ft. altitude support very suitable condition for insect diversity. Post-monsoon is best season for them.

In India so far known species of mantids are 162 belonging to 6 families, 19 subfamilies and 68 genera. Out of this, 13 species belonging to 11 genera are reported from the state. They are classified under 7 subfamilies and 3 families. It is true that the number is much less than what actually is presumed to occur there. Taxonomic study on mantids is going on at different institutes and it is expected that many so far undiscovered species will be known from two hot spots (the Western Ghats and North-Eastern India) and will be shortly added to the figure stated above.

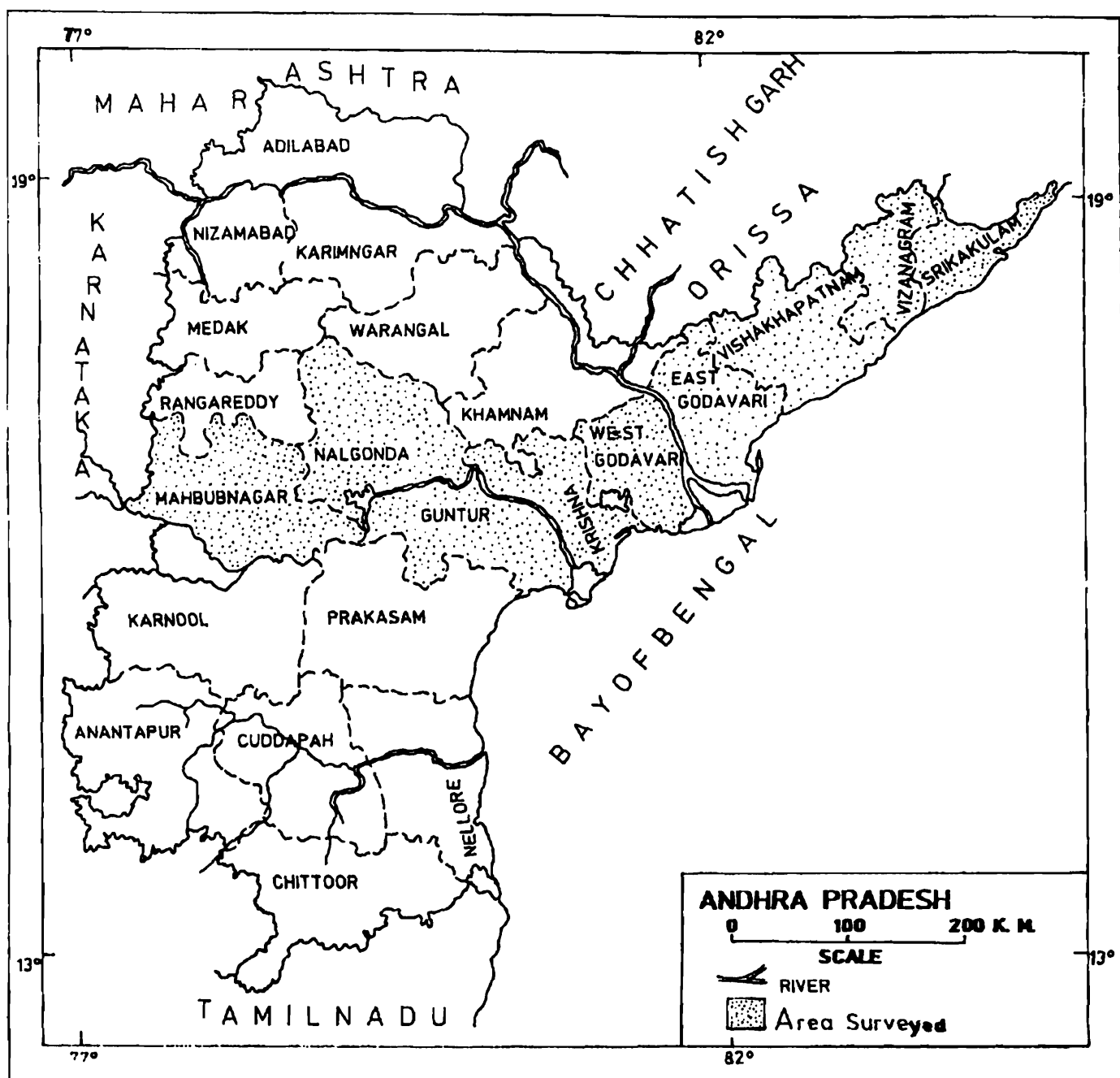
Most of the following studied insects are present in the collection of Zoological Survey of India (ZSIC).

Family HYMENOPODIDAE

These insects are non-metallic coloured, antennae (in male) not comb-like, pronotum distinctly longer than broad or longer, fore tibia with two ventral rows of spines of which external spines are numerous and close beset, proximal external spine of fore femur not elongated (normal) and claw groove of fore femur near base, middle and hind femora with small flat expansions, wings sometimes with eye-like or spiral ornamentation, supra anal plate transverse.

Two subfamilies are represented from the state.

* Post-Graduate Department of Zoology, Presidency College, Kolkata



Map of Andhra Pradesh

Key to the Subfamilies

Eyes within the circumference of the head. Disc of frontal sclerite not depressed like pit and without wing like keel Acromantinae

Eyes bulging and extends the circumference of the head. Disc of frontal sclerite depressed like pit and with wing like keel. Hymenopodinae

Subfamily ACROMANTINAE

Eyes round. Vertex often with small protuberence. External and discoidal spines of fore femora 4 in number. Fore and hind wings are normally developed.

In India, one tribe Acromantini is known which is characterized by the presence of protuberence of vertex, slender pronotum, middle, and hind femora with small flat expansions.

Two species have been recorded.

1. *Euantissa pulchra* (Fabricius) 1787

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

Frontal sclerite transverse, with smooth disc and angular upper edge. Pronotum shorter than fore coxae, metazona with parallel margins. Superior edge of fore femora simple (not arched and not expanded). Fore wings opaque and hind wings with a dark patch along posterior border only.

Material examined : Nalgonda Tiger valley, 2M, 1F, 4.x.1963, B. Nath.

Distribution : This species is widely distributed in India (particularly Eastern, North Eastern and Southern India).

Remarks : This is a common small, fast and bush dwelling form predominant in plains and hills of low altitude.

2. *Hestiasula brunneriana* Saussure, 1871

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

Vertex with a tubercle in the middle. Frontal sclerite transverse, with smooth disc. Pronotum short, elliptical. Fore femora oval, external border smooth, superior edge strongly arched and expanded, internal superior border with 3 black spots and one such spot internally above spine. Middle and hind femora with insignificant small flat expansions, hind femora with short ventral lobes, which, however, are almost absent in Indian species. Costal area of fore wings greenish opaque, rest hyaline, stigma clear and elongated, hind wings clear and only brownish near truncated apex. Three brownish bands on middle and hind legs.

Material examined : Anantagiri, 1M, 19.iii.1985, S. Saha; Wangasara. 1M, 10.iii.1985, S. Saha.

Distribution : Andhra Pradesh, Meghalaya, West Bengal.

Elsewhere : Bangladesh, Sri Lanka, West Pakistan.

Remarks : The external edge of anterior femora are serrated that seemingly makes it closer to the genus *Ephestiasula*.

Subfamily HYMENOPODINAE

Eyes conical, bulging and separated by deep grooves of the vertex. Vertex with protuberance above ocelli. Frontal sclerite with pit and lateral wing like extensions. Supracoxal region distinctly marked by strong width. External and discoidal spines of fore femora 4 in number. Middle and hind femora with lobes. Both wings are normally developed.

Two genera are known in India.

3. *Cerebroter laevicollis* (Saussure) 1870

1870. *Cerebroter laevicollis* Saussure, *Mitt. Schweiz. Entomol. Ges.*, 3 : 242.

Vertex above ocelli with a tubercle. Eyes conical. Frontal sclerite excavated, transverse and bicarinate. Pronotum looks oval with pronounced supra-coxal dialation; prozona denticulate, metazona almost straight. Anterior coxae with 6 spines. Superior edge of anterior femur almost straight. Middle and hind femora with small pre-apical lobes; ventral lobes occupying distal position only (entire length in the other genus *Hymenopus*). Fore wings with a yellow spot at base, eye-mark a little in front of middle of the length; hind wing pink at base and costal area; smoky patch at the center small and round.

Material examined : Betla, 1M, 2F, 13.vi.1983, S. M. Ali.

Distribution : India: Andhra Pradesh, Assam, Meghalaya, Sikkim, West Bengal.

Elsewhere : Indonesia, Java.

Remarks: The colour of the anal membrane is variable.

Family MANTIDAE

Head wider than long, eyes large, antennae not pectinate, fore leg with typical rows of spines. Legs may be foliaceous. Wing mostly normal in both sexes but may be reduced in female.

Four subfamilies are known from the state.

Subfamily OXYOTHESPINAE

Slender and medium sized insect with wide head, laterally conical eyes beset with spine, transverse frontal sclerite, anterior femur with 4 discoidal and 4 external spines, of which the

2nd external spines longest of all. Middle and hind legs comparatively small, not foliaceous, with genicular spines. Supra anal plate transverse, truncated at tip, cerci foliaceous.

This subfamily contains one Indian genus *Heterochaetula*.

4. *Heterochaetula fissispinis* Wood-Mason 1889

1889. *Heterochaetula fissispinis* Wood-Mason 1889. *J. Asiatic. Soc. Bengal*, 58 : 309.

Eyes with bifid spine. Submedian lobes of vertex more elevated to form a shallow groove for the reception of anterior end of pronotum. Lateral margins of pronotum with black denticles in female. Minute black granules over entire body. Fore femur with bands, its mid-dorsal end conically projected. The lateral apical lobes of middle and hind femora prolonged and sharp. Hind wings with a violet blotch and concentric rings.

Material examined : Chintapalli, 1F, 19.viii.1985, T. Mukherjee.

Distribution : India : Andhra Pradesh, Karnataka, Tamil Nadu.

Remarks : The only other known Indian species has undivided eye-spine and the lateral apical lobes of middle and hind femora less prolonged.

Subfamily THESPINAE

Tribe Parathespini

Delicate, small dirty-brown mantids with narrow transverse frontal sclerite. Pronotum slender, longer than fore coxae and brief supra-coxal dialation. Middle and hind legs comparatively longer and slender. Wings shorter than rest of abdomen and reduced in female.

The two known Indian tribes are separated by the shape of eye, which is either rounded (Thespini) or conical. (Parathespini).

5. *Parathespis humbertiana* Saussure 1869

(Figs. 1,2)

1869. *Parathespis humbertiana* Saussure *Mitt. Schweiz. Entomol. Ges.*, 3 : 71.

Eye dorsally conical and laterally rounded. Frontal sclerite very narrow, transverse. Pronotum longer and slender. In fore legs, the femur with 4 discoidal and 4 external spines, claw furrow distally placed, tibia small, with 5 external spines. Middle and hind legs comparatively longer and slender. Wings shorter than rest of the abdomen and reduced in female. Supra anal plate lanceolate.

Material examined : Guntur : Nagarjun Hill, 1M, 25.ix.1968, B. Nath.

Distribution : India : Andhra Pradesh, Madhya Pradesh, Tamil Nadu.

Elsewhere : Sri Lanka.

Remarks : This is the only so far known one species representing this tribe from India.

Subfamily AMELINAE

Tribe Amelini

Mostly bark coloured small mantids with elliptical pronotum shorter than fore coxae. Fore femora with 4 external and 4 discoidal spines, the external edge serrated. Middle and hind femora without any spine.

The only Indian tribe is characterized by the presence of serration along the external edge of fore femora.

*Out of 8 genera, 2 are so far known from the state.

6. *Amantis biroi* Giglio-Tos, 1915 (Figs. 3,4,5)

1915. *Amantis biroi* Giglio-Tos, 1915. *Bull. Soc. Entomol. Ital.*, 46 : 153.

Vertex smooth. Frontal sclerite higher than width, carinae indistinct, with a black spot at upper middle point. Pronotum entirely blackish with faint dorso-median black stripe.

Fore legs brown and 1st segment of tarsi black. Fore wing smoky-transparent, stigma without black spot at corners.

Material examined : Vizag: Jyotimamidi, 2M, 25.ii.1985, S. Saha; Wangasara, 9M, 4-5. iii. 1985 and 10.iii. 1985, S. Saha; Lankapakalu, 2M, 15.iii. 1985, S. Saha.

Distribution : India : Andhra Pradesh, West Bengal.

Elsewhere : Southern Asia.

Remarks : This is a common bush-inhabiting species near ground.

7. *Amantis saussurei* (Bolivar) 1897

1897. *Iridopteryx saussurei* Bolivar, *Ann Soc. Entomol. France*, 66 : 305.

Vertex is blackish with black spots scattered on the head. Two black dots on either lateral sides of frontal sclerite, Pronotum with dorso-median black stripe. Fore legs brown; 2nd segment of tarsi externally brown. Fore wing smoky-transparent, stigma with black spot at corners.

Material examined : Vizag : Chintapalli, 1M, 19.viii.1985, T. Mukherjee.

Distribution : India : Andhra Pradesh, Kerala, Tamil Nadu.

8. *Elmantis trincomalae* (Saussure) 1869
(Figs. 6, 7)

1869. *Elmantis trincomalae* Saussure, *Mitt. Schweiz. Entomol. Ges.*, 3 : 63.

Body grayish brown. Lobes of vertex prominent (one median and two lateral). Eyes big and round. Frontal sclerite transverse; in the middle, upper border arched and feebly indented. Pronotum flattened, with obtuse-bosses and with a tooth at lateral points of maximum width. Metazona constricted behind the dialation, prosternum with a big oval black patch. Fore tibia with 10 external spines. Fore femora annulated by brown bands, with 4 discoidal and 4 external spines, the proximal two external spines being closer to each other. Hind metatarsus longer than rest segments taken together.

Material examined : Vizag: Jyotimamidi, 2M, 25.ii.1985, S. Saha; R.V. Nagar, 1F, 23.iii.1985, T. Mukherjee, Lankapakalu, 1F (nymph), 18.iii.1985, S. Saha.

Distribution : Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu.

Elsewhere : Sri Lanka.

9. *Memantis minor* Werner 1931

1931. *Memantis minor* Werner *Proc. Zool. Soc. London*, 1330.

Lateral lobes of vertex less pronounced. Frontal sclerite smooth, transverse, upper margin arched. Pronotum rhomboidal, a little flattened at lateral margins; bosses on pronotum well distinct. Fore femora almost triangular, superior edge arched; external edge bears 4 spines and few fine spinules, proximal two external spines closer to each other. Tibiae and tarsi with dark-brown rings. Costal area of fore wing distinctly broader than in other species. 1st branch of cubitus 4-branched.

Material reported : Vizag (Vizagapatnam), 1M, dt. and coll. N.A. [Werner (1931)]

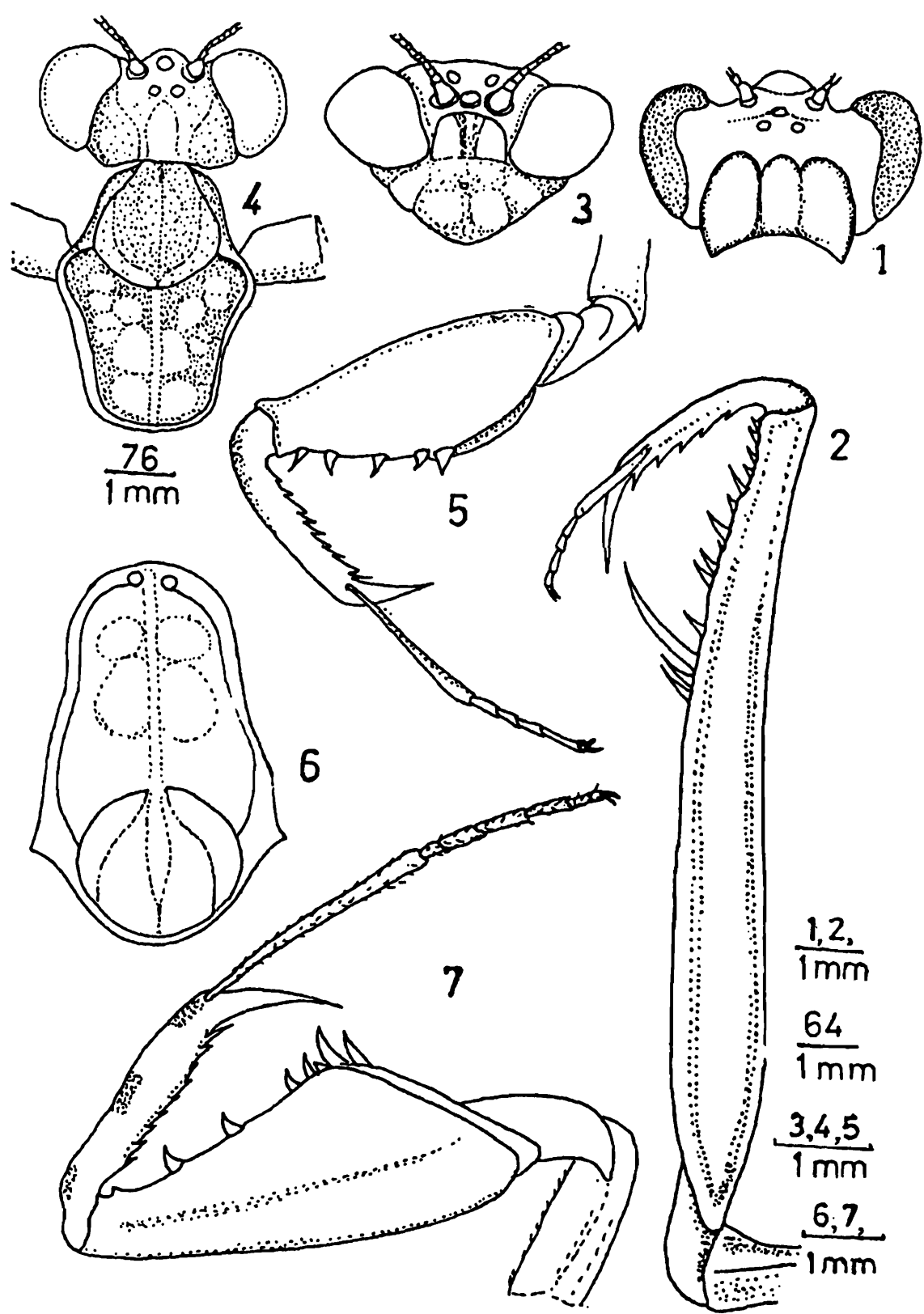
Distribution : India : Andhra Pradesh.

Remark : According to Werner, this species is very close to *Memantis gardeneri*. The present species differs from *gardeneri* by its smaller size, arched upper margin of frontal sclerite and more dark brown spots on fore wings. In literature it is mentioned as Madras : Vizagapatnam.

Subfamily MANTINAE

Tribe Mantini

Mantis belonging to this subfamily devoid of process of vertex. The Pronotum is simple. In fore leg, tibia with normal rows of spines, femora usually with 4-5 external and 3-4 discoidal spines. Middle and hind femora and tibiae without pre-apical lobules. Cerci cylindrical, rarely flattened.



Figs. 1-7 : Figs. 1-2 : *Parathespis humberiana* Saussure, female, head and left fore leg; Figs.3-5 : *Amantis biroii* Giglio-Tos, male, head, pronotum and left leg; Figs. 6-7 : *Elmantis trincomaliae* (Saussure), female, pronotum and right fore leg.

Tribe Mantini has 4 external and 4 discoidal spines; the external edge is smooth (or serrated in those with 3 discoidal spines). Middle and hind femora and tibiae without pre-apical lobules. Cerci cylindrical, rarely flattened.

10. *Statilia apicalis* (Saussure) 1871

1871. *Statilia apicalis* (Saussure). *Mem. Soc. Phys. Hist. Nat. Geneve*, **21** : 291.

Eyes rounded. Frontal sclerite transverse, upper margin arched and no spine on it. Prosternum not black at coxal junction but with black patch at base. Fore leg with 4 discoidal and 4 external spines; claw groove distally situated and its anterior border not bordered by black line; internal apical lobes of coxae contiguous; tibiae with 7 external spines. Middle and hind femora without apical spine. Hind wing without any transverse band.

Material examined : Chintapally, 1M, 1F, dt. & coll. N.A.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Bihar, Himachal Pradesh, Uttar Pradesh, West Bengal.

Elsewhere : Australia, China, Gunea, Congo, Philippine, Timor.

11. *Statilia maculata* (Thunberg) 1784

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

Eyes rounded. Frontal sclerite transverse, upper margin arched. Prosternum black at coxal junction. Fore leg with femur with shining pale yellow patch, with 4 discoidal and 4 external spines; claw groove distally situated and its anterior border with by black line. Fore coxae with 6-7 whitish triangular spines; internal apical lobes contiguous; fore tibiae with 7 external spines. Middle and hind femora without apical spine. Hind wing without any transverse band. Costal area of fore wing opaque, discoidal area semi-opaque.

Material examined : Chintapalli, 1F, 19. Viii. 1985, T. Mukherjee.

Distribution : India : Andhra Pradesh : Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Uttar Pradesh, West Bengal.

Elsewhere : Asia.

Remark : Laboratory reared specimens developed hyaline hind wings and less smoky fore wings. Therefore coloration depends on environment. Probably there is sympatric distribution of species with coloured and non-coloured wings. The species name is now changed to *Statilia maculata maculata* by Ehrmann (2002).

Family EMPUSIDAE

Medium to large mantis with vertex process, combed antennae, 5 external spines on fore leg, with 3-4 smaller spines alternating with longer internal spines and there are lobular expansions on abdominal segments.

The characters of this family are entirely different and thus easy to recognize.

Of the two subfamilies, one is known from the state.

Subfamily EMPUSIDAE

Empusidae is identified by the presence of long and slender pronotum and spiniform projection at distal end of fore coxae.

12. *Empusa guttula* (Thunberg) 1815 (Figs. 8, 9)

1815. *Gongylus guttulus* Thunberg. *Mem. Acad. Sci. St.-Petersburg*, 5 : 294.

Green body. Distal end of the median ridge of frontal sclerite curved and pointed. Apex of vertex process bifid and no inferior carina. Pronotum with sharp lateral spines and gaps. Fore coxae internally black at distal half and few spines near base. Lobes of middle coxae small, elongated-round and lamellar; those of hind coxae are smaller. Middle and hind femora with rounded apical lobes containing 2 transverse deep brown patches. Abdominal segments with lateral and ventro-median projection. Fore wing a little longer than body, costal area green, opaque, whitish while discoidal area sub-opaque. Antero apical area of hind wing brownish.

Material examined : Mehaboobnagar, 1M, 9.iv.1980, B.C. Saha.

Distribution : Andhra Pradesh, Orissa, Rajasthan, Uttar Pradesh.

Elsewhere : Africa, Egypt, Somalia, Tunisia, Kenya, Libya, Cameroon, Madagascar, Namibia.

13. *Gongylus gongylodes* (Linnaeus) 1758 (Figs. 10-14)

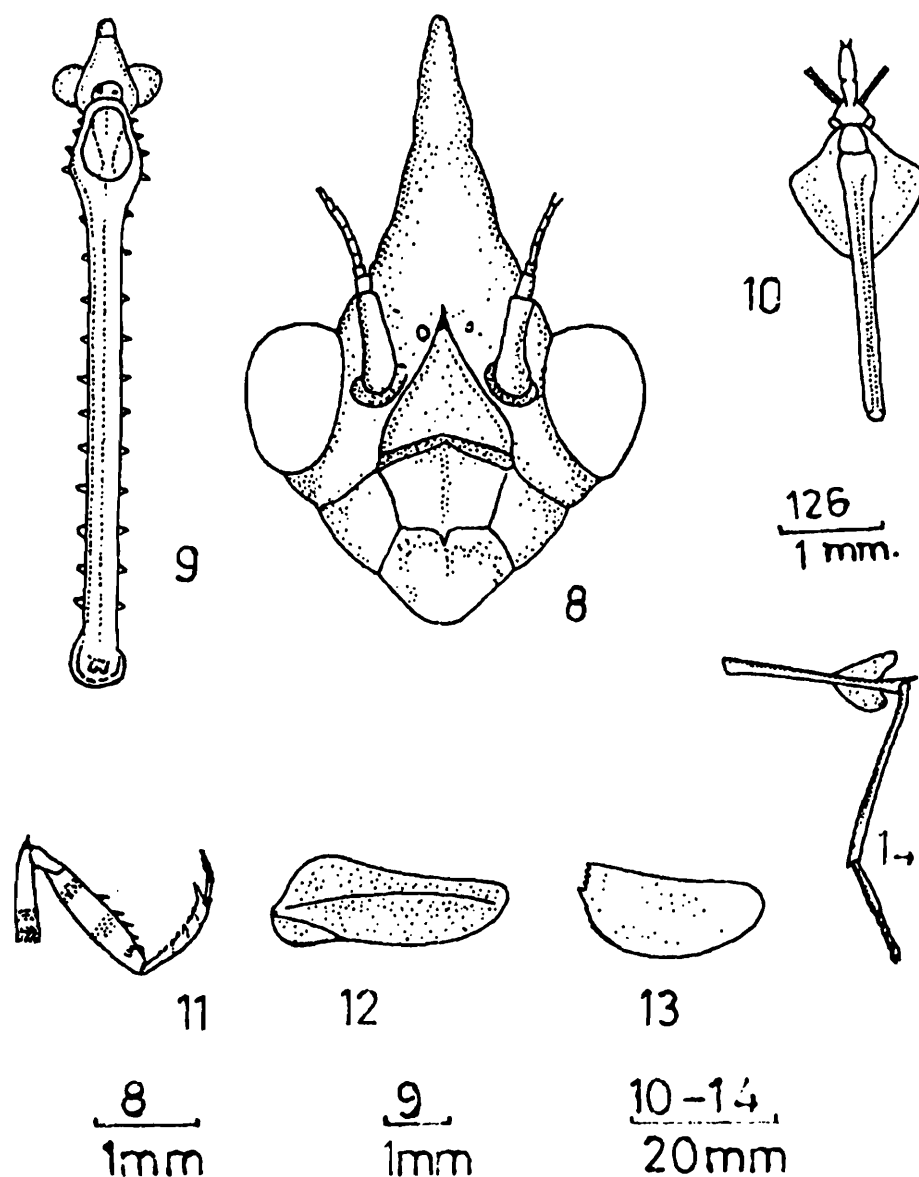
1758. *Gryllus (Mantis) gongylodes* Linnaeus, *Syst. Nat.*, 10 : 426.

Greenish-brown. Dilation of pronotum rhomboidal, width about 1/3rd the length of pronotum. Fore coxae deep brownish at external distal half. Dilation of femur oval elongate, with all spines black at tips only. In middle and hind legs coxae with small lamellar portions, femora with distal lobes, the ventral one almost round, dorsal two are triangular and small. Middle abdominal segments laterally lamellar and bear transverse black mark on ventral side. In male, both wings extend beyond abdomen.

Material examined : Bezwada, near Waltair, 1M, 17.iii.1928, dt. and coll. N.A.

Distribution : India : Andhra Pradesh, Kerala, Tamil Nadu, West Bengal.

Elsewhere : Java, Sri Lanka, Myanmar, Thailand.



Figs. 8-14 : **Figs. 8-9 :** *Empusa guttuda* (Thunberg), male, head and pronotum; **Figs. 10-14 :** *Gongylus gongylodes* (Linnaeus), female, head with pronotum, left fore leg, fore and hind wing and right hind leg.

ACKNOWLEDGEMENTS

Authors are grateful to the Director, Zoological Survey of India for providing laboratory facility and to the Head of the Department of Zoology, Presidency College for constant inspiration and encouragement for completion of the work.

REFERENCES

- Bolivar, I. 1897. Les Orthopteres de St. Joseph's College a Trichinipoly. *Ann. Soc. Entomol. France*, **66** : 305.

- Ehrmann, R. 2002. Mantodea : Gottsanbeterinnen der Welt. *Natur und Tier-Verlag GmbH*, Münster, : 519.
- Fabricius, J.C. 1787. Mantissa Insectorum Hafniae. *Mant. Ins.*, 1 : 229.
- Giglio-Tos, E. 1915. Mantidae Esotici Generi e specie nuove. *Bull. Soc. Entomol. Ital.*, 46 : 153.
- Kirby, W.F. 1904. A synonymic catalogue of Orthoptera. Vol. 1. London.
- Linnaeus, C. 1758. *Syst. Nat.*, 10 : 426.
- Mukherjee, T.K., Hazra, A.K. and Ghosh, A. 1995. The Mantid Fauna of India (Insecta : Mantodeae). *Oriental Insects*, 29 : 185-358.
- Saussure, H. De. 1871. Melanges Orthopterologiques. Supplement au III me fascicule. *Mem. Soc. Phys. Hist. Nat. Geneve*, 21 : 291, 330.
- Saussure, H. De. 1869. Essai d'un system des mantides. *Mitt. Schweiz. Entomol. Ges.*, 3 : 63, 71.
- Thunberg, C.P. 1815. *Mem. Acad. Sci. St.-Petersburg*, 5 : 294.
- Werner, F. 1931. Further notes on Indian Mantids or Praying Insects. *Proc. Zool. Soc. London*, 1931 : 1330.
- Wood-Mason, J. 1889. The Ethiopian and Oriental representatives of the Mantodean. *J. Asiatic. Soc. Bengal*, 58 : 309.

INSECTA : BLATTARIA (DICTYOPTERA)

S. K. MANDAL

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The present work was initiated to make a taxonomic study of the Blattaria (Dictyoptera) of Andhra Pradesh with special reference to its detailed distribution.

Earlier works on Indian Blattids are by Kirby (1904), Shelford (1906), Hanitsch (1915), Bruijning (1948), Princis (1966, 1971) Roth (1996) and Mandal (1995). The present study is under taken, based on the named and unnamed specimens preserved in the department (ZSI) collected by several survey parties in recent years.

The present paper deals with 14 species under 13 genera distributed over 5 families.

The classification followed here is after Rehn (1951) and Princis (1960).

SYSTEMATIC ACCOUNT

Order DICTYOPTERA

Suborder BLATTARIA

Family POLYPHAGIDAE

1. *Polyphaga indica* (Walker)
2. *Theria petiveriana* (Linnaeus)

Family BLATTIDAE

3. *Periplaneta americana* (Linnaeus)
4. *Neostylopyga sexpustulata* (walker)

Family BLATTELLIDAE

5. *Blattella germanica* (Linnaeus)
6. *Blattella humbertiana* (Saussure)

7. *Symploce biligata* (Walker)
8. *Anaplectella indica* Bey-Bienko
9. *Malaccina pallidula* Bolivar
10. *Balta acutiventris* (Chopard)

Family PYCNOSCELIDAE

11. *Pycnoscelus surinamensis*

Family DEROCALYMMIDAE

12. *Pseudoglomeris glomeris* (Saussure)
13. *Trichoblatta sericea* Saussur
14. *Stipnoblatta opaca* (Saussure)

Family POLYPHAGIDAE

Genus *Polyphaga* (Linnaeus), 1835

1. *Polyphaga indica* (Walker)

1886. *Polyphaga indica* Walker, *Cat. Brit. Mus. Lond.*, : 14.

1893. *Heterogamia indica* : Saussure, *Rev. suisse Zool.*, 1 : 3.

1957. *Polyphaga indica* : Princis, *Opusc. Ent.*, 22 : 89.

Material examined : District : nil : 1♂, 1♀, Nil, 19.ix.1973, coll. K.V. Lakhminarayan.

Diagnosis : Male : Head completely covered by pronotum; interocular space narrow, ocelli large; pronotum more than one and half time broad than long; tegmina extended beyond the abdomen; supraanal plate symmetrical, posterior margin transverse; subgenital plate a little asymmetrical, both of the lateral margin with tubercular spines; anteroventral margin of front femur with serially presence of hairs and distally with a large spine.

Colour : Body deep brown; pronotum with anterior and lateral margin with golden yellow line.

Female : Tegmina and wings absent; supranal plate with two lobes, posterior margin with a shallow notch; subgenital plate large, posterior margin rounded.

<i>Measurements (in mm.)</i>	<i>Male</i>	<i>Female</i>
Total body length	19.7-21.0	24.0-27.0
Pronotum length	06.5-08.0	9.0-10.8
Pronotum width	10.0-11.0	14.0-16.0
Tegmen length	23.0-28.0	-- --

Distribution : India : (Andhra Pradesh, Maharashtra, Orissa, Rajasthan).

Elsewhere : Iran.

Remarks : This species is first time recorded from Andhra Pradesh.

Genus *Theria* Billberg, 1820

1. *Theria petiveriana* (Linnaeus)

1820. *Cassida petiveriana* Linnaeus, *Syst. Nat.* (ed. 10)1 : 346.

1964. *Theria petiveriana* : Princis, *Orthopterorum Catalogus*, part 4 : 346.

Material examined : Cuddappha district : 2♂♂, 10, Kamgumadugu, 20-21.vii.1921, coll. H.S. Pruthi; District nil : 1♀♀, Diguva-metta, 19-23.vii.1929, coll. H.S. Pruthi

Diagnosis : Body medium size; head with vertex completely covered by pronotum; interocular space less than the distance between antennal sockets; ocelli distinct; pronotum covered with cilia like hairs, anterior and posterior margin rounded, lateral margin convex; tegmina extended at the end of the abdomen; wings vestigial; supranal plate hairy, asymmetrical; subgenital plate hairy asymmetrical with a pair of symmetrical styles; hind margin semicircular; anterior margin of front femur without spine.

Colour : Head with pronotum black; tegmina black with four pair of large golden yellow spots; legs black.

Female : Subgenital plate short; styles short.

<i>Measurements (in mm.)</i>	<i>Male</i>	<i>Female</i>
Total body length	18.5-20.0	20.0-21.0
Pronotum length	7.4-7.7	7.0-7.3
Pronotum width	13.0-13.6	12.8-13.4
Tegmen length	19.0-20.0	14.0-15.7

Distribution : India : (Andhra Pradesh, Kerala, Pondy-chery, Tamil Nadu).

Remarks : This species is easily recognized by its remarkable golden yellow spots on tegmina.

Family BLATTIDAE

Genus *Periplaneta* Burmeister, 1838

3. *Periplaneta americana* (Linnaeus)

1758. *Blatta americana* Linnaeus, *Syst. Naturae* (10th ed.), 1 : 424.

1924. *Periplaneta americana* : Chopard, *Rec. Indian Mus.*, 26 : 173.

1966. *Periplaneta americana* : Princis, *Orthopterorum Catalogus*, part 7 : 405.

Material examined : Mehbubnagar district : 2♂♂, Vetverpally, 17.iv.1985, coll. S.K. Chatterjee; 1♂, 1♀, Mannanur, 7.x.1998, coll. S.K. Mandal; Vishakhapatnam District : 1♀, Shivlingapuram, 17.x.1998, coll. S.K. Mandal.

Diagnosis : Male : Size large; head with vertex exposed; interocular space less than the distance between antennal sockets; ocelli small; pronotum flattened, smooth, sides deflexed; wider behind the middle, all angles broadly rounded; supraanal anal plate with V-shaped excavation at the posterior margin; subgenital plate symmetrical; anteroventral margin of front femur with strongly spined.

Colour : Reddish brown; pronotum with a yellow band at lateral margin and another broad at posterior margin; tegmina uniformly reddish brown. Female : Supranal plate with a deep acute medium emargination at posterior margin; subgenital plate with mesodistal portion valvular.

<i>Measurements (in mm.)</i>	<i>Male</i>	<i>Female</i>
Total body length	30.5-32	29.5-31.0
Pronotum length	8.0-8.2	8.3-8.5
Pronotum width	9.7-9.9	10.6-11.0
Tegmen length	28.0-28.5	29.0-29.5

Distribution : Cosmopolitan.

Remarks : It is one of the most important domestic cockroach pest and thrives in tropical and subtropical climates all over the world.

Genus *Neostylopyga* Sheford, 1911

4. *Neostylopyga sexpustulata* (Walker)

1871. *Polyzosteria sexpustulata* Walker, *Cat. Derm. Salt. Mus.*, 5 suppl. Blatt., : 36.

1966. *Neostylopyga sexpustulata* : Princis, *Orthopterorum Catalogus*, part 7 : 537.

Material examined : Vishakhapatnam district : 1♂, Vishakhapatnam, date Nil, coll. Indian Mus.

Diagnosis : Male : Head with vertex covered by pronotum; interocular space narrower than the distance between the antennal sockets; pronotum wider than long, anterior margin truncate, posterior margin a little convex medially; tegmina with small lateral pads; supraanal plate symmetrical, subgenital plate broad, posteriorly conical; anteroventral margin of front femur with 3 distally placed large spines.

Colour : Brown to dark brown; six brown spots present on the body.

<i>Measurements (in mm.)</i>	<i>Male</i>	<i>Female</i>
Total body length	24.0-30.0	22.0-27.0
Pronotum length	8.0-9.0	8.5-9.5
Pronotum width	9.0-10.0	8.5-9.5
Tegmen length	0.5-0.7	0.4-0.5

Distribution : India (Andhra Pradesh, Bihar, Orissa, Uttar Pradesh and Karnataka); Java; Indonesia.

Remarks : One specimens of this species has been found during present study. However, I have examined the specimens present in the National Zoological Collections.

Family BLATTELLIDAE

Genus *Anaplectella* Hanitsch, 1928

5. *Anaplectella indica* Bey-Bienko

1970. *Anaplectella indica* Bey-Bienko, *Ent. Rev. Wash.*, **48** : 525.

1971. *Anaplectella indica* : Princis, *Orthopterorum Catalogus*, part **14** : 1144.

Material examined : Hyderabad : 1 ♀, Hyderabad, 26.i.1964, coll. N. Borkhsenius.

Diagnosis : Female : Body small size; interocular space slightly narrower than the distance between antennal sockets; pronotum strongly transverse; tegmina extending beyond the abdomen; subgenital plate basally broad.

Colour : Tegmina with a dark apical spot.

<i>Measurements (in mm.)</i>	<i>Female</i>
Total body length	6.2
Pronotum length	1.5
Pronotum width	2.6
Tegmen length	5.3

Distribution : India : (Andhra Pradesh).

Remarks : I have included this species from literature Roth (1996).

Genus *Blattella* Caudell, 1903

6. *Blattella germanica* (Linnaeus)

1767. *Blatta germanica* Linnaeus, *Syst. Naturae*, **1**(2) (ed. 12) : 688.

1969. *Blattella germanica* : Princis, *Orthopterorum Catalogus*, part 13.

Material examined : District : nil : 2♂♂, Metturdam, 18.xi.1952, coll. A. P. Kapur; Mehbubnagar district : 2♂♂, 1♀, 17.iv.1985, coll. S. Chatterjee & S.K. Mandal; Warangal district : 1♀, Pakhal forest Rest House, 4.vii.1985, coll. P. Parui.

Diagnosis : Male : Body small size; head with vertex exposed; interocular space 3/5 wide between antennal sockets; tegmen with discoidal vein forked before middle point; abdominal tergites 2 to 7 with laterocaudal angle produced as lobes; supraanal plate semicircular, weakly convex at the posterior margin; subgenital plate with posterior margin forming a large broad rounded lobe; anterior margin of front femur with a row of heavy spines that decrease in length distally and terminate with two large spines.

Colour : General colour testaceous; pronotum with a pair of dark longitudinal bands.

Female : Supraanal plate moderately triangular, apex obtusely emarginated; subgenital plate large.

<i>Measurements (in mm.)</i>	<i>Male</i>	<i>Female</i>
Total body length	10.74	11.0
Pronotum length	0.3	0.3
Tegmen length	10.7	11.5

Distribution : Cosmopolitan.

Remarks : The so called "German cockroach" has been able to establish itself every where their man has settled.

7. *Blattella humbertiana* (Saussure)

1863. *Polyzosteria humbertiana* : Saussure, *Mem. Soc. Geneva*, 17 : 131.

1969. *Blattella humbertiana* : Princis, *Orthopterorum Catalogus*, part 13 : 842.

Material examined : Mehbubnagar district 1♂, 1♀, Mannanur, 11.iv.1985, coll. S. Chatterjee; District Nil : 1♀, Jotimatadi, 26.ii.1985, coll. S.S. Saha; Karnool district : 1♀, Karnool, 22.vi. coll. P. Parui.

Diagnosis : Male : Body small size; head with vertex exposed; supraanal plate strongly transverse, distal margin broadly convex; subgenital plate symmetrical.

Colour : Head yellow, frontal region yellowish brown; abdomen yellowish brown, each segment with a rectangular dark-brown spots, on each side which are connected by a narrow stripe of similar color.

<i>Measurements (in mm.)</i>	<i>Male</i>	<i>Female</i>
Total body length	11.5	12.0
Pronotum length	3.0	3.0
Pronotum width	3.5	3.5

Distribution : Widely distribution in the world.

Remarks : This species is the most common in the field, found among decaying vegetation and also on trees. This species is included in the fauna of Meghalaya Mandal (1995), Tripura and Arunachal Pradesh (in press).

Genus *Symploce* Hebard, 1916

8. *Symploce biligata* (Walker)

1868. *Ischnoptera biligata* Walker, *Cat. Blatt. Mus.*, London, : 123.

1924. *Ischnoptera fulvastra* Chopard, *Rec. Ind. Mus.*, 26 : 168.

1969. *Symploce biligata* : Princis, *Orthopterorum catalogus*, Part, 13 : 886.

Material examined : Adilabad district : 1♂, Generam Reserve Forest, 31.viii.1999, coll. S.K. Mandal; 1♀, Goppulod, Kawal Resv. forest, 2.ix.1999, Coll. S.K. Mandal; Kurnool district : 1♀, Gajal pally Forest Rest House, 22.vi.1995, coll. P. Parui.

Diagnosis : Male : Body medium size; head with vertex exposed; ocelli large and rounded; interocular space half of the length of distance between the antennal sockets; pronotum smooth, anterior margin much rounded, posterior margin obtusely angulated; tegmina exceeding the abdomen, the plical knotch scarcely indicated; radial vein bifurcate beyond the middle; tergite 7 at the base with two big rounded tubercles; supraanal plate with subtruncated at the posterior margin; subgenital plate with posterior margin indented on left side; styli similar, cylindrical at apex; anteroventral margin of front femur with 2 apical spines and 13 serially placed small spines.

Colour : Pronotum and tegmina with pale uniform color.

Female : Light yellowish brown; tegmina without hyaline areas; subgenital plate large.

<i>Measurements (in mm.)</i>	<i>Male</i>	<i>Female</i>
Total body length	12.5	12.0
Pronotum length	3.5	3.5
Tegmen length	10.7	12.5

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Meghalya, Orissa.

Elsewhere : Sri Lanka; Sumatra.

Remarks : This species is first time recorded from Andhra Pradesh.

Genus *Balta*

9. *Balta acutiventris* (Chopard)

1924. *Mareta acutiventris* Chopard, *Rec. Ind. Mus.*, **26** : 168.

1969. *Balta acutiventris* : Princis, *Orthopterorum catalogus*, part 13.

Material examined : Karnool district : 1 ♀, Gajalpalli, 22.vi.1985, coll. P. Parui.

Diagnosis : Female : Head with vertex exposed: interocular space less than the distance between the antennal sockets; pronotum wide, lateral margins very widely translucent without any marking; tegmina extending a little beyond the apex of abdomen; supraanal plate triangular notched at apex, forming lobes somewhat irregular; anteroventral margin of front femur with 2 apical spines.

Colour : Rufotestaceous species; abdomen yellow above; beneath brownish.

<i>Measurements (in mm.)</i>	<i>Female</i>
Total body length	9.5
Pronotum length	2.7
Tegmen length	10.0

Distribution : India : Andhra Pradesh.

Remarks : This species is first time recorded from this state.

Genus *Malaccina* (Bolivar)

10. *Malaccina pallidula* (Bolivar)

1897. *Theganopterys (Pseudectobia) pallidula* Bolivar, *Ann. Soc. Ent. France*, **66** : 287.

1908. *Lupparia pallidula* : Shelford, *Genera Insectorum*, **73** : 16.

1996. *Malaccina pallidula* : Roth, *Oriental Insects*, **30** : 351.

Material examined : Vishakhapatnam district : 1 ♀, Wangsara, 20.viii.1985 Coll. T.K. Mukherjee.

Diagnosis : Male : Body small size; head with a little exposed; inter ocular space less than the distance between antennal sockets; pronotum with anterior and posterior margin transverse, lateral sides obliquely convex; tegmina and wings reaching to about the end of the abdomen; anteroventral margin of front femur type A3; tarsal claws symmetrical; tergal segment 7th with a pair of deep setose fossae medially; supra annal plate asymmetrical.

Colour : Head yellowish; pronotal disk brownish yellow; tegmina yellowish hyaline.

Female : Interocular space as the distance between antennal sockets; supraanal plate with posterior margin convexly rounded; subgenital plate with posterior margin shallowly concave medially.

<i>Measurements (in mm.)</i>	<i>Male</i>	<i>Female</i>
Total body length	6.3-7.4	6.5-7.00
Pronotum length	1.6-1.9	1.8-3.00
Pronotum width	2.5	2.6
Tegmen length	5.1-5.5	5.0-5.3

Distribution : India : (Andhra Pradesh, Maharastra, Tamilnadu)

Remarks : This species is newly recorded from this state. It is previously recorded from Mumbai (Maharashtra).

Family PYCNOSCELIDAE

Subfamily PYCNOSCELINAE

Genus *Pycnoscelus* Scudder, 1816

11. *Pycnoscelus surinamensis* Linnaeus, *Syst. Naturar.*, 1 : 424

1758. *Blatta surinamensis* Linnaeus, *Syst. Naturae* (10th Ed.), 1 : 424

1903. *Pynoscclus surinamensis* : Rehn, *Trans. Am. Ent. Sec.*, 29 : 131 : 136

1904. *Pycnoscelus surinamensis* : Princis, *Orthopterum Catalogus*, part 6 : 264.

Material examined : Prakashan district : 1 ♀, Nagarjun Sagar Tiger Reserve, Srisilum 11.iv.1985, cell S. Chatterjee & S.K. Mandal.

Diagnosis : Female : Body medium size; head with vertex exposed; ocelli large; approximate to the eye; pronotum laterally rounded, posterior margin convex; tegmina and wings extending scarcely upto the end of abdomen; posterior margin of supraanal plate convexly rounded and weekly indented medially; subgenital plate with unequally rounded at apex; anteroventral margin of front femur with row of slender piliform spinules and terminates in one large spines (Type C1).

Colour : Pronotum shiny blakish brown with yellowish margin anteriorly; tegmina dark chestnut brown, marginal field yellowish brown.

<i>Measurements (in mm.)</i>	<i>Female</i>
Total body length	18.0
Pronotum length	5.1

Pronotum width	6.6
Tegmen length	18.98

Distribution : Cosmopolitan.

Remarks : This species normally exists as female. Occasionally parthenogenic males occur in cultures of *surinamensis* but they are non functional, when mated parthenogenic females. Roth, (1967).

Family DEROCALYMMIDAE

Genus *Pseudoglomeris* Brunner, 1893

12. *Pseudoglomeris glomeris* (Saussure)

1863. *Perisphaeria glomeris*, Saussure, *Mem. Soc. Genera*, 17 : 135.

1904. *Pseudoglomeris glomeris* : Kirby, *Syn. Cat. Orth.*, 1 : 190.

Material examined : Karnool district : 2♂♂, Nandayal, 22.iv.1985, Coll. P. Parui, Vishakhapattanam district : 1♂, 1♀, Wangsara, 23.viii.1985, Coll. T.K. Mukherjee; 1♂, R.V. Nagar, Vishakhapatnam, 24.viii.1985, coll. T. K. Mukherjee.

Diagnosis : Male : Size medium; body covered with small hairs; head with a little exposed; interocular space much smaller, ocelli large, oval shaped; pronotum elevated in the back side, anterior margin obtusely rounded, posterior margin straight and lateral margin rounded; tegmina leathery; extended beyond the last abdominal tergite; cerci extended beyond the supraanal plate; supraanal plate simple; subgenital plate asymmetrical.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Karnataka, Manipur, Orissa, Tamilnadu & West Bengal).

<i>Measurements (in mm.)</i>	<i>Male</i>
Total body length	14.0
Pronotum length	3.0
Pronotum width	3.5
Tegmen length	12.00

Remarks : *Pseudoglomeris glomeris* is newly recorded from Andhra Pradesh.

Genus *Trichoblatta* (Saussure & Zehntnery, 1895)

13. *Trichoblatta serica* (saussure)

1863. *Perispharia sericea*, Saussure, *Mem. Soc. Geneve*, 17 : 138.

1964. *Trichoblatta sericea* : Orthopterorum Catalogus, part 6 : 208.

Material examined : Andhra Pradesh. 1 ♂, No exact locality or data is known.

Diagnosis : Size small; body strongly arched shaped; head with vertex concealed or covered by pronotum; transverse, punctate, rounded on every side; elytra elongate; apex rounded; ulner vein branches 2-3 apically; supra and plate posteriorly a little arched; subgenital plate transeverse anteroventral margin of front femur with serially arranged small spines.

Colour : Black; femora and tibia dark brown, tassal segments yellowish brown.

Distribution : India (Andhra Pradesh, Bihar, Gujrat, Karnataka, Kerala, Maharashtra, Orissa, Sikkim.)

Remarks : This species is first time recorded Andhra Pradesh. It is previously reported in fauna of Arunachal Pradesh. Not recorded so far outside from India.

Stilpnoblatta Saussure and Zehntner, 1895

14. *Stilpnoblatta opaca* (Saussure)

1869. *Parahormetica bengalensis* Saussure, *Mem. Soc. Geneve*, 20 : 884.

1895. *Parahormetica (Stilpnoblatta) bengalensis* : Saussure and Zehntner, *Rev. suisse Zool.*, 3 : 44.

1964. *Stilpnoblatta bengalensis* : Princis, *Orthopterorum Catalogus*, part 6 : 275.

Material examined : Nil.

Diagnosis : Male : Body medium size; head with vertex exposed; ocelli small, globular; interocular space smaller than the distance between the antennal sockets; pronotum with anterior and posterior margin obtusely rounded; ist abdominal tergite usually specialized in the middle; tegmina extend beyond the abdomen; supraanal plate symmetrical, posterior margin with a small notch; subgenital plate symmetrical; anteroventral margin of front femur with a row of bristle of hairs and with a large spine.

Colour : Head and pronotum shiny, deep brown, antennae yellowish brown; tergite with deep brown medially and laterally.

Female : Body strongly arched shaped; tegmina and wings absent; subgenital plate with lateral margin wavy.

<i>Measurements (in mm.)</i>	<i>Male</i>	<i>Female</i>
Total body length	18.2	17.0
Pronotum length	05.0	05.8
Pronotum width	07.5	07.2
Tegmen length	18.5	--

Distribution : India (Andhra Pradesh, Bihar, Orissa and West Bengal).

Remarks : The shape of the head closely resemble with *P. surinamensis*. No specimen of this species has been recorded during the present study. I have included this species from literature K.P. Mukherjee (1989).

SUMMARY

The present paper deals with 14 species of Blattids distributed over 5 families and 13 genera collected from the state Andhra Pradesh. Six species are recorded for the first time from the state.

ACKNOWLEDGEMENT

The author is grateful to the Director Zoological Survey of India, Kolkata, for providing necessary laboratory facilities to carryout this study. Thanks are due to Dr. J.K. Jonathan, Additional Director and Dr. A. K. Hazra, Joint Director, Incharge (Ent. Div.), for giving through manuscript and giving suggestions.

REFERENCES

- Bruijning, C.F.A. 1948. Studies on Malayan Blattidae. *Zool. Meded. R. Mus. Nat. Hist. Leiden*, **29** : 1-174.
- Hanitsch, R. 1915. Malayan Blattidae, *J. Straits. Br. R. Asiat. Soc.*, **69** : 1.
- Kirby, W.F. 1904. A synonymic catalogus of Orthoptera, *Brit. Mus. Nat. Hist.*, **1** : 1-501.
- Mandal, S.K. 1995. Insecta : Blattariae. In : *Fauna of Meghalaya, State Fauna Series*, **4**(Part 3) : 353-384.
- Mandal, S.K. 2000. Insecta : Dictyoptera : Blattariae. In : *Fauna of Tripura, State Fauna Series*, **7**(Part-2) : 285-294.
- Mandal, S.K. 2006. Dictyoptera : Blattaria. In : *Fauna of Arunachal Pradesh, State Fauna Series*, **13**(Part 2) : 175-190.
- Mukherjee, K.P. 1989. Insecta : Dictyoptera : Blattaria. In : *Fauna of Orissa, State Fauna Series*, **1**(2) : 171-179. (Publ. *Zool. Surv. India*).
- Mukherjee, K.P. 1993. Dictyoptera : Blattaria. In : *Fauna of West Bengal, State Fauna Series*, **3**(Part 4) : 461-473.
- Princis, K. 1960. Zur Systematic der Blattarien. *EOS*, **36** : 429-49.

- Princis, K. 1963. Part-4 : Blattariae Subordo Polyphagoidea. In : M. Beier (ed.). *Orthopterorum Catalogus* : 75-172.
- Princis, K. 1966. Pars 8 : Blattariae. Subordo Blattoidea. In : Beier (ed.), *Orthopterorum Catalogus* : 402-614.
- Princis, K. 1971. Pars 13 : Blattariae : Subordo Blattoidea. In : Beier (ed), *Orthopterorum Catalogus* : 711-1038.
- Roth, L.M. 1967. Sexual isolation in parthenogeneric *Pycnoscelus surinamensis* (Linnaeus) and the application of the name *Pycnoscelus indicus* to its busexual relative (Dictyoptera : Blattaria : Pycnoscelinae). *Ann. Entom. Soc. Amer.*, **60** : 774-779.
- Roth, L.M. 1996. The Cockroach genera *Anaplecta*, *Anaplectella* and *Malaccina*, (Blattaria : Blattellidae : Anaplectinae and Blattellinae. *Oriental Insects*, **30** : 301-372.
- Rehn, J.W.H. 1951. Classification of the Blattaria as indicated by their wings. *Mem. Amer. Soc. Philad.*, No. **69** : 1-201.
- Shelford, R. 1906. Studies of the Blattidae. *Trans. Ent. Soc. London*, : 231-280.

INSECTA : HEMIPTERA : APHIDIDAE

B.C. DAS, C.K. SENGUPTA and N.K. PRAMANIK

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

Aphids are small soft bodied homopteran insects infesting a large number of plants. It infests tender shoots, buds, flowers and even roots. It also causes damage to plants by transmitting plant viruses. Sometimes crop production is hampered due to the damage caused directly or indirectly by aphids.

Andhra Pradesh being a very dry and hot area as a whole, not very congenial for aphids to thrive upon. Still quite a few species have been collected from the state by the first author. Though 650 species of aphids under 212 genera have been known from India, (L.K. Ghosh, 1998), not much have been reported from this state. Only few species have been reported so far (A.K. Ghosh, 1993). Here 11 species under 8 genera have been reported. This is the first consolidated list of aphid species from this state.

A list of aphid species collected from different areas of the state along with keys is given here.

LIST OF APHID SPECIES

Family **APHIDIDAE**
Subfamily **APHIDINAE**
Tribe **Aphidini**
Genus I. ***Aphis*** Linnaeus

1. *Aphis craccivora* Koch
2. *Aphis gossypii* Glover
3. *Aphis kurosawai* Takahashi
4. *Aphis nerii* Boyer de Fonscolombe

Genus II. *Toxoptera* Koch

- 5.
- Toxoptera aurantii*
- (Boyer de Fonscolombe)

Genus III. *Hysteroneura* Davis

- 6.
- Hysteroneura setariae*
- (Thomas)

Genus IV. *Melanaphis* Van der Goot

- 7.
- Melanaphis sacchari*
- (Zehntner)

Tribe **Macrosiphini**Genus V. *Macrosiphoniella* del Guercio

- 8.
- Macrosiphoniella sanborni*
- (Gillette)

Genus VI. *Macrosiphum* Passerini

- 9.
- Macrosiphum (Sitobion) rosaeformis*
- Das

Genus VII. *Myzus* Passerini

- 10.
- Myzus ranunculinus*
- (Walker)

Subfamily GREENIDEINAE

Genus VIII. *Schoutedenia* Rubsaamen

- 11.
- Schoutedenia emblica*
- (Patel & Kulkarni)

Key to the tribes of Subfamily APHIDINAE

1. Spiracles of abdominal segment 1 & 2 placed close together. Antennal tubercles often well developed **Macrosiphini**
- Spiracles of abdominal segment 1 & 2 placed apart. Antennal tubercles usually not well developed **Aphidini**

Key to the genera of Tribe Aphidini

1. Hind tibiae with a series of peg-like spines. Abdominal segment 5 & 6 with dense spinules ventrolaterally **Toxoptera** Koch
- Hind tibiae without such peg-like spines. Abdomen without any spinules on 5 & 6 segment ventrolaterally 2
2. Lateral tubercles on abdominal segments 1 & 7 posteroventral to the spiracles of these segments. Frons normal and without any projection **Aphis** L.
- Lateral tubercles on abdominal segments 1 & 7 posterodorsal to the spiracles of these segments. Frons with a projection just inner to the antennal socket 3
3. Cauda pale with medially constriction and about 0.6 to 0.8 times as long as siphunculus **Hysteroneura** Davis

- Cauda without any constriction and about as long as siphunculus
 *Melanaphis* Van der Goot

Genus I. *Aphis* Linnaeus

1758. *Aphis* Linnaeus *Syst. Nat.*, (10th Ed.) 1 : 451.

Key to the species of the genus *Aphis* Linnaeus

- Ultimate rostral segment stiletto-shaped 1
 Ultimate rostral segment not stiletto-shaped 2
1. P. t. about 1.5-2.4 times as long as base of segment VI. U.r.s. about 1.5-1.6 times as long as h.t. 2 *kurosawai* Takahashi
2. First segment of hind tarsus with 3 hairs. Siphunculi about twice as long as cauda with 10-12 hairs *nerii* Boyer de Fonscolombe
- First segment of hind tarsus with 2 hairs 3
3. Abdominal dorsum sclerotic, with polygonal reticulations *craccivora* Koch
- Abdominal dorsum rather pale without polygonal reticulations 4
4. U.r.s. as long as or little longer than h.t. 2, Cauda with 4-7 hairs. Cauda pale to dusky *gossypii* Glover

1. *Aphis craccivora* Koch

1854. *Aphis craccivora* Koch, *Die Pflanzen Aphidien*, 1 : 124.

1990. *Aphis craccivora* Koch, Ghosh, L.K., *Mem. zool. Surv. India*, 17(3) : 22.

Material examined : 4 apterae on Bean, Peranki, Vijaywada, 2.1.99; 2 apterae and 2 alatae on *Solanum* sp., Araku valley, 12.1.99.

Diagnosis : Abdominal dorsum sclerotic with polygonal reticulations.

Biological notes : Black aphids on inflorescences and leaves. Leaves curled due to infestation.

Distribution : India : Andhra Pradesh (Krishna and Visakhapatnam districts) and all over India.

Elsewhere : Cosmopolitan.

2. *Aphis gossypii* Glover

1877. *Aphis gossypii* Glover, *Rept. Comm. Agr. U.S.A.* for 1816 : 36.

1990. *Aphis gossypii* Glover; Ghosh, L.K., *Mem. zool. Surv. India*, 17(3) : 35.

Material examined : 6 apterae and 2 alatae on Sapodilla plum, Kadiyam, Rajamundy, 5.1.99; 2 apterae on Merigold, Araku Valley, 10.1.99; 4 apterae on guava, Paranki, Vijaywada, 2.1.99.

Diagnosis : P.t. usually less than 3 times as long as base of a.s. vi, siphunculi upto twice as long as cauda which bears 4-7 hairs.

Biological notes : Yellowish ash colour aphids were collected from undersurface of tender leaves and flowers, moderate infestation, no ants were found to attend the aphids.

Remarks : This is a highly polyphagus species found abundantly in the area in comparison with other species. Its infestation of Sapodilla plum extends its host range.

Distribution : India : Andhra Pradesh (East Godavari, Krishna and Visakhapatnam districts) and all over India.

Elsewhere : Virtually Cosmopolitan.

3. *Aphis Kurosawai* Takahashi

1921. *Aphis kurosawai* Takahashi, *Aphididae of Formosa*, 1 : 53

1990. *Aphis kurosawai* Takahashi, Ghosh, L.K., *Mem. zool. Surv. India*, 17(3) : 41.

Material examined : 3 alatae and 1 apterous viviparous female, on undet compositae, Hyderabad, 31.12.98.

Diagnosis : P.t. about 1.5-2.5 the base of a.s. vi, u.r.s. stillete shaped and about 1.5-1.6 times as long as h.t. 2, Siphunculi about 1.1-1.3 times as long as cauda which bears 7-11 hairs.

Biological notes : Blackish alatae and apterous aphids were collected from inflorescences.

Distribution : India : Andhra Pradesh (Hyderabad), and all over.

Elsewhere : Bhutan, China, Nepal, Taiwan, Thailand.

4. *Aphis nerii* Boyer de Fonscolombe

1841. *Aphis nerii* Boyer de Fonscolombe, *Annls. Soc. Ent. Fr.*, 10 : 179.

1990. *Aphis nerri* B.d.F, Ghosh, L.K., *Mem zool. Surv. India*, 17(3) : 48

Material examined : 1 alate vivipareus female on *Calotropis* sp. Metha Bhumi, Vijayawada, 3.1.99.

Diagnosis : Siphunculi cylindrical imbricated, about 2.0 × cauda which bears 11 hairs.

Biological notes : Yellowish insect was collected from tender leave.

Distribution : India : Andhra Pradesh (Krishna district) and all over India.

Elsewhere : Virtually Cosmopolitan.

Genus II. *Toxoptera* Koch

1856. *Toxoptera* Koch, *Die Pflanzen Aphiden*, 3 : 253.

5. *Toxoptera aurantii* (Boyer de Fonscolombe)

1851. *Aphis aurantii* B.d.F., *Ann. ent. Soc. Fr.*, 10 : 178.

1986. *Toxoptera aurantii* (B.d.F.), Ghosh, L.K., *Tech. Monogr. No. 16, Zool. Surv. India*, : 31.

Material examined : 6 apterae on *Citrus* sp. Araku Valley, 11.1.99.

Diagnosis : Hind tibiae with peg like structure. Lateroventral area of abdominal segments 6-7 with spinular striae. Siphunculi as long as or longer than cauda which bears 9-17 hairs. F.T.C. 3.3.3.

Biological notes : Dark black aphids were collected from undersurface of tender leaves. Small ants present.

Distribution : India : Andhra Pradesh (Araku Valley) and throughout India.

Elsewhere : Virtually cosmopolitan.

Genus III. *Hysteroneura* Davis

1919. *Hysteroneura* Davis, *Can. Ent.*, 51 : 263.

6. *Hysteroneura setariae* (Thomas)

1878. *Siphonophora setariae* Thomas, *Bull. Ill. St. Lab. nat. Hist.*, 1(2) : 5

1986. *Hysteroneura setariae* (Thomas), Ghosh, L.K., *Tech. Monogr. No. 16, Zool. Surv. India* : 33

Material examined : 5 apterae, Grass, Kadiyam, Rajamundry, 5.1.99.

Diagnosis : Cauda pale, medially constricted with 4 hairs.

Biological notes : Blackish aphids were collected from inflorescences, no ants were found in association with the aphids.

Distribution : India : Andhra Pradesh (East Godavari dist.) and all over India.

Elsewhere : Widely distributed.

Genus IV. *Melanaphis* Van der Goot

1917. *Melanaphis* Van der Goot, *Contrib. Fauna Indes Neerl*, 1(3) : 61.

7. *Melanaphis sacchari* (Zehntner)

1897. *Aphis sacchari* Zehntner, Arch. Srikerind Ned. Ind., 5 : 551

1980. *Melanaphis sacchari* (Zehntner), Raychauduri, D.N. (ed), *Mono Zool. Soc. Cal.*, : 66

Material examined : 2 apterae on Sugar cane, Vijaywada, 3.1.99.

Diagnosis : Siphunculi longer than basal width. Cauda with 9-11 hairs. Longest hair on abdominal tergite shorter than to as long as b.d. III.

Distribution : India : Andhra Pradesh (Krishna districts) and all over India.

Elsewhere : Widely distributed but not known from Europe.

Key to the genera of Tribe *Macrosiphini*

U.s.r. stiletto-shaped *Macrosiphoniella* del Guerio

U.r.s. never stiletto-shaped 1

1. Siphunculi reticulated with iso-diametrical hexagonal cells. Apterae with secondary rhinaria
Macrosiphum Passerini

– Siphunculi cylindrical or clavate but not reticulated. Apterae without any secondary rhinaria *Myzus* Passerini

Genus V. *Macrosiphoniella* del Guercio

1911. *Macrosiphoniella* del Guercio, Redia, 7 : 331

8. *Macrosiphoniella sanborni* (Gillette)

1908. *Macrosiphum sanborni* Gillette, *Canad. Ent.*, 40 : 65

1986. *Macrosiphoniella sanborni* (Gillette), Ghosh, L.K., *Tech. Monogr. No. 16, Zool. Surv. India* : 99.

Material examined : 5 apterae on Chrysanthemum, Kadiayam, Rajamundry; 5.1.99.

Diagnosis : Siphunculi shorter than cauda and reticulated on distal half. Secondary rhinaria on antennal segment III never less than 10. Ante siphuncular selerite well developed. Dorsal abdominal hairs on sclerotic bases.

Biological note : Dark black aphids were collected from tender shoots and under surface of young leaves, moderate infestation, no ants.

Distribution : India : Andhra Pradesh (East Godavari dist.) and all over India.

Elsewhere : Cosmopolitan.

Genus VI. *Macrosiphum* Passerini

1860. *Macrosiphum* Passerini, Gli Afidi. : 27.

9. *Macrosiphum (Sitobion) rosaeformis* Das

1918. *Macrosiphum rosaeformis* Das, Mem. Indian Mus., 6(4) : 158

1986. *Macrosiphum (Sitobion) rosaeformis* Das, Ghosh, L.K., Tech. Monogr. No. 16. Zool. Surv. India, : 106.

Material examined : 3 apterae on *Rosa* sp., Araku Valley, 10.1.99.

Diagnosis : Antennal segment III with secondary rhinaria on basal half, processus terminalis shorter than antennal segment III. Hairs on abdominal dorsum shorter than b.d. III. Siphunculi about 0.20-0.30 times as long as body.

Biological notes : Brownish aphids were collected from tender shoots and buds.

Distribution : India : Andhra Pradesh (Visakhapatnam dist.) and all over India.

Elsewhere : Africa, Japan, Nepal, Pakistan and Taiwan.

Genus VII. *Myzus* Passerini

1860. *Myzus* Passerini, Gli Afidi, : 27.

10. *Myzus ranunculinus* (Walker)

1852. *Aphis ranunculinus* Walker List specimens Hemipterous Br. Mus., 4 : 1046.

1980. *Myzus ranunculinus* (Walker), Raychaudhuri, D.N. (ed.). Mono. zool. Soc. Cal., : 217.

Material examined : 7 apterae on tobacco, Katheru, Rajamundry, 6.1.99.

Diagnosis : Siphunculi cylindrical, longer than width of head across outer margin of eyes. Processus terminalis longer than segment III. u.r.s. longer than h.t. 2.

Biological notes : Greenish aphids infested under surface of tender leaves, no ants.

Distribution : India : Andhra Pradesh (East Godavari dist.), West Bengal.

Elsewhere : Europe and Japan.

Subfamily GREENIDEINAE

Tribe Cervaphidini

Genus VIII. *Schoutedenia* Rubsaamen11. *Schoutedenia emblica* (Patel & Kulkarni)

1952. *Cerciaphis emblica* Patel and Kulkarni, Curr. Sci., 21 : 350.

1993. *Schoutedenia emblica* (Patel and Kulkarni), Ghosh, A.K., Fauna of India (Homoptera : Aphididae) pt. 6 : 46

Distribution : India : Andhra Pradesh, (Baptala), Maharashtra, Meghalaya, Tamil Nadu, Tripura, West Bengal.

Elsewhere : Nepal.

Remarks : This is reported from published literature since the material was not available.

SUMMARY

A total of 11 species under 8 genera have been reported here. Reported all species belonged to subfamily Aphidinae except one. The non availability of species of other subfamilies may be due to hot and dry climatic condition and restriction of distribution of host plants. Extensive exploration may result in increasing species number taking into the size of the state and the areas remain to be explored.

ACKNOWLEDGEMENT

The authors are grateful to the Director for the encouragement and facilities provided to carry out this work. Thanks are also due to Dr. L.K. Ghosh, Emeritus Scientist, for manifold helps during the course of this study.

REFERENCES

- Ghosh, A.K. 1993. *Fauna of India and adjacent countries*, (Homoptera : Aphididae), part. 6 : 1-330.
- Ghosh, L.K. 1986. A compectus of Aphididae (Homeptera) of Himachal Pradesh in Northwest Himalaya, India. *Tech. Monogr. No. 16* : 1-282. *Zool. Surv. India*
- Ghosh, L.K. 1990. A taxonomic review of the genus *Aphis* Linnaeus (Homoptera : Aphididae) in India. *Mem. zool. Surv. India*, 17(3) : 1-159.
- Raychaudhuri, D.N. (ed.) 1980. Aphids of North East India and Bhutan. The Zoological Society, Cal., : 1-521.

INSECTA : HEMIPTERA : HOMOPTERA : CERCOPOIDEA : MEMBRACIDAE : FULGOROIDEA

B. BISWAS, M. GHOSH and ANIMESH BAL

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The present study is an consolidated account of some of the supperfamilies like Cercopoidea, Fulgoroidea and the family Membracidae under the superfamily Cicadelloidea. The account deals with 27 species under 19 genera belonging to 7 families. Of which, 24 species under 19 genera (marked a asterick*) are recorded for the first time from the state of Andhra Pradesh.

The materials deals with this paper were collected by the different survey parties as well as specimens housed in the National Zoological collections. Beside, the species recorded by earlier workers have also been incorporated.

For each species the original reference and subsequent references are given. Keys to the families, subfamilies, genera and species are provided for easy identification of various taxa, general diagnosis and distributional record of each species within the state of Andhra Pradesh in India and abroad have been cited. A chart has been provided to show the distribution of each species in different districts of Andhra Pradesh.

SYSTEMATIC ACCOUNT

Suborder HOMOPTERA

Superfamily CERCOPOIDEA

Family 1. APHROPHORIDAE

Genus 1. *Clovia* Stal, 1866

1. *Clovia bipunctata* Kirby*

2. *Clovia puncta* (Walker)*

Genus 2. *Poophilus* Stal, 1866

3. *Poophilus costalis* (Walker)*

Genus 3. *Ptyelus* St. Farg. & Serville, 1825

- 4.
- Ptyelus nebulosus*
- (Fabricius)*

Superfamily CICADELLOIDEA

Family 1. MEMBRACIDAE

Subfamily 1. OXYRHACHINAE

Genus 4. *Oxyrhachis* Germer, 1835

- 5.
- Oxyrhachis punctatus*
- Ananthasubramanian

- 6.
- Oxyrhachis taranda*
- (Fabricius)*

Subfamily 2. CENTROTINAE

Genus 5. *Leptocentrus* Stal, 1866

- 7.
- Leptocentrus leucaspis*
- (Walker)

- 8.
- Leptocentrus taurus*
- (Fabricius)*

Genus 6. *Otinotus* Buckton, 1903

- 9.
- Otinotus oneratus*
- Buckton*

Genus 7. *Tricentrus* Stal, 1866

- 10.
- Tricentrus congestus*
- (Walker)*

- 11.
- Tricentrus pilosus*
- Ananthasubramanian and Ananthakrishnan

Genus 8. *Telingana* Distant, 1908

- 12.
- Telingana paria*
- (Fairm)*

Genus 9. *Gargara* Amy. & Serv., 1843

- 13.
- Gargara robusta*
- Distant*

- 14.
- Gargara citrea*
- Distant*

Superfamily 3. FULGOROIDEA

Family 1. ARAEOPIDAE

Genus 10. *Sarida* Melichar, 1903

- 15.
- Sarida rostrata*
- Melichar*

Genus 11. *Pundaluoya* Kirkaldy, 1902

- 16.
- Pundaluoya pulchella*
- Distant*

Genus 12. *Nilaparvata* Distant 1906

- 17.
- Nilaparvata lugens*
- Stal*

Genus 13. *Toya* Distant, 1906

- 18.
- Toya attenuata*
- Distant*

Genus 14. *Liburnia* Stal, 1866

- 19.
- Liburnia pallescens*
- Distant*

20. *Liburnia furcifera* Horvath

21. *Liburnia dohertyi* Distant*

Family 2. EURYBRACHIDAE

Genus 15. *Messana* Stal, 1858

22. *Messana nebulosa* Stal*

Genus 16. *Eurybrachys* Guerin, 1843

23. *Eurybrachys tomentosa* Fabricius*

24. *Eurybrachys spinosa* Fabricius*

Family 3. DICTYOPHARIDAE

Genus 17. *Thanatodictya* Kirkaldy 1906

25. *Thanatodictya lineata* Donovan*

Family 4. ISSIDAE

Genus 18. *Tatva* Distant, 1906

26. *Tatva bufo* Distant*

Family 5. CIXIIDAE

Genus 19. *Menemosyne* Stal, 1866

27. *Menemosyne punctipennis* Distant*

Key to Super families of the Suborder HOMOPTERA

1. Postclypeus greatly expanded occupying most of the face and expanding on the dorsal side; hind legs with tibiae elongate bearing one or two lateral and a double apical groups of small spine. CERCOPOIDEA
- Postclypeus reduced not expanded to the dorsal side of head; hind legs otherwise .. 2
2. Hind coxae immobile; tegulae usually present; 1A and 2A of fore wings to form a “Y” vein FULGOROIDEA
- Hind coxae mobile; tegulae absent; 1A & 2A of fore wings not forming a “Y” vein CICADELLOIDEA

Superfamily 1. CERCOPOIDEA

Cercopids, are characterized by two ocelli, on the vertex ; third tibiae with stout teeth short spine at the apex. Cercopids with adults have a great power leaping, thereby known as frog hoppers as many of the nymphs of these insects live in cockoo spits they are also known as “cuckoo-spits”

This group is represented by nearly 2368 species belonging to 326 genera in the world (Animal resources of India, State of Art, Zoological survey of India 1991).

In India about 190 species in 37 genera of 3 families are known (Ghosh *et al.* 2000), The information available on cercopid fauna of Andhra Pradesh is very meagre. All the species constitute the new record from the state.

Family 1. APHROPHORIDAE

Key to genera of the family APHROPHORIDAE

1. Face more or less convexly produced 2
- Face more or less flattened not convexly produced *Clovia*
2. Clypeus slightly passing the apices of the anterior coxae *Poophilus*
- Clypeus reaching but not extending beyond the apices of the anterior coxae .. *Ptyelus*

Genus 1. *Clovia* Stal, 1866

1866. *Clovia* Stal, Hem. Afr., 4 : 75.

Key to species of the genus *Clovia*

1. Apical area of the tegmina sub hyaline, crossed by two irregularly bent oblique tawny fasciae; head as long as the medial length of pronotum *bipunctata*
- Apical area of the tegmina never possesses any oblique tawny fasciae; head a little shorter than the medial length of pronotum *puncta*

1. *Clovia bipunctata* Kirby*

1891. *Clovia bipunctata* Kirby, J. Linn. Soc. zool., 24 :163.

1908. *Clovia bipunctata* : Distant. Fauna Brit. India, 4 :

1999. *Clovia bipunctata* : Biswas *et al.*, Fauna of Meghalaya, State Fauna Series, 4(Part 4) : 475.

Material examined : 1 ex., Rajamundry, East Godavari Dist., 20.10.98, S.P. Chakraborty & party coll.

Digagognostic character : The apical area of tegmina subhyaline and crossed by two oblique tawny fasciae, a black spot at posterior angle of inner margin of tegmina; head as long as the medial length of pronotum.

Length : 6-8 mm.

Distribution : India : Andhra Pradesh (Dist. East Godavari); Bihar; Meghalaya; Orissa; Pondicherry; Sikkim; Tripura; West Bengal.

Elsewhere : Java; Japan; Sri Lanka.

2. *Clovio puncta* (Walker)*

1851. *Ptyelus puncta* Walker, List. Hom., 3 : 718.

1908. *Clovio puncta* : Distant, *Fauna Brit. India*, 4 : 94.

1999. *Clovio puncta* : Biswas *et al.*, *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 476.

Material examined : 1 ex., Rajamundry, East Godavari, Dist., 20.10.98, S.P. Chakraborty and party coll.; 1 ex., Anandapuram, Visakhapatnam Dist. 23.10. 98, S.P. Chakraborty and party coll., 2 exs Osmania University campus, Hyderabad, Ranga Reddi Dist., S.K.Chatterjee and party coll. : 1ex. Machlipattnam, Krishna Dist., 15.10. 98, S.P. Chakraborty and party coll. 3ex. Chitval, Nellore (South), Dist., 28.5.2000, S.K.Chatterjee and party coll., 2exs. Kamasinghavaram, West Godavari Dist., 4.10.98, S.K.Mandal and party coll.; 3exs., Venkateshwar, Chittoor Dist., 1.10.98, S.K.Mandal and party coll.; 1ex. Kudura, Cuddapah Dist., 4.1.2000, G.C. Sen and party coll.; 1ex., Madherpuri, East Godavari Dist., 19.10.98, S.P. Chakraborty and party coll.; 3exs., Betamcherta, Kurnool Dist., 14.3.98, S.K. Chatterjee and party coll.

Diagnostic character : Body pale tawny brown, palely pilose; sternum with a piceous spot behind anterior coxa; head a little shorter than the medial length of pronotum; tegmina with a black dot like spot at posterior angle of inner margin; anterior margin of face with a black spot on each side; pronotum with some darker longitudinal lines.

Length : 6 mm.

Distribution : India : Andhra Pradesh (Dists. Cuddapah, Chittoor, Godavari (East), Godavari (West), Kurnool, Nellore (South), Ranga Reddy), Bihar; Gujarat; Maharashtra; Meghalaya; Orissa; Sikkim; Tripura; West Bengal.

Genus 2. *Poophilus* Stal, 1866

1866. *Poophilus* Stal, Hem. Afr., 4 : 72.

3. *Poophilus costalis* (Walker)

1851. *Ptyelus costalis* Walker, List. Hom., 3 : 707.

1908. *Poophilus costalis* : Distant, *Fauna Brit. India*, 4 : 86.

1999. *Poophilus costalis* : Biswas *et al.*, *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 474.

Material examined : 1ex., Adilabad Dist., 6.12.99. P.H. Roy and party coll. 1ex., Golconda forte, Ranga Reddi Dist., 13.10.98, S.P. Chakraborty and party coll.

Diagnostic character : Body tawny brown, thickly pilose; five very small black spots on central apical margin of vertex; tegmina with central margin paler and broader on apical area; face and disk of the sternum fuscous or piceous.

Length : 9-10 mm.

Distribution : India : Andhra Pradesh (Dist. Ranga Reddy), Karnataka, Maharashtra, Meghalaya.

Elsewhere : Bangladesh; Singapore; Sri Lanka; South and West Africa.

Genus 3. *Ptyelus* St. Farg. & Serv., 1825

1825. *Ptyelus* St. Farg. & Serv., *Enc. Meth.*, **10** : 608.

4. *Ptyelus nebulosus* Fabricius*

1794. *Cercopis nebulosus* Fabr., *Syst. Ent.*, **4** : 50.

1908. *Ptyelus nebulosus* : Distant, *Fauna Brit. India*, **4** : 88.

1999. *Ptyelus nebulosus*: Biswas *et al.*, *Fauna of Meghalaya, State Fauna Series*, **4**(Part 4) : 476.

Material examined : 1 ex., Guntimadugo black forest, Khamam Dist., P. H. Roy and party coll.

Diagnostic character : Body pale yellowish grey, thickly pilose; head with two small black spots at the anterior margin; tegmina with an oblique transverse spot beyond the middle of the costal margin, an oblique anterior fascia, a large spot varied with fuscous at the commissure and a minute costal spot towards the apex yellowish grey; the vertex is slightly shorter than the pronotum at the middle and subtriangularly rounded in front; the pronotum has two small but distinct foveate spots near its anterior margin

Length : 10-12 mm.

Distribution : India: Andhra Pradesh (Dist. Khamam); Maharashtra.

Superfamily 2. CICADELLOIDEA

Family 1. MEMBRACIDAE

Membracids, are characterised by three jointed tarsi, prothorax produced backward into a process, ocelli placed between the eyes; antennae in front of and between the eyes. Horn like process of the pronotum, very often assuming curious shapes in different species, have earned them the name "cow bugs or horn bugs. Although capable to fly they prefer to hop about when disturbed and this habit earned them the popular name "tree hoppers"

This group is represented by nearly 2300 species in the world (Animal resources in India, State of Art, Zoological Survey of India, 1991) while Ananthasubramanian (1996) had described 23 species under 42 genera in his Fauna of India (Homoptera : Membracidae) where he recorded three species viz. *Oxyrhachis punctatus*, *Tricentrus pilosus* and *Leptocentrus leneaspis* from the state of Andhra Pradesh. The other 7 species under 6 genera are recorded for the first time from the state.

Key to Subfamilies of family MEMBRACIDAE

1. Scutellum rudimentary or obsolete, entirely concealed by pronotum, well developed propleural and metapleural process, fore tibiae dilated..... OXYRHACHINAE
2. Scutellum distinct and more or less uncovered, propleural and metapleural process absent CENTROTINAE

Subfamily 1. OXYRHACHINAE

Genus 4. *Oxyrhachis* Germer, 1835

1835. *Oxyrhachis* Germer., *Slib. Rev. Ent.*, 3 : 232.

Key to species of the genus *Oxyrhachis*

1. Posterior process short, not reaching the tegminal tips *punctatus*
- Posterior process long, distinctly extending beyond tegminal tips; apex of the posterior process only moderately elevated *taranda*

5. *Oxyrhachis punctatus* Ananthasubramanian

1980. *Oxyrhachis punctatus* Ananthasubramanian, *Rec. zool. Surv. India, Occ. Paper No.*, 16 : 6.

1996. *Oxyrhachis punctatus* : Ananthasubramanian, *Fauna of India, Membracidae* : 47.

Diagnostic characters : Head, pronotum grayish brown, cranial callosities distinct, upper margin of vertex arcuate, lateral margin of foliate lobes rectangularly rounded with inner angles acute; ocelli closer to each other than to eyes and situated above c-o line, frontoclypeus grayish, tinged with red, extending slightly below lower margin of vertex, tips truncate, slightly upturned, longly pilose supra ocular callosities large, black, suprahumeral horns about as long as space between their bases, as viewed from front directed upward and outward, tips acute, posterior process grayish black, ventral keel finely serrate and not reaching the tip of the tegmina.

Length : 6-7 mm.

Distribution : India : Andhra Pradesh (Dist. Nalgonda)

Remarks : Since this species was recorded by Ananthasubramanian (1996) from Nalgonda Dist. of Andhra Pradesh in his *Fauna of India (Membracidae)*, it has been incorporated in the present study. Authors could not get the specimens to examine personally.

6. *Oxyrhachis taranda* (Fabricius)

1798. *Membracis tarandus* Fabr., *Ent. Syst. Suppl.*, : 514.

1980. *Oxyrhachis tarandus* : Distant. *Fauna Brit. India*. 4 : 4.

1999. *Oxyrhachis taranda* : Ananthasubramanian, *Fauna of India Membracidae*, : 50.

Material examined : 5exs., Golabasti, Pathancheru, Medak, Dist., 11.X.98, S.P. Chakrabarti and party coll.; 1ex., Vampally, Cuddapah Dist., 2.1.02, G.C.Sen and party coll.; 6exs, Golconda forte, Ranga Reddy Dist., 13.X.98, S.P. Chakrabarti and party coll.

Diagnostic characters : Body fuscous or ferruginous, pronotum punctate; head apically ochraceous and frontally piceous; lateral process of pronotum subhorizontal, strongly tricarinate, seen from the front upwardly recurved; posterior process long, extending beyond the tegminal apices, upwardly recurved beneath laminately ampliate finely serrate; tegmina dull hyaline, the base pale ferruginous.

Length : 7-9 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapah, Medak, Ranga Reddi); Karnataka; Tamil Nadu; West Bengal.

Elsewhere : Egypt; Pakistan; South Africa.

Subfamily 2. CENTROTINAE

Genus 5. *Leptocentrus* Stal, 1866

1866. *Leptocentrus* Stal, *Hem. Afr.*, 4 : 87 & 90

Key to the species of the genus *Leptocentrus*

1. Lateral pronotal process slender, strongly recurved, centrally carinate, posterior process recurved from near base; scutellum black *leucaspis*
- Lateral pronotal process robust, tricarinate above, and less recurved, scutellum cretaceously sericeous *taurus*

7. *Leptocentrus leucaspis* (Walker)

Centrotus leucaspis Walker, *List. Hom. Suppl.*, : 158.

1908. *Leptocentrus leucaspis* : Distant, *Fauna Brit. India*, 4 : 30.

1994. *Leptocentrus leucaspis* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 75.

Material examined : 2exs., Rampur, Adilabad Dist. 28.VIII.98, S.K. Mandal and party coll.

Diagnostic characters : Head, pronotum, scutellum, abdomen beneath black; the lateral pronotal processes slender, strongly recurved and centrally carinate, posterior process recurved from near base, tricarinate above and touching the apex of the interior margin of tegmina which is ochraceous, punctate at base and the costal margin black.

Length : 7-9 mm.

Distribution : India : Andhra Pradesh (Dst. Adilabad); West Bengal.

Ealsewhere : Philippines; Sri Lanka.

8. *Leptocentrus taurus* (Fabricius)

1775. *Membracis taurusn* Fab., *Syst. Ent.*, : 676.

1908. *Leptocentrus taurus* : Distant, *Fauna Brit. India*, 4 : 28.

1994. *Leptocentrus taurus* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 76.

Material examined : 2exs., Rampur, Adilabad Dist. 28.VIII.99, S.K. Mandal and party coll., 1ex., Sri Kalabasti, Chittor Dist., 5.1.2000. G.C. Sen and party coll.

Diagnostic character : Head, pronotum black; scutellum cretaceously sericeous; abdomen beneath black ; transverse lateral process robust and less recurved ; posterior pronotal process strongly tricarinate above, curved and apically touching the interior margin of tegmina; tegmina pale bronzy, narrowly oblique and punctate at base with a narrow piceous submarginal streak.

Length : 6-8 mm.

Distribution : India : Andhra Pradesh (Dist. Adilabad, Chittor); Assam; Sikkim; West Bengal.

Elsewhere : Borneo.

Genus 6. *Otinotus* Buckton, 1903

1903. *Otinotus* Buckton, *Monogr. Membrac.*, : 233.

9. *Otinotus oneratus* Buckton*

1903. *Onetus oneratus* Bucton, *Monogr. Membrac.*, : 233.

1908. *Onetus oneratus* : Distant, *Fauna Brit. India*, 4 : 40.

1994. *Otinotus oneratus* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 77.

Material examined : 1ex., Golconda forte, Ranga Reddi, Dist., 13.10.98, S.P. Chakraborti and party coll.; 4exs. Golabasti, Pathancheru, Medak Dist., 11.10.98, S.P. Chakraborti and party coll.; 1ex. Srisailam, Prakasan Dist., 14.10.98, S.K. Mandal and party coll.; 6 exs., Vempally, Cuddaph Dist., 10.1. 02, G.C. Sen and party coll.; 1es. Samsabad, Meheboobnagar Dist., 10.10.98, S.P. Chakraborty and party coll.

Diagnostic chacracter : Head and pronotum castaneous or pieceous brown; posterior pronotal process long, slender, contageous to scutellum and then sinuate, impinging on tegmina, its apex passing the posterior angle of inner margin of tegmina, tegmina punctate and ochraceously opaque at base; lateral pronotal process slender obliquely upturned, apically little recurved.

Length : 6 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddaph; Medak, Meheboobnagar, Prakasan, Ranga Reddi); Bihar; Maharashtra, West Bengal.

Elsewhere : Sri Lanka.

Genus 7. *Tricentrus* Stal, 1866

1866. *Tricentrus* Stal, *Hem. Afr.*, 4 : 80.

Key to species of the genus *Tricentrus*

1. Posterior process with basal half attenuate, slightly arched, apex acute and impinging on tegmina, suprahumeral horns obliquely projecting on tegmina, suprahumeral horns obliquely projecting forward its apices subacutely truncate *congestus*
- Posterior process with its apex black, acute slightly raised and not impinging on tegmina; suprahumeral horns variable, obliquely directed upward and outward its apices subacute, directed backward *pilosus*

10. *Tricentrus congestus* (Walker)*

1858. *Centotus congestus* Walker, *Ins. Samud. Hom.*, : 79.

1908. *Tricentrus congestus* : Distant, *Fauna Brit. India*, 4 : 54.

1996. *Tricentrus congestus* : Ananthasubramanian, *Fauna of India*, : 81.

Material examined : 1ex. Golconda forte, Ranga Reddi Dist., 13. 10 98, S.P. Chakraborti and party coll.

Diagnostic characters : Head, pronotum, body beneath pieceous: posterior pronotal process short, robust, centrally carinate; lateral pronotal process narrower with its apex subacute in its frontal view whereas it looks somewhat long, moderately broad in its dorsal view.

Length : 4.5-5 mm.

Distribution : India : Andhra Pradesh (Dist. Ranga Reddi); Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : China, Malasia, Mayanmar, Philippine island and Singapore.

11. *Tricentrus pilosus* Ananthasubramanian and Ananthakrishnan

1975. *Tricentrus pilosus* Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 225

1996. *Tricentrus pilosus* : Ananthasubramanian, *Fauna of India*, : 99.

Diagnostic characters : General colouration brown; head longly pilose silvery hairs, vertex with upper margin slightly arcuate and lower margin strongly oblique and continued

to frontoclypeus, pronotum light brown laterally, darker medially; suprahumeral callosities black, humeral angles light brown with posterior margin rounded, apices subacute; legs with trochanter and basal three fourths of femora black, rest light reddish brown, hind trochanter prominently toothed on the dilated inner surface, inner margin of mid and hind femora corrugated; abdomen dark brown pubescent ventrally.

Length : 5-6 mm.

Distribution : India : Andhra Pradesh (Dist. Ranga Reddi), Andaman Islands, Karnataka, Kerala, Tamil Nadu.

Remarks : Since the species was recorded by Ananthasubramanian (1996) from Ranga Reddi Dist. of Andhra Pradesh it has been incorporated in the present study. Authors could not get the spemins to examine personally.

Genus 8. *Telingana* Distant, 1908

1908. *Telingana* Distant, *Fauna Brit. India*, 4 : 17.

12 *Telingana paria* (Fairm)*

1846. *Centrotus paria* Fairm, *Ann. Soc. Ent. Fr.*, : 513.

1908. *Telingana paria* : Distant, *Fana Brit. India*, 4 : 18.

1994. *Telingana paira* : Biswas *et al.*, *Fauna of West Bengal, State fauna Series*, 3(Part 5) : 76.

Material examined : 1ex., Rajendranagar. Hyderabad, Ranga Reddi Dist., 6.3.99, S.K. Chatterjee and party coll.

Diagnostic chacracter : Head pronotum ferruginous brown or castaneous; abdomen beneath grayish pilose, pronotum with its lateral transverse process as seen from above short, recurved, strongly carinate, apices obtusely acute, posterior process slender separated from scutellum at base above tricarinate, its apex acute and almost touching the tegmina in its posterior angle of the inner margin.

Length : 5.5 mm.

Distribution : India : Andhra Pradesh (Dist. Ranga Reddi).

Genus 9. *Gargara* Amy. & Serv., 1843

1843. *Gargara* Amy. & Serv., *Hem.*, : 537.

Key to species of the genus *Gargara*

1. Head, pronotum, body beneath pale black ; tegmina subhyaline black at base
..... *robusta*

- Head, pronotum, body beneath pale yellow, tegmina brownish yellow, apex of the posterior pronotal process black *citrea*

13. *Gargara robusta* Distant*

1908. *Gargara robusta* Distant, *Fauna Brit. India*, 4 : 61.

1999. *Gargara robusta* : Biswas *et al.*, *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 61.

Material examined : 1 ex. Goppulod, Kawal Reserve forest, Adilabad Dist., 2.9.99, S.K. Mondal and party coll.

Diagnostic character : Head, pronotum, abdomen black, tegmina subhyaline, black and punctate at base; near end of clavus at the margin of tegmina, a pale brownish transverse spot; posterior process of pronotum short and robust only just passing the apex of the claval area.

Length : 3.5 mm.

Distribution : India : Andhra Pradesh (Dist. Adilabad); West Bengal.

14. *Gargara citrea* Distant*

1908. *Gargara citrea* Distant, *Fauna Brit. India*, 4 : 63.

Material examined : 1ex. Goppulod, Kawal Reserve forest, Adilabad Dist., 2.9.99, S.K. Mondal and party coll.

Diagnostic character : Head, pronotum, body beneath and legs pale yellow; apex of the posterior pronotal process black, posterior process of pronotum, short, broad, sinuate at base, its apex subacute and reaching the posterior angle of inner margin of tegmina.

Length : 4-5 mm.

Distribution : India : Andhra Pradesh (Dist. Adilabad).

Superfamily FULGOROIDEA

Fulgoroids, are characterized by ocelli usually two, placed in cavities beneath eyes; antennae of two joints and a bristle placed beneath the eyes. The fulgorid also known as “Lantern flies” represents about 6521 species in the world (Animal resources in India, State of Art, Zoological Survey of India). In India, nearly 430 species are known. The present study is the first consolidated account of fulgorid fauna from the state of Andhra Pradesh. All the species constitute new records from the state of Andhra Pradesh.

Key to families of the Superfamily FULGOROIDEA

1. Posterior tibiae with a mobile spur at the apex ARAEOPIDAE
- Posterior tibiae without a mobile spur at the apex 2

2. Face amplified on both side in a distinct angle; legs compressed; anal area of wings reticulate EURYBRACIDAE
- Face not laterally angulate; legs not compressed, simple; anal area of wings never reticulate 3
3. Face with three ocelli, one of which is situated at the apex; clypeus convex, without any carination 4
- Face without an apical ocellus; clypeus not convex but always carinated DICTYOPHARIDA
4. Tegmina coriaceous or subcoriaceous and very much abbreviated ISSIDAE
- Tegmina not coriaceous but vitreous, and not abbreviated CIXIIDAE

Key to genera of the family ARAEOPIDAE

1. Head more or less prominently produced in front of eyes *Sarida*
- Head not prominently produced in front of eyes 2
2. Vertex of head broader than long *Pundaluya*
- Vertex of head longer than broad 3
3. Face more than twice as long as greatest breadth 4
- Face less than twice as long as greatest breadth *Nilaparvata*
4. Vertex with a median transverse ridge, behind which the disk foveate *Toya*
- Vertex without any median transverse ridge and non foveate *Liburnia*

Family 1. ARAEOPIDAE

Genus 10. *Sarida* Melichar, 1903

1903. *Sarida* Melichar, *Hom. Faun. Ceylon*, : 96.

15. *Sardia rostrata* Melichar*

1903. *Sardia rostrata* Melichar, *Hom. Fauna. Ceylon*, : 96.

1906. *Sardia rostrata* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 475.

1906. *Sardia rostrata* : Metcalf, *General Catalogue of Hom.*, 3 : 153.

Material examined : 3exs., Machlipattnam, Krishna Dist., 15.10 98, S.P. Chakraborty and party coll.

Diagnostic character : Body rusty yellow; vertex with a brown spot at middle of the neck; face black; lateral and middle keel and between eyes yellowish; pronotum black, its posterior

margin bordered with white; mesonotum rusty yellow, with two longitudinal brown spots before apex; tegmina clouded, its apical area darker brown with pale marginal spots, a large spot on first apical cell; all veins brown with fine granules, abdomen above brown; legs brown, spurs also brown.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Dist. Krishna).

Elsewhere : Sri Lanka.

Genus 11. *Pundaluoya* Krikaldy, 1902

1902. *Pundaluoya* Kikkaldy, *J. Bombay nat. Hist. Soc.*, **15** : 190.

11. *Pundaluoya pulchella* Distant*

1912. *Pundaluoya pulchella* Distant, *A.M.N.H.* (8)**9** : 190.

1960. *Pundaluoya pulchella* : Metcalf, *General catalogue of Hem.*, **3** : 49.

Material examined : 2exs., Machalipattnam, Krishna Dist., 15.9.1998, S.P. Chakraborty and party coll.

Diagnostic character : Body black; vertex clouded; ridges of pronotum and mesonotum castaneous; face with the central carination bifurcating a little beyond middle; tegmina hyaline; veins thickly sparckled with fuscous granules and a carved fascia extending from stigma to posterior angle and two short oblique fascous fascia beyomd stigma and a marginal line near apex of clavus; abdomen spotted with brown; legs black.

Length : 3 mm.

Distribution : India : Andhra Pradesh (Dist. Krishna); Bihar; Kerala; Maharashtra; Tamil Nadu; West Bengal.

Genus 12. *Nilaparvata* Distant, 1906

1906. *Nilaparvata* Distant, *Fauna Brit. India, Rhynchota*, **3** : 473.

17. *Nilaparvata lugens* (Stal)

1854. *Delphax lugens* Stal, *Ofv. Sevenska. Vet. Akad. Forh.*, **11** : 246.

1906. *Nilaparvata lugens* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 486.

1943. *Nilaparvata lugens* : Metcalf, *General catalogue of Hom.*, : 296.

Material examined : 8 exs., Cuddapah F.R.H., Cuddapah Dist., 21.1.2000, G.C. Sen and party coll.

Diagnostic characters : Body brownish yellow; head castaneous brown, with anterior interspaces between central lateral carination black; face brownish yellow; its carination pale yellowish, its margin pitchy black; clypeus castaneous, its carination pale yellow; mesonotum with its carination faint yellow; tegmina subhyaline with yellowish tint, veins smoothly brown, an elongated black spot at apex of clavus; wings hyaline with an apaline luster.

Length : 2.5 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapah); Tripura; West Bengal.

Elsewhere : China; Java; Malay peninsula; Sri Lanka.

Genus 13. *Toya* Distant, 1906

1906. *Toya* Distant, *Fauna Brit. India, Rhynchota*, 3 : 472.

18. *Toya attenuata* Distant

1906. *Toya attenuata* Distant, *Fauna Brit. India, Rhynchota*, 3 : 472.

1943. *Toya attenuata* : Metcalf, *General catalogue of Hom.*, 3 : 388.

Material examined : 5sexs., Cuddaph F.R.H., Cuddapah Dist., 2.1.200, G.C. Sen and party coll.

Diagnostic characters : Vertex blackish red, with brownish carina; face black with carina; pronotum piceous brown and its carina brownish yellow; tegmina hyaline with brownish yellow tint, its vein fuscous, legs yellowish with black tarsal claw.

Length : 3 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapah).

Elsewhere : Sri Lanka.

Genus 14. *Liburnia* Stal, 1866

1866. *Liburnia* Stal, *Hem. Afr.*, 4 : 179.

Key to species of the genus *Liburnia*

1. Tegmina with an elongate marginal piceous spot near apex of the clavus 2
- Tegmina without any piceous spot near apex of clavus *pallescens*
2. Pronotum white, medially with two black dot like punctures behind eyes *furcifera*
- Pronotum ochraceous, medially without dot like punctures behind eyes *dohertyi*

19. *Liburnia pallescens* (Distant)

1912. *Sogata pallescens* Distant, *A.M.N.H.*, (8)9 : 192.

1943. *Liburnia pallescens* : Metcalf, *General catalogue of Hom.*, 3 : 357.

Material examined : 3exs., Cuddapah F.R.H., Cuddapah, Dist., 2.1.2000, G.C. Sen and party coll.

Diagnostic character : Vertex creamy white with a small dark spot on each side of apex; pronotum creamy white; mesonotum black, with broad centrally longitudinal creamy white carina; tegmina subhyaline, with an elongate marginal piceous spot near apex of clavus, its vein dark.

Length : 3.5 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapah); Bihar; West Bengal.

20. *Liburnia furcifera* (Horvath)

1899. *Delpra furcifera* Horvath, *Termesk, Fuzetek*, 22 : 372.

1900. *Liburnia fucifera* : Entomon. *Nachr.*, 26 : 262.

1943. *Liburnia furcifera* : Metcalf, *General catalogue of Hom.*, : 357.

Material examined : 6exs., Cuddapah F.R.H., Cuddapah Dist., 2.1.200, G.C. Sen and party coll.

Diagnostic characters : Vertex longer than broad, face elongate, narrow, the carina of the face white; pronotum white, medially with two black dot like punctures and an outwardly arched carina; mesonotum reddish yellow; tegmina hyaline its vein brownish yellow and on the terminal margin a dark elongate spot; legs yellow.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapah).

Elsewhere : Japan, Sri Lanka.

22. *Liburnia doherti* (Distant)

1906. *Sogata doherti* Distant, *Fauna Brit. India, Rhynchota*, 3 : 417.

1943. *Liburnia doherti* : Metcalf, *General catalogue of Hom.*, 3 : 355.

Material examined : 6 exs., Cuddapah F.R.H., Cuddapah Dist., 2.1.2000, G.C. Sen and party coll.

Diagnostic character : Vertex with a pale grayish longitudinal fascia running upto its anterior area and a black line on each side; face with white carina; pronotum and mesonotum yellowish brown, its venation dark its basal area semiopaque.

Length : 4 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapha), Manipur.

Elsewhere : Sri Lanka.

Family EURYBRACHIDAE

Key to genera of the family EURYBRACHIDAE

1. Front distinctly broader than pronotum; genae broad *Messana*
- Front not distinctly broader than pronotum but as broad as pronotum; genae narrow
..... *Eurybrachys*

Genus 15. *Messana* Stal, 1858

1858. *Messana* Stal. *Rio Jan. Hem.*, 2 : 67.

22. *Messana nebulosa* Stal

1863. *Messana nebulosa* Stal, *Stett. Ent. Zeit.*, 24 : 246.

1906. *Messana nebulosa* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 227.

1956. *Messana nebulosa* : Metcalf., *General catalogue of Hom.*, 4(8) : 10.

Material examined : 2exs., Sri Sailam F.R.H., Prakasam Dist., 22.10.1985, S.K. Mandal and party coll.

Diagnostic character : Head spotted with brown; face bright reddish brown; pronotum with two small fuscous discal spots; tegmina pale tawny grayish, with irregular scattered piceous mottling on basal half not reaching costal area and three subapical piceous spots and two apical piceous spots; wings cretaceous with three subapical black spots.

Length : 14.5 mm.

Distribution : India Andhra Pradesh (Dist. Prakasam)

Genus 16. *Eurybrachys* Guerin, 1834

1834. *Eurybrachys* Guerin, *Belang. Ind. Orient.*, : 475.

Key to species of the genus *Eurybrachys*

1. Abdomen with small tuft of efflorescence and the apex broadly clothed with white waxy efflorescence *tomentosa*
- Abdomen without small tuft of efflorescence and apex otherwise *spinosa*

23. *Eurybrachys tomentosa* (Fabricius)

1775. *Cicada tomentosa* Fabricius, *Syst. Ent.*, 2 : 324.

1843. *Eurybrachys tomentosa* Amy. & Serv., *Hem.*, : 517.

1965. *Eurybrachys tomentosa* : Metcalf, *General catalogue of hom.*, 4 : 24.

Material examined : 2exs., Madhapuri, Rajamundry, East Godavari Dist., 19.11.1998, S.P. Chakraborty and party coll.

Diagnostic characters : Head and pronotum grayish olivaceous but abdomen fuscous, with a white tuft of efflorescence at the apex; legs fuscous; tegmina grayish with small scattered spots and an oblique transverse discal fascia at the apex of posterior margin a double series of small spots and a large spot present; wings creamy white with two black fasciae on apical margin.

Length : 8 mm.

Distribution : India : Andhra Pradesh (Dist. East Godavari); Karnataka; Maharashtra.

24. *Eurybrachys spinosa* (Fabricius)

1798. *Cicada spinosa* Fabricius, *Ent. Syst. Suppl.*, : 520.

1839. *Eurybrachys spinosa* Spin., *Ann. Soc. Fr.*, : 369.

1959. *Eurybrachys spinosa* Metcalf, *General catalogue of Hom.*, 4 : 24.

Material examined : 2exs., Indrally Adilabad Dist., 30.9.99, S.K.Mandal and party coll.

Diagnostic characters : Head, pronotum, mesonotum brownish yellow; abdomen and legs purplish red; tegmina greenish with three greenish white fasciae and an elongate transverse black spot at posterior margin; wings creamy white, with two transverse black spots on apical area.

Length : 8 mm.

Distribution : India : Andhra Pradesh (Dist. Adilabad); Tamil Nadu.

Family 3. DICTYOPHARIDAE

Genus 17. *Thanatodictya* Kirkaldy, 1906.

1906. *Thanatodictya* Kirkaldy, *Bull. Hawaiian sugar Pl. Assoc. Div. Ent.*, 10 : 392.

25. *Thanatodictya lineata* (Donovan)

1800. *Fulgora lineata* Donovan, *Ins. Ind. t.* 8 : 1.

1859. *Dictyuophora lineata*; Dohrn, *Catalogue Hemiptera rum.*, : 59.

1912. *Thanatodictya lineata* : Melichar, *Abh. Zool. Bot. Ges. Wien*, 7(1) : 105.

1946. *Thanatodictya lineata* : Metcalf, *General catalogue of Hom.*, 8 : 85.

Material examined : 2exs., Anandapuram, Visakhapatnam Dist., 20.9.98, S.P. Chakraborty and party coll.

Diagnostic characters : Body ochraceous, the ridges of the head reddish with black spots between ridges and eyes is green; pronotum with carinae oblique, mesonotum with three green carinae extending to more than half of the length from base; tegmina with two longitudinal fuscous fasciae commencing at long distance from base; legs spotted; posterior tibiae with four spines.

Length : 6 mm.

Distribution : India : Andhra Pradesh (Dist. Visakhapatnam); Assam; Maharashtra; West Bengal.

Family 4. ISSIDAE

Genus 18. *Tatva* Distant, 1906

1906. *Tatva* Distant, *Fauna Brit. India, Rhynchota*, 3 : 337.

26. *Tatva bufo* Distant

1906. *Tatva bufo* Distant, *Fauna Brit. India, Rhynchota*, 3 : 337.

1955. *Tatva bufo* Metcalf, *General catalogue of Hom.*, 15 : 472.

Material examined : 1es., Rajamundry F.R.H., East Godavari Dist., 20.10.98, S.P. Chakraborty and party coll.

Diagnostic characters : Two fuscous spots at base of vertex; vertex granulose with a longitudinal carina; pronotum granulose and marginal with strong ridge, with a faint central carina; mesonotum with two short ridges on anterior angle on two small brownish spot on its disc; tegmina tale like and subcoriaceous with two oblique broken fuscous spots and some transverse spots.

Length : 5.5 mm.

Distribution : India : Andhra Pradesh (Dist. East Godavari); Maharashtra.

Family 5. CIXIIDAE

Genus 5. *Mnemosyne* Stal, 1866

1866. *Mnemosyne* Stal, *Hem. Afr.*, 4 : 150

27. *Mnemosyne punctipennis* Distant

1906. *Mnemosyne punctipennis* : Distant, *Fauha Brit. India, Rhynchota*, 3 : 259.

1936. *Mnemosyne punctipennis* : Metcalf, *General catalogue of Hom.*, 2 : 42.

Material examined : 1ex., Lurathipattnam, Adilabad Dist., 6.12.99, P.H. Roy and party coll.

Diagnostic character : Vertex reddish brown; pronotum castaneous, centrally longitudinally ridged and an oblique carina near lateral margin; mesonotum with five distinct longitudinal carinae; tegmina with marginal area thick and with numerous minute fuscous spots, claval area fuscous; posterior tibiae with two prominent spines.

Length : 9.5 mm.

Distribution : India : Andhra Pradesh (Dist. Adilabad); Tamil Nadu; Sikkim.

SUMMARY

This paper incorporates an account of 27 species in 19 genera of the Super family Fulgoroidea containing 5 families viz., Araeopidae, Eurybrachidae, Dictyopharidae, Issidae, Cixiidae, the Super family Cercopoidea represented by only one family viz Aphorophoridae and another family Membracidae under the Super family Cicadelloidea.

ACKNOWLEDGEMENTS

The authors express their deep sense of gratitude to the Director, Zoological Survey of India for extending laboratory facilities. Greatful thanks are due to Dr. A.K. Hazra Scientist - 'E' for numerous courtesies. Co-operation from the colleagues of the Hemiptera section are also thankfully acknowledged.

REFERENCES

- Amyot, C.J.B. and Serville, J.G.A.M., 1843. Deuxieme partic. Homopteras. Homoptera Latr. Histoire Naturelle des Insects. Hemipteres, 676. pl-22 : 455-588.
- Ananthasubramanian, K.S. and Ananthakrishnan, T.N. 1975a. Taxonomic and ecological studies of some Indian Membracids (Insecta : Homoptera) part-1. *Rec. zool. Surv. India*, 68 : 161-272.
- Ananthasubramanian, K.S. & Ananthakrishnan, T.N. 1975b. Taxonomic and ecological studies of some Indian Membracids (Insecta : Homoptera) part 2. *Rec. zool. Surv. India*, 68 : 305-340.
- Ananthasubramanian, K.S. 1980A. description of a new genus and some new species of Membracids (Homoptera) in the collection of the Zoological Survey of India. *Rec. zool. Surv. India. Mis. Publ. Occ. Pap. No.*, 16 : 1-69.

- Ananthasubramanian, K.S. 1996. Fauna of India. Homoptera : Membracidae : 1-534.
- Biswas, B., Basu, R.C. and Ghosh, L.K. 1994. Insecta : Hemiptera : Homoptera : Membracidae, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 69-90.
- Biswas, B. and Ghosh, L.K. 1998. Insecta : Hemiptera : Homoptera : Membracidae, *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 51-67.
- Biswas, B., Ghosh, M. and Ghosh, L.K. 1999. Insecta : Hemiptera : Homoptera : Cercopoidea, *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 463-485.
- Distant, W.L. 1906. *Fauna of British India including Ceylon and Burma, Rhynchota*, 6 : 17-45.
- Distant, W.L. 1908. *Fauna of British India including Cylon and Burma, Rhynchota*, 4 : 1-78.
- Distant, W.L. 1916. *Fauna of British India including Cylon and Burma, Rhynchota*, 6 : 1-48.
- Melichar, L. 1912. Homoptera. Wissenschaftlich Ergebnisse der Zweiten Dentschem Zentral Afrika Expedition under Fuhrmg Adolf Friedrichs. Hetezog. Zu Mecklenburg, 1 : 109-134.
- Metcalf, Z.P. 1936. General catalogue of Homoptera Fascicle IV. Fulgoroidea. Part 2. Cixiidae 1-269.
- Metcalf, Z.P. 1956. General catalogue of Homoptera Fascicle IV. Part 17 : 1-84.

INSECTA : HEMIPTERA : HOMOPTERA : CICADELLOIDEA

M. GHOSH and ANIMESH BAL

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The Cicadellids are usually known as “Leafhoppers” These insects cause considerable damage to various kinds of plants, of which mostly are agricultural plants, by sucking the sap and transmitting different viral diseases. Therefore, they may be considered as economically important pest insects from the agricultural point of view. The Cicadellids are belonging to the Superfamily Cicadelloidea under the Series Auchenorrhyncha of the Suborder Homoptera belonging to the Order Hemiptera.

A little more than 15,000 species have, so far, been recorded in the world while India has 680 species of cicadellids (Hamilton, 1984). Distant (1908, 1916, 1918) had recorded many species in his Fauna of British India but more from the present State of Andhra Pradesh. Pruthi (1930, 1936) had recorded 9 species under 7 genus of 4 families of leafhoppers from the State, which have been incorporated in the present paper. Gauri (1963-1974), Rao (1967-1989), Ramakrishna & Menon (1971-1974), Dutta (1972-1988), Viraktanath (1976-1983) and Ghosh *et al.* (1994-2003) have contributed notable works on Indian Cicadellid.

The present paper provides a comprehensive taxonomic-cum-faunistic account of the Superfamily Cicadelloidea of Andhra Pradesh, comprising 29 species under 20 genera distributed in 9 families, of which 16 species under 12 genera and 5 families are being recorded for the first time from the State of Andhra Pradesh (with asteric mark in the text). A few identified and Regd. species, which have been recorded earlier, housed in the National Zoological Collection, are also included in the present fauna.

The work is mainly based upon the collections made by various survey parties of the Zoological Survey of India, Kolkata. Taxonomic keys to different taxa, diagnostic characters and taxonomic references of each species, their distribution in Andhra Pradesh, in other States of India as well as elsewhere in the world have been provided in the present paper.

MATERIAL AND METHOD

Cicadellids insects feed on almost all kinds of vegetation-trees, shrubs, herbs, grasses and crops, and suck the sap from the leaves, flower stalks of the plant. Therefore, these insects can be collected by sweeping with the help of insect net. By other means they may be collected by beating the bushes with any strong stick over a spreading malmal cloth beneath the bush to hold the dislodged insect which are fallen over it. Since most Cicadellids are having flight capabilities these insects are often collected by light trap at night.

After collection of live specimens, they are killed in a killing Jar (Kielner Jar) by using either liquid Benzene or Chloroform or carbon tetrachloride as killing agent. The dead insect specimens are transferred into the insect envelopes each of which is provided with a collection data label mentioning the collection locality, the name of the collector, date of collection etc. These envelopes containing insect specimen; are preserved dry with para-dichloro benzene and Nephthalene.

In the laboratory, Cicadellid specimens are generally mounted on cartidge triangle paper with the help of gum as adhesive for easy handling and studies are carried out under Stereoscopic Binocular Microscope during the process of identification.

SYSTEMATIC ACCOUNT

Superfamily	CICADELLOIDEA
Family I.	TYPHLOCYBIDAE
Genus 1.	<i>Zygina</i> Fieber
1. <i>Zygina maculifrons</i> (de Mots.)	
Family II.	MACROSPIDAE
Genus 2.	<i>Magnentius</i> Pruthi
2. <i>Magnentius clavatus</i> Pruthi	
Family III.	CICADELLIDAE
Genus 3.	<i>Cofana</i> Melichar
3. <i>Cofana spectra</i> (Distant)	
4. <i>Cofana mimica</i> (Distant)	
Family IV.	AGALLIDAE
Genus 4.	<i>Agallia</i> Cutris
5. <i>Agallia pararobusta</i> Pruthi	
Family V.	KRISHNIDAE
Genus 5.	<i>Krisna</i> Kirkadly
6. <i>Krisna striata</i> Kirkadly	

Family VI. IASSIDAE

Genus 6. *Iassus* Fabricius7. *Iassus chlorophana* (Melichar)8. *Iassus indicus* (Lethierry)

Family VII. APHRODIDAE

Genus 7. *Chiasmus* Mulsant & Rey9. *Chiasmus alata* PruthiGenus 8. *Amritodus* Anufriev10. *Amritodus atkinsoni* (Lethierry)

Family VIII. HECALIDAE

Genus 9. *Parabolocratus* Fieber11. *Parabolocratus albomaculatus* (Distant)12. *Parabolocratus porrecta* (Walker)13. *Parabolocratus glaucescens* Fieber

Family IX. DELTOCEPHALIDAE

Genus 10. *Scaphoideus* Uhler14. *Scaphoideus morosus* MelicharGenus 11. *Deltocephalus* Burmeister15. *Deltocephalus nigrifacialis* DistantGenus 12. *Paternus* Distant16. *Paternus viridula* PruthiGenus 13. *Bella* Pruthi17. *Bella apicalis* PruthiGenus 14. *Thamnotettix* Zetterstedt18. *Thamnotettix veinatus* PruthiGenus 15. *Eutettix* Duzee19. *Eutettix phycitis* DistantGenus 16. *Goniagnathus* Fieber20. *Goniagnathus fumosus* Distant21. *Goniagnathus punctifer* WalkerGenus 17. *Nephotettix* Matsum.22. *Nephotettix nigropicta* (Stål)

23. *Nephotettix virescens* (Distant)Genus 18. *Balclutha* Kirkaldy24. *Balclutha indica* (Pruthi)25. *Balclutha micropterus* (Pruthi)Genus 19. *Exitianus* Ball26. *Exitianus nanus* (Distant)27. *Exitianus atkinsoni* (Distant)28. *Exitianus indicus* (Distant)Genus 20. *Cicadula* Zetterstedt29. *Cicadula indica* Pruthi**Key to the families of the Superfamily CICADELLOIDEA**

1. Veins at the base of tegmina indistinct, not forked on corium TYPHLOCYBIDAE
- Veins at the base of tegmina distinct, corium more or less branched and connected by transverse veins 2
2. Face tumid, ocelli situated on vertex 3
- Face not tumid, ocelli may or may not be situated on vertex 5
3. Face centrally carinate; hind wings always with three apical cells MACROSPIDAE
- Face neither centrally carinate nor foveate 4
4. Ocelli placed on disc of the vertex, head or rounded CICADELLIDAE
- Ocelli on the face below the anterior edge of the head, head entirely deflexed AGALLIDAE
5. Body dorsoventrally flattened, ocelli on anterior margin of head; comparatively larger insect 6
- Body not dorsoventrally flattened, smaller insect 7
6. Submarginal veins in hind wing continued over jugam KRISHNIDAE
- Submarginal veins in hind wing not continued over jugam IASSIDAE
7. Ocelli on face; frontal suture continued upto ocelli APHRODIDAE
- Ocelli on anterior margin of head or on vertex; face convex 8
8. Body dorsoventrally flattened; pronotum with lateral margin carinate; vertex, pronotum and scutellum without any longitudinal median impressed black line HECALIDAE
- Body rather robust, broad and compressed DELTOCEPHALIDAE

Family I. TYPHLOCYBIDAE

Genus 1. *Zygina* Fieber, 1866

1866. *Zygina* Fieber, *Zool. bot. Ges. Wien.*, **16** : 509.

1. *Zygina maculifrons* (de Motsch)

1863. *Typhlocyba maculifrons* de Motsch, *Bull. Soc. Nat. Mosc.*, : 103.

2000. *Zygina maculifrons* (de Motsch) : Ghosh, M., Biswas, B. & Ghosh, L.K., *Fauna of Tripura, State Fauna Series*, **7(2)** : 331.

Material examined : 3 exs. : Kurnool F.R.H., Kurnool Dist., 28.xii.1999; G. C. Sen & Party coll.

Diagnosis : Body yellowish; vertex, anterior margin rounded, at apex a large black spot; face with indistinct transverse brownish stripes; apex of clypeus black; pronotum longer than vertex, rounded, the disk of pronotum greyish colour; scutellum long and triangular, a transverse depressed line on its middle; tegmina yellowish green, with delicate veins, membrane slightly clouded with smoky brown; legs yellow; abdomen black.

Length : 2.5 mm.

Distribution : India : Andhra Pradesh (Dist. Kurnool); Tripura; West Bengal.

Elsewhere : China, Formosa, Japan, Java, Singapore Island.

Family II. MACROSPIDAE

Genus 2. *Magentius* Pruthi, 1930

1830. *Magentius* Pruthi, *Mem. Ind. Mus.*, **XI** : 6.

1. *Magentius clavatus* Pruthi

1930. *Magentius clavatus* Pruthi, *Mem. Ind. Mus.*, **XI** : 7.

1988. *Magentius clavatus* Pruthi : Datta, B., *Rec. zool. Surv. India, Occ. Paper No.*, **90** : 20.

Material examined : 1 ex., Kangamalugu (3000), Cuddapah Dist.; 21.VII.1927, H. P. coll.

Diagnosis : Vertex narrow, blackish; pronotum with a ridge on its anterior margin and punctate and transverse striation; front strongly rise; scutellum blackish, punctate; tegmina coriaceous; its veins thick with white pubescens; legs densely spined.

Length : 6 mm.

Distribution : India : Andhra Pradesh (Cuddapah); Tamil Nadu.

Family III. CICADELLIDAE

Genus 3. *Cofana* Melichar, 1926

1926. *Cofana* Melichar, *Ann. Mus. Nat. Hist.*, **23** : 245.

Key to species of the genus *Cofana*

1. Vertex angularly produced; lateral margin of vertex are in a line with outer margin of the eyes *spectra*
- Vertex rounded; lateral margin of vertex are not in a line with outer margin of the eyes *mimica*

3. *Cofana spectra* (Distant)

1910. *Cicadella spectra* (Distant), *Insect. Trans*, **10** : 234.

1990. *Cofana spectra* (Distant) : Partact, *Cicadomorpha*, **3** : 76.

Material examined : 4 exs.; Cuddapah, F.R.I., Cuddapah Dist.; 1.I.2000; G. C. Sen & Party; 1 ex., Atmakur, Kurnool Dist.; 26.XII.1999; G. C. Sen and party; 1 ex.; Kurnool F.R.I., Kurnool Dist.; 27.XII.1999; G.C. Sen and party.

Diagnosis : Body light white yellow; four black spots on vertex, two at central and one at base and one at apex; at basal angle of the face two black spots and a central line; pronotum with central dark line; tegmina with brownish veins; legs and abdomen whitish yellow.

Length : 9 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapah, Kurnool); Assam; Bihar; Karnataka; Maharashtra; Madhya Pradesh; Manipur; Meghalaya; Mizoram; Orissa; Sikkim; West Bengal.

Elsewhere : Bangladesh, Nepal, Sri Lanka.

4. *Cofana mimica* (Distant)

1908. *Kolla mimica* (Distant), *Fauna Brit. India, Rhynchota*, **4** : 225.

1999. *Cofana mimica* (Distant) : Ghosh, M. & Ghosh, L.K., *Fauna of Meghalaya, Fauna Series*, **4(Part-4)** : 8.

Material examined : 2 exs.; Atmakur, Kurnool Dist.; 26.XII.1999 G. C. Sen and party.

Diagnosis : Body covered with greenish white pubescens; vertex with three black spots in transverse series; one spot at central portion and other two identical spots close to ocelli; pronotum with fine transverse impression; sectellum yellowish, with distinct dark longitudinal line; face centrally smooth and flattened and laterally black striation; tegmina greenish white, its vein dark brown; wings semihyaline; legs greenish; abdomen greenish white.

Length : 5.5 mm.

Distribution : India : Andhra Pradesh (Dist. Kurnool); Bihar; Manipur; Meghalaya; Mizoram; Sikkim; Uttar Pradesh and West Bengal.

Family IV. AGALLIDAE

Genus 4. *Agallia* Curtis, 1833

1833. *Agallia* Curtis, *Ent. Mag.*, I : 193.

5. *Agallia pararobusta* Pruthi

1936. *Agallia pararobusta* Pruthi, *Mem. Ind. Mus.*, XI : 104-105.

1988. *Agallia pararobusta* Pruthi : Datta, B., *Rec. zool. Surv. India, Occ. Paper*, No. 90 : 204.

Material examined : 1 ex.; Guvalucherree (500), Palkonda Hills; Cuddapah Dist.; 1-3.VIII.1929; H. S. Pruthi coll.

Diagnosis : Vertex with distinct oblique black spot and a faint brown strips near median line, this brown strip being continued to front; pronotum with dark strip on lateral angle and with finely transversely striate; scutellum with a black spot near each basal angle and a minute black spot on its median line near anterior margin; tegmina with dark brown stripes on claval region; abdomen black.

Length : 3 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapah); South India.

Family VI. IASSIDAE

Genus 6. *Iassus* Fabricius, 1803

1803. *Iassus* Fabricius, *Systema Rhyngotorum*, : 85.

Key to species of the genus *Iassus*

1. Vertex wider than pronotum *chlorophana*
- Vertex not wider, equally as broad as pronotum '*indicus*

7. *Iassus chlorophana* (Melichar)

1903. *Pachyopsis chlorophana* Melichar, *Hom. Faun. Ceylon* : 153.

1966. *Iassus chlorophana* Melichar : Metcalf, *General Catalogue of Homp.*, 15 : 58.

Material examined : 2 exs.; Rampur, Adilabad Dist., 28.VIII.1999; S.K. Mondal coll.

Diagnosis : Vertex smooth, eyes blackish red; ocelli red; pronotum finely distinctly striate; scutellum obscurely depressed at basal angle; tegmina brownish yellow, with a minute pitchy black spot at apex of clavus and costal area and obscurely punctate.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Dist. Adilabad); Karnataka; West Bengal.

Elsewhere : Myanmar, Sri Lanka.

8. *Iassus indicus* (Lethierry)

1892. *Macropsis indica* Lethierry, *Bull. zool. Soc. France*, : 209.

1996. *Inssus indicus* (Lethierry) : Ghosh, M. & Ghosh, L.K., *Fauna of West Bengal, State Fauna Series*, 3(Part-3) : 48.

Material examined : 2 exs.; Cuddapah, F.R.H., Cuddapah Dist.; 1.I.2000; G. C. Sen and party coll.

Diagnosis : Vertex rounded at apex; ocelli placed far apart from each other; pronotum finely striate; scutellum depressed at basal angle; tegmina brownish yellow, coarsely punctate; posterior tibiae densely spined.

Length : 7.5 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapah); Andaman; Karnataka; Tamil Nadu; West Bengal.

Elsewhere : Africa, Formosa, Myanmar, Philippine, Sri Lanka.

Family VII. APHRODIDAE

Key to genera of the family APHRODIDAE

1. Small size; head long, acutely angulated produced; vertex marginally sharpended CHIASMUS
- Large size; head broad short, not acutely produced; vertex not sharpended margin, parallal margin AMRITODUS

Genus 7. *Chiasmus* Mulsant & Rey, 1855

1855. *Chiasmus* Mulsant & Rey, *Ann. Linn. Soc. Lyon.*, 2(2) : 215-216.

9. *Chiasmus alata* Pruthi

1930. *Chiasmus alata* Pruthi, *Mem. Ind. Mus.*, XI : 23.

1988. *Chiasmus alata* Pruthi : Datta, B., *Rec. zool. Surv. India, Occ. Paper No. 90* : 68.

Material examined : 1 ex.; Razampeta, Cuddapah Dist.; VIII.1929; H. S. Pruthi coll.

Diagnosis : Vertex short, with a black large spot at apex, and a black dot on each lateral margin; pronotum near anterior margin with a number of black dots; scutellum with a deep transverse impression with five black dots on disc, and a dot at each basal angle; tegmina light brown; abdomen black.

Length : 3.5 mm.

Distribution : India : Andhra Pradesh (Dist. Cuddapah); Madhya Pradesh; West Bengal.

Genus 8. *Amritodus* Anufriev, 1970

1970. *Amritodus* Anufriev, *J. Nat. Hist. Soc.*, 4 : 375-376.

10. *Amritodus atkinsoni* (Lethierry)

1889. *Idiocerus atkinsoni* Lethierry, *J. Asiat. Soc. Bengal.*, 18 : 252.

1996. *Amritodus atkinsoni* (Lethierry) : Ghosh, M. & Ghosh, L. K. *Fauna of West Bengal, State Fauna Series*, 3(Part-3) :

Material examined : 8 exs., Rajahmundry F.R.H.; East Godavari Dist.; 19.X.1998; S. P. Chakraborty coll.

Diagnosis : Body grey brown; vertex with three black spots, one at base another two at anterior margin; face at base two black spots; clypeus yellow colour, with median longitudinal black line; pronotum with a dark brown longitudinal line and two black spots at anterior margin; scutellum with triangular black spot near each basal angle; tegmina pale brownish, its vein dark smoky; legs yellow in colour.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Dist. East Godavari); Bihar; Madhya Pradesh; Maharashtra; Orissa; Punjab; Tamil Nadu; Uttar Pradesh.

Elsewhere : Myanmar, Japan, Pakistan, Sri Lanka.

Family VIII. HECALIDAE

Genus 9. *Parabolocratus* Fieber, 1866

1866. *Parabolocratus* Fieber, *Verh z-b. Ges. Wien.*, : 502.

Key to species of the genus *Parabolocratus*

1. Apical area of tegmina brownish, with white spots present *albomaculatus*
- Apical area of tegmina not brownish, without any white spot 2

2. Vertex with some obscure longitudinal orange red fascia *porrecta*
 – Vertex without such longitudinal orange red fascia *glaucescens*

11. *Parabolocratus albomaculatus* (Distant)

1908. *Thomsoniella albomaculata* Distant, *Fauna Brit. India, Rhynchota*, 4 : 280.

1998. *Parabolocratus albomaculata* Distant : Ghosh, M. & Ghosh, L.K., *Fauna of Meghalaya, State Fauna Series*, 4(Part 4), : 15.

Material examined : 3 exs.; F.R.H. at light Kurnool, Kurnool Dist.; 25.XII.1999; G.C. Sen & party coll.

Diagnosis : Brownish body; apical margin of vertex strongly bent up, the extreme margin blackish red; pronotum finely transversely striate; scutellum with an angulate line before apical area; tegmina greenish brown, its apical area brownish with white spot; abdomen black.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Dist. Kurnool); Meghalaya; Mizoram; Orissa; Tamil Nadu; West Bengal.

Elsewhere : Belgian Congo, Philippines Island, Sri Lanka.

12. *Parabolocratus porrecta* (Walker)

1858. *Accocephalus porrectus* Walker, *List. Hom. Suppl.*, : 262

1908. *Thomsoniella porrecta* Distant, *Fauna Brit. India, Rhynchota*, 4 : 279.

1973. *Parabolocratus porrecta* Morrison, *Pacif. Insects*, 15 : 421.

Material examined : 12 exs., Kurnool F.R.H., Kurnool Dist.; 28.XII.1999; G.C. Sen and party coll.; 16 exs.; Cuddapah F.R.H. Cuddapah Dist.; 30.XII.1999; G.C. Sen and party coll.

Diagnosis : Greenish yellow body; anterior margin of vertex usually blacking and some longitudinal orange red fasciae; ocelli in groove very near to eye; pronotum with six orange red fasciae and scutellum also three fascial present; tegmina greenish yellowish.

Length : 5 mm.

Distribution : India : Andhra Pradesh (Kurnool, Cuddapah); Assam; Manipur; Meghalaya; Mizoram; Orissa; Tripura, West Bengal.

Elsewhere : Australia; Phillipine.

13. *Parabolocratus glaucescens* Fieber

1866. *Parabolocratus glaucescens* Fieber, *Verh. z-b. Ges. Wien.*, : 502.

1963. *Parabolocratus glaucescens* Fieber : Netcalf, *General Catalogue of Homp.*, Part IX : 35.

Material examined : 1 ex., Kurnool F.R.H., Kurnool Dist., 25.XII.1999; G.C. Sen and party coll.

Diagnosis : Body brownish, head prolonged in front; foliaceous on the anterior margin of vertex and one black line on half of vertex; pronotum transverse almost broader than head include eyes; pronotum transversely finely striation; scutellum triangularly produced; tegmina transparent hyaline with a margin limbus; legs brownish yellow.

Length : 6 mm.

Distribution : India : Andhra Pradesh (Kurnool).

Family IX. DELTOCEPHALIDAE

Key to genera of the family DELTOCEPHALIDAE

1. Vertex as long as broad, or acutely angularly produced 2
 - Vertex shorter than long, not pointed or acutely angularly produced 7
2. Tegmina long, covering the abdomen round off behind with distinct vein 3
 - Tegmina shorter, narrow; scutellum large, as long as or little longer than pronotum
..... *Scaphoideus*
3. Face symetrically hexagonal; in the claval a distinct transverse vein running from the
outer claval veins to the claval suture *Deltocephalus*
 - Face transverse, the clavus does not contain the transverse vein 4
4. Vertex longer than width between eyes gradually narrowing the apex 5
 - Vertex only half as long as or less than half as long as broad, tegmina with three apical
cell 6
5. Pronotum more than twice as long as broad, tegmina with three apical cells
..... *Paternus*
 - Pronotum about twice as long as broad, tegmina with five apical cells *Bella*
6. Breadth of the vertex between the eyes broader than that of the face at bas
..... *Thamnotettix*
 - Breadth of the vertex between the eyes broader than that of the face *Eutettix*
7. Head shorter than pronotum, pronotum stripped or wrinkled 8
 - Head longer than pronotum, pronotum without stripped or wrinkled *Nephotetux*
8. Tegmina usually punctate; clypeus rectangular at base, somewhat narrower
..... *Goniagnathus*

- Tegmina usually not punctate, rather hyaline, clypeus not as above 9
- 9. Wings with two ante-apical cells **Balclutha**
- Wings with three ante-apical cells 10
- 10. Vertex with a black curved transverse fascia between eyes, apicus of tegmina rectangular **Exitianus**
- Vertex without such fascia, apices of the tegmina not rectangular **Cicadula**

Genus 10. *Scaphoideus* Uhler, 1888

1888. *Scaphoideus* Uhler, *Trans. Maryland Acad. Sci.*, I : 33.

14. *Scaphoideus morosus* Melichar

1903. *Scaphoideus morosus* Melichar, *Hom. Faun. Ceylon*, : 197.

1968. *Scaphoideus morosus* Melichar : Metcalf, *General Catalogue of Homp.*, X : 2136.

Material examined : 1 ex.; Sirpur, Adilabad Dist.; 28.VIII.1999; S.K. Mondal & party coll.

Diagnosis : Vertex with a transverse line and a broad brownish red fascia between the eyes; pronotum greyish white with four longitudinal pale brownish red fasciae; scutellum with three longitudinal dark fasciae; tegmina greyish, its vein reddish, tegmina with dark obliquely transverse line on costal area and reddish spots preceded by a smaller white spot in central of apical cell.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Adilabad); West Bengal.

Genus 11. *Deltocephalus* Burmeister, 1838

1838. *Deltocephalus* Burmeister, *Genera Insectorum*, 1 : 15.

15. *Deltocephalus nigrifacialis* Distant

1918. *Deltocephalus nigrifacialis* Distant, *Fauna Brit. India, Rhynchota*, 7 : 81.

1988. *Deltocephalus nigrifacialis* Distant : Datta, B., *Rec. zool. Surv. India, Occ. Paper No. 90* : 119.

Material examined : 1 ex.; Doulatnabad Narsapua, Medak Dist.; 9.III.1999; S.K. Chatterjee & party coll.

Diagnosis : Brownish yellow body; vertex with two pair of large pale brownish spots, one pair between eyes and other pair on central area; pronotum with four longitudinal fascia; scutellum with a black spot at each basal angle and a similar spot at apex; tegmina pale brownish with dark spots before apical margin, the apical area distinctly with darker spots. Legs brownish tibiae finely spotted.

Length : 3.5 mm.

Distribution : India : Andhra Pradesh (Meddak); Sikkim.

Genus 12. *Paternus* Distant, 1918

1818. *Paternus* Distant, *Fauna Brit. India, Rhynchota*, 7 : 71.

16. *Paternus viridulus* Pruthi

1930. *Paternus viridulus* Pruthi, *Mem. Ind. Mus.*, 11 : 42.

1988. *Paternus viridulus* Pruthi : Datta, B., *Rec. zool. Surv. India, Occ Paper No. 99* : 166.

Material examined : 1 ex.; Kangumadugu (3000) Palkonda Hills, Cuddapah Dist.; 4.VII.1929; H. S. Pruthi.

Diagnosis : Body greenish yellow, vertex acute apex, sulcate at base; pronotum with a pair of linear impression on anterior margin; scutellum depressed distad; tegmina subhyaline, vein slender, indistinct wings smoky; abdomen greenish.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Cuddapah); South India; West Bengal.

Genus 13. *Bella* Pruthi, 1930

1930. *Bella* Pruthi, *Mem. Ind. Mus.*, XI : 44.

17. *Bella apicalis* Pruthi

1930. *Bella apicalis* Pruthi, *Mem. Ind. Mus.*, XI : 44.

1988. *Bella apicalis* Pruthi : Datta, B., *Rec. zool. Surv. India, Occ. Paper No. 90* : 98.

Material examined : 1 ex.; Ballapalli, foot of the seshachalam, Palkond Hills, Cuddapah Dist.; 18-23.VIII.1929; H. S. Pruthi coll.

Diagnosis : Vertex tringulate, sulcate at base, vertex with a black spot at extreme lateral margin; face and vertex demarcated by a black distinct line; clypeus brown; pronotum dark brown, transversely finely striae; scutellum deeply transversely impression at basal margin; tegmina smoky colour, vein dark colour; legs black dotted.

Length : 5 mm.

Distribution : India : Andhra Pradesh (Cuddapah); South India; West Bengal.

Genus 14. *Thamnotettix* Zetterstedt, 1840

1840. *Thamnotettix* Zetterstedt, *Insectae Laponica*, I : 292.

18. *Thamnotettix veinatus* Pruthi

1930. *Thamnotettix veinatus* Pruthi, *Mem. Ind. Mus.*, II : 63-64.

1988. *Thamnotettix veinatus* Pruthi : Datta, B., *Rec. zool. Surv. India, Occ Paper No. 90* : 184.

Material examined : 1 ex.; Vempolle, Cuddapah Dist.; 2.I.2000; G.C. Sen, coll.

Diagnosis : Vertex with dark patches and spots; pronotum brownish yellow, anterior margin with a dark spot; scutellum at anterior margin with pair of dark stripes and a distinct black spot at each basal angle; tegmina brown vein brown pigmented; metatibial spines.

Length : 4 mm.

Distribution : India : Andhra Pradesh (Cuddapah); South India; West Bengal.

Genus 15. *Eutettix* van Duzee, 1892

1892. *Eutettix* van Duzee, *Psyche*, 6 : 307.

19. *Eutettix phycitis* Distant

1908. *Eutettix phycitis* Distant, *Fauna Brit. India, Rhynchota*, 4 : 368.

1998. *Eutettix phycitis* Distant : M. Ghosh & L. K. Ghosh, *Fauna of Meghalaya, State Fauna Series*, 4(Part 4), : 17.

Material examined : 3 exs., Cuddapah, F.R.H., Cuddapah Dist.; 1.I.2000; G. C. Sen and party coll.

Diagnosis : Greenish body, vertex with an obscured transverse impression in front of eyes; pronotum greenish yellow; scutellum brownish, with a large dark brown spot in each basal angle and a longitudinal line; tegmina brown, with more numerous white spots on basal angle; posterior tibiae with a series of small reddish spots.

Length : 3.5 mm.

Distribution : India : Andhra Pradesh (Cuddapah); Assam; Bihar; Meghalaya; Tamil Nadu; West Bengal.

Elsewhere : Australia.

Genus 16. *Goniagnathus* Fieber, 1866

1866. *Goniagnathus* Fieber, *Verh. z-b. Ges. Wien.*, 16 : 506.

Key to species of the genus *Goniagnathus*

1. Vertex of head three or four times broader, and arcuated; face elongate*punctifer*
- Vertex of head broader and not arcuated, face not elongate*fumosus*

20. *Goniagnathus punctifer* (Walker)

1858. *Bythoscopus punctifer* Walker, *Insecta Saundersim*, 108.

1998. *Goniagnathus punctifer* Walker : Ghosh, M. & Ghosh, L.K., *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 19.

Material examined : 5 exs., F.R.H., Kurnool Dist.; 25.XII.1999; G. C. Sen & party coll.

Diagnosis : Vertex with indistinct dark spots; face with brown transverse striation; pronotum brownish, with very finely transverse striation; tegmina light brownish, its costal area and veins finely brown spotted; legs castaneous; abdomen black.

Length : 6.5 mm.

Distribution : India : Andhra Pradesh (Kurnool); Bihar; Maharashtra; Manipur; Meghalaya; Sikkim; Tripura; Uttar Pradesh.

Elsewhere : Maldives, Malagasy, Myanmar, Sri Lanka.

21. *Goniagnathus fumosus* Distant

1918. *Goniagnathus fumosus* Distant, *Fauna Brit. India, Rhynchota*, 7 : 43.

1967. *Goniagnathus fumosus* Distant : Metcalf, *General Catalogue of Homoptera*, 10 : 1910.

Material examined : 3 exs., Doulathabad Narsapur Medak Dist.; 9.III.1999; S.K. Chatterjee & party coll.; 6 exs.; F.R.H., Kurnool Dist.; 25.XII.1999; G.C. Sen coll.

Diagnosis : Body brownish yellow; vertex with distinct black spots, face with black transverse striation; pronotum black, with transverse striation; pronotum black, with transverse striation; scutellum brownish yellow; tegmina brownish, its vein and costal area finely black spots; legs black.

Length : 6.5 mm.

Distribution : India : Andhra Pradesh (Medak, Kurnool); Bihar; Tamil Nadu; Uttar Pradesh; West Bengal.

Genus 17. *Nephotettix* Matsumura, 1902

1902. *Nephotettix* Matsumura, *Term. Fuzetek*, 25 : 356.

Key to species of the genus *Nephotettix*

1. Vertex with a transverse submarginal black band; anterior margin of pronotum marked by a transverse band *nigropicta*
- Vertex usually without submarginal black band; anterior margin of pronotum without black band *virescens*

22. *Nephotettix nigropicta* (Stål)

1870. *Thamnotettix nigropicta* Stål, *Ofv.-Vet.-Ak. Forh.* : 74

1998. *Nephotettix nigropicta* (Stål) : Ghosh, M. & Ghosh, L.K., *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 20.

Material examined : 20 exs., Cuddapah F.R.H., Cuddapah Dist.; 2.I.2000; G.C. Sen & party coll.

Diagnosis : Body greenish yellow, smooth and shining, vertex with a transverse black line between the eyes; pronotum greenish yellow, its anterior margin black, scutellum smoky colour; tegmina greenish, claval area black, an oblique broad black stripe extending midiad to claval suture; legs black.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Cuddapah); Assam; Manipur; Meghalaya; Mizoram; Orissa; Sikkim; West Bengal.

Elsewhere : East Africa, Japan, Sri Lanka.

23. *Nephotettix virescens* Ghauri

1971. *Nephotettix virescens* Ghauri, *Bull. Ent. Res.*, 60 : 481.

1998. *Nephotettix virescens* (Ghauri) : Ghosh, M. & Ghosh, L.K., *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 20.

Material examined : 13 exs., Cuddapah F.R.H., Cuddapah Dist.; 21.I.2000; G.C. Sen & party coll.

Diagnosis : Body yellowish green, shining, smooth, vertex yellowish; face black, clypeus in male with a black spot on each side; pronotum yellowish green, in male anterior margin black; scutellum smoky colour; tegmina with a black spot before middle and apical two fifth black in male, but in female this spots absent; legs black.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Cuddapah); Assam; Bihar; Meghalaya; Mizoram; West Bengal.

Elsewhere : Ethiopian region, Indonesia, Japan, Korea, Malayasia, Palestine, Philippines, Singapore, Tiwan, Thailand.

Genus 18. *Balclutha* Kirkadly, 1901

1901. *Balclutha* Kirkadly, *Entomologist*, 34 : 338.

Key to species of the genus *Balclutha*

1. Vertex truncate medially *indica*
- Vertex not truncate medially, but slightly blunt *micropteros*

24. *Balclutha indica* (Pruthi)

1930. *Eugnathodus indica* Pruthi, *Mem. Ind. Mus.*, XI : 48-49.

1988. *Balclutha indica* (Pruthi) : Datta, B., *Rec. zool. Surv. India, Occ. Paper No.*, 90 : 92.

Material examined : 1 ex., Cuddapah F.R.H., Cuddapah Dist.; 30.XII.1999; G. C. Sen & party coll.

Diagnosis : Body pale yellow; vertex sulcate medially; pronotum wider posteriorly; scutellum later impressus midially; tegmina hyaline; abdomen dorsally black.

Length : 4 mm.

Distribution : India : Andhra Pradesh (Cuddapah); Madha Pradesh; Punjab; Tamil Nadu; West Bengal.

25. *Balclutha micropteros* (Pruthi)

1930. *Eugnathodus micropteros* Pruthi, *Mem. Ind. Mus.*, XI : 50.

1988. *Balclutha micropteros* (Pruthi) : Datta, B., *Rec. zool. Surv. India, Occ. Paper No.*, 90 : 94.

Material examined : 2 exs., Vempole, Cuddapah Dist.; 2.I.2000; G. C. Sen & party coll.

Diagnosis : Vertex not truncate but slightly blunt, vertex with a pair of dark spot near at base; ocelli black; face greenish yellow; scutellum yellow; tegmina about one and half times as long as the abdomen; tegminal vein green; abdomen dark brown.

Length : 4 mm.

Distribution : India : Andhra Pradesh (Cuddapah); Tamil Nadu.

Genus 19. *Exitianus* Ball, 1929

1929. *Exitianus* Ball, *Trans. Amer. Ent. Soc.*, 55 : 5.

Key to species of the genus *Exitianus*

1. Pronotum with two small piceous spots on each side near anterior margin behind the eyes *nanus*
- Pronotum without such spots; present a series of black liner spots before anterior margin 2

2. Scutellum with two small central oblique black liner spots on disk *atkinsoni*
 – Scutellum without such small central spots *indicus*

26. *Exitianus nanus* (Distant)

1908. *Athysanus nanus* Distant, *Fauna Brit. India, Rhynchota*, 4 : 225.

1988. *Exitianus nanus* (Distant) : Datta, B., *Rec. zool. Surv. India, Occ. Paper No. 90* : 69.

Material examined : 6 exs., Cuddapah F.R.H., Cuddapah Dist.; 2.I.2000; G.C. Sen & party coll.; 8 exs.; Kurnool F.R.H., Kurnool Dist.; 28.XII.1999; G.C. Sen and party coll.

Diagnosis : Body brownish yellow; vertex with an arcuate piceous fascia between eyes; pronotum light greyish with two piceous spots near anterior margin behind eyes; scutellum brownish with a dark spot at each basal angle; tegmina hyaline, its vein brown; abdomen pale brownish.

Length : 5 mm.

Distribution : India : Andhra Pradesh (Kurnool, Cuddapah); Bihar; Himachal Pradesh; maharashtra; Meghalaya; Punjab; Tamil Nadu.

Elsewhere : Iraq.

26. *Exitianus atkinsoni* (Distant)

1908. *Athysanus atkinsoni* Distant, *Fauna Brit. India, Rhynchota*, 4 : 348.

2000. *Exitianus atkinsoni* (Distant) : Ghosh, M., Biswas B., & Ghosh, L.K., *Fauna of Tripura, State Fauna Series*, 7(2) : 327.

Material examined : 4 exs., Cuddapah F.R.H., Cuddapah Dist.; 1.I.2000; G.C. Sen & party coll.

Diagnosis : Brownish body, vertex with a black bascia across eyes, on apical margin of each side with a black spot; ocelli large; face granulate; pronotum at posterior area greyish, with a bow like linear transverse black spot; scutellum with a large subtrangular black spots near each basal angle and at central area two oblique linear black spots on the disk tegmina subhyaline, vein pale brown; femora with series small brownish black spots.

Length : 5 mm.

Distribution : India : Andhra Pradesh (Cuddapah); Bihar; Jammu and Kashmir; Tripura; West Bengal.

Elsewhere : Nepal.

28. *Exitianus indicus* (Distant)

1908. *Athysanus indicus* Distant, *Fauna Brit. India, Rhynchota*, 4 : 344.

1988. *Exitianus indicus* (Distant) : Datta, B., *Rec. zool. Surv. India, Occ paper No.*, **90** : 18.

Material examined : 6 exs., Dulathabad and Narsaputha; Medak Dist.; 9.II.1999; S.K. Chatterjee coll.; 8 exs.; Cuddapah F.R.H.; Cuddapah Dist.; 1.I.2000; G.C. Sen & party coll.; 10 exs.; Kurnool F.R.H., Kurnool Dist.; 28.XII.1999; G.C. Sen and party coll.

Diagnosis : Vertex with transverse distinct black fascia between eyes; and a indistinct a central longitudinal black line at base; pronotum brownish, with series of distinct brownish dots at anterior margin; scutellum brownish, slightly granules; tegmina greyish, subhyaline vein pale brownish; legs with brownish, longitudinal streak.

Length : 4.5 mm.

Distribution : India : Andhra Pradesh (Medak, Kurnool, Cuddapah); Assam Manipur; Meghalaya; Mizoram; North India; Orissa; Punjab; Sikkim; Tripura; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Australia, China, Philippines.

Genus 20. *Cicadula* Zetterstedt, 1840

1840. *Cicadula* Zetterstedt, *Insecta lapponica*, **1** : 296.

29. *Cicadula indica* Pruthi

1930. *Cicadula indica* Pruthi, *Mem. Ind. Mus.*, **11** : 54.

1988. *Cicadula indica* Pruthi : Datta, B., *Rec. zool. Surv. India, Occ. Paper No.* **90** : 105.

Material examined : 1 ex.; Vempole, Cuddapah Dist.; 2.I.1999; G.C. Sen & party coll.

Diagnosis : Body greenish yellow in colour; face with dark brown fascia; pronotum and scutellum greenish, scutellum with a transversely depressed in apical area; tegmina long narrow pale yellow, its venation black; legs brown; abdomen black.

Length : 3.5 mm.

Distribution : India : Andhra Pradesh (Cuddapah); Tamil Nadu; West Bengal.

SUMMARY

The present work consists nine families of the Superfamily Cicadelloidea under the Order Hemiptera from Andhra Pradesh. They are Typhlocyidae, Macrospidae, Cicadellidae, Agallidae, Krishnidae, Iassidae, Aphrodidae, Hecalidae and Deltocephalidae. A total number of 29 species under 20 genera belonging to the above mentioned nine families have been included in the present study, of which 16 species are recorded for the first time from the State of Andhra Pradesh. necessary taxonomic keys for the families, genera and species of leaf-hopper have been constructed in present work. beside reference to original literature,

notes on economic important wherever possible, general diagnosis, geographical distribution of each species are incorporated. The paper is based on the collection made by various survey parties of Zoological Survey of India.

ACKNOWLEDGEMENT

The author are highly grateful to the Director, Zoological Survey of India for providing laboratory facilities during the period of work. Sincere thanks are due to Dr. A.K. Hazra, Scientist-E, for his constant encouragement and guidance in many ways. Cooperation and encouragement from the colleagues of the Hemiptera Section are also thankfully acknowledged.

REFERENCES

- Burmister, H.C. 1838. Description of the species of Deltocephalus. Rhynchota. No. 2. *Genera Insectorum iconibus illustravit et descripsit*. V. 1, pls 6 : 15.
- Curtis, John 1833. Characters of some undescribed genera and species indicated in the "Guide to an Arrangement of British Insects." *Ent. Mag.*, 1 : 186-199.
- Datta, B. 1969. On Indian Cicadellidae (Homoptera) I. *Zool. Anz.*, 182(5/6) : 391-392.
- Datta, B. 1973. On Indian Cicadellidae (Insecta : Homoptera) XXII. *Zool. Anz.*, 191(5/6) : 443-447.
- Datta, B. 1988. On Indian Cicadellidae (Insecta : Homoptera) *Rec. zool. Surv. India, Occ. Paper No. 90*.
- Datta, B. And Ghosh, L.K. 1973. Two new species of Typhlocybinae (Homoptera : Cicadellidae) from India. *Zool. Anz. Leipzig*, 191(5/6) : 410-414.
- Distant, W.L. 1908. *Fauna Brit. India*, Rhynchota, (Homoptera) IV : 157-414.
- Distant, W.L. 1916. *Fauna Brit. India*, Rhynchota, (Homoptera) VI : 217-240.
- Distant, W.L. 1918. *Fauna Brit. India*, Rhynchota, (Homoptera) VII : 1-109.
- Ghauri, M.S.K. 1963. A New genus based on *Orosius maculata* Pruthi and generic reassignment of some Pruthi's species of Cicadelloidea (Anchenorhyncha : Homoptera). *Ann. Mag. Nat. Hist.*, 6 : 465-475.
- Ghauri, M.S.K. 1975. A New genus and species of Idiocerine leaf hopper (Cicadelloidea : Anchenorhyncha : Homoptera). *Mevu. Rev. Ent.*, 5 : 287-290.
- Ghosh, L.K. and Ghosh, M. 1994. Insecta : Hemiptera : Homoptera : Cicadelloidea. *Fauna of West Bengal, State Fauna Series 3(Part-5)* : 30-67.
- Ghosh, M. and Ghosh, L.K. 1999. Insecta : Hemiptera : Homoptera : Cicadelloidea. *Fauna of Meghalaya, State Fauna Series, 4(Part 4)* : 1-52.

- Metcalf, Z.P. 1966. General catalogue of Homoptera. Fascicle VI Cicadelloidea. *Agric. Res. Ser.*, 1-17 : 1-2695.
- Pertact, P.I. 1990. Rice disease spread by leaf hopper and planthoppers. *Auchenorrhyncha Fauna of Rice Fields* : 1-116.
- Pruthi, H.S. 1930. Studies on Indian Jassidae (Homoptera) part I. Introduction and designation of some new genera and species. *Mem. Indian Mus.*, II : 1-68.
- Pruthi, H.S. 1934. Studies on Indian Jassidae (Homoptera) part II. Description of genotypes of some of genera founded by W.L. Distant with revision of the *Moonia* Distant. *Mem. Indian Mus.*, II(2) : 69-99.
- Pruthi, H.S. 1936. Studies on Indian Jassidae (Homoptera) part III. Description of some new genera and species with records, first records of some known species from India. *Mem. Indian Mus.*, II(3) : 101-131.
- Pruthi, H.S. 1940. Description of some new species of *Empoasca* Walsh. (Eupterygidae, Jassidae) from North India. *Indian J. Ent.*, 2(1) : 1-9.
- Viraktamate, C.A. 1976. Four new species of Idiocerinae leaf-hopper from India with a note on male *Balocha astuta* Melichar (Homoptera : Cicadellidae : Idiocerinae). *Mys. agric. J.*, 10 : 234-244.
- Viraktamate, C.A. 1979. Few new species of Idioscopus (Homoptera : Cicadellidae) from Southern India. *Entomon.*, 4 : 173-181.
- Viraktamate, C.A. 1980. Indian Macropsinae (Homoptera : Cicadellidae) 1. New species of *Macropsis* from South India. *J. Nat. Hist.*, 14 : 319-329.
- Viraktamate, C.A. 1981. Indian Macropsinae (Homoptera : Cicadellidae) II. species described by W.L. Distant and description of new species from Indian subcontinent. *Ent. Scand.*, 12 : 295.
- Viraktamate, C.A. 1982. A generic revision of old world Agallini (Homoptera : Cicadellidae), Ph.D. Thesis submitted to the *Univ. Agril. Science Bangalore, India* : 1-367.

INSECTA : HEMIPTERA : HETEROPTERA : PENTATOMOIDEA

B. BISWAS and ANIMESH BAL

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

Pentatomids commonly known as "Shield bugs" are characterised by large scutellum either covering the whole abdomen or occupying a large portion of the base of abdomen between the hemelytra. Although majority of these bugs are plant sucking, the members belonging to the subfamily Amyroteinae are wholly or partially predaceous.

A perusal of literature reveals that more than 590 species known to occur from India against 5000 species in the world. Our knowledge about Pentatomid fauna of Andhra Pradesh is meager. The present work is an attempt to provide a comprehensive account of Super family Pentatomoidea of Andhra Pradesh.

The paper deals with 26 species in 24 genera belonging to 6 families. Of these, 18 species (marked asterick) under 17 genera are being reported for the first time from the state of Andhra Pradesh. The materials dealt with were collected by the different survey parties as well as specimens housed in the National Zoological Collection. Besides, the species recorded by the earlier workers have also been incorporated.

SYSTEMATIC ACCOUNT

Superfamily PENTATOMOIDEA

Family 1. SCUTELLERIDAE

1. Genus *Scutellera* Lam. 1801

1. *Scutellera nobilis* (Fabricius)*

2. Genus *Chrysocoris* Hahn., 1843

2. *Chrysocoris perpallidus* (Westwood)

Family 2. PENTATOMIDAE

Division 1. EUSARCOCORARIA

3. Genus *Carbula* Stal, 1864

3. *Carbula scutellata* Distant*

4. Genus *Neocarbula* Distant, 1918

- 4.
- Neocarbula capitata*
- Distant*

5. Genus *Eysarcocoris* Stal

5. *Eysarcocoris ventralis* (Westwood)*
6. *Eysarcocoris montivagus* Distant*
7. *Eysarcocoris guttiger* (Thunberg)*

Division 2. EURYDEMARIA

6. Genus *Agonocelis* Spin, 1837

- 8.
- Agonocelis nubila*
- (Fabricius)*

Division 3. ANTESTIARI

7. Genus *Plautia* Stal, 1867

- 9.
- Plautia fimbriata*
- (Fabricius)*

8. Genus *Apines* Dallas, 1851

- 10.
- Apines concinna*
- Dallas

Division 4. NEZARIA

9. Genus *Nezara* Amy. & Serv, 1843

- 11.
- Nezara viridula*
- Linnaeus*

10. Genus *Piezodorus* Fieber, 1861

- 12.
- Piezodorus rubrofasciatus*
- (Fabricius)*

Division 5. MENIDARIA

11. Genus *Menida* Motsch., 1861

- 13.
- Menida histrio*
- (Fabricius)*

12. Genus *Keriahana* Distant, 1918

- 14.
- Keriahana elongata*
- Distant*

Division 6. CARPOCORARIA

13. Genus *Palomina* Muls. & Ray, 1868

- 15.
- Palomina reuteri*
- Distant

14. Genus *Halymorpha* Mayr., 1864

- 16.
- Halymorpha picus*
- (Fabricius)*

Division 7. HALYARIA

15. Genus *Erthesina* Spin, 1837

- 17.
- Erthesina fullo*
- (Thunberg)

16. Genus *Halys* Fabricius, 1803

- 18.
- Halys dentatus*
- (Fabricius)*

Division 8. DYMANTARIA

17. Genus *Gulielmus* Distant, 1901

- 19.
- Gulielmus laterarius*
- Distant*

18. Genus *Adria* Stal, 1876

- 20.
- Adria parvula*
- (Dallas)

Family 3. ASOPINIDAE

19. Genus *Canthecona* Amy., & Serv., 1843

- 21.
- Canthecona furcellata*
- (Wolff.)*

Family 4. TESSARATOMIDAE

20. Genus *Tessarotoma* Lapell., & Serv., 1825

- 22.
- Tessarotoma javanica*
- (Thunberg).

Family 5. DINIDORIDAE

21. Genus *Aspongopus* Laporte, 1832

- 23.
- Aspongopus janus*
- Fabricius*

22. Genus *Cyclopelta* Amy. & Serv., 1843

- 24.
- Cyclopelta siccifolia*
- (Westwood)

23. Genus *Megymenum* Laporte, 1832

- 25.
- Megymenum inerme*
- Herr.-Schiiff*

Family 6. ACANTHOSOMATIDAE

24. Genus *Elasmotethus* Fiber, 1861

- 26.
- Elasmotethus punctatum*
- (Dallas)*

Key to the families of the Superfamily PENTATOMOIDEA

1. Primary and subcostal veins of the wings remote including a central broad area; haemus present; scutellum covering the whole of hemelytra excepting extreme base of the outer margin SCUTELLERIDAE
- Primary and subcostal veins of wings usually contarminal and diverging at apex, somewhat -parallel; haemus generally absent 2
2. Spiracle of basal ventral segment not hidden by metasternum ... TESSARATOMIDAE
- Spiracle of basal ventral segment hidden by posterior margin of metasternum 3
3. Scutellum never extending beyond middle of the abdomen, its apex broad; membrane very large DINIDORIDAE

- Scutellum extending to about or beyond middle of the abdomen, its apex narrowed and only slightly produced behind the frena; membrane moderate or small 4
- 4. Tarsi with two joints ACANTHOSOMATIDAE
- Tarsi with three joints 5
- 5. Rostrum slender basal joint not incrassated, nor inserted at labrum
..... PENTATOMIDAE
- Rostrum robust basal joint incrassated, inserted at labrum..... ASOPINIDAE

Family SCUTELLERIDAE

Key to the genera of the family SCUTELLERIDAE

1. Abdomen furrowed longitudinally, body elongate *Scutellera*
2. Abdomen not longitudinally furrowed, scutellum completely covering abdomen, connexivum exposed *Chrysocoris*

1. Genus *Scutellera* Lam., 1801

1801. *Scutellera* Lam., Syst., : 293.

1. *Scutellera nobilis* (Fabr.)

1775. *Cimex nobilis* Fabr., Syst. Ent., : 697.

1904. *Scutellera nobilis* : Distant, Fauna Brit. India, 1 : 51.

Material examined : 2exs., Visakhapatnam, Visakhapatnam Dist.

Diagnostic character : Body above metallic bluish green or purplish; scutellum with usually the central fascia indistinct but bears six small discal spots arranged in pairs and a lateral spot on each side near centre

Length : 17-21 mm.

Distribution : Andhra Pradesh (Dist. Visakhapatnam), Assam, Karnataka.

2. Genus *Chrysocoris* Hahn, 1834

1834. *Chrysocoris* Hahn, Wanz. Ins., 2 : 38.

2. *Chrysocoris perpallidus* (Westwood)

1837. *Callidea perpallidus* Westwood in Hope Cat., 1 : 15.

1904. *Chrysocoris perpallidus* : Distant. Fauna Brit. India, 1 : 58.

2000. *Chrycoris perpureus* : Chakraborty and Ghosh, *Fauna of Tripura, State Fauna Series*, 7(Part-2) : 424.

Material examined : 1 ex., Rajendranagar, Hyderabad, Ranga Reddi Dist., 6.3. 99, S.K. Chatterjee and party coll.; 4 exs., Benconda, Srikakulam Dist., 11.2.98, M. Prasad and party coll.

Digonistic character : Body bluish black or purplish green; five spots on pronotum two anterior three on the posterior disk; seven spots on scutellum, one on anterior disk and other six arranged in pairs, and antennae black; base of the first joint of antennae, femora and body beneath ochraceous, third and fourth joint of rostrum, head beneath and marginal spots on sternum, apices of the femora, tibiae and tarsi bluish black.

Length : 15-17 mm.

Distribution : Andhra Pradesh (Dist. Ranga Reddi, Srikakulam), Karnataka, Maharashtra, Tamil Nadu, Tripura.

Family 2. PENTATOMIDAE

Key to the division of the family PENTATOMIDAE

1. Scutellum broad 2
- Scutellum moderate and triangular 4
2. Scutellum narrowed towards apex 3
- Scutellum broad not narrowed towards apex; body short and broad, the lobes of the head are about equal in length *Eusarcocoraria*
3. Scutellum triangular longer than broad, body elongate and less convex.. *Eurydemaria*
- Scutellum as broad as long with apex rounded body ovovate and convex above *Antestiaria*
4. Abdomen armed at base with a spine 5
- Abdomen unarmed 6
5. Head narrowed to the apex and more or less sinuate at the lateral margin *Nezaria*
- Head shorter and broader; neither narrowed to the apex nor sinuate at the lateral margin *Menidaria*
6. Abdomen beneath with a central longitudinal sulcation 7
- Abdomen without any sulcation head usually longer; margin of the pronotum entire not serrate *Carpocoria*
7. Lateral margin of the pronotum serrate or dentate; eyes moderate ; antennaeiferous tubercles are remote from lateral margin of head *Dymantaria*

Division 1 EUSARCOCORIARIA

Key to the genera of the Division EUSARCOCORIARIA

1. Scutellum almost as long as corium 2
- Scutellum distinctly shorter than corium, apically narrowed *Carbula*
2. Lateral lobes of the head a little longer than the central lobe, head not deflected
..... *Neocarbula*
- Lateral lobes of head as long as central lobe; head deflected, pronotum anteriorly deflected
..... *Eysarcocoris*

3. Genus *Carbula* Stal, 1864

1864. *Carbula* Stal, *Hem. Afr.*, 1 : 140

3. *Carbula scutellata* Distant

1887. *Carbula scutellata* Distant, *Tr. E. S.*, : 347.

1904. *Carbula scutellata* : Distant, *Fauna Brit. India*, 1 : 172.

Material examined : 1ex., Anandapuram, Visakhapatnam Dist., 23.10. 98, S.P. Chakraborty & party coll.

Diagnostic character : Body luteous brownly punctate; antennae luteous infascated at apex; pronotum with lateral angle produced into a large spot at basal angle and the apex impunctate; connexivum luteous with black spots; body beneath and legs luteous; corium with a purplish tinge

Length : 8 mm.

Distribution : Andhra Pradesh (Dist. Visakhapatnam), Maharashtra, Meghalaya.

Elsewhere : Myanmar.

4. Genus *Neocarbula* Distant, 1918

1918. *Neocarbula* Distant, *Fauna Brit India*, 7 : 134.

4. *Neocarbula capitata* Distant

1918. *Neocarbula capitata* Distant, *Fauna Brit. India*, 7 : 134.

Material examined : 1ex., Kichar, Secundrabad, Ranga Reddi Dist., 16.1.04, D.R. Mallick and party coll.

Dignostic characater : Head black thickly and coarsely punctate; pronotum ochraceous, darckly punctate, posteriorly delimited transverse waved pale line, and containing a transverse

dark cicatrice on each side; scutellum with apical glabrous spot near each basal angle and two indistinct dark spots on the apical area; abdomen with a waved longitudinal fascia on each side and very broad black central fascia.

Length : 6.5 mm.

Distribution : Andhra Pradesh (Ranga Reddi Dist.), Uttar Pradesh

5. Genus *Eysarcocoris* Stal, 1864

1864. *Eysarcocoris* Stal, *Hem. Afr.*, 1 : 135

Key to the species of the genus *Eysarcocoris*

1. Pronotal angles not prominent head brassy black. *ventralis*
- Pronotal angles more or less prominent 2
2. Abdomen beneath shining black, apical joint of antennae piceous, pronotal angles less produced *montivagus*
- Abdomen beneath with a central angular brassy black fascia, apical joint of antennae brownish ochraceous, pronotal angles more produced *guttiger*

5. *Eysarcocoris ventralis* (Westwood)

1837. *Pentatoma ventralis* Westwood, in *hope cat*, 1 : 36.

1904. *Eysarcocoris ventralis* : Chakraborty and Ghosh, *Fauna of Tripura, State Fauna Series*, 7(Part-2) : 42

Material examined : 1ex., Abedinekkalum, Krishna Dist., 16.10.98, S.P. Charakborty and party coll.; 1ex., Chennur, Cuddapha Dist., 31.10.99, G.C. Sen and party.

Diagnostic character : Body brownish ochraceous, thickly punctate; anterior area of pronotum luteous with two large spots; head brassy black; two large rounded luteous spots near basal angle of scutellum; body beneath and legs ochraceous with the central disk of the abdomen brassy black.

Length : 5.5-6.5 mm.

Distribution : Andhra Pradesh (Dist. Cuddapha, Krishna), Bihar Karnataka, Maharashtra Meghalaya, Sikkim, West Bengal.

Elsewhere : Mayanmar, Malay Peninsula.

6. *Eysarcocoris montivagus* (Distant)

1904. *Eusarcocoris montivagus* Distant, *Fauna Brit. India*, 1 : 166.

2000. *Eysarcocoris montivagus* Chakraborty & Ghosh, *Fauna of Tripura, State Fauna Series, 7(Part 2)* : 421.

Material examined : 1ex., Venkateshwara Nature Park, Chittor Dist., 1.10.98, S.K. Mandal & Party coll.

Diagnostic character : This species differs from *Eusarcocoris guttiger* by the more produced pronotal angles, scutellum and more laterally sinuate, abdomen beneath with a central angulate fascia, brassy black; apical joint of antennae ochraceous.

Length : 5–5.5 m.m.

Distribution : Andhra Pradesh (Dist. Chittor), Assam, Maharashtra, Meghalaya, Nagaland, Orissa, Tripura, West Bengal.

7. *Eysarcocoris guttiger* (Thunberg)

1783. *Cimex guttiger* Thunberg, *Nov. Ins. Sp.*, 2 : 32.

1904. *Eusarcocoris guttiger* Distant, *Fauna Brit. India*, 1 : 165.

Material examined : 1ex., Chennur, Cuddapah Dist., 31.12.99, G.C. Sen & Party coll.

Diagnostic character : Body obscure luteous with brongy black punctures; a large spot near each basal angle of the scutellum and apical margin of the scutellum and extreme lateral margin of pronotum luteous; body beneath and legs ochraceous abdomen shiningly black, central area of the sternum black.

Length : 5.25-5.5.

Distribution : Andhra Pradesh (Dist. Cuddapah), Maharashtra, Meghalaya, Nagaland, Orissa, Sikkim, Tripura, West Bengal.

Elsewhere : Sri Lanka.

Division 2. EURYDEMARIA

6. Genus *Agonoscelis* Spin., 1837

1837. *Agonoscelis* Spin., *Ess.*, : 712

8. *Agonoscelis nubila* (Fabr.)

- 1775 *Cimex nubila* Fabr., *Syst., Ent.*, : 712.

1904. *Agonoscelis nubila* : Distant, *Fauna Brit. India*, 1 : 189.

1999. *Agonoscelis nubila* : Chakraborty & Ghosh, *Fauna of Meghalaya, State Fauna Series, 4(Part 4)* : 399.

Material examined : 20 exs., Yadagirigura, Nalgonda Dist., 28.12 99, G.C. Sen & party coll.; 1ex., Rajendranagar, Hyderabad, Rangareddi Dist., 6.III.99, S.K. Chatterjee and party

coll.; 2 exs., Atmakur, Kurnool Dist., 27.XII.99, G.C. Sen and party coll.; 8 exs., Chennur, Cuddapah Dist., 31.XII.99, G.C. Sen and party coll.

Diagnostic Characters : Body ochraceous thickly covered with black punctures excepting lateral margins and central fascia to head; connexivum orange yellow with minute black spots at the apices of incisures; an irregular central fascia to pronotum, posterior central fascia and apex to scutellum and basal lateral margin to corium which are levigate and more or less orange yellow; there are also scattered luteous rugosities distinct on the anterior lateral area of scutellum.

Length : 10–11 m.m.

Distribution : Andhra Pradesh (Dist.–Cuddapah, Kurnool, Nalgonda, Rangareddi), Bihar, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Tamil Nadu, West Bengal.

Elsewhere : Myanmar, China, Japan, Malayan Peninsula, Sri Lanka.

Division 3. ANTESTIARIA

Key to the genera of the division ANTESTIARIA

1. Mesonotum centrally carinate; head more or less narrowed anteriorly; anterior lateral margin of the pronotum entire, not callously elevated *Plautia*
 Mesonotum centrally sulcate; head as broad as long not narrowed anteriorly *Apines*

7. Genus *Ploutia* Stal, 1867

1867. *Ploutia* Stal *Qfv-Vet-Ak. Frosh.*, 514.

9. *Ploutia fimbriata* (Fabr.)

1787. *Cinex fimbriata* Fabr., *Mant. Ins.*, 2 : 295.

1904. *Plautia* : Distant, *Fauna Brit. India*, 1 : 181

2000. *Plautia fimbriata* : Chakraborty & Ghosh, *Fauna of Tripura, State Fauna Series*, 7(Part 2) : 419.

Material examined : 1ex., Cuddapah F.R.H., Kurnool Dist., 24.IX.99, G.C. Sen and party Coll.; 1ex., Dolnapenta, 25.IX.92, S.K. Mandal and party coll.; Kishar, Secunderabad, Rangareddi Dist., 16.I.04, D.R. Munlik and party coll.

Diagnostic characters : Body bright olivaceous green, corium purplish red; apical margin of scutellum. Narrowly grayish, corium frequently with a posterior discal spot lateral margin green, membrane fuliginous with two brown spots, body beneath and legs greenish, abdomen above red, central disk greenish ochraceous with lateral marginal black points at the apices of the incisures.

Length : 10-11 m.m.

Distribution : Andhra Pradesh (Dist.–Cuddapah, Kurnool, Prakasan, Rangareddi) Assam, Maharashtra, Meghalaya, Nagaland, Sikkim, Tamilnadu, West Bengal.

Elsewhere : China, Japan, Malayan peninsula, Myanmar.

8. Genus *Apines* Dallas, 1851

1851. *Apines* Dallas, *List. Hem.*, 1 : 232.

10. *Apines Concinna* Dallas.

1851. *Apines Concinna* Dallas, *List. Hem.*, 1 : 232.

1904. Distant, *Fauna Brit. India*, 1 : 186.

Material examined : 1 ex., Anandapuram, Vsakhapatanam Dist., 23.X.98, S.P. Chakraborty and party coll.

Diagnostic Characters : Body black, shining punctate; pronotum with a central elongate pale stramineous spot between which and base sometimes a smaller spot; scutellum with three basal, a transverse arcuate and the apex pale stramineous; corium with the basal lateral margin and a transverse fasciate spot on apical area pale stramineous.

Length : 6.5 mm.

Distribution : Andhra Pradesh (Visakhapatnam) Maharashtra, Uttaranchal.

Division 4. NEZARIA

Key to the genera of the Division NEZARIA

1. Abdomen obtusely or tuberculously spinous at base; abdomen not furrowed; head thickly punctate; abdomen punctate *Nezara*
- Abdomen acutely spinous at base; anterior tibiae not dilated ; lateral margins of pronotum not reflexed *Piezodorus*

9. Genus *Nezara* Amy. & serv., 1843

1843. *Nezara* Amy. & serv., *Hem.*, : 143.

4. *Nezara Viridula* Linnaeus

1758. *Cimex Viridula* Linn., *Syst. Nat.*, ed., 10 : 444.

1904. *Nezara Viridula* : Distant, *Fauna Brit. India*, 1 : 220.

2000. *Nezara Viridula* : Chakraborty & Ghosh, *Fauna of Tripura, State Fauna Series*, 7(part 2) : 422.

Material examined : 1 ex., Kodumura, Kurnool Dist., 29. XII. 99, G.C. Sen and party coll.;

2daxes., Bedkonda, Srikakulam Dist., 11.II.98, M. Prasad and party coll.; 1ex., Agrampari, Visakhapatnam Dist., 6.II.04, D.R. Munlik and party coll.; 1ex., Hyderabad, Rangareddi Dist., 31.XII.98, B.C. Das and party coll.; 1ex., Srisalam, Prakasan Dist., 24.IX.98, S.K. Mandal party coll.

Diagnostic Characters : Body pale derkgreen or greenish, ochraceous, thickly punctate; extremity of sefmental angles to abdomen black; antennae green; apices of the third and the apical areas of tource and fifth joints purple brown; in same specimens two spots at the base of the head, three spots on anterior area of pronotum, three basal and an apical spot to scutellum and a discal spot on apical area of coriam green.

Length : 12–16mm.

Distribution : Andhra Pradesh (Dist.–Kurnool, Rangareddi, Visakhapatnam). Cosmopolitan.

10. Genus *Piezodorus* Fieber, 1861

1861. *Piezodorus* Fieber, *Eur. Nem.*, 78 & 329.

12. *Piezodorus rubrofasciatue* (Fabr.)

1787. *Cimex rubrofasciatns* Fabr., *Mant. Ins.*, 2 : 293.

1904. *Piezodorus rubrofasciatus* : Distant, *Fauna Brit. India*,

1999. *Piezodorus rubrofasciatus* : Chakraborty & Ghosh. *Founa of Meghalaya, State Founa Series*, 4(part 4) : 405

Material examined : 3exs., Darnal Prakasan Dist., 22.X.98, S.K. Mandal and party coll.

Diagnostic Characters : Body above pale greenish, thickly punctate; cluvus with a small black apical spot; Pronotum with a transverse pale fascia between the pronotal angle; connexivum and basal lateral margins of coreium pale purple or sanguineous; body beneath and legs pale luteous.

Length : 8-10 mm.

Distribution : Andhra Pradesh (Dist. Prakasam), Assam, Maharashtra, Meghalaya, Sikkim, West Bengal.

Elsewhere : Australia, Japan, Malay peninsula, Mayanmar, Orissa, Sri Lanka.

Division 5. MENIDARIA

Key to the genera of the Division MENIDARIA

1. Head broad not subtruncate; pronotum with the lateral margins nearly straight, the anterior and posterior margins very slightly sinuate; abdomen with a well developed spine
..... ***Menida***

- Head subtruncate which is about as long as breadth between eyes; the pronotum is twice as broad as the medial length, its lateral margins moderately oblique; the basal abdominal spine is short and rudimentary **Keriahana**

11. Genus *Menida* Motsch., 1861

1861. *Menida* Motsch., *En. Ent.*, 10 : 23.

13. *Mnida histrio* (Fabricius)

1787. *Cmea histrio* Fabr., *Mant. Ins.*, 2 : 296.

1904. Distant, *Fauna Brit. India*, 1 : 228.

Material examined : 1ex., Dronachalam, Kurnool Dist., 28.XII.99, G.C. Sen and party coll; 1ex., Pakhol F.R.H., Warangal Dist., 3.VII.85, P. Parui and party coll.

Diagnostic Characters : Body ochraceous, blackly punctate head with four longitudinal lines and margins blackly punctate; pronotum with an anterior submarginal black line and two transverse annulate black markings on anterior area scutellum with a spot on each basal angle, an anterior discal spot and one on each lateral margin a little before apex, black, apical area of the corium reddish ochraceous with a black spot.

Length : 6.5-8 mm.

Distribution : Andhra Pradesh (Dist.-Kurnool, Warangal), Karnataka, Maharashtra, Meghalaya, Tamilnadu, Tripura, West Bengal.

Elsewhere : China, Myanmar.

12. Genus *Keriahana* Distant

1918. *Keriahana* Distant, *Fauna Brit. India*, 7 : 143.

14. *Keriahana elongata* Distant

1918. *Keriahana elongata* Distant, *Brit. India*, 7 : 144.

Material examined : 1ex., Yellaturu, Cuddapah Dist., 1.1.2000, G.C. Sen and party coll.

Diagnostic Characters : Body black thickly punctate; pronotum with the lateral margin, some transverse spot on the posterior disk and a small spot on each lateral angle ochraceous, scutellum with a small spot at each basal a few irregular spot on posterior half and the apex ochraceous; six spot arrange in pairs on anterior segment of abdomen, luteous.

Length : 7 mm.

Distribution : Andhra Pradesh (Cuddapah).

Elsewhere : Myanmar.

Division 6. CARPOCORARIA

Key to the genera of the Division CARPOCORARIA

1. Connexivum punctured only with brown or black *Palomena*
- Connexivum spotted or punctured with black; margin of pronotum neither elevated nor callous. *Halyomorpha*

Genus 13. *Palomena* Muls & Ray, 1866

1866. *Palomena* Muls & Ray, *Pun, France, Pent.*, : 271 & 277.

15. *Palomena reuteri* Distant

1879. *Palomena reuteri* Distant, *Pr. E. S.*, : 122.

1904. *Palomena reuteri* : Distant, *Fauna Brit. India*, 1 : 156.

Material examined : 1ex., Kajipet, Cuddapah, 30.XII.99, G.C. Sen and party coll.

Diagnostic Character : Body green, head, membrane, basal half of scutellum, anterior margin of pronotum bronzy; head, pronotum rugulose punctured with black, central lobe slightly shorter than lateral lobes, rostrum luteous its apex black, lateral angles of the pronotum prominent and rounded, abdomen above black, Connexivum luteous, punctured with black.

Length : 11-12 mm.

Distribution : Andhra Pradesh (Cuddapah), Jammu & Kashmir, Punjab.

4. Genus *Halyomorpha* Mayr, 1864

1864. *Halyomorpha* Mayr, *Verh. Z.-B.Ges.*, 14 : 911

16. *Halyomorpha picus* (Fabr.)

17911. *Cimex picus* Fabr., *Ent. Syst.*, 4 : 115.

1904. *Halyomorpha picus* : Distant *Fauna Brit. India*, 1 : 152.

Material examined : 1ex., Hyderabad, Rangareddi Dist., 31.XII.98, B.C. Das and party coll.

Diagnostic Characters : Body thickly and darkly punctate greenish ochraceous, testaceous; anterior and lateral areas of pronotum and head marked with dark fuscous or brownish; lateral areas of head and sternum blackly punctate; a small dark spot at basal angle of scutellum; body beneath and legs testaceous.

Length : 12-17 mm.

Distribution : Andhra Pradesh (Dist. Rangareddi); Karnataka, Kerala, Maharashtra, Meghalaya, West Bengal.

Elsewhere : China, Japan, Mayanmar, Sri Lanka.

Division 7. HALYARIA

Key to the genera of the Division HALYARIA

1. Anterior and posterior tibiae dilated..... *Erthesina*
- Anterior tibiae sometimes dilated but posterior tibiae simple; head longer than pronotum
..... *Halys*

15. Genus *Erthesina* Spin, 1837

1837. *Erthesina* Spin., : 291.

17. *Erthesina fullo* (Thunberg)

1783. *Cimex fullo* Thunb., *Nov. ins. Spec.*, 2 : 42.

1904. *Erthesina fullo* : Distant, *Fauna Brit. India*, 1 : 117.

Material examined : 1ex., srikalahasti, Chittor Dist., 23.1.99, P. Mukhopadhaya and party coll.

Diagnostic Characters : Head black, thickly punctate; pronotum with a central line, lateral and anterior margin ochraceous : corium purplish brown, the marginal areas darker : connexivum alternately ochraceous and piceous; four longitudinal fasciae to head beneath, margin and subapical spot to abdomen, transverse lines at abdominal stigmata black.

Length : 20-25 mm.

Distribution : Andhra Pradesh (Dist. Chittor), Andaman islands, Assam, Kerala, Meghalaya, Sikkim.

Elsewhere : Bangladesh, China, Japan.

16. Genus *Halys* Fabricius, 1803

1802. *Halys* Fabr., *syst. Rhyng.*, : 180.

18. *Halys dentatus* (Fabricius)

1775. *Cimex dentatus* Fabr., *Syst. Ent.*, : 702.

1904. *Halys dentatus* : Distant, *Fauna Brit. India*, 1 : 119.

Material examined : 1ex., Srisailam, Prakasan Dist., 24.IX.98, S.K. Mandal and party coll.; 1ex., Haliz, Nalgonda Dist. 24.I.04, D.R. Moulik and party coll.; 5exs., Rajendranagar, Rangareddi Dist., 6.III.99, S.N. Chatterjee and party coll.; 7exs., Chikadpally, Rangareddi Dist., 5.III.99, S.K. Chatterjee and party coll.

Digonostic character : Body dull ochraceous, durckly punctate, scutellum with short basal and obscure central fasciae and two marginal spots before apex pale, apical margine pieceous; membran greious brown; head beneath and sternumcoarsely punctate; abdomen darckly ands finely punctate its lateral margine piceous.

Length : 17-23 mm.

Distribution : India : Andhra Pradesh (Dist.–Nalgonda, Prakasan, Rangareddi); Karnataka, Kerala Maharastra, Meghalaya, Sikkim, Uttaranchal Uttar Pradesh, West Bengal.

Elsewhere : Sri Lanka.

Division 8. DYMANTARIA

Key to genera of Division DYMANTARIA

1. Head with the lateral lobe longer than the central and metting beyond it ... *Gulielmus*
- Head with lobes about equal in length; antennae five jointed and are alike in both the sexes *Adria*

17. Genus *Gulielmus* Distant, 1901

1901. *Gulielmus* Distant, *Entomologist*, : 347.

19. *Gulielmus laterarius* Distant

1901. *Gulielmus iaterarius* Distant, *Entomologist*, : 347.

1904. *Gulielmus laterarius* : Distant, *Fauna Brit. India*, 1 : 137.

Material examined : 1ex., Venkateshwara University, Chittor Dist., 30.10.98, S.K. Mandal and party coll.

Length : 9-10 mm.

Distribution : Andhra Pradesh (Dist. Chittor), Maharashtra.

18. Genus *Adria* Stal, 1876

1876. *Adria* Stal, *En. Hem.*, 5 : 58.

20. *Adria parvula* (Dallas)

1851. *Pentatoma parvula* Dallas, *List. Hem.*, 1 : 246.

1904. *Adria parvula* : Distant, *Fauna Brit. India*, 1 : 139.

Material examined : 1ex., Koti, Secunderabad, Rangareddi Dist., 18.1.04. D.R. Moulik

and party coll.; 1 ex., Venkateshwar University Campus, Chittoor Dist., 30.IX.98, S.K. Mandal and party coll.

Diagnostic Characters : Body ochraceous, thickly and coarsely punctate; scutellum with a spot near each basal angle and a central indistinct longitudinal line levigate and with a small obscure darker spot at apex; pronotum with a anterior and lateral margin and some anterior transverse markings levigate.

Length : 7-8 mm.

Distribution : Andhra Pradesh (Dist. Chittoor), Maharashtra, West Bengal.

Elsewhere : Myanmar, Senegal.

Family 3. ASOPINIDAE

Key to the genera of the family ASOPINIDAE

1. Anterior funora with a prominent spine; lateral pronotal margins crenulate or dentate ***Canthecona***
- Anterior femora unarmed; lateral pronotal angles rounded not produced. Second joint of antennae more than twice as long as third ***Asopus***

19. Genus *Canthecona* Any. & Serv., 1843

1843. *Canthecona* Any. & Serv., *Hem.*, : 81.

21. *Canthecona furcellata* (Wolff.)

1801. *Cimex furcellata* Wolff, *lc*, 5 : 182.

1904. *Canthecona furcellata* Distant, *Fauna Brit. India*, 1 : 248.

Material examined : 1 ex., Secunderabad, Kajipolly, Rangareddi Dist., 19.1.04, D.R. Moulik and party coll.

Diagnostic Characters : Body ochraceous with bronzy pectures; head with a central pale fascia ochraceous; pronotum with a broken transverse fascia on anterior area; some more or less distinct longitudinal fascia on anterior half and the lateral angles bronzy black; scutellum bronzy black at base with large levigate spot at each black angle; corium with bronzy black suffusions; connexium with large subquadrate bronzy black spots.

Length : 15-16 mm.

Distribution : Andhra Pradesh (Dist. Rangareddi), Bihar, Maharashtra, Tamil Nadu, West Bengal.

Elsewhere : Java, Myanmar.

Family 4. TESSARATOMIDAE

Genus 20. *Tessaratoma* Lapell. & Serv., 1825

1825. *Lessaratoma* Lapell. & Serv., *Encycl. Melh.*, 10 : 540.

22. *Tessaratoma javanica* (Thunberg)

1783. *Cimex Jvanica* Thunb., *Nov. Ins. Spec.*, 2 : 45.

1904. *Jessaratoma javanica* : Distant, *Fauna Brit. India*, 1 : 259.

Material examined : 10exs., Pathancheru, Medak Dist., II.X.98, S.P. Chakraborty and party coll.; 1ex., Secunderabad, Rangareddi Dist., ? ., ?

Diagnostic Characters : Body brownish ochraceous or pale olive brown; pronotum with the lateral margin moderately amplified and reflexed not anteriorly dilated; almost oblique from the lateral angles of head; apex of the scutellum spicuous : body beneath usually covered with a white powdery substance in male anal appendage is truncate at apex.

Family 5. DINIDORIDAE

Key to the genus

1. Antennae five jointed *Aspongopus*
- Antennae four jointed..... 2
2. Head small, lateral lobes only a little longer than central lobe *Cyclopelta*
- Head large, lateral lobes much longer than the central lobe and usually meeting beyond it; pronotum margins angularly sinuate; abdominal margins lobately dentate
..... *Megymenum*

21. Genus *Aspongopus* Laporte, 1832

1832. *Aspongopus* Laporte, *Ess. Hem.*, : 58.

23. *Aspongopus janus* (Fabricius)

1775. *Cimex janus* Fabr., *Syst. Ent.*, : 714.

1904. *Aspongopus janus* : Distant, *Fauna Brit. India*, 1 : 281.

Material examined : 1ex., Simlachalam, Visakhapatnam Dist., 22.X.98, S.P. Chakraborty and party coll.

Diagnostic Characters : Body olivaceous or sanguineous, sub anterior transverse fascia to pronotum a little more than basal half of scutellum, head, antennae black; lateral margins of sternum and abdomen ochraceous or sanguineous; body beneath and legs black; third joint of antennae a little longer than first but shorter than remaining joints.

Length : 16-20 mm.

Distribution : Andhra Pradesh (Dist. Visakhapatnam), Karnataka, Kerala, Maharashtra, Meghalaya, Tamilnadu, Uttaranchal, West Bengal.

Elsewhere : Myanmar, Sri Lanka.

22. Genus *Cyclopelta* Amy. & Serv., 1843

1843. *Cyclopelta* Amy. & Sev., *Hem.*, : 172.

24. *Cyclopelta siccifolia* (Westwood)

1837. *Aspongopus siccifolia* Westw. In *Hope Cat.*, 1 : 26.

1904. *Cyclopelta siccifolia* : Distant, *Fauna Brit. India*, 1 : 280.

1999. *Cyclopelta siccifolia* : Chakraborty and Ghosh, *Fauna of Meghalaya, State fauna series*, 4(Part 4) : 410.

Material examined : 1ex., Visakhapatnam, Visakhapatnam Dist.

Dignostic character : Body black, membrane more or less brownish ochraceous; connexivum concolorous neither red nor spotted with black; scutellum occasionally with a minute sanguineous spot at base.

Length : 11-16 mm.

Distribution : India : Andhra Pradesh (Dist. Visakhapatnam); Maharashtra; Meghalaya; Sikkim; West Bengal.

Elsewhere : Myanmar; Sri Lanka.

23. Genus *Megymenum* Laporte, 1832

1832. *Megymenum* Laporte, *Ess. Hem.*, : 52.

25. *Megymenum inerme* Herr. Schiiff.

1839. *Megymenum inerme* Herr. Schiiff., *Wanz. Ins.*, 5 : 62.

1904. *Megymenum inerme* : Distant, *Fauna Brit. India*, 1 : 286.

Material examined : 1ex., Ramasinghavaram, West Godavari Dist., 4.10.98, S.K. Mandal & party coll.

Dignostic character : Body ovate and elongate, brassy black; antennae short compressed second and third joint dilated; pronotum distinctly centrally tumescent on anterior area, the lateral margin obliquely angularly sinuate; the anterior angle obtuse; membrane infusate beyond middle; lateral margin of head tumid not spined in front of eyes.

Length : 14-15 mm.

Distribution : Andhra Pradesh (Dist. West Godavari), Assam, West Bengal.

Family 6. ACANTHOSOMATIDAE

24. Genus *Elasmotethus* Fieber, 1861

1861. *Elasmotethus* Fieber, *Eur. Heb.*, 78 & 328.

26. *Elasmotethus punctatum* (Dallas)

1851. *Acanthosoma punctatum* Dallas, *List. Hem.*, 1 : 306.

1904. *Elasmotethus punctatum* : Distant, *Fauna Brit. India*, 1 : 326.

Material examined : 1ex., Venkateshwar University, campus, Chittor Dist., 30.IX.98, S.K. Mondal and party coll.

Diagnostic Characters : Body greenish, thickly punctate; head with brown punctures, scutellum triangular with its apex attenuated and produced strongly, punctured with brown; corium with a small unpunctate patch on the disk; connexivum with a small spine at the posterior angle of each segment and with a small black spot on each segment at the posterior margin.

Length : 9-9.5 mm.

Distribution : Andhra Pradesh (Dist. Chittor), Punjab.

SUMMARY

The paper incorporates the account of 26 species in 24 genera belonging to 6 families of the Super family Pentatomoidea. 20 species marked with asterix (*) are being recorded for the first time from Andhra Pradesh. Keys to various taxa, general diagnosis of genera and species, geographical distribution both in India and abroad and references to the original literature have been provided.

ACKNOWLEDGEMENTS

The authors are indebted to the Director, Zoological Survey of India for providing laboratory facilities. Greatful thanks are due to Dr. A.K. Hazra Scientist-E for numerous courtesies. Cooperation from the colleagues of the Hemiptera section are also thankfully acknowledged.

REFERENCES

- Chakraborty, S.P. and Ghosh, L.K. 1998. *Insecta : Hemiptera : Heteroptera : Pentatomoidea. Zool. Surv. India, Fauna of Meghalaya, State Fauna Series, 4(Part-4) : 391-429.*
- Chakraborty, S.P. and Ghosh, L.K. 2000. *Insecta : Hemiptera : Heteroptera : Pentatomoidea. Zool. Surv. India, Fauna of Tripura, State Fauna Series, 7(Part-2) : 417-425.*

- Chopra, N.P. and Sucheta. 1989a. Identity and Systematic of *strothecoris nigriups* Horrath. (Hemiptera : Pentatomidae : Podopinae). *Bull entomol.*, **27**(1) : 28-31.
- Distant, W.L. 1902. The Fauna of British India including Ceylon and Burma, Rhynchota : Heteroptera 1 : 1-130, London (Taylar and Frantis).
- Mathew, K. 1968. On a collection of Pentatomidae (Hemiptera) from silent valley, Kerala, India *Rec. zool. Surv. India*, **84**(1-4) : 35-47.

INSECTA : HEMIPTERA : PYRRHOCORIDAE

P.C. SAHA and ANIMESH BAL

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

Pyrrhocoridae is a small family under the order Hemiptera, where a few members are serious pests of cotton. Earlier workers included this group in the family Lygaeidae, but the absence of ocelli in Pyrrhocoridae separates them from Lygaeidae. Pyrrhocorids are much larger and more robust species than Lygaeids. *Dysdercus koenigii* causes havoc in cotton cultivation by infesting and transmitting the fungus *Nematospora* to the cotton boll which actually stains the cotton.

About 360 species under 43 genera have so far been recorded globally while India has 45 species under 15 genera. Distant (1902) included only one species from Andhra Pradesh in his Fauna of British India, Rhynchota Vol. II. Sen *et al.* (1994, 1999) contributed on the pyrrhocorid fauna of West Bengal and Meghalaya with a few new records from the concerned states. No other comprehensive taxonomic work has yet been done on the pyrrhocorid fauna of Andhra Pradesh.

The present studies have been based upon the named and unnamed collections housed in the Hemiptera section as well as collected materials received from different survey parties of Zoological Survey of India who ventured the state of Andhra Pradesh.

The resultant work comprised 11 species under 7 genera of the family Pyrrhocoridae, of which 9 species have been reported for the first time from the state of Andhra Pradesh. Identified materials under this study will be deposited in the National Zoological Collection.

MATERIALS AND METHOD

Pyrrhocorids can be collected either by sweeping of crops and bushes with insect nets or by light trapping at night. After collection the specimens are killed in a killing jar with liquid benzene or chloroform as killing agent and preserved dry with Naphthalene and Paradichlorobenzene. The specimens are kept in insect envelopes with proper data labels

mentioning locality, date of collection and name of collector with ecological notes. In the laboratory specimens are relaxed and set-pinned. After identification under binocular microscope the specimens are labeled properly and kept dry in insect drawers for permanent preservation.

SYSTEMATIC ACCOUNT

Following is the systematic list of all the species contained in the present paper. Species with asteric mark denotes new records from the state.

Family PYRRHOCORIDAE

Subfamily 1. EURYOPHTHLMINAE

1. Genus *Macrocerea* Spinola 1837

1. *Macrocerea grandis* (Gray)

2. Genus *Iphita* Stal 1870

2. *Iphita limbata** Stal.

3. Genus *Physopelta* Stal 1843

3. *Physopelta gutta** Burmeister

Subfamily 2. PYRRHOCORINAE

4. Genus *Dysdercus* Amyot and Serville 1843

4. *Dysdercus koenigii* (Fabricius)

5. *Dysdercus olivaceus** Fabricius

5. Genus *Antilochus* Stal 1863

6. *Antilochus coqueberti* (Fabricius)

7. *Antilochus ruses** Stal.

6. Genus *Melamphus* Stal 1868

8. *Melamphus feber* *Fabricius

9. *Melamphus rubrocinctus** Stal

7. Genus *Odontopus* Laporte 1832

10. *Odontopus nigricornis** Stal

11. *Odontopus varicornis** (Fabricius)

Key to Subfamilies of the family PYRRHOCORIDAE

1. Females always with the sixth ventral segment cleft at base
..... EURYOPHTHALMINAE

Both sexes with sixth ventral segment entire PYRRHOCORINAE

Subfamily EURYOPHTHALMINAE

Key to genera of the subfamily EURYOPHTHALMINE

1. Antennae normal in both sexes, first joint longer than head but shorter than head and pronotum together.
Antennae quite long in male first joint is about twice as long as head and pronotum together *Macroceraea* (= *Lohita*)
2. Pronotum with anterior disc convex, which does not reach anterior margin of pronotum, lateral margin strongly reflexed *Iphita*
Pronotum with its anterior convex disc reaching the anterior margin of pronotum; lateral margin not strongly reflexed *P. hysopla*

Subfamily EURYOPHTHALMINAE

1. Genus *Macroceraea* Spinola 1837

1837. *Macroceraea spinola*, *Essai, Ins. Hem.*, : 177.

1. *Macroceraea grandis* (Gray)

1832. *Lygaeus grandis* Gray, *In Griffiths Anim. Kingd.* XV.

1902. *Lohita grandis* : District, *Fauna Brit. India, Rhynchota*, 2 : 95.

1994. *Macroceraea grandis* : Sen *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(part 5) : 436.

1998. *Macroceraea grandis* : Sen *et al.*, *Fauna of Meghalaya, State Fauna Series*, 4(part 4) : 333.

Material examined : 1ex, Chittor, Chittor-Dist, 1.X.1998., S.K. Mondal and party coll.

Diagnostic characters : Body red; pronotum and scutellum reddish in colour; central to clavus area with elongate and large rounded spots different in size at inner angle of corium; leg black.

Distribution : India : Andhra Pradesh (Dist-Chittor); Assam; Meghalaya; West Bengal.

Elsewhere : Philippines.

2. Genus *Iphita* Stal 1870

1870. *Iphita* Stal, *Enum. Hem.*, 1 : 99.

2. *Iphita limbata* Distant

1902. *Iphita limbata* Distant, *Fauna of Brit. India, Rhynchota*, 2 : 96.

1994. *Iphita limbata* Sen et al., *Fauna of West Bengal, State Fauna Series*, 3(part 5) : 436.

1998. *Iphita limbata* Sen et al., *Fauna of Meghalaya, State Fauna Series*, 4(part 4) : 333.

Material examined : 1ex, Visakhapattanam, Visakhapattanam Dist., 22.X.1998., S. P. Chakraborty and party coll.

Diagnostic characters : Body blackish red, lateral margin of pronotum, corium and base of antennae brownish yellow; pronotum at the middle transversely impressed, legs reddish.

Distribution : India : Andhra Pradesh (Dist-Visakhapattanam); Assam; Kerala; Maharashtra; Meghalaya.

Elsewhere : Bangladesh, Sri Lanka.

3. Genus *Physopelta* Amoyt and Serville, 1843

1843. *Physopelta* Amoyt and Serville, *Hemip.*, : 271.

3. *Physopelta gutta* (Burmeister)

1834. *Lygaeus (Pyrrhocoris) gutta* Burmeister, *Nova Acta Acad. Leop. Carol.* XVI, Suppl., 424.

1902. *Physopelta gutta* : Distant, *Fauna of Brit. India, Rhynchota*, 2 : 97.

1994. *Physopelta gutta* : Sen et al., *Fauna of West Bengal, State Fauna Series*, 3(part 5) : 437.

1998. *Physopelta gutta* : Sen et al., *Fauna of Meghalaya, State Fauna Series*, 4(part 4) : 334.

Material examined : 1ex, Eluru, West Godavari Dist, 28.XI.2000; P. H. Roy and party coll.

Diagnostic characters : Body pale reddish brown in colour; head with a spot at base; pronotum scutellum and base of corium reddish in colour and with a discal round black spot; antennae reddish in colour; body pilose.

Distribution : India : Andhra Pradesh (Dist-West Godavari); Assam; West Bengal.

Elsewhere : Australia, Borneo, China, Japan, Java, Myanmar, Phillippines, Sri Lanka, Sumatra.

Subfamily PYRRHOCORINAE

Key to genera of the subfamily PYRRHOCORINAE

1. Apical angle of corium more or less rounded, not elongately acute *Dysdercus*
 Apical angle of corium elongately acute 2
2. Head not transversely constricted or impressed beneath near base; lateral margin of pronotum acute, seldom reflexed *Antilochus*
 Head transversely constricted or impressed beneath near base 3

3. Eyes not touching anterior margin of pronotum *Melampus*
 Eyes immersed to head *Odontopus*

Subfamily PYRRHOCORINAE

4. Genus *Dysdercus* Amyot and Serville 1843

1843. *Dysdercus* Amyot and Serville, *Heimp.*, : 272.

Key to species of the genus *Dysdercus*

1. Presence of a transverse line which connect the area of each eye; pronotum and corium punctate *koenigii*.
 Absence of transverse line in between eyes; pronotum and corium not punctate
 *olivaceus*

4. *Dysdercus koenigii* (Fabricius)

1775. *Cimex koenigii* Fabricius, *Syst. Ent.*, : 720.

1902. *Dysdercus cingulatus* : Distant, *Fauna Brit. India, Rhynchota*, : 199.

1914. *Dysdercus koenigii* : Bergorth, *Ent. Mitt.*, 3 : 355.

1994. *Dysdercus koenigii* : Sen *et al*, *Fauna of West Bengal, State Fauna Series*, 3(part 5) : 439.

1998. *Dysdercus koenigii*: Sen *et al*, *Fauna of Meghalaya, State Fauna Series*, 4(part 4) : 337.

Material examined : 6exs, Tiger Valley; 5.X.1963, B. Nath and party coll; 2 exs, Nagarjun Kunda, 28.x.1963., B. Nath coll; 1 ex, Chiraurrutta, Prakasam Dis., 23.x.1998., S.K. Mondal; and party coll; 1 ex, Venkateswara, N Palli, Chittor Dist., 01.X.1998., S.K. Mondal; and party coll; 1 ex, Guntimaduga Khammam Dist., 12.XII.1999., P.H. Roy and party coll; 3 exs, Gokavarom forest, East Godavari Dist., 25.xii.2000., P.H. Roy and party coll; 1 ex, Eluru, West Godavari Dist., 28.XI.2000., P.H. Roy and party coll.

Diagnostic characters : Body yellow with a slight tinge of brown anterior pronotal callosity and lateral margin of pronotum reddish; scutellar membrane and legs black in colour; abdominal segments and spot of coxae creamy white. Other characters as in key.

Distribution : India : Andhra Pradesh (Dist.–Prakasam, Chittor, East Godavari and West Godavari); Assam; Karnataka; West Bengal; Andaman and Nicobar Islands.

Elsewhere : Sri Lanka.

5. *Dysdercus olivaceus* Fabricius

1798. *Dysdercus olivaceus* Fabricius. *Ent. Syst. Suppl.*, : 540.

1868. *Dysdercus loivaceus* : Stal, *Hem.*, 1 : 84.

Material examined : 16 exs, Guntur, Guntur-Dist, 31.IX.1963., B. Nath Coll.

Diagnostic characters : Body saffron yellow, anterior callosity to pronotum, sternum, abdomen, rostrum and legs reddish yellow with a slight tinge of brown; basal fasciae to third, fourth and fifth abdominal segments fuscus. Others characters as in key.

Distribution : India : Andhra Pradesh (Dist-Guntur).

5. Genus *Antilochus* Stal 1863

1863. *Antilochus* Stal, *Berl. ent. zeitschr.*, 7 : 393.

Key to species of the genus *Antilochus*

1. Pronotum with two transverse series of punctures while base of scutellum with one transverse series of punctures *russus*
- Pronotum and scutellum without transverse series of punctures *coqueberti*

6. *Antilocus ruses* Stal

1863. *Antilochus ruses* Stal, *Berlin Ent. Zeitschr.* 7 : 394.

1903. *Antilochus ruses* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 101.

1994. *Antilochus ruses* : Sen *et al.*, *Fauna of Meghalaya, State Fauna Series*, 4(part 4) : 335.

Material examined : 2 exs. Guntur, Guntur Dist., 31.IX.1963., B. Nath coll.

Diagnostic characters : Body reddish brown, membrane yellowish brown, pronotum transversely punctate and strongly angulated; scutellum at base of membrane corium thickly punctured; apices of anterior femora spined.

Distribution : India : Andhra Pradesh (Dist-Guntur) ; Assam; Sikkim; West Bengal.

Elsewhere : Bhutan, Myanmar.

7. *Antilochus coqueberti* (Fabricius)

1784. *Cimex augur* Fabricius *Thunberg. Nova. Ins. spec.*, 3 : 58.

1903. *Antilochus coqueberti* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 101.

1926. *Antilochus coqueberti* : Esaki. *Ann. Mus. Nat. Hung.*, 21 : 158.

1994. *Antilochus coqueberti* : Sen *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(part 5) : 440-441.

1998. *Antilochus coqueberti* : Sen *et al.*, *Fauna of Meghalaya, State Fauna Series*, 4(part 4) : 335.

Material examined : 10 exs, Pederu, Visakhapattaman Dist., 14.x.1998., S.K. Mondal; and party coll.; 1 ex, Venkateshwara, N Palli, Chittor-Dist., 1.X.1998., S.K. Mondal and party coll.

Diagnostic characters : Head blood red in colour; antennae black; apical margin of membrane pale brownish; pronotum at anterior margin black; obscurely punctate; corium thickly punctate; anterior femoral spine present.

Distribution : India : Andhra Pradesh (Dist-Visakhapatnam, Chittoor); Andaman Island; Assam, Jammu and Kashmir; Meghalaya, West Bengal.

Elsewhere : China, Malacca.

6. Genus *Melamphaus* Stal 1868

1868. *Melamphaus* Stal, *Hem. Fabr.*, 1 : 83.

Key to species of the genus *Melamphaus*

1. Lateral margin of pronotum acute; rostrum extending to near middle of abdomen.....
.....*feber*
- Lateral margin of pronotum reflexed; rostrum not extending to near middle of abdomen
.....*rubrocinctus*

8. *Melamphaus feber* (Fabricius)

1903. *Melamphaus feber* Distant, *Fauna Brit. India, Rhynchota*, 2 : 107.

1905. *Melamphaus feber* : Breddin, *Mitt. Naturist Mus. Hamburg*.

1998. *Melamphaus feber* : Sen *et al.*, *Fauna of Meghalaya, State Fauna Series*, 4(part 4) : 338.

Material examined : 1 exs, Daulathabad, Medak Dist, 9.III.1999., S. K. Chatterjee and party coll.

Diagnostic characters : Head blood reddish in colour; posterior area of pronotum scutellum and membrane black; two black spots present at lateral segments of abdomen; apical margin of corium with brownish spot; antennae black.

Distribution : India : Andhra Pradesh (Dist-Medak); Assam; Meghalaya; West Bengal.

Elsewhere : Borneo, Malacca, Myanmar, Palawan, Pulocandor, Philippines.

9. *Melamphaus rubrocinctus* Stal.

1870. *Melamphaus rubrocinctus* Stal. *Enum. Hem.*, 1 : 108.

1903. *Melamphaus rubrocinctus* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 108.

1998. *Melamphaus rubrocinctus* : Sen *et al.*, *Fauna of Meghalaya, State Fauna Series*, 4(part 4) : 338.

Material examined : 1 ex, Chemur, Cuddapah-Dist., 1.1.2000., G.C. Sen and party.

Diagnostic characters : Head brownish red with small spot at the base; pronotum, scutellum, corium, membrane pitchy black; two oblique reddish fasciae present at lateral and posterior margin of pronotum; apical margin of membrane smoky brown.

Distribution : India : Andhra Pradesh (Dist-Cuddapah); Assam; Meghalaya; West Bengal.

Elsewhere : Myanmar, Margherita.

7. Genus *Odontopus* Laporte 1832

1832. *Odontopus* Laporet., *Ess. Hem.*, : 37.

Key to species of the genus *Odontopus*

1. Body ochraceous, reddish ochraceous or sanguineous; a round spot near the apical angle of the corium *nigricornis*.

Body above purplish red, no red spot near the apical angle of corium *varicornis*

10. *Odontopus nigricornis* Stal

1861. *Odontopus nigricornis* Stal, *Stett. Entt. Zeit.*, 22 : 146.

1910. *Odontopus nigricornis* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 96.

1994. *Odontopus nigricornis* : Sen et al., *Fauna of West Bengal, State Fauna Series*, 3(part 5) : 441.

Material examined : 1 ex, Vijaywada, Krishna Dist., 17.x.1998, S. P. Chakraborty and party coll., 1 ex., Dronachallam, Kurnool Dist., 27.XII.1999., G. C. Sen and party coll.

Diagnostic characters : Blood reddish or yellow with a slight tinge of brown; a round spot near apical angle of corium, anterior femora finely serrate beneath and armed with one or two spines; antennae with third joint shortest and second and third subequal in length.

Distribution : India : Andhra Pradesh (Dist-Krishna, Kurnool); Assam; Karnataka; Maharashtra, West Bengal; Sikkim.

Elsewhere : Myanmar.

11. *Odontopus varicornis* (Fabricius)

1787. *Climex varicornis* Fabricius, *Mant. Ins.*, 2 : 298.

1868. *Odontopus varicornis* : Stal, *Hem Fabr.*, : 81.

Material examined : 1 ex, Nagarjunsagar, Mahabubnagar Dist., 17.IV. 1985., S. Chatterjee and party coll.

Diagnostic characters : Body purplish red; pronotal margins, lateral margins of corium, connexivum above and beneath, and lateral margins of poststranum luteous; antenna, scutellum,

clavus, membrane and margins of abdominal segments black; antennae with base of first joint reddish, first joint a little longer than second.

Distribution : India : Andhra Pradesh (Dist. Mahabubnagar);.

Elsewhere : Sri Lanka.

SUMMARY

The present paper incorporated the account of 11 species of Pyrrhocorids belonging to 7 genera from the state of Andhra Pradesh, out of which 9 species, with asteric marks in the text are being recorded for the first time from the state. For each species the original and the subsequent references, distributional records in India and elsewhere, keys to various taxa have been provided. This is the first comprehensive account of Pyrrhocorid bugs from the state of Andhra Pradesh.

ACKNOWLEDGEMENTS

The authors are grateful to the Director Zoological Survey of India, Kolkata, for providing laboratory facilities during the period of work. Sincere thanks are due to Dr. A. K. Hazra, Scientist-E, for critically going through the manuscript and rendering valuable suggestions for further improvement. The authors are also grateful to the colleagues and Miss Nabaneeta Saha, J.R.F. of Hemiptera Section for their kind cooperation.

REFERENCES

- Distant, W.L. 1902. The Fauna of British India including Ceylon and Burma, **2** : 94-121.
- Distant, W.L. 1903. The Fauna of British India including Ceylon and Burma, **2** : 101.
- Distant, W.L. 1910. The Fauna of British India including Ceylon and Burma, **5** : 92-100.
- Esaki, T. 1926. Verzeichnis der Hemiptera : Heteroptera der insect Fauna, *Ann. Mus. Nat. Hung.*, **24** : 135-189.
- Sen, G. C., Biswas, B. and Basu, R.C. 1993. Insecta : Hemiptera : Heteroptera : Pyrrhocoridae. *Fauna of West Bengal, State Fauna Series*, **3**(Part 5) : 433-447.
- Sen, G. C., Ghosh, M. and Ghosh, L. K. 1998. Insecta : Hemiptera : Heteroptera : Pyrrhocoridae. *Fauna of Meghalaya, State Fauna Series*, **4**(Part 4) : 331-342.

INSECTA : HEMIPTERA : REDUVIIDAE

B. BISWAS and ANIMESH BAL

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The Reduviids are commonly known as “Assassin bugs”, which are mostly predaceous upon other insects and a few are blood suckers. Some of them are pathogenic and transmit various diseases to man and animals.

The family Reduviidae of the Order Hemiptera is represented by more than 3000 species belonging to 29 subfamilies in the world (Richards & Davies 1977) while India has recorded 450 species under 29 genera (Biswas & Bal 2003), Distant (1904, 1910) had recorded only a single species namely *Rhinocoris* (= *Harpactor*) *marginatus* (Fabr.) from Visakhapatnam of the present Andhra Pradesh State, in his Fauna of British India Rhynchota volumes. Although notable research work on the Reduviid fauna of Southern India specially Tamil Nadu and adjoining areas have been carried out but nothing has done on Andhra Pradesh fauna of the same (Ambrose & Lirington 1986), Ambrose & Vennison 1988-1993, Ambrose & Sahayraj 1993).

The present work may be considered as the first comprehensive taxonomic studies on the fauna of Reduviidae from Andhra Pradesh with 20 species under 15 genera of 7 subfamilies, of which 19 species are being recorded for the first time from the State.

The research work is mainly based upon the collections received from different survey parties of the Zoological Survey of India, Kolkata. Identified and unnamed collections housed in the National Zoological Collections, were also studied. Taxonomic keys to different taxa, diagnostic characters and taxonomic references, distribution in Andhra Pradesh, India and world for each species have been cited in the present paper. Studied collections are kept as a part of the National Zoological Collection.

SYSTEMATIC ACCOUNT

- Family REDUVIIDAE
- Subfamily I. NABIDINAE
- Genus 1. *Pachynomus* Klug.
1. *Pachynomus biguttatus* Stål
- Subfamily II. TRIBELOCEPHALINAE
- Genus 2. *Tribelocephala* Stål
2. *Tribelocephala indica* Walker
- Subfamily III. HARPACTORINAE
- Division 1. CORANUSARIA
- Genus 3. *Coranus* Curtis
3. *Coranus fuscipennis* Reuter
- Division 2. POLIDIDUSARIA
- Genus 4. *Polididus* Stål
4. *Polididus armatissimus* Stål
- Division 3. HARPACTORARIA
- Genus 5. *Lopocephala* Lap.
5. *Lopocephala guerine* Lap.
- Genus 6. *Rhinocoris* Hahn.
6. *Rhinocoris marginatus* (Fabr.)
7. *Rhinocoris fuscipes* (Fabr.)
8. *Rhinocoris costalis* (Stål)
- Genus 7. *Sphedanolestes* Stål
9. *Sphedanolestes bowringi* Distant
- Division 4. SYCANARIA
- Genus 8. *Sycanus* Amy. & Serv.
10. *Sycanus collaris* (Fabricius)
- Subfamily IV. STENOPODINAE
- Genus 9. *Thodelmus* Stål
11. *Thodelmus falleni* Stål

Subfamily V. ECTRICHODIINAE

Genus 10. *Scadra* Stål12. *Scadra fuscicrus* StålGenus 11. *Quercetanus* Distant13. *Quercetanus atromaculatus* Distant

Subfamily VI. ACANTHASPIDINAE

Genus 12. *Acanthaspis* Amy. & Serv.14. *Acanthaspis trimaculata* Reuter15. *Acanthaspis quinquespinosa* (Fabr.)16. *Acanthaspis lutipes* Walker

Subfamily VII. PIRATINAE

Genus 13. *Sirthenia* Spin.17. *Sirthenia flavipes* (Stål)Genus 14. *Ectomocoris* Mayr18. *Ectomocoris tibialis* DistantGenus 15. *Pirates* Serv.19. *Pirates arcuatus* (Stål)20. *Pirates atromaculatus* (Stål)**Key to the subfamilies of the family REDUVIIDAE**

1. Rostrum, three joined 2
- Rostrum, four joined NABIDINAE
2. Ocelli present 3
- Ocelli absent, antenniferous tubercles laterally obliquely prominent; pronotum transverse; first joint of antennae incrassate; body tomentose TRIBELOCEPHALINAE
3. Hemelytra without a quadrangular cell at interior area of corium near base of membrane 3
- Hemelytra with a quadrangular cell at interior area of corium near base of membrane; first joint of antennae rarely very short, generally elongate, space between the eyes transverse HARPACTORINAE
4. Hemelytra without a discoidal cell 5
- Hemelytra with a discoidal cell somewhat hexangular and touching base of the membrane or largely triangular STENOPODINAE

5. Scutellum with its apex triangular or subtriangular 6
 – Scutellum with its apex broad and two or three spined ECTRICHODIINAE
 6. Pronotum constricted before or near middle, anterior tarsi three jointed
 ACANTHASPIDINAE
 – Pronotum constricted behind middle PIRATINAE

Subfamily I. NABIDINAE

Genus 1. *Pachynomus* Klug, 1830

1830. *Pachynomus* Klug, *Symb. Phys.*, 2.

1. *Pachynomus biguttatus* Stål

1863. *Pachynomus biguttatus* Stål, *Ann. Soc. Ent. Fr.*, : 58.

1902. *Pachynomus biguttatus* : Distant, *Fauna Brit. India*, 2 : 390.

Material examined : 1 ex., Visakhapatnam, Neartope, foot of Palnio hills, Visakhapatnam Dist., F Andricus, S.J. coll.

Diagnostic characters : Body black; a large rounded ochraceous apical spot to corium densely punctate; pronotum distinctly centrally longitudinally impressed with strongly punctate transverse impression; scutellum with a distinct medial, oblong cluster of punctures; membrane not reaching abdominal apex.

Length : 9-13 mm.

Distribution : Andhra Pradesh (Dist. Visakhapatnam); West Bengal.

Subfamily II. TRIBELOCEPHALINAE

Genus 2. *Tribelocephala* Stål

1853. *Tribelocephala* Stål, *Ofv. Vet. Ak. Forh.*, : 263.

2. *Tribelocephala indica* (Walker)

1873. *Opisthoplatys indica* Walker, *Cat. Het.*, 8 : 20.

1902. *Tribelocephala indica* : Distant, *Fauna Brit. India*, 2 : 220.

1994. *Tribelocephala indica* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 375.

Material examined : 1 ex., Dornal forest, Prakasan Dist., 22.IX.98, Dr. S. K. Mondal and party coll.

Diagnostic characters : Body chocolate brown to piceous, palely tomentose; antennae

with first joint incrassate longly pilose; rostrum, body beneath and legs a little paler; head and pronotum moderately granulate.

Length : 11 to 13 mm.

Distribution : Andhra Pradesh (Dist. Prakasan); West Bengal.

Elsewhere : Sri Lanka.

Subfamily III. HARPACTORINAE

Key to the Division of the Subfamily HARPACTORINAE

1. Antennae short, its first joint not longer than head CORANUSARIA
- Antennae long, its first joint longer than head 2
2. Anterior femora granulate, generally nodose or nodulose and always spinous
..... POLIDIDUSARIA
- Anterior femora nither granulate nor nodulose and without any spine 3
3. Postocular and anteocular area almost subequal in length; abdominal segments lobately
dilated; head almost as long as pronotum; body oblong and subelongate
..... HARPACTORARIA
- Postocular area almost three times longer than the anteocular area; abdomen on each side
much dilated; head distinctly longer than pronotum SYCANARIA

Division 1. CORANUSARIA

Genus 3. *Coranus* Curtis, 1833

1833. *Coranus* Curtis, *Brit. Ent.*, 10 pl., : 453.

3. *Coranus fuscipennis* Reuter

1881. *Coranus fuscipennis* Reuter, *Act. Soc. Sc. Fenn.*, 12 : 275.

1902. *Coranus fuscipennis* : Distant, *Fauna Brit. India*, 2 : 381.

1994. *Coranus fuscipennis* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 409.

Material examined : 1 ex., Jamnaram F.R.H. Adilabad Dist. 30.VIII.99, S. K. Mondal and party coll.

Diagnostic characters : Body black, greyishly sericeous or pilose; postocular area of head with a central pale longitudinal line; corium very palely ochraceous, ferruginous on apical area, membrane, clavus, abdomen beneath black; scutellum with an erect conical tuberculous spine; femora nodulose and black; posterior lobe of pronotum densely granulate; connexivum pale testaceous with transverse piccous spots.

Length : 9-10 mm.

Distribution : Andhra Pradesh (Dist. Adilabad); Maharashtra.

Elsewhere : Myanmar.

Division 2. POLIDIDUSARIA

Genus 4. *Polididus* Stål, 1858

1858. *Polididus* Stål, *Ofv.-Vet.-Ak. Forh.*, 448.

4. *Polididus armatissimus* Stål

1859. *Polididus armatissimus* Stål, *Ofv.-Vet.-Ak. Forh.*, : 376

1902. *Polididus armatissimus* : Distant, *Fauna Brit. India*, 2 : 386.

1994. *Polididus armatissimus* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 402.

Material examined : 1 ex., Courtallam, 24.X.1924, H.S. Rao coll.

Diagnostic characters : Head with a long spine behind the base of each antenna and with a number of smaller discal spines; pronotum spinous, the longest being two erect one on anterior lobe and posterior lobe with lateral spines; anterior pronotal lobe with greyish narrow vittae, abdomen beneath piceous; sublateral fascia on each side; tibiae and femora spinous.

Length : 10 mm.

Distribution : Andhra Pradesh; Maharashtra; West Bengal.

Elsewhere : China, Japan, Myanmar, Philippines, Sri Lanka.

Division 3. HARPACTORARIA

Key to the genera of the Division Harpactoraria

1. First joint of antennae as long as head *Lophocephala*
- First joint of antennae much longer than head; about as long as anterior femora 2
2. Posterior lobe of pronotum not longitudinally impressed *Rhinocoris*
- Posterior lobe of pronotum longitudinally impressed *Sphedanolestes*

Genus 5. *Lophocephala* Lap., 1832

1832. *Lophocephala* Lap., *Ess. Hem.*, : 12.

5. *Lophocephala guerine* Lap.

1832. *Lophocephala guerine* Lap., *Ess. Hem.*, : 12.

1902. *Lophocephala guerine* : Distant, *Fauna Brit. India*, 2 : 331.

1994. *Lophocephala guerine* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 391.

Material examined : 1 ex., Waltair, Visakhapatnam Dist., 29.IV.1910; S.W.K. coll.

Diagnostic characters : Body blood reddish; scutellum, interior area of corium, membrane, intermediate and posterior femora, apices of the tibiae and tarsi violaceous black; body and antennae finely pilose; posterior pronotal angles rounded and subnodulose.

Length : 16-17 mm.

Distribution : Andhra Pradesh (Dist. Visakhapatnam); West Bengal.

Elsewhere : Sri Lanka.

Genus 6. *Rhinocoris* Hahn., 1834

1834. *Rhinocoris* Hahn, Wang. *Ins.*, 2 : 20.

Key to the species of the genus *Rhinocoris*

1. Posterior lobe of pronotum rugosely granulate, body, lateral margins of abdomen and base of antennae blood reddish *marginatus*
- Posterior lobe of pronotum not or very obscurely, rugosely granulate 2
2. Body coral red; upper surface of postocular area and a lateral fascia behind eyes black; segmental fascia to abdomen beneath and legs black; pronotum with anterior lobe distinctly sculptured *fuscipes*
- Body black; a spot between and a lateral spot behind eyes, coxae, trochanters and abdomen beneath coral red; pronotum with anterior lobe very obscurely sculptured *costalis*

6. *Rhinocoris marginatus* (Fabr.)

1794. *Reduvius marginatus* Fabr., *Ent. syst.*, 4 : 196.

1902. *Harpactor marginatus* : Distant, *Fauna Brit. India*, 2 : 332.

Material examined : 1 ex., Kawal Jannaram, Adilabad Dist., 1.X.99., S.K. Mondal and party coll.

Diagnostic characters : Body blood reddish, scutellum inner area of corium, membrane, abdomen, beneath and apical two thirds of tibiae violaceous black; lateral margins of abdomen blood reddish, coxae, disc of sternum, anterior lobe of pronotum reddish Ochraceous and Sculptured, posterior lobe rugulose, corium rugulose, base of the membrane margined with blood reddish streak.

Length : 19.5-20 mm.

Distribution : Andhra Pradesh (Dist. Adilabad); North India.

7. *Rhinocoris fuscipes* (Fabr.)

1787. *Reduvius fuscipes* Fabr., *Mant. Ins.*, 2 : 312.

1902. *Harpactor fuscipes* : Distant, *Fauna Brit. India*, 2 : 333.

1994. *Reduvius fuscipes* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 392.

Material examined : 1 ex., Vijoywada, P.R.H. (at light) Krishna Dist., 16.X.98, S.P. Chakraborty and party coll.

Diagnostic characters : Body coral red, lateral fascia behind eyes, postocular area, an oblong spot behind eyes, anterior area of posterior lobe of pronotum, disk of scutellum and legs black, two spots to the prosternum, basis of pro-meso and metasternum are also black; first joint and base of second joint of rostrum and spots near coxae coral red; membrane, clavas, interior area of corium fuscously violaceous; pronotum with anterior lobe sculptured, posteriorly centrally impressed; membrane with its posterior margin pale fuliginous.

Length : 14-16 mm.

Distribution : Andhra Pradesh (Dist. Krishna); Maharashtra.

Elsewhere : Sri Lanka.

8. *Rhinocoris costalis* (Stål)

1866. *Reduvius costalis* Stål, *Ofv.-Vet.-Ak. Fosh.*, : 285.

1902. *Harpactor costalis* : Distant, *Fauna Brit. India*, 2 : 334.

1994. *Reduvius costalis* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 392.

Material examined : 1 ex., Osmania University Campus, Ranga Reddy Dist., 8.III.1999, S.K. Chakraborty and party coll.; 1 ex., Atmakur, Kurnool Dist., 26.XII.1999, G.C. Sen and party coll.

Diagnostic characters : Body black, pronotum with anterior lobe obscurely sculptured, centrally impressed, posterior lobe not impressed; a spot between and a lateral spot behind eyes, anterior lobe of pronotum, apex of scutellum, broad lateral areas of corium, connexivum, coxae, trochanters and abdomen beneath coral red.

Length : 19.5-20 mm.

Distribution : Andhra Pradesh (Dist. Kurnool, Ranga Reddi, Visakhapatnam); Assam, Meghalaya, West Bengal.

Elsewhere : Myanmar, Malay peninsula.

Genus 7. *Sphedanolestes* Stål, 1866

1866. *Sphedanolestes* Stål, *Ofv.-Vet.-Ak. Fosh.*, 284, 288.

9. *Sphedanolestes bowringi* Distant

1909. *Sphedanolestes bowringi* Distant, *Fauna Brit. India*, 2 : 205.

1994. *Sphedanolestes bowringi* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 393.

Material examined : 1 ex., Chitral, Nellore (South) Dist., 28.V.2000. S.K. Chatterjee and party coll.

Diagnostic characters : Body black, scutellum, pronotum, and sternum coral red, a small spot on each side of head behind eyes pale luteous; two spots on posterior area of connexivum, markings on each lateral area of abdomen beneath and abdominal apex black; membrane with the apical area brownish ochraceous and passing the abdominal apex; anterior lobe of pronotum centrally longitudinally sulcate; posterior lobe centrally impressed.

Length : 9 mm.

Distribution : Andhra Pradesh (Dist. Nellore South); Cosmopolitan.

Division 4. SYCANARIA

Genus 8. *Sycanus* Amy. & Serv, 1843

1843. *Sycanus* Amy. & Serv., *Hem.*, : 360.

10. *Sycanus collaris* (Fabricius)

1781. *Sycanus collaris* Fabr., *Spec. Ins.*, 2 : 380.

1902. *Sycanus collaris* : Distant, *Fauna Brit. India*, 2 : 351.

1994. *Sycanus collaris* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 395.

Material examined : 1 ex., Ramsangavaram, West Godavari Dist., S.K. Mondal and party coll.

Diagnostic characters : Body black; apical half of corium and basal margin of membrane stramineous and bronzy; scutellar spine long obliquely erect; its apex distinctly bifid; abdomen dilated on each side specially at the third and fourth segments; antennae black with its first joint subequal in length to anterior femora.

Length : 22-25 mm.

Distribution : Andhra Pradesh (Dist. West Godavari); Assam, Meghalaya.

Elsewhere : Malay peninsula, Sri Lanka.

Subfamily IV. STENOPODINAE

Genus 9. *Thodelmus* Stål

1859. *Thodelums* Stål, *Ofv.-Vet.-Ak. Fosh.*, : 377.

11. *Thodelmus falleni* Stål

1859. *Thodelums falleni* Stål, *Ofv.-Vet.-Ak. Fosh.*, : 378.

1902. *Thodelums falleni* : Distant, *Fauna Brit. India*, 2 : 236.

Material examined : 1 ex., Dolnapenta, Prakasan Dist., 25.IX.98, S.K. Mondal and party coll.

Diagnostic characters : General colouration cinnamon brown; a central and lateral fascia on each side of head; lateral margins, a central line to the anterior lobe of pronotum, apices of femora and tibiae black; head a little longer than pronotum with a distinct spine on each side at apex.

Length : 21.5 to 24 mm.

Distribution : Andhra Pradesh (Dist. Prakasan); Maharashtra; Tamil Nadu.

Elsewhere : Mayanmar, Sri Lanka.

Subfamily V. ECTRICHODIINAE

Key to the genera of the Subfamily ECTRICHODIINAE

1. Rostrum with the first joint about as long as remaining joints together *Scadra*
- Rostrum with the first and second joint subequal in length *Quercetanus*

Genus 10. *Scadra* Stål, 1859

1859. *Scadra* Stål, *Ofv.-Vet.-Ak. Fosh.*, : 176 & 182.

12. *Scadra fuscicrus* Stål

1859. *Scadra fuscicrus* Stål, *Ofv.-Vet.-Ak. Fosh.*, : 183.

1902. *Scadra fuscicrus* : Distant, *Fauna Brit. India*, 2 : 308.

1999. *Scadra fuscicrus* : Biswas *et al.*, *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 304.

Material examined : 1 ex., Shivalingaparanl, Visakhapatnam Dist., 11.X.98, S.K. Mondal and party coll.; 1 ex., Taganapmlesa, Visakhapatnam Dist., 9.X.98, S.K. Mondal and party coll.

Diagnostic characters : Body rufous testaceous; a large spot on interior area of corium,

membrane, three segmental spots to the ventral segments and the tibiae black or piceous; posterior lobe of pronotum with two piceous spots.

Length : 10.5-13.5 mm.

Distribution : Andhra Pradesh (Dist. Visakhapatnam).

Elsewhere : Mayanmar and Sri Lanka.

Genus 11. *Quercetanus* Distant, 1902

1902. *Quercetanus* Distant, *Fauna Brit. India*, 2 : 310.

13. *Quercetanus atromaculatus* Distant

1902. *Quercetanus atromaculatus* Distant, *Fauna Brit. India*, 2 : 311.

Material examined : 2 exs., Vijoywada F.R.H. (at light) Krishna Dist.; 16.X.98. S.P. Chakraborty and party coll.

Diagnostic characters : Body dull sanguineous, two large discal spots to the posterior pronotum and the central incision to the anterior lobe of pronotum, membrane and corium black; a linear spot near anterior coxae and a similar spot behind them, a spot to connexivum are also black; abdomen beneath reddish piceous; base of the first joint of antennae red.

Length : 16 mm.

Distribution : Andhra Pradesh (Dist. Krishna). Western India.

Subfamily VI. ACANTHASPIDINAE

Genus 12. *Acanthaspis* Amy. & Serv., 1843

1843. *Acanthaspis* Amy & Serv., *Hem.*, : 336.

Key to the species of the genus *Acanthaspis*

1. Posterior lobe of pronotum discally unarmed; pronotum dark with pale spots and markings; legs unicolourous *trimaculata*
- Pronotum with posterior lobe having two long discal spines 2
2. Posterior lobe of pronotum with two lateral and two discal white spines; first joint of rostrum equal or subequal in length *quinquespinosa*
- Posterior lobe of pronotum unicolours, unspotted first joint of rostrum shorter than second *lutipes*

14. *Acanthaspis trimaculata* Reuter

1887. *Acanthaspis trimaculata* Reuter, *Rev. & Ent.*, 6 : 157.

1902. *Acanthaspis trimaculata* : Distant, *Fauna Brit. India*, 2 : 268.

Material examined : 1 ex., Dolmapeta, Prakasan Dist., 25.IX.98, S.K. Mondal and party coll.

Diagnostic characters : Generally black to piceous body; legs and antennae, a round spot behind middle of corium, ochraceous, a large subapical white spot to membrane with its apex emarginate, connexium with testaceous spots; pronotum with the disk of its posterior lobe unarmed, and posterior lateral angles prominent, shortly dentately produced.

Length : 21.5 mm.

Distribution : Andhra Pradesh (Dist. Prakasan); Maharashtra; North India.

15. *Acanthaspis quinquespina* (Fabr.)

1781. *Reduvius quinquespina* Fabr., *Spec. Ins.*, 2 : 382.

1902. *Acanthaspis quinquespina* : Distant, *Fauna Brit. India*, 2 : 257.

1994. *Acanthaspis quinquespina* : Biswas and Ghosh, *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 301.

Material examined : 1 ex., Bora, Visakhapatnam Dist.; 15.IX.98, S.K. Mondal and party coll.; 1 ex., Malva forest, Adilabad Dist.; 29.XI.99, P.H. Roy and party coll.

Diagnostic characters : Body black; two lateral and two discal spines to pronotum, a transverse discal spots to corium and spots to connexivum above and beneath luteous; anterior lobe of pronotum strongly sculptured, posterior lobe rugose with a long lateral spine on each side and with two shorter erect discal spines between them; scutellar spine long, obliquely ascending.

Length : 15.5-19 mm.

Distribution : Andhra Pradesh (Dist. Adilabad, Visakhapatnam); Assam; Bihar; Maharashtra; Meghalaya; West Bengal.

Elsewhere : Myanmar, Sri Lanka.

16. *Acanthaspis lutipes* Walker

1873. *Acanthaspis lutipes* Walker, *Cat. Het.*, 7 : 175.

1902. *Acanthaspis lutipes* : Distant, *Fauna Brit. India*, 2 : 260.

Material examined : 1 ex., Dornal forest, Prakasan Dist., 22.IX.98, Mondal and party coll.

Diagnostic characters : Body purplish brown; head with a spot on each side of ocelli and a distinct longitudinal incision between eyes; pronotum with the anterior lobe moderately sculptured and centrally sulcate; a large transverse spot almost crossing corium at inner angle;

spots to connexivum above and beneath; abdomen beneath, coxae trochanters and legs pale ochraceous.

Length : 17 to 18 mm.

Distribution : Andhra Pradesh (Dist. Pranatan); Karnataka; North India.

Subfamily VII. PIRATINAE

Key to the genera of the Subfamily PIRATINAE

1. Head of moderate length; antennae inserted near or not remote from eyes; intermediate tibiae generally provided with a spong furrow 2
- Head long, pornect; antennae inserted remotely from eyes; intermediate tibiae without a spong furrow *Sirthenea*
2. Spongily furrow occupying more than half of the anterior tibiae *Ectomocoris*
- Spongily furrow occupying less or not more than half of the anterior tibiae *Pirates*

Genus 13. *Sirthenea* Spin., 1840

1840. *Sirthenea* Spin., *Ess. Hem.*, 100.

17. *Sirthenea flavipes* (Stål)

1855. *Rasahus flavipes* Stål, *Ofv.-Ver-Ak. Fosh.*, : 187.

1902. *Sirthenea flavipes* : Distant, *Fauna Brit. India*, 2 : 303.

1996. *Sirthenea flavipes* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 387.

Material examined : 1 ex., Dakkili, Nellore Dist.; 29.V.2000, S.K. Chatterjee and party coll.

Diagnostic characters : Body black; antennae pilose, first joint of antennae not reaching apex of the head, second joint about as long as anteocular portion of head; first joint of antennae, base and apex of clavus, apex of membrane, rostrum, legs; base and a subclaval apical spot to corium, a large lateral, basal and apical abdominal spot luteous.

Length : 19-21 mm.

Distribution : Andhra Pradesh (Dist. Nellore); Assam; West Bengal.

Elsewhere : Borneo, China, Japan, Java, Philippines, Sri Lanka.

Genus 14. *Ectomocoris* Mayr, 1865

1865. *Ectomocoris* Mayr, *Verh. Z.-b. Ges. Wien.*, 15 : 438.

18. *Ectomocoris tibialis* Distant

1902. *Ectomocoris tibialis* Distant, *Fauna Brit. India*, 2 : 293.

Material examined : 1 ex., Visakhapatnam Dist.

Diagnostic characters : Body black; hemelytra rudimentary only reaching the base of the first abdominal segment, first joint and base of the second joint of antennae, tibiae and tarsi ochraceous; head anteriorly produced as long as the anterior lobe of the pronotum, spongy furrow occupying three fourths of the under surface of the anterior tibiae.

Length : 17 mm.

Distribution : Andhra Pradesh (Dist. Visakhapatnam); Maharashtra.

Genus 15. *Pirates* Serv., 1831

1831. *Pirates* Serv., *Ann. Sc. Nat.*, 23 : 215.

Key to the species of the genus *Pirates*

1. Membrane with an arcuate transverse fascia near its base and a subapical rounded spot *arcuatus*
- Membrane with a large discal spot and a small black spot near base of clavus *atromaculatus*

19. *Pirates arcuatus* (Stål)

1870. *Spilodermus arcuatus* Stål, *Ofv.-Vet.-Ak. Fosh.*, 692.

1902. *Pirates arcuatus* : Distant, *Fauna Brit. India*, 2 : 300.

1994. *Pirates arcuatus* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 386.

Material examined : 1 ex., Eluru, West Godavari Dist., 28.XI. 2000; P.H. Roy and party coll.

Diagnostic characters : Body black; second joint of antennae about as long as anterior lobe of pronotum which is more or less longitudinally striate, pronotum, scutellum, clavus, and basal half of corium dark cinnamon brown.

Length : 9.5-11 mm.

Distribution : Andhra Pradesh (Dist. West Godavari); Assam.

Elsewhere : Bangladesh, China, Japan, Myanmar, Philippines.

20. *Pirates atromaculatus* (Stål)

1870. *Cleptocoris atromaculatus* Stål, *Ofv.-Vet.-Ak. Fosh.*, 692.

1902. *Pirates atromaculatus* : Distant, *Fauna Brit. India*, 2 : 301.

1994. *Pirates atromaculatus* : Biswas *et al.*, *Fauna of West Bengal, State Fauna Series* 3(Part 5) : 386.

Material examined : 1 ex., Jannaram F.R.H., Adilabad Dist., 30.VIII.99, S.K. Mondal and party coll.

Diagnostic characters : Body black; a medial longitudinal fascia inwardly angulated and amplified on corium margined with black; a small black spot on clavus, and a large discal black spot on membrane; anterior femora unarmed beneath; spongy furrow to anterior tibiae occupying about one third of the length of anterior tibiae.

Length : 12 mm.

Distribution : Andhra Pradesh (Dist. Adilabad); Assam; Meghalaya; Nagaland.

Elsewhere : Hong Kong; Java; Myanmar and Sri Lanka.

SUMMARY

This paper deals with 20 species of Reduviid bugs belonging to 15 genera under 7 subfamilies from the State of Andhra Pradesh, Diagnosis of each species, keys to various taxa and relevant literatures references have been provided in the text. Distribution in different districts of Andhra Pradesh and other State of India as well as abroad have been incorporated in the present paper. Total 19 species are being reported as new record from the State.

ACKNOWLEDGEMENTS

The author are grateful to the Director, Zoological Survey of India for laboratory facilities. Sincere thanks are due to Dr. A. K. Hazra, Scientist-E, for numerous courtesies. Cooperation and encouragement from the colleagues of the Hemiptera Section are also thankfully acknowledged.

REFERENCES

- Ambrose, D.P. 1993. A new species of *Acanthaspis* Amy. & Serv. (Heteroptera : Reduviidae) from South India, *J. Bombay nat. Hist. Soc.*, **91**(1) : 104-105.
- Ambrose, D.P. and Kumarswami, N. S. 1992. A new genus of Harpactorinae (Heteroptera : Reduviidae) from Southern India. *J. Bombay nat. Hist. Soc.*, **89**(2) : 234-236.
- Ambrose, D.P. and Livingstone, D. 1986. A new species of *Rhynocoris* (Fabricius) from Southern India. *J. Bombay Nat. Hist. Soc.*, **83**(1) : 173-177.
- Ambrose, D.P. and Sahayraj, K. 1993. A new species of *Coranus* Curtis from Southern India (Insecta : Reduviidae : Harpactorinae). *J. Bombay Nat. Hist. Soc.*, **90** : 458-460.

- Ambrose, D.P. and Vennison, S.J. 1988. A new species of *Oncocephalus* Klug (Heteroptera : Reduviidae : Stenopodinae) from Southern India. *J. Bombay Nat. Hist. Soc.*, **85**(3) : 599-602.
- Ambrose, D.P. and Vennison, S.J. 1989. A new species of *Coranns* from Southern India (Heteroptera : Reduviidae : Harpactorinae). *Acta Entomologica Bohemoslov*, **86** : 67-76.
- Ambrose, D.P. and Vennison, S.J. 1993. A new species of *Labidocoris* Mayr (Heteroptera : Reduviidae : Ectriichodinae) from Southern India. *J. Bombay Nat. Hist. Soc.*, **90**(3) : 455-457.
- Biswas, B., Sen, G.C. and Ghosh, L.K., 1994. *Fauna of West Bengal, State Fauna Series*, **3**(Part 5) : 369-411.
- Biswas, B., And Ghosh, L.K., 1999. *Fauna of Meghalaya, State Fauna Series*, **4**(Part 4) : 291-330.
- Biswas, B., And Bal Animesh, 2003. Insecta : Heteroptera : Reduviidae. *Fauna of Sikkim, State Fauna Series*, **9**(Part 2) : 525-540.
- Richards, O.W. And Davies, R.G., 1977. *Imms General text book of Entomology*, Vol. **2** : 732.
- Distant, W.L., 1904. Fauna of British India, including Ceylon and Burma, Vol II. Heteroptera : 196-430.
- Distant, W.L., 1910. Fauna of British India, including Ceylon and Burma, Vol V. Heteroptera : Appendix : 169-220.

INSECTA : HEMIPTERA : WATER-BUGS

ANIMESH BAL

Zoological Survey of India, M-Block, New Alipore, Kolkata 700 053

INTRODUCTION

Water-bugs constitute a group of 15 families of heteropteran insects of the Order Hemiptera, which are mainly of two categories on the basis of their habitat, Aquatic and Semi-aquatic bugs. Aquatic bugs are living throughout of their life-cycle inside the waterbody and they are placed under the Series Hydrocorisae while Semi-aquatic bugs are dwelling on the surface of waterbody and are belonging to the Series Amphibicorisae. In the present study on the fauna of water-bug of Andhra Pradesh, total eight families have been reported, of which five families, namely Corixidae, Notonectidae, Pleidae, Nepidae and Belostomatidae are of the Series Hydrocorisae (Aquatic bugs). Three families viz. Hydrometridae, Mesoveliidae and Gerridae are under the Series Amphibicorisae (Semi-aquatic bugs). The classification is based upon Richards and Davies (1977).

The aim of the present work was to bring out a faunistic-cum-taxonomic account of water-bugs of Andhra Pradesh. The work is mainly based upon the collections made by different survey parties of the Zoological Survey of India. The named and unnamed collections of the National Zoological Collections were also studied.

In the Fauna of British India, Rhynchota Volumes by Distant (1902, 1906, 1910) no species of water-bug was reported from any locality of the present Andhra Pradesh. Brooks (1951) had recorded a couple of species from the state while a few earlier identified Regd. Specimens of the National Zoological Collection have been incorporated in this paper.

The present paper has recorded 31 species under 16 genera belonging to eight families from the State of Andhra Pradesh, of which 24 species are being reported for the first time from the State (with asteric marks in the text). The keys for different taxa, diagnostic characters for each species, distribution of each species in the Districts of Andhra Pradesh as well as in other States of India and countrywise in the world, have been provided in the present paper. The studied specimens are kept properly in the National Zoological Collection, Kolkata.

MATERIAL AND METHOD

Materials studied for the present work were mostly collected from different parts of Andhra Pradesh by the survey parties from the Zoological Survey of India, Kolkata. Some named as well as unnamed earlier collections were also studied for the present work on the water-bug fauna of Andhra Pradesh.

The long handled water-nets of closed meshed Nylon threads were used to collect the specimens of water-bugs from water bodies. In the field the collected specimens were preserved in 70% Ethyl alcohol and in the Laboratory it was changed by fresh alcohol. The specimens were studied under Stereoscopic Binocular Microscope. The studied materials have been kept as Wet collection. Each species was labelled properly by depicting the systematic position and collection data. The alcohol was changed before final preservation as part of the National Zoological Collection.

SYSTEMATIC ACCOUNT

Following in the systematic list of all the species dealt in the present paper. Species with asteric mark denotes new record from the State.

Series HYDROCORISAE

Family I. CORIXIDAE

Subfamily MICRONECTINAE

Genus 1. *Micronecta* Kirkaldy 1897

1. *Micronecta (Indonectella) thyesta* Distant
2. *Micronecta (Basileonecta) scutellaris scutellaris* (Stal)

Family II. NOTONECTIDAE

Subfamily ANISOPINAE

Genus 2. *Anisops* Spinola 1837

3. *Anisops barbata* Brooks
4. *Anisops waltairensis* Brooks
5. *Anisops nasuta* Fieber*
6. *Anisops batillifrons* Lundblad*
7. *Anisops sardea* Herrich-Shaffer*
8. *Anisops bouvieri* Kirkaldy

Subfamily NOTONECTINAE

Genus 3. *Enithares* Spinola 1837

9. *Enithares ciliata* (Fabricius)

Genus 4. *Nychia* Stal 1859

- 10.
- Nychia marshalli*
- (Scott)*

Family III. PLEIDAE

Genus 5. *Paraplea* Esaki & China 1928

- 11.
- Paraplea indistinguenda*
- (Matsumura)*

Family IV. NEPIDAE

Subfamily RANATRINAE

Genus 6. *Ranatra* Fabricius 1790

- 12.
- Ranatra faena*
- Montandon*

- 13.
- Ranatra digitata*
- Hafiz & Pradhan*

- 14.
- Ranatra sordidula*
- Dohrn*

- 15.
- Ranatra filiformis*
- Fabricius*

Subfamily NEPINAE

Genus 7. *Laccotrephes* Stal 1865

- 16.
- Laccotrephes ruber*
- (Linnaeus)*

- 17.
- Laccotrephes elongatus*
- Montandon*

- 18.
- Laccotrephes griseus*
- (Guerin)

Family V. BELOSTOMATIDAE

Subfamily LETHOCERINAE

Genus 8. *Lethocerus* Mayr 1853

- 19.
- Lethocerus indicus*
- (Lepeletier & Serville)*

Subfamily BELOSTOMATINAE

Genus 9. *Diplonychus* Laporte 1833

- 20.
- Diplonychus molestus*
- (Dufour)*

- 21.
- Diplonychus indicus*
- Venkatesan & Rao*

Séries AMPHIBICORISAE

Family VI. HYDROMETRIDAE

Subfamily HYDROMETRINAE

Genus 10. *Hydrometra* Latreille 1796

- 22.
- Hydrometra greeni*
- Kirkaldy*

Family VII. MESOVELIIDAE

Subfamily MESOVELIINAE

Genus 11. *Mesovelia* Mulsant & Rey 1852

- 23.
- Mesovelia vittigera*
- Horvath*

Family VIII. GERRIDAE

Subfamily HALOBATINAE

Genus 12. *Halobates* Eschscholtz 182224. *Halobates formidabilis* (Distant)*

Subfamily EOTRECHINAE

Genus 13. *Onychotrechus* Kirkaldy 190325. *Onychotrechus sakuntala* (Kirkaldy)*

Subfamily GERRINAE

Genus 14. *Tenagogonus* Stal 185326. *Tenagogonus (Limnometra) fluviorum* (Fabricius)*27. *Tenagogonus (Limnometra) anadyomene* (Kirkaldy)*Genus 15. *Gerris* Fabricius 179428. *Gerris spinolae* Lethierry & Severin*29. *Gerris adelaides* Dohrn*Genus 16. *Limnogonus* Stal 186830. *Limnogonus (Limnogonus) nitidus* (Mayr)*31. *Limnogonus (Limnogonus) fossarum* (Fabr.)***Key to the families of WATER-BUGS dealt in the paper**

1. Antennae shorter than head, usually hidden in cavities beneath eyes and not visible from above Series HYDROCORISAE.....2
- Antennae longer than head, inserted in front of eyes and clearly visible from above ...
..... Series AMPHIBICORISAE.....6
2. Rostrum very short and broad with no distinct segmentation, front tarsi spatulate and developed into comb-like palae; base of head overlapping the anterior margin of pronotum CORIXIDAE
- Rostrum cylindrical or cone shaped with distinctly 3-4 segmented; front tarsi otherwise; base of the head inserted into the pronotum 3
3. Body convex dorsally; abdomen not provided with siphon like appendages 4
- Body flattened dorsally; abdomen provided with a pair of siphon like appendages 5
4. Elongated forms; adult 6-17 mm in length; rostrum 4 segmented; hind legs very long and fringed with long swimming hairs; abdominal venter with median narrow keel
..... NOTONECTIDAE

- Oval forms; adult minute, less than 3 mm in length; rostrum 3 segmented; hind legs normal and not fringed with long hairs; abdominal venter not narrowly keeled but rather elevated into variously formed carinae at the middle of each segment PLEIDAE
- 5. Abdomen with a pair of long slender non-retractile posterior appendages; tarsi one segmented; hind coxae short, free and rotatory NEPIDAE
- Abdomen with a pair of short, flat and retractile posterior appendages; tarsi 2-3 segmented; hind coxae broadly jointed to the thoracic pleura BELOSTOMATIDAE
- 6. Head long, as long as entire thorax; antennae and legs filiform .. HYDROMETRIDAE
- Head shorter than pronotum; antennae and legs not filiform 7
- 7. Rostrum 3 segmented; coxae contiguous; scutellum double, not covered and visible from above in winged forms; claws of all inserted at tips of tarsi MESOVELIIDAE
- Rostrum 4 segmented; coxae not contiguous, middle and hind coxae closer than to fore coxae; scutellum covered and not visible in winged forms; claws pre-apical.....GERRIDAE

Series HYDROCORISAE

Family I. CORIXIDAE

Subfamily MICRONECTINAE

Genus 1. *Micronecta* Kirkaldy 1897

1897. *Micronecta* Kirkaldy, *Entomologist*, 30 : 260.

Key to species of the genus *Micronecta*

1. Body length not exceeding 3 mm; males without strigil *theysta*
- Body length about 4 mm; males with strigil *scutellaris*

1. *Micronecta (Indonectella) theysta* Distant

1910. *Micronecta theysta* Distant, *Fauna Brit. India, Rhynchota*, 5 : 349.

1965. *Micronecta theysta* : Fernando, *J. Bombay nat. Hist. Soc.*, 61(3) : 606.

1994. *Micronecta (Indonectella) theysta* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.*, 165 : 9.

Diagnosis : As in the key.

Distribution : India : Andhra Pradesh; Bihar; Karnataka; Orissa; Tamil Nadu; West Bengal.

Elsewhere : China, Japan, Taiwan, Vietnam.

Remarks : No specimen was available for the study. Thirumalai (2001) reported this species from Andhra Pradesh. No collection data regarding the insect was available.

2. *Micronecta (Basileonecta) scutellaris scutellaris* (Stal)

1858. *Sigara scutellaris* Stal, *Vetens akad. Forh.*, **15** : 339.

1910. *Micronecta dione* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 348.

1910. *Micronecta proba* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 348.

1940. *Micronecta (Basileonecta) scutellaris scutellaris* : Hutchinson, *Trans. Conn. Acad. Art Sci.*, **33** : 365.

1989. *Micronecta (Basileonecta) scutellaris scutellaris* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.*, **118** : 15.

Material examined : 2 FF, Ravalapalam, East Godavari Dist., 20.X.1998, S. P. Chakraborty & party coll.; 1 F, Eluru, canal water, West Godavari Dist., 28.XI.2000, P.H. Roy & party coll.; 7 FF, Kalluru Lake, near Kaikalur, Krishna Dist., 29.XI.2000, P. H. Roy & party coll.

Diagnosis : As in the key.

Distribution : India : Andhra Pradesh (Districts—East Godavari, West Godavari, Krishna); Bihar; Karnataka; Kerala; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : China, Central Africa, Indonesia, Malaysia, Saudi Arabia, Sri Lanka, Vietnam.

Family II. NOTONECTIDAE

Key to subfamilies of the family NOTONECTIDAE

1. Hemelytra commissure with a hair-lined pit at the anterior end Subfamily ANISOPINAE
- Hemelytra commissure without any hair lined pit at the anterior end Subfamily NOTONECTINAE

Subfamily ANISOPINAE

Genus 2. *Anisops* Spinola 1837

1837. *Anisops* Spinola, *Ess. Ins. Hemipt.*, : 38.

Key to species of the genus *Anisops*

1. Males without cephalic horn 2
- Males with cephalic horn 3
2. Facial tubercle of male provided with a pair of tufts of hair which extend posteriorly towards the base of the labrum; male first tibia with stridulatory comb composed of about 21 teeth *barbata*

- Facial tubercle of male slightly elevated but not provided with any tufts of hair; male first tibia with stridulatory comb of about 11 teeth *waltairensis*
- 3. Cephalic horn short 4
- Cephalic horn prominent 5
- 4. In the cephalic horn frontal excavation of small area with anterior meeting point broadly rounded; rostral prong shorter than 3rd rostral segment *nasuta*
- In the cephalic horn frontal excavation of large area with anterior meeting point scarcely rounded; rostral prong slightly longer than 3rd rostral segment *batillifrons*
- 5. Much prominent cephalic horn with frons excavate of its entire length and bordered laterally by two carinae; rostral prong slightly shorter than the 3rd rostral segment; stridulatory comb of male on the first tibia of about 18 teeth *sardea*
- Moderately prominent cephalic horn with frons excavate triangularly and bordered laterally by two carinae; rostral prong as long as the 3rd rostral segment; male stridulatory comb of about 12 teeth *bouvieri*

3. *Anisops barbata* Brooks

1951. *Anisops barbata* Brooks, *Kans. Univ. Sci. Bull.*, **34**(8) : 387.

1974. *Anisops barbata* : Fernando & Cheng, *Fdn. Mus. J.*, **19** : 36.

1994. *Anisops barbata* : Bal & Basu, *Fauna of West Bengal, State Fauna Series*, **3**(Part 5) : 546.

2001. *Anisops barbata* : Thirumalai, *Fauna of Nilgiri Biosph. Reserve, Conservation Area Series*, **11** : 116.

Diagnosis : Body length for males 8.6-9.3 mm, for females 8.0-9.1 mm. Other diagnostic characters as in the key.

Distribution : India : Andhra Pradesh (Dist. Visakhapatnam); Himachal Pradesh; Karnataka; Orissa; Tamil Nadu; West Bengal.

Elsewhere : Indonesia, Malaysia, Myanmar, Sri Lanka, Taiwan, Vietnam.

Remarks : No specimen was available for study. Brooks (1951) studied one male collected from Waltair, A.P.

4. *Anisops waltairensis* Brooks

1951. *Anisops waltairensis* Brooks, *Kans. Univ. Sci. Bull.*, **34**(8) : 457.

2001. *Anisops waltairensis* : Thirumalai, *Fauna of Nilgiri Biosph. Reserve, Conservation Area Series*, **11** : 117.

Diagnosis : Body length 4.5-4.7 mm for males and 4.8-5.1 mm for females. Other diagnostic characters as in the key.

Distribution : India : Andhra Pradesh (Dist. Visakhapatnam); Himachal Pradesh; Tamil Nadu; West Bengal.

Remarks : No material was available for the study. Books (1951) created the species on Male Holotype and one Female Allotype collected from Waltair.

5. *Anisops nasuta* Fieber*

1851. *Anisops nasuta* Fieber, *Abh. K. Bohm. Ges. Wiss.*, 5 : 485.

1906. *Anisops Fieberi* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 46.

1951. *Anisops nasuta* : Brooks, *Kans. Univ. Sci. Bull.*, 34(8) : 416.

1994. *Anisops nasuta* : Bal & Basu, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 547.

Material examined : 15 MM, 25 FF, Pathancheru, Medak Dist., 11.X.1998, S. P. Chakrabarty & party coll.; 4 MM, 8 FF, Bhongir, Nalgonda Dist., S. P. Chakrabarty & party coll.; 4 MM, 3 FF, Kalluru Lake, near Kaikalur, Krishna Dist., 29.XI.2000, P. H. Roy & party coll.

Diagnosis : Body length for males 6.0-7.8 mm, for females 6.0-6.9 mm, greatest body width at the middle of the body length. Other diagnostic characters as in the key.

Distribution : India : Andhra Pradesh (Dist. Medak, Nalgonda, Krishna); Orissa; West Bengal.

Elsewhere : Australia, Celebes, China, Formosa, Guam, Java, Malay Peninsula, Nepal, New Guinea, Sri Lanka, Sumatra.

6. *Anisops batillifrons* Lundblad*

1933. *Anisops batillifrons* Lundblad, *Ann. Mag. nat. Hist.*, (10)12 : 463.

1951. *Anisops batillifrons* : Brooks, *Kans. Univ. Sci. Bull.*, 34(8) : 430.

2003. *Anisops batillifrons* : Bal & Basu, *Fauna of Sikkim, State Fauna Series*, 9(Part 2) : 545.

Material examined : 1M, 1F, Ravalapalam, East Godavari Dist., 20.X.1998, S.P. Chakraborty & party coll.; 3 MM, 4FF, Kottavalasa, Visakhapatnam Dist., 24.X.1998, S.P. Chakraborty & party coll.; 2MM, Eluru, canal water, West Godavari Dist., 28.XI.2000, P. H. Roy & party coll.; 2MM, 3FF, Alampur, Mehbubnagar Dist., 28.XII.1999, G.C. Sen & party coll., 1M, Kalluru Lake, near Kaikanur, Krishna Dist., 29.XI.2000, P.H. Roy & party coll.

Diagnosis : Body length for males 5.6-6.4 mm, for females 5.4-6.3 mm. Other diagnostic characters as in the key.

Distribution : India : Andhra Pradesh (Dist. East Godavari, West Godavari, Visakhapatnam, Mehbubnagar, Krishna); Assam; Delhi; Tripura; Sikkim; West Bengal.

Elsewhere : China, Formosa, Japan, Myanmar, Philippines.

7. *Anisops sardea* Herrich-Shaffer*

1850. *Anisops sardea* Herrich-Shaffer, *Die. Wanz. Ins.*, 9 : 41.

1904. *Anisops sardea* : Kirkaldy, *Wein. ent. Ztg.*, 23 : 114.

1951. *Anisops sardea* : Brooks, *Kans. Univ. Sci. Bull.*, 34(8) : 423.

2001. *Anisops sardeus* : Thirumalai, *Fauna of Nilgiri Biosph. Reserve, Conservation Area Series*, 11 : 117.

Material examined : 2 MM, Ravalapalam, East Godavari Dist., 20.X.1998, S. P. Chakraborty and party coll.

Diagnosis : Males may reach 7.5-8.4 mm and females 7.2-7.5 mm in body length, general body colour pale yellow or brownish yellow. Other diagnostic characters as in the key.

Distribution : India : Andhra Pradesh (Dist. East Godavari); Orissa; Punjab; Uttar Pradesh; South India; West Bengal.

Elsewhere : Africa, Albania, Canary Island, Myanmar, Pakistan, Syria, Turkey.

8. *Anisops bouvieri* Kirkaldy

1904. *Anisops bouvieri* : Kirkaldy, *Wein. ent. Ztg.*, 23 : 116.

1994. *Anisops bouvieri* : Bal & Basu, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 548.

2001. *Anisops bouvieri* : Thirumalai, *Fauna of Nilgiri Biosph. Reserve, Conservation Area Series*, 11 : 116.

Material examined : 2MM, 1F Ravalapalam, East Godavari Dist., 20.X.1998, S.P. Chakraborty and party coll.; 2MM, 13FF, Kottavalasa, Visakhapatnam Dist., 24.X.1998, S.P. Chakraborty & party coll.; 5MM, 7FF, Eluru, canal water, West Godavari Dist., 28.XI.2000, P.H. Roy & party coll.; 1F, Kalluru Lake, near Kaikalur, Krishna Dist., 29.XI, 2000, P.H. Roy & party coll.; 7 MM, 8FF, Waltair, Visakhapatnam Dist., 27.I.1921.

Diagnosis : Body length of males and females 6.0-6.3 mm and 5.7-6.0 mm respectively, general body colour pearlaceous. Other diagnostic characters as in the key.

Distribution : India : Andhra Pradesh (Dist.-East Godavari, West Godavari, Visakhapatnam, Krishna); Assam; Andaman Islands; Bihar; Madhya Pradesh; Orissa; West Bengal.

Elsewhere : Bangladesh, China, Myanmar, New Guinea, Thailand.

Subfamily NOTONECTINE

Key to genera of the subfamily NOTONECTINAE

1. Femur of middle leg provided with distinct anteapical protuberance; eyes not holoptic *Enithares*
- Femur of middle leg without anteapical protuberance; eyes holoptic *Nychia*

Genus 3. *Enithares* Spinola 1837

1837. *Enithares* Spinola, *Ess. Ins. Hemipt.*, : 60.

9. *Enithares ciliata* (Fabricius)

1798. *Notonecta ciliata* Fabricius, *Suppl. Ent. Syst.*, : 524.

1906. *Enithares indica* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 42.

1910. *Enithares paivana* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 329.

1919. *Enithares lactea* : Paiva, *Rec. Indian Mus.*, 19 : 155.

1968. *Enithares ciliata* : Lansbury, *Pacif. Ins.*, 10 : 413.

2001. *Enithares ciliata* : Thirumalai, *Fauna of Nilgiri Biosph. Reserve, Conservation Area Series*, 11 : 115.

Diagnosis : Body of male and female insects may attain a length about 9.0-9.6 mm; head in dorsal view rounded; fore titia of male concave along inner margin and concave along outer margin; mesotrochanter rounded with a patch of black spicules along ventral margin, covering a much larger area.

Distribution : India : Andhra Pradesh; Andaman Islands; Bihar; Goa; kerala; Maharashtra; Tamil Nadu.

Elsewhere : Bhutan, Indonesia, Malaysia, Mauritius, Sri Lanka, Vietnam.

Remarks : No specimen was available for study. Thirumalai (2001) reported this species from Andhra Pradesh. So it is incorporated in the present paper.

Genus 4. *Nychia* Stal 1859

1859. *Nychia* Stal, *Eugen. Resa. Zool.*, 1 : 268.

10. *Nychia marshalli* (Scott)*

1872. *Antipalocoris marshalli* Scott, *Entomologist's mon. Mag.*, 8 : 245.

1900. *Nychia marshalli* : Kirkaldy, *Annu. Soc. ent. Belg.*, : 435.

1934. *Nychia marshalli* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 155.

1994. *Nychia marshalli* : Bal & Basu, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 550.

2001. *Nychia marshalli* : Thirumalai, *Fauna of Nilgiri Biosph. Reserve, Conservation Area Series*, 11 : 116.

Material examined : 1 F, Pathancheru, Medak Dist., 11.X.1998, S. P. Chakraborty & party coll.

Diagnosis : Males are little longer than females, attain a length of about 5.2 mm, while females reach upto 4.8 mm; eyes holoptic; postero-lateral margin of eye E-shaped; hemelytron

without clavus; posterior legs slender and longer than the body length; hemelytron fully cover the body in females while in males last three abdominal segments remain uncovered.

Distribution : India : Andhra Pradesh (Dist. Medak); West Bengal.

Elsewhere : Africa, Europe, Sir Lanka.

Family III. PLEIDAE

Genus 5. *Paraplea* Esaki & China 1928

1928. *Paraplea* Esaki & China, *Eos*, 4 : 166.

11. *Paraplea indistinguenda* (Matsumura)*

1905. *Plea indistinguenda* Matsumura, *J. Sapporo agric. Coll.*, 2 : 59.

1906. *Plea pallescens* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 48.

1934. *Plea indistinguenda* : Lundblad, *Arch. Hydrobio. Suppl.*, 12 : 127.

1994. *Plea indistinguenda* : Bal & Basu, *Fauna of West Bengal, State Fauna Series*, 3(Part 5) : 551.

1999. *Paraplea indistinguenda* : Thirumalai, *I.A.A.B.*, 7 : 34.

Material examined : 7 exs., Ravalapalam, East Godavari Dist., 20.X.1998, S. P. Chakraborty & party coll.

Diagnosis : General body length upto 1.5 mm; front of the head with no markings; pronotum with reticulum like punctures; abdominal keels compact and no spine like process on abdominal sternites.

Distribution : India : Andhra Pradesh (Dist. East Godavari); Bihar; Kerala; Uttar Pradesh; West Bengal.

Elsewhere : Bangladesh, Japan.

Family IV. NEPIDAE

Key to subfamilies of the family NEPIDAE

1. Body very long and slender; pronotum longer than broad ... Subfamily RANATRINAE
- Body oblong or elongately subovate; pronotum as long as or a little shorter than broad Subfamily NEPINAE

Subfamily RANATRINAE

Genus 6. *Ranatra* Fabricius 1790

1790. *Ranatra* Fabricius, *Skr. nat. Selsk.*, 1(1) : 227.

Key to species of the genus *Ranatra*

1. Abdominal appendages considerably longer than body length (Body length about 46 mm, abdominal appendages about 56 mm long) *faena*
- Abdominal appendages shorter than the body length 2
2. Second segment of antenna elongate finger like (digitate) and blackish in colour on its entire length; abdominal appendages 28 mm long while body length about 31 mm *digitata*
- Second segment of antenna otherwise; abdominal appendages and body length otherwise 3
3. Body length 22-24 mm, abdominal appendages about 20 mm long; metasternal process posteriorly projectile with lateral concavity and mid-longitudinal carination slightly *sordidula*
- Body length 27-28 mm, abdominal appendages about 23 mm long; metasternal process posteriorly triangular with a distinct mid-longitudinal carination *filiformis*

12. *Ranatra faena* Montandon*

1903. *Ranatra faena* Montandon, *Bull. Soc. ent. Ital.*, 35 : 23.

1906. *Ranatra faena* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 21.

1999. *Ranatra faena* : Thirunalai, *I.A.A.B.*, 7 : 32.

Material examined : 1F, Peddaaravidu, Prakasam Dist., 18.III.1999, S.K. Chatterjee & party coll.

Diagnosis : The species is very close to *R. elongata* but differs in more robust shape, femora posteriorly more robust, metasternal process very elevated on median line and body length as well as abdominal appendages more longer. Other characters as in the key.

Distribution : India : Andhra Pradesh (Dist. Prakasam).

Elsewhere : Myanmar.

Remarks : Earlier this species was recorded from its type-locality in Myanmar. Thirumalai (1999) included the species in the check list of Aquatic and Semi-aquatic heteroptera of India.

13. *Ranatra digitata* Hafiz & Pradhan*

1947. *Ranatra digitata* Hafiz & Pradhan, *Rec. Indian Mus.*, 45 : 371.

1999. *Ranatra digitata* : Thirumalai, *I.A.A.B.*, 7 : 32.

Material examined : 1 F, Bhongir, Nalgonda Dist., 12.X.1998, S. P. Chakraborty and party coll.

Diagnosis : Body length may be 27.3-31 mm while abdominal appendages may be 26.4-28 mm in adult specimens; metasternal process broadly convexly rounded with a slight median keel posteriorly. Other characters as in the key.

Distribution : India : Andhra Pradesh (Dist. Nalgonda); Orissa.

14. *Ranatra sordidula* Dohrn*

1860. *Ranatra sordidula* Dohrn, *Stettin ent. Ztg.*, **21** : 409.

1906. *Ranatra sordidula* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 22.

1999. *Ranatra sordidula* : Bal & Basu, *Fauna of Meghalaya, State Fauna Series*, **4**(Part 5) : 440

Material examined : 1M, 1F, Kottavalasa, Visakhapatnam Dist., 24.X.1998, S.P. Chakraborty and party coll.; 1F, Yedagirigutta, Nalgonda Dist., 23.XII.1999, G.C. Sen and party coll.; 1F, Alampur, Mehbubnagar Dist., 28.XII.1999, G.C. Sen and party coll.; 1M, 1F, Sydapuram, Nellore Dist., 25.V.2000, S.K. Chatterjee and party coll.

Diagnosis : Head with no tubercle on the vertex. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh (Dist.–Visakhapatnam, Nalgonda, Mehbubnagar, Nellore); Meghalaya; Orissa; West Bengal.

Elsewhere : Malay Peninsula, Sri Lanka, Thailand.

15. *Ranatra filiformis* Fabricius*

1790. *Ranatra filiformis* Fabricius, *Skr. nat. Selsk.*, **1** : 228.

1906. *Ranatra filiformis* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 21.

1934. *Ranatra filiformis* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 36.

1947. *Ranatra filiformis* : Hafiz & Pradhan, *Rec. Indian Mus.*, **45** : 364.

1972. *Ranatra filiformis* : Lunsbury, *Trans. R. ent. Soc. London*, **124** : 320.

1994. *Ranatra filiformis* : Bal & Basu, *Fauna of West Bengal, State Fauna Series*, **3**(Part 5) : 542.

2001. *Ranatra filiformis* : Thirumalai, *Fauna of Nilgiri Biosph Reserve, Conservation Area Series*, **11** : 118.

Material examined : 1M, 1F, Alampur, Mehbubnagar Dist., 28.XII.1999, G.C. Sen & party coll.

Diagnosis : This species is smaller than *R. elongata* and a bit difficult to identify; head provided with distinct tubercle on the vertex; eyes are more prominent than other species of *Ranatra*. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh : (Dist.–Mehbubnagar); Assam; Bihar; Kerala; Maharashtra; Orissa; Pondichery; Punjab; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Nepal, Pakistan, Philippines Islands; Sri Lanka.

Subfamily NEPINAE

Genus 7. *Laccotrephes* Stal 1865

1865. *Laccotrephes* Stal, *Hem. Africana*, 3 : 186.

Key to species of the genus *Laccotrephes*

1. Abdominal appendages longer than the body length (body length 30-35 mm, abdominal appendages 36-40 mm); abdomen above yellowish red in color; anterior area of prosternum provided with a small indistinct tubercle *ruber*
 Abdominal appendages shorter than the body length; abdomen above colouration otherwise; anterior area of prosternum provided with distinct tubercle or acute spine like process....2
2. Body length 20-30 mm while abdominal appendages about 18-23 mm long; prosternum with a distinct conical tubercle; colour of the abdomen above dull greyish ... *elongatus*
 Body length not exceeding 20 mm with abdominal appendages upto 10-12 mm long; prosternum armed with a strong acute spine like process; colour of the abdomen above light bluish *griseus*

16. *Laccotrephes ruber* (Linnaeus)*

1790. *Nepa ruber* Linnaeus; *Mus. Lud. Ulr.*, : 165.

1906. *Laccotrephes ruber* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 18.

1928. *Laccotrephes ruber* : Dover, *J. Bombay nat. Hist. Soc.*, 32 : 615.

1950. *Laccotrephes ruber* : Pradhan, *Rec. Indian Mus.*, 48 : 101.

2003. *Laccotrephes ruber* : Bal & Basu, *Fauna of Sikkim, State Fauna Series*, 9(Part 2) : 544.

Material examined : 1 F, Chennur, Cuddapah Dist., 31.XII.1999, G. C. Sen and party coll.

Diagnosis : Compared with *L. griseus*, this species is larger and the abdominal appendages distinctly longer than the body. Other characters as in the key.

Distribution : India : Andhra Pradesh (Dist. Cuddapah); Bihar; Gujarat; Himachal Pradesh; Jammu & Kashmir; Kerala; Maharashtra; Nagaland; Orissa; Sikkim; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : China, Formosa, Japan, Nepal, Pakistan, Sri Lanka.

17. *Laccotrephes elongatus* Montandon*

1907. *Laccotrephes elongatus* Montandon, *Bull. Soc. Sci. Buc.*, 15 : 330.

1910. *Laccotrephes elongatus* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 313.

2002. *Laccotrephes elongatus* : Bal & Basu, *Fauna of Kabar Lake, Wetland Ecosystem Series*, 4 : 80.

Material examined : 1F, Bhongir, Nalgonda Dist., 12.X.1998, S. P. Chakraborty and party coll.

Diagnosis : Elytra slightly enlarged at the middle; claval commissure nearly twice longer than the length of the scutellum; middle femora much longer than the middle tibiae. Other characters as in the key.

Distribution : India : Andhra Pradesh (Dist. Nalgonda); Bihar; Maharashtra; West Bengal.

18. *Laccotrephes griseus* (Guerin)

1829. *Laccotrephes griseus* Guerin, *Iconogr. Regne Anim., Ins.*, : 352.

1947. *Laccotrephes griseus* : Hafiz & Pradhan, *Rec. Indian Mus.*, 45 : 364.

1992. *Laccotrephes griseus* : Bal & Basu, *Proc. zool. Soc., Calcutta*, 45(Suppl. A) : 325.

2002. *Laccotrephes griseus* : Bal & Basu, *Fauna of Kabar Lake, Wetland Ecosystem Series*, 4 : 80.

Material examined : 2MM, Pathancheru, Medak Dist., 11.X.1998, S.P. Chakraborty and party coll.; 3MM, 2FF, Aduripalle, Nellore Dist., 12.I.1999, P. Mukhopadhyay and party coll.; 1F, Alampur, Mehbubnagar Dist.; 28.XII.1999, G.C. Sen and party coll.; 1F, Patagunta, Chittoor Dist., 6.VI.2000, S.K. Chatterjee and party coll.

Diagnosis : This species is the smallest among all the species under the genus *Laccotrephes* found in the subcontinent. Body length never exceeds 20 mm and the abdominal appendages also very short, upto 10-12 mm in length. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh (Dist.–Chittoor, Medak, Mehbubnagar, Nellore); Bihar; Meghalaya; Pondicherry; Tamil Nadu; West Bengal.

Elsewhere : Myanmar, Seychelles, Sri Lanka, Thailand.

Family V. BELOSTOMATIDAE

Key to subfamilies of the family BELOSTOMATIDAE

1. Abdominal sternites V and VI subdivided laterally by a suture like fold; spiracles located on or adjacent to mesal margins of ventral laterotergites.....Subfamily LETHOCERINAE
- Abdominal sternites not subdivided by any suture; spiracles located near center of ventral laterotergites Subfamily BELOSTOMATINAE

Subfamily LETHOCERINAE

Genus 8. *Lethocerus* Mayr 1853

1853. *Lethocerus* Mayr, *Verh. zool. bot. Ver. Wien.*, 2(1852) : 17.

19. *Lethocerus indicus* (Lepeletier & Serville)*

1825. *Belostoma indica* Lepeletier & Serville, *Encycl. Meth.*, : 272.
 1909. *Lethocerus indicus* : Montandon, *Bull. Soc. Sci. Buc.*, 17 : 138.
 1956. *Lethocerus indicus* : Usinger, *Aquatic Insects of California*, : 204.
 1969. *Belostoma indica* : Varshney & Biswas, *J. Bombay nat. Hist. Soc.*, 66(2) : 399.
 2002. *Lethocerus indicus* : Bal & Basu, *Fauna of Kabar Lake, Wetland Ecosystem Series*, 4 : 81.

Material examined : 2 FF, Bhongir, Nalgonda Dist., 12.X.1998, S. P. Chakraborty and party coll.

Diagnosis : This species is known as "Giant Indian water-bug" Adult insects may be 62-85 mm in body length; head between eyes with parallel sides; pronotum with a transverse faciae at the basal end and a fine mid-longitudinal carination; hemelytra with distinct membrane which provided with prominent and thick longitudinal veins; posterior legs provided with thick sets of long swimming hairs on the ventral sides.

Distribution : India : Andhra Pradesh (Dist. Nalgonda); Assam; Bihar; Kerala; Maharashtra; Meghalaya; Mizoram; Orissa; Uttar Pradesh; West Bengal.

Elsewhere : China, Java, Myanmar, Malaysia, Pakistan, Philippines, Sri Lanka, Sumatra.

Subfamily BELOSTOMATINAE

Genus 9. *Diplonychus* Laporte 1833

1833. *Diplonychus* Laporte, *Guerin's Mag. zool.*, 2 : 18.

Key to species of the genus *Diplonychus*

1. Head length shorter than the width between the eyes; anterior claws longer than the width of tarsus; males not provided with tufts of hair or spikes on the respiratory strap *molestus*
- Head length more than the width between the eyes; anterior claws shorter than the width of tarsus; males with tufts of hairs or spikes on the respiratory strap *indicus*

20. *Diplonychus molestus* (Dufour)*

1863. *Appasus molestum* Dufour, *Ann. Soc. ent. Fr.*, : 395.
 1906. *Sphaerodema molestum* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 36.
 1997. *Diplonychus molestus* : Bal & Basu, *Fauna of Delhi, State Fauna Series*, 6 : 271.

Material examined : 2 FF, 10 FF, Hyderabad, Ranga Reddy Dist., Prof. M. Sayced-ud-Din coll.

Diagnosis : Body length may be 13.5-17.5 mm, anterior tarsal claws moderately well developed and longer; ventro-lateral stripe of fine hairs on the abdomen broader; posterior angles of pronotum a little more obtuse and less acute than those of *D. rusticus*. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh (Dist. Ranga Reddy); Delhi; Jammu & Kashmir; Orissa; West Bengal.

Elsewhere : Malacca, Sumatra.

21. *Diplonychus indicus* Venkatesan & Rao*

1980. *Diplonychus indicus* Venkatesan & Rao, *J. Bombay nat. Hist. Soc.*, **77** : 299.

Material examined : 1 F, Pathancheru, Medak Dist., 11.X.1998, S. P. Chakraborty and party coll.; 2 MM, 4 FF, Aduripalle, Nellore Dist., 12.I.1999, P. Mukhopadhyay and party coll.

Diagnosis : Body length may be 13.5-16.5 mm head about one and half times longer than the width between the eyes; rostrum long and segment I of rostrum twice longer than segment II; pronotum with lateral margins nearly straight; anterior tarsus two segmented and terminated by two small and equal claws which are shorter than the width of the tarsal segment; segment I of the anterior tarsus shorter than the segment II, the division being visible on the ventral side. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh (Dist. Medak, Nellore).

Remark : Earlier this species was recorded only from its type-locality at Chetpet pond, Madras, Tamil Nadu.

Series AMPHIBICORISAE

Family VI. HYDROMETRIDAE

Subfamily HYDROMETRINAE

Genus 10. *Hydrometra* Latreille 1796

1796. *Hydrometra* Latreille, *Precisdes caract. gen. des. Ins.*, : 86

22. *Hydrometra greeni* Kirkaldy*

1898. *Hydrometra greeni* Kirkaldy, *Entomologist*, **31** : 2.

1902. *Hydrometra vittata* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 70.

1943. *Hydrometra greeni* : Hungerford & Evans, *Ann. Mus. nat. Hung.*, **28** : 79.

1989. *Hydrometra greeni* : Thirumalai, *Rec. zool. Surv. India, Occa. Paper*, **118** : 38.

2002. *Hydrometra greeni* : Bal & Basu, *Fauna of Kabar Lake, Wetland Ecosystem Series*, **4** : 83.

Material examined : 1F, Dronachallam, Kurnool Dist., 25.XII.1999, G.C. Sen and party coll.

Diagnosis : Adult insect may be 11-12 mm in length; the hemelytra extend upto the 5th abdominal segments in both the sexes; males with 6th abdominal segment transversely depressed ventrally and the dorsal margin is fringed with short erect hairs; females with last abdominal segment broader behind than in front as seen in dorsal view.

Distribution : India : Andhra Pradesh (Dist. Kurnool); Bihar; Orissa; Southern India; Uttar Pradesh; West Bengal.

Elsewhere : Japan, Malaysia, Myanmar, Philippines, Sri Lanka.

Family VII. MESOVELLIIDAE

Subfamily MESOVELIINAE

Genus 11. *Mesovelgia* Mulsant & Rey 1852

1852. *Mesovelgia* Mulsant & Rey, *Ann. Linn. Lyon.*, **1850-52** : 138.

23. *Mesovelgia vittigera* Horvath*

1895. *Mesovelgia vittigera* Horvath, *Rev. Entomologie*, **14** : 160.

1901. *Mesovelgia orientalis* : Kirkaldy, *Entomologist*, **34** : 808.

1902. *Mesovelgia mulsanti* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 37.

1939. *Mesovelgia vittigera* : Hafiz & Ribeiro, *Rec. Indian Mus.*, **41** : 424.

1982. *Mesovelgia vittigera* : Andersen, *Semi-aquatic bugs, Entomonograph*, **3** : 62.

2002. *Mesovelgia vittigera* : Bal & Basu, *Fauna of Kabar Lake, Wetland Ecosystem Series*, **4** : 84.

Material examined : 1F (Brachypterous); Kottavalasa, Visakhapatnam Dist., 24.X.1998, S.P. Chakraborty and party coll.

Diagnosis : Adults may be 2.5-3.0 mm in body length; eyes large almost touching the anterior margin of pronotum; two ocelli about equally distant from eyes as far from each other; antennal second, segment shortest, other three segments subequal in length; hemelytra may be absent (apterous forms) when present may be fully developed (macropterous forms) or half developed (brachypterous forms); corium encloses three closed-cells on the outer half; males are easier to identify by the last abdominal segment ventrally with a single median spine in a group and two sets of brush like hairs laterally; in the hind leg of male second tarsal segment longer than the third segment.

Distribution : India : Andhra Pradesh (Dist. Visakhapatnam); Andaman Islands; Bihar; Karnataka; Orissa; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Africa, Australia, Egypt, Java, Malaysia, Palestine, Philippines, Samoa Island, Sri Lanka, Sumatra, Syria.

Family VIII. GERRIDAE

Key to subfamilies of the family GERRIDAE

1. Metasternum greatly reduced, represented by a very short subtriangular plate behind mesonotum Subfamily HALOBATINAE
Metasternum well developed 2
2. Pronotal lobe reduced in wingless forms; middle and hind tarsi with ventral spinous hairs; tarsal sutures between mesothorax and metathorax distinct.....Subfamily EOTRECHINAE
Pronotal lobe not reduced in wingless forms; lateral sutures between mesothorax and metathorax indistinct.....Subfamily GERRINAE

Subfamily HALOBATINAE

Genus 12. *Halobates* Eschscholtz 1822

1822. *Halobates* Eschscholtz, *Entomographien*, : 102.

24. *Halobates formidabilis* (Distant)*

1910. *Euratas formidabilis* Distant, *Fauna Brit. India, Rhynchota*, 5 : 157.

1999. *Halobates formidabilis* : Thirumalai, *I.A.A.B.*, 7 : 40.

Material examined : 1 ex., backwaters, Visakhapatnam Dist., 20.IV.1910, S. W. Kemp coll., Reg. No. 5640/16.

Diagnosis : Adult insects may be 5.0-5.5 mm in body length; dorsum of the body bluish in colour while antennae blackish; head large, somewhat flattened but apically subtriangularly produced; antennae with first joint longest and as long as the anterior femora; rostrum not surpassing the anterior coxae; pronotum more wider than long with two discal pale foveations; anterior femora in male strongly incrassated and anterior tibiae with a long robust spine ventrally near the middle; intermediate legs heavily pilose and more longer than the posterior legs.

Distribution : India : Andhra Pradesh (Dist. Visakhapatnam); Andaman Sea.

Subfamily EOTRECHINAE

Genus 13. *Onychotrechus* Kirkaldy 1903

1903. *Onychotrechus* Kirkaldy, *Entomologist*, 36 : 44.

25. *Onychotrechus sakuntala* (Kirkaldy)*

1901. *Gerris sakuntala* Kirlenldy, *Entomologist*, **34** : 117.
 1902. *Onychotrechus sakuntala* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 183.
 1929. *Onychotrechus sakuntala* : Esaki, *Ann. Mag. nat. Hist.*, (10)**4** : 418.
 1982. *Onychotrechus sakuntala* : Andersen, *Semi-aquatic bugs, Entomonograph*, **3** : 183.
 2000. *Onychotrechus sakuntala* : Bal & Basu, *Fauna of Tripura, State Fauna Series*, **7**(Part 2) : 436.

Material examined : 6MM, 4 FF (all Brachypterous forms), Eluru, canal water, West Godavari Dist., 28.XI.2000, P. H. Roy and party coll.; 3 MM, 10 FF (all Brachypterous forms), Kalluru Lake, near Kaikalur, Krishna Dist.; P. H. Roy and party coll.

Diagnosis : Adult insects may be upto 5.5 mm in length; head with lateral yellowish margins in front of eyes and mid-longitudinal yellowish fascia; antennae with first segment longest and curved, other segments subequal in length; rostrum considerably surpassing the anterior coxae; middle femora slightly longer than posterior femora; tarsal claws long and nearly equal to the first tarsal segment in length.

Distribution : India : Andhra Pradesh (Dist. West Godavari, Krishna); Tripura; Meghalaya.

Elsewhere : Myanmar, Sri Lanka.

Subfamily GERRINAE

Key to genera of the subfamily GERRINAE

1. Pronotal lobe usually covering whole mesonotum in apterous forms; pronotum with dark line to its entire length ***Tenagogonus***
 Pronotal lobe otherwise; pronotum with no distinct dark line 2
2. Antennae shorter, either subequal or shorter by one-half the body length; second and third antennal segments together either subequal or shorter than the first segment ***Gerris***
 Antennae moderately long, usually shorter than the body length; second and third antennal segments together clearly longer than the first segment ***Limnogonus***

Genus 14. *Tenagogonus* Stal 1853

1853. *Tenagogonus* Stal, *Of Vet. Akad. Forh.*, **10** : 263.

Key to species of the genus *Tenagogonus*

1. Middle coxae with a spine like projection on the dorsum of postero-lateral margin; second tarsal segment not longer than the first tarsal segment on the front leg
 ***fluviorum***

Middle coxae without spine like projection; second tarsal segment longer than first tarsal segment on the front leg *anadyomene*

26. *Tenagogonus (Limnometra) fluviorum* (Fabricius)*

1775. *Cimex fluviorum* Fabricius, *Syst. Ent.*, 4 : 727.

1902. *Gerris fluviorum* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 177.

1934. *Limnogonus fluviorum* : Lundblad, *Arch. Hydrobid., Suppl.*, 12 : 374.

1958. *Limnometra fluviorum* : Hungerford & Matsuda, *Kans. Univ. Sci. Bull.*, 39 : 401.

1989. *Tenagogonus (Limnometra) fluviorum* : Thirumalai, *Rec. zool. Surv. India, Occa. Paper*, 118 : 43.

Material examined : 2 FF (Macropterous forms); Gopulod, Adilabad Dist., 2.IX.1999, S. K. Mondal and party coll.

Diagnosis : Adult may be 11.0-12.5 mm in length; antennae with first and fourth segments longest and subequal in length; second antennal segment distinctly shorter than third. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh (Dist. Adilabad); Kerala; Maharashtra; Pondicherry; Tamil Nadu; West Bengal.

Elsewhere : Philippines, Sri Lanka.

27. *Tenagogonus (Limnometra) anadyomene* (Kirkaldy)*

1901. *Gerris anadyomene* Kirkaldy, *Entomologist*, 34 : 117.

1902. *Gerris anadyomene* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 177.

1958. *Limnometra anadyomene* : Hungerford & Matsuda, *Kans. Univ. Sci. Bull.*, 39 : 402.

1960. *Tenagogonus (Limnometra) anadyomene* : Matsuda, *Kans. Univ. Sci. Bull.*, 41 : 206.

1989. *Tenagogonus (Limnometra) anadyomene* : Thirumalai, *Rec. zool. Surv. India, Occa. Paper*, 118 : 42.

Material examined : 2 MM (Apterous forest); Kuchimuru, Cuddapah Dist., 4.I.2000, G. C. Sen and party coll.

Diagnosis : Adult may be upto 12.0 mm in body length; antennal second segment shortest while other three segments are longer and subequal in length. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh (Dist. Cuddapah); Kerala; Tamil Nadu; West Bengal.

Elsewhere : Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka.

Genus 15. *Gerris* Fabricius 1794

1794. *Gerris* Fabricius, *Ent. Syst.*, 4 : 187.

Key to species of the genus *Gerris*

1. Antennal first segment subequal to the remaining three segments together; posterior femur distinctly longer than the body length *spinolae*
- Antennal first segment shorter than the remaining three segments together; posterior femur nearly one-sixth length shorter than the body length *adelaides*

28. *Gerris spinolae* Lethierry & Severin*

1896. *Gerris spinolae* Lethierry & Severin, *Cat. Gen. Hem.*, 3 : 63.
1902. *Gerris spinolae* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 180.
1918. *Gerris spinolae* : Paiva, *Rec. Indian Mus.*, 14 : 24.
1992. *Gerris spinolae* : Bal & Basu, *Proc. zool. Soc., Calcutta*, 45(Suppl-A) : 326.
2003. *Gerris spinolae* : Bal & Basu, *Fauna of Sikkim, State Fauna Series*, 9(Part 2) : 552.

Material examined : 2 MM, 4 FF (Macropterous forms), 19 MM, 19 FF (Brachypterous forms), Pathancheru, Medak Dist, 11.X.1998, S. P. Chakraborty and party coll.; 1 M, 1 F (Macropterous forms), 2 MM, 5 FF (Brachypterous forms), Golconda, Range Reddy Dist., 13.X.1998, S. P. Chakraborty and party coll.; 3 MM, 3 FF (Macropterous forms), 3 MM, 1 F (Brachypterous forms), Kottavalasa, Visakhapatnam Dist., 24.X.1998, S. P. Chakraborty and party coll.; 9 MM (Apterous forms), 1 F (Brachypterous form), Kalluru Lake near Kaikalur, Krishna Dist., 29.XI.2000, P. H. Roy and party coll.

Diagnosis : Body length may be 11.0-12.5 mm antennal third segment much shorter than second segment and a little shorter than the fourth segment; a black distinct carina on the posterior lobe of pronotum. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh (Dist. Medak, Ranga Reddy, Visakhapatnam, Krishna); Sikkim; Uttar Pradesh; West Bengal.

Elsewhere : Myanmar.

29. *Gerris adelaides* Dohrn*

1860. *Gerris adelaides* Dohrn, *Stettin. ent. Ztg.*, 21 : 408.
1902. *Gerris adelaides* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 181.
1969. *Gerris adelaides* : Cheng & Fernando, *Oriental Ins.*, 3(2) : 4.
1999. *Gerris adelaides* : Bal & Basu, *Fauna of Meghalaya, State Fauna Series*, 4(Part 4) : 451.

Material examined : 2 MM, 1 F (Macropterous forms), Eluru, canal water, West Godavari Dist., 28.XI.2000, P. H. Roy and party coll.

Diagnosis : Adults may be upto 11.5 mm in length; head with a basal semi-lunar pale rostrum short, slightly surpassing base of head; posterior lobe of pronotum with a distinct

brownish carina along the full length; middle leg with first tarsal segment about four times as long as the second tarsal segment. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh (Dist. West Godavari); Meghalaya; West Bengal.

Elsewhere : Bangladesh, China, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam.

Genus 16. *Limnogonus* Stal 1868

1868. *Limnogonus* Stal, *K. Svenska Vet.-Akad. handl.*, 7 : 132.

Key to species of the genus *Limnogonus*

1. Connexivum terminating into a fairly prominent spine; pronotal lobe without yellow median line but two small yellow spots..... *nitidus*
- Connexivum not terminating into any spine like structure; pronotal lobe with mid-longitudinal yellow line on its entire length *fossarum*

30. *Limnogonus (Limnogonus) nitidus* (Mayr)*

1865. *Hydrometra nitida* Mayr, *Verh. zool. bot. Ges. Wien.*, 15 : 443.

1910. *Gerris nitida* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 142.

1934. *Limnogonus nitida* : Lundblad, *Arch. Hydrobid., Suppl.*, 12 : 387.

1979. *Limnogonus nitida* : Polhemus, *Bull. Fish Res. Stn., Sri Lanka*, 29 : 90.

1989. *Limnogonus nitida* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper*, 118 : 41.

Material examined : 2FF (Macropterous form), Bhongir, Nalgonda Dist., 12.X.1998, S. P. Chakrabarty and party coll.; 2 MM, 3 FF (Macropterous forms), 4FF (Apterous forms), Dronachallam, Karnool Dist., 25.12.1999, G. C. Sen and party coll.; 1M (Macropterous form), 1 M (Apterous form), Kajipeta, Cuddapah Dist.; 30.XII.1999, G. C. Sen and party coll.; 4 MM, 4 FF (Macropterous forms), 1 M, 3 FF (Apterous forms), Chennur, Cuddapah Dist., 31.XII.1999, G. C. Sen and party coll.; 3 MM, 9 FF (Macropterous forms), 11 MM, 15 FF (Apterous forms), Kuchimuru, Cuddapah Dist., 4.I.2000, G. C. Sen and party coll.; 2 MM, 4 FF (Macropterous forms), 2FF (Apterous forms), Sri Kalahasti, Chittoor Dist., 5.I.2000, G. C. Sen and party coll.

Diagnosis : Body length may be 6.0-8.0 mm; antennae with first segment longest and slightly longer than fourth segment while second and third segments smallest and subequal in length; both the sexes have fairly prominent connexival spines.

Distribution : India : Andhra Pradesh (Dist. Nalgonda, Kurnool, Cuddapah, Chittoor); Assam; Bihar; Kerala; Meghalaya; Orissa; Sikkim; Tripura; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Bangladesh, Celebes, Indonesia, Maldives Islands, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam.

31. *Limnogonus (Limnogonus) fossarum* (Fabricius)*

1755. *Cimex fossarum* Fabricius, *Syst. Ent.*, : 727.

1902. *Gerris fossarum* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 178.

1918. *Gerris fossarum* : Paiva, *Rec. Indian Mus.*, 14 : 23.

1960. *Limnogonus (Limnogonus) fossarum* : Matsuda, *Kans. Univ. Sci. Bull.*, 41 : 198.

1975. *Limnogonus (Limnogonus) fossarum* : Andersen, *Ent. Scand. Suppl.*, 7 : 30.

1989. *Limnogonus (Limnogonus) fossarum* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper*, 118 : 40.

Material examined : 4 MM, 7 FF (Macropterous form), Pathancheru, Medak Dist., 11.X.1998, S. P. Chakraborty and party coll.; 11 MM, 9 FF (Macropterous form), Ravalapalam, East Godavari Dist., 20.X.1998, S. P. Chakraborty and party coll.; 1 M, 2 FF (Macropterous form), Kottavalasa, Visakhapatnam Dist., 24.X.1998, S. P. Chakraborty and party coll.; 1 M (Macropterous form), 1 M (Apterous form), Dronachallam, Kurnool Dist., 25.XII.1999, G. C. Sen and party coll.; 1 M, 1 F (Macropterous form), Kodamuru, Kurzool Dist., 27.XII.1999, G. C. Sen and party coll.; 1 M, 1 F (Apterous forms), 1 F (Macropterous form), Alampur, Mahbubnagar Dist., 28.XII.1999, G. C. Sen and party coll.; 2 MM, 1 F (Macropterous form), Kuchimuru, Cuddapah Dist., 4.I.2000, G. C. Sen and party coll.; 2 Ff (Macropterous form), 1 F (Apterous form), Sri Kalahasti, Chittoor Dist., 5.I.2000, G. C. Sen and party coll.

Diagnosis : Body length of adult insects maybe 9.0-10.0 mm; antennal second, third and fourth segments subequal in length while the first segment longest; in male the hind margin of dorsal vesicle plate concave; in females the hind margin of sternum VII with a small median tooth. Other diagnostic characters are as in the key.

Distribution : India : Andhra Pradesh (Dist. Medak, East Godavari, Visakhapatnam, Kurnool, Mahbubnagar, Cuddapah, Chittoor); Maharashtra; West Bengal. This species is widely distributed all over the country.

Elsewhere : China, Indonesia, Malacca Islands, Philippines, Thailand, Vietnam.

SUMMARY

The present work dealt with 31 species under 16 genera which are belonging to eight families of water-bugs namely Corixidae, Notonectidae, Pleidae, Nepidae, Belostomatidae, Hydrometridae, Mesoveliidae and Gerridae, from Andhra Pradesh. The research work which has resulted the present paper, is mainly based upon the collections made by different survey parties of the Zoological Survey of India and a few unnamed collections as well as some named specimens housed in the National Zoological Collection, Kolkata. In the present paper

24 species under 14 genera of seven families are being recorded for the first time (with asteric marks) from the state of Andhra Pradesh. Taxonomic keys for different taxa of water-bugs, besides of which the original references, morphological diagnostic characters, distribution in India and elsewhere in the world for each species have been cited in the present paper.

ACKNOWLEDGEMENTS

The author is extremely grateful to the Director, Zoological Survey of India for providing all facilities during the online period of the research work. Sincere thanks are due to Dr. A. K. Hazra, Scientist-E, for critically going through the manuscript and rendering valuable suggestions for improvement of the same. The author is also thankful to Dr. S. K. Mitra; Scientist-E (Retd.) for his suggestions and encouragement. Cooperation and help received from the colleagues of the Hemiptera Section are also thankfully acknowledged by the author.

REFERENCES

- Andersen, N.M. 1975. The *Limnogonus* and *Neogerris* of the old world with character analysis and a reclassification of the Gerrinae (Hemiptera : Gerridae). *Ent. Scand. Suppl.*, 7 : 1-96.
- Andersen, N.M. 1982. *The Semiaquatic Bugs (Hemiptera : Gerromorpha)*, Entomonograph Vol. 3. Denmark : 1-455.
- Bal, Animesh and Basu, R.C. 1992. Water-bugs of Economic importance. *Proc. zool. Soc. Calcutta*, 45(Suppl. A) : 321-329.
- Bal, Animesh and Basu, R.C. 1994. Insecta : Hemiptera : Mesoveliidae, Hydrometridae, Veliidae and Gerridae. *Fauna of West Bengal, State Fauna Series*, 3(Part-5) : 511-534.
- Bal, Animesh and Basu, R.C. 1994. Insecta : Hemiptera : Belostomatidae, Nepidae, Notonectidae and Pleidae. *Fauna of West Bengal, State Fauna Series*, 3(Part-5) : 535-558.
- Bal, Animesh and Basu, R.C. 1997. Hemiptera : Water-bugs. *Fauna of Delhi, State Fauna Series*, 6 : 261-276.
- Bal, Animesh and Basu, R.C. 1999. Insecta : Hemiptera : Water-bugs. *Fauna of Meghalaya, State Fauna Series*, 4(Part-4) : 431-461.
- Bal, Animesh and Basu, R.C. 2000. Insecta : Hemiptera : Water-bugs. *Fauna of Tripura, State Fauna Series*, 7(Part-2) : 427-443.
- Bal, Animesh and Basu, R.C. 2002. Insecta : Hemiptera : Water-bugs. *Fauna of Kabar Lake, Wetland Ecosystem Series*, 4 : 77-78.
- Bal, Animesh and Basu, R.C. 2003. Insecta : Hemiptera : Water-bugs. *Fauna of Sikkim, State Fauna Series*, 9(Part-2) : 541-557.

- Brooks, G.T. 1951. A revision of the genus *Anisops* (Notoncetidae, Hemiptera). *Kans. Univ. Sci. Bull.*, **34**(8) : 301-519.
- Distant, W.L. 1902. *The Fauna of British India, including Ceylon and Burma, Rhynchota*. London, **2** : 1-503.
- Distant, W.L. 1906. *The Fauna of British India, including Ceylon and Burma, Rhynchota*. London, **3** : 1-503.
- Distant, W.L. 1910. *The Fauna of British India, including Ceylon and Burma, Rhynchota*. London, **5** : 1-362.
- Dohrn, A. 1860, Zur Heteropteran Fauna Ceylon's. *Stettin. ent. Ztg.*, **21** : 409.
- Dover, C. 1928, Aquatic Rhynchota in the College of Agriculture, Coimbatore, Southern India. *J. Bombay nat. Hist. Soc.*, **32**(3) : 614-615.
- Dufour, L. 1863, Essai Monographique sur les Belostomides. *Annu. Soc. ent. Fr.*, **3** : 373-400.
- Esaki, T. 1929. New or little known Gerridae-II. Indian Species. *Ann. Mag. nat. Hist.*, (10)**4** : 412-419.
- Fabricius, J.C. 1775. *Systema Entomologiae*, : 1-690.
- Fabricius, J.C. 1790. Nova insectorum genera. *Skr. nat. Selsk.*, **I** : 1-350.
- Fabricius, J.C. 1794. *Entomologia Systema*, : 1-58.
- Fabricius, J.C. 1798. Supplementum Entomologic Systematica. *emendata et aucta*, Hafinae : 1-527.
- Fernando, C.H. and Cheng, L. 1974. A preliminary study on the fauna and distribution of aquatic hemiptera in Malay and Singapore. *Fdn. Mus. J.*, **19** : 21-46.
- Fieber, F.X. 1851. Rhynchotographien. *Abh. K. Bohm. Ges. Wiss.*, **7** : 469-486.
- Hafiz, H.A. and Pradhan, K.S. 1947. Notes on a collection of aquatic Rhynchota from the Patna State, Orissa, with description of two new species. *Rec. Indian Mus.*, **45**(4) : 347-376.
- Hafiz, H.A. and Ribeiro, S. 1939. On a further collection of aquatic Rhynehota from the Rajmahal Hills, Santan Pargazas, Bihar, with description of *Microvelia santala* sp. nov. *Rec. Indian Mus.*, **41**(4) : 423-436.
- Herrich-Shaffer, G.A.W. 1850. *Die Wanzenartigen insckten*, **9** : 45-256.
- Hungerford, H.B. and Evans, N.E. 1934. The Hydrometridae of the Hungarian National Museum and other studies in the family (Hemiptera). *Ann. Mus. nat. Hungarici, Budapest*, **38** : 31-112.

- Hungerford, H.B. & Matsuda, R. 1958. The *Tenagogonus-Limnometra* Complex of the Gerrinae, *Kans. Univ. Sci. Bull.*, **39**(9) : 371-457.
- Hutchinson, G.E. 1940. A revision of the Corixidae of India and adjacent regions. *Trans. Conscefiend Acad. Arts Sci.*, **33** : 339-476.
- Kirkaldy, G.W. 1898. Notes on aquatic Rhynehota. I. *Entomologist*, **31** : 2.
- Kirkaldy, G.W. 1900. Hydrocorises. *Annu. Soc. ent. Belg.*, **44** : 431-435.
- Kirkaldy, G.W. 1901. A guide to the study of British Water-bugs. *Entomologist*, **34** : 95-135.
- Kirkaldy, G.W. 1903. Miscellanea Rhynchotalia, *Entomologist*, **36** : 44-45.
- Lansbury, L. 1968. The *Enithares* (Hemiptera-Heteroptera : Notonectidae), *Pacif. Insects*, **10**(2) : 353-442.
- Lansbury, L. 1972. A review of the Oriental Species of *Ranatra* Fabricius (Hemiptera-Heteroptera : Nepidae). *Trans. R. ent. Soc. London*, **124**(3) : 287-341.
- Lepeletier, A.L.M. and Serville, J.G.A. 1925. *Encyclopedia methodique*, **10** : 272.
- Lethierry, B.R. and Severin, M. 1896. *Catalogue general des Hemipteres*, Berlin, **3** : 1-275.
- Linnaeus, C. 1764. *Systema Naturae. Museum Ludovice Ulrieae etc. Holmiae*.
- Lundblad, V.O. 1934. Zur Kenntnis der aquatilen and Semiaquatilen Hemipteren von Sumatra, Java and Bali. *Arch. Hydrobiol. Suppl.*, **12** : 1-195, 263-489.
- Mayr, G.L. 1853. Zwei neue Wazen and Kordofan. *Verh. zool.-bot. Ver. Wien.*, **2**(1852) : 17.
- Mayr, G.L. 1865. Diagnosis neuer Hemipteran. II. *Verh. zool.-bot. Ges. Wien.*, **15** : 443.
- Matsuda, R. 1960. Morphology, evolution and classification of the Gerridae (Hemiptera : Heteroptera). *Kans. Univ. Sci. Bull.*, **41**(2) : 25-632.
- Montandon, A.L. 1903. Hemipterus aquatiques, Notes Synonymiques et geographiques, descriptions d'especes nouvelles. *Bull. Soc. Sci. Buc.*, **12** : 110.
- Montandon, A.L. 1909. Belostomidae et Nepidae, Notes diverses et descriptions d'especes nouvelles. *Bull. Soc. Sci. Buc.*, **17** : 138.
- Mulsant, P.E. and Rey, C. 1852. Description de quelques Hemipteres Heteropteres Nouveaux on pell connus. *Opuse. ent.*, : 1-157.
- Paiva, C. 1918. Aquatic Rhynehota from the Southern Shan States. *Rec. Indian Mus.*, **14** : 19-33.
- Paiva, C. 1919. Aquatic and Semiaquatic Rhynehota from the Satara and Poona Districts. *Rec. Indian Mus.*, **16** : 152-156.

- Polhemus, J.T. Aquatic and Semiaquatic Hemiptera of Sri Lanka from the Austrian Indo-Pacific Expedition, 1970-71. *Bull. Fish Res. Stn. Sri Lanka*, **29** : 89-113.
- Pradhan, K.S. 1950. A collection of aquatic Rhynchota from the Rihand Dam site, Mirzapur District (U.P.) with description of a new water strider (Insecta : Hemiptera : Gerridae). *Rec. Indian Mus.*, **48**(2) : 1-5.
- Stal, C. 1859. Hemiptera. *K. Svenska Eug. zool.*, **4** : 249.
- Stal, C. 1865. *Hemiptera Africana*, **3** : 1-191.
- Stal, C. 1868. Hemiptera Fabriciana. *K. Svenska Vet.-Akad. Handl.*, **7** : 1-148.
- Scott, J. 1872. Notes on some Corsican insects. *Entomologist's mon. Mag.*, **8** : 245.
- Spinola, M.M. 1837. *Essai sur less Insectes Hemipteres Rhyngotes ou Heteropteres*, : 1-68.
- Thirumalai, G. 1989. Aquatic and Semiaquatic Hemiptera (Insecta) of Jadavi Hills, Tamil Nadu. *Rec. zool. Surv. India, Occ. Paper No. 118* : 1-63.
- Thirumalai, G. 1994. Aquatic and Semiaquatic Hemiptera (Insecta) of Tamil Nadu. I, Dharampuri and Padukkottai Districts. *Rec. zool. Surv. India, Occa. Paper No. 165* : 1-45.
- Thirumalai, G. 1999. Aquatic and Semi-aquatic Hetroptera of India., *I.A.A.B.*, **7** : 1-74.
- Thirumalai, G. 2001. Insecta : Aquatic and Semi-aquatic Heteroptera. *Fauna of Nilgiri Biosphere Reserve, Fauna of Conservation Area Series*, **11** : 111-127.
- Usinger, R.L. 1956. *Aquatic Insects of California*, : 1-508.
- Venkatesan, P. and Raghunatha Rao, T.K. 1980. Description of a new species and a key to Indian Species of Belostomatidae. *J. Bombay nat. Hist. Soc.*, **77** : 299-303.

INSECTA : COLEOPTERA : COCCINELLIDAE

S. K. CHAKRABORTY

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The Coccinellidae beetles, popularly called "Ladybird beetles", are very common insects found in agricultural fields and forests. They vary in size from few millimeters to almost square-inch size with beautiful colours. These beetles are economically important as they cause severe damage (only by the members of sub-family Epilachninae) to the agricultural crops as well as predating on *Aphids*, *Coccids*, *Aleuryds*, *plantmites* and other soft bodied insects.

Some stray records of the species from this family was made from South-India earlier. No consolidated work was done on the Coccinellidae fauna of the state earlier.

In this present study only sixteen species have been recorded for the first time from the state. It is assumed that number of species may increase after further exploration of the state.

Materials for this study was available from different survey parties of this department. Present study includes sixteen species under twelve genera belonging to seven tribes under five subfamilies.

This work provides keys to the subfamilies, tribes, genera and species. In case of single species only diagnostic characters have been provided. Necessary geographical distribution, synonymies and literature references along with a district-wise distribution chart of the species have also been provided.

SYSTEMATIC ACCOUNT : LIST OF TAXA

Family COCCINELLIDAE

Subfamily 1. STICHOLOTINAE

Tribe 1. Sticholotini

Genus 1. *Jauravia* Motschulsky

1. *J. simplex* (walker)

Subfamily II. SCYMNINAE

Tribe 2. Aspidimerini

Genus 2. *Pseudaspidimerus* kapur

2. *P. Circumflexa* var. *testacea* (Weise)

Tribe 3. Scymnini

Genus 3. *Scymnus* kugelann

3. *Sc. (Pullus) brunnescens* Mots.
 4. *Sc. (Pullus) Coccivora* Aiyar
 5. *Sc. (Scymnus) nubilus* Mulsant

Subfamily III. CHILOCORINAE

Tribe 4. Chilacorini

Genus 4. *Brumus* Mulsant

6. *B. suturalis* Fabricius

Subfamily IV. COCCINELLINAE

Tribe 5. Coccinellini

Genus 5. *Oenopia* Mulsant

7. *O. luteopustulata* Mulsant

Genus 6. *Coelophora* Mulsant

8. *C. unicolor* (Fabricius)

Genus 7. *Menochilus* Timberlake

9. *M. sexmaculatus* (Fabricius)

Genus 8. *Micraspis* Dejean

10. *M. Cardoni* (weise)
 11. *M. discolor* (Fabricius)
 12. *M. Vincita* (Gorham)

Genus 9. *Coccinella* Linnaeus

13. *C. transversalis* Fabricius

Genus 10. *Harmonia* Mulsant

14. *H. arcuata* (Fabricius)

Tribe 6. Psylloborini

Genus 11. *Illeis* Mulsant

15. *I. Cincta* (Fabricius)

Subfamily V. EPILACHNINAE

Tribe 7. EPILACHNINI

Genus 12. *Henosepilachna* Li16. *Henosepilachna* nsp.?

Family COCCINELLIDAE

Key to the subfamilies of COCCINELLIDAE known from Andhra Pradesh

1. Terminal segment of maxillary palpi elongate oval or elongate conical; mentum very narrowly articulated with submentum; the ninth sternite of male flat, triangular; head capsule sometimes projecting anteriorly *Sticholotinae*
- Terminal segment of maxillary palpi strongly divergent apically or nearly parallel sided, rarely slightly convergent apically; mentum usually not very narrowly articulated with submentum; the ninth sternite of male linear or clavate; head capsule not projecting anteriorly 2
2. Antennae relatively short, at most about two-third as long as head width, often very short, strongly modified and inserted frontally, laterally or ventrally, the terminal segment of maxillary palpi generally nearly parallel sided, never strongly divergent apically; clypeus normal or strongly expanded laterally; meso- and metasterna usually broadly separated; femora relatively stout or sometimes strongly depressed 3
- Antennae relatively long, at least about one-half as long as the head width, usually longer than two third and inserted frontally, laterally or dorsally; the terminal segment of maxillary palpi usually strongly divergent apically; clypeus never strongly expanded laterally; meso- and meta sterna always feebly and narrowly articulated, separating middle coxal cavities narrowly; femora relatively slender, never strongly depressed 4.
3. Clypeus strongly expanded laterally; anterior margin of pronotum deeply and trapezoidally concave and lateral portions very strongly descending below; elytral base distinctly broader than pronotal base; meta sternum distinctly impressed for the reception of middle femora; elytral epipleura relatively broad and its inner carina reaching clytral apex; tibiae often angulate externally *Chilocorinae*
- Clypeus not strongly expanded laterally; anterior margin of pronotum not deeply or trapezoidally concave, lateral portion descending below but not very strongly; clytral base slightly broader than pronotal base; elytral epipleura very narrow and its inner carina not reaching the elytral apex but ending near two third of the elytral length from base *Scymninae*
4. Female genital plate (9th sternite) always very elongate; dorsum pubescent, weakly or moderately convex; compound eyes sometimes coarsely faceted; antennae eight to

- eleven segmented and laterally inserted; abdomen composed of five or six visible segments; tarsi true tetramerous, cryptotetramerous or true trimerous *Coccidulinae**
- Female genital plate not elongate, oval or transverse; dorsum glabrous or pubescent, if pubescent, it is strongly convex; compound eyes never coarsely faceted; antennae always eleven segmented and more or less dorsally inserted; abdomen composed of six visible segments; tarsi cryptotetramerous 5
 - 5. Dorsum glabrous; mandibles with a bifid or multidenticulate tip and also with a basal tooth; mesepimeron nearly triangular, its posterior margin almost straight or slightly angulate, metum relatively narrowly articulated with submentum and distinctly divergent apically; inner margin of female genital plate without notch or small emargination and with a stylus near the inner corner; siphon of male genitalia rather long and usually strongly curved with a well developed capsule, median piece of tegmen usually not very slender *Coccinellinae*
 - Dorsum pubescent; mandibles with a multidenticulate tip and without a basal tooth; mesepimeron quadrate, its posterior margin distinctly angulate; mentum very broadly articulated with submentum and convergent apically; inner margin of female genital plate with notch or small emargination and with a stylus as far outward from the inner corner of female genital plate; siphon of male genitalia rather short and weakly curved without a well developed capsule, median piece of tegmen tubular and slender *Epilachninae*

Subfamily 1. STICHOLOTINAE

Tribe 1. Sticholotini

Genus 1. *Jauravia* Motschulsky

1858. *Jauravia* Mots., *Etud. Ent.*, VII : 117.

1931. *Jauravia*, Korschefsky, *Coleoptm. Cat.*, 16 pars 118 : 222.

1. *Jauravia simplex* (walker)

1859. *Coccinella simplex* Walker, *Ann. Mag. Nat. Hist.*, (3)4 : 219. (Type loc.-Ceylon)

1932. *Jauravia simplex*; Korschefsky, *Coleoptm, cat*, 16; pars 120 : 588.

1946. *Jauravia simplex*, Kapur, *Ann. Mag. Nat. Hist. Lond.*, (11)13 : 86.

Length : 2.2-2.5 mm, width 2.0–2.3 mm.

Diagnostic characters : Body circular, lateral borders of elytra broadly expanded; pubescence short, as long as on pronotum, moderately dense, punctures fine and close, interspace wrinkled, upper surface light brown, matt.

* Not treated in this paper.

Material studied : 1 ex., Aduripalle, Nellore Dist., 12.II.1999; 1 ex., Puttur and 1 ex., Palmaner, Chittor Dist., 20-21.II.1999, P. Mukhopadhyay & Party coll.

Distribution : India : Andhra Pradesh, Maharashtra.

Elsewhere : Sri Lanka.

Remarks : It is a new record from Andhra Pradesh.

Subfamily II SCYMNINAE

Key to the tribes of subfamily SCYMNINAE known from Andhra Pradesh

1. Eyes covered anteriorly by the expanded head capsule; antennae nine segmented and very short; elytral epiplurae very narrow with distinct foveae; trochanters elongate, femora broadly expanded, concealing the compressed tibiae, tarsi true trimerous; abdomen composed of six segments, first segment convex posteriorly in an arc
..... ASPIDIMERINI
- Eyes exposed anteriorly, antennae nine to eleven segmented; elytral epiplurae very narrow without distinct foveae; trochanters normal, femora cylindrical and stout, tarsi trimerous or cryptotetramerous; first abdominal segment not convex posteriority 2
2. Anterior margin of prosternum roundedly convex anteriorly, prosternal carina absent; terminal segment of maxillary palpi slightly convergent apically with a truncate apex
..... STETHORINI.
- Anterior margin of prosternum flat or slightly concave; prosternal carina present or absent; terminal segment of maxillary palpi parallel sided SCYMNINI

Tribe 2. Aspidimerini

Genus 2. *Pseudaspidimerus* Kapur

1948. *Pseudaspidimerus* Kapur, *Trans. Royal ent. Soc. Lond.*, **99** : 81, 117-118.

2. *Pseudaspidimerus circumflexa* (Motschulsky)

1858. *Platynaspis circumflexa* Motschulsky, *Etud. ent.*, **7** : 117 (Type-loc-Ceylon).

1900. *Aspidimerus circumflexa*, Weise. *Dtsch. ent. Z.* : 423.

1948. *Pseudaspidimerus circumflexa*; kapur, *Trans. Royal ent. Soc. Lond.*, **99** : 121.

Length : 2.5-2.75 mm, width : 1.75-2.1 m.

Diagnostic characters : Pronotum, scutellum and elytra entirely testaceous or moderately dark brown; pubescence yellowish grey; underside and legs pale testaceous except the thoracic sternites and the median part of the first four abdominal sternites which are reddish testaceous or fuscous.

Material studied : 4 exs., Elamanchili, Visakhapatnam dist., 9-11-1997, P. Mukhopadhyay & party coll.

Distribution : India : Andhra Pradesh, Tamil Nadu, Maharashtra, Bihar, West Bengal, Andamans, Assam and Meghalaya.

Elsewhere : Myanmar and Sri Lanka.

Remarks : This species is recorded for the first time from Andhra Pradesh. Specimens studied belong to variety *testaceous* (weise).

Tribe 3. Scymnini

Genus 3. *Scymnus* kugelann

1794. *Scymnus* Kugelann, *Neues Magazin Leih. Ent.*, 1, 5 : 545-546.

1931. *Scymnus*, Korschefsky, *Coleoptm. Cat.*, 16, Pars 118 : 115.

Key to the subgenera of genus *Scymnus* known from Andhra Pradesh

1. Femoral line of the first abdominal sternite complete *Scymnus* (*Pullus*)
- Femoral line of the first abdominal sternite incomplete *Scymnum* (*Scymnus*)

Key to the species of the genus *Scymnus* known from Andhra Pradesh

1. Elytra and pronotum reddish brown without any marking or spot, length : 1.78 mm., width 1.18 mm *brunnescens* Mots
- Elytra and pronotum dark brown or light brown, with marking or spot 2
2. Smaller species, Length 1.48 mm, width 1.18 mm., elytron with a large black spot at the scutellar base, a small black spot at the end of the two-third on the suture and another small black spot near the lateral margin at the two-third of its length, basal spots are often confluent to the sutural spot *Coccivora* Aiyar
- Larger species, Length-1.93 mm. Width - 1.33 mm., a large black spot occupying almost the entire pronotum only leaving a narrow flavus margin; this spot extends backward along the suture upto the two-third of its length in a gradually narrowing manner *nubilus* Mulsant

3. *Scymnus* (*pullus*) *brunnescens* Motschulsky

1863. *Scymnus brunnescens* Motschulsky, *Bull. Soc. Nat. Moscou*, 36, 425. (Type-loc.-Ceylon)

1931. *Scymnus* (*pullus*) *brunnescens*, Korschefsky, *Coleoptm. Cat.*, 16, pars 118 : 122.

Material studied : 6 exs., Kaikalur, Krishna Dist., 19-4-1996, S. K. Chatterjee & party coll.

Distribution : India : Andhra Pradesh; South, Central and Eastern India, Assam, Manipur, Meghalaya, West Bengal and Andamans.

Elsewhere : Sri Lanka, Myanmar, Indonesia, Philippines, Formosa, China and Japan.

Remarks : A widely distributed speceis. Recorded for the first time from Andhra Pradesh.

4. *Scymnus (pullus) coccivora* Aiyar

1925. *Scymnus coccivora* Aiyar, *J. Bombay Nat. Hist. Soc.*, **30** : 491 (Type-loc.-Coimbatore, S. India).

1931. *Scymnus (Pullus) coccivora*, Korschefsky, *Coleoptm. Cat.*, **16**, pars 118 : 142.

Material studied : 1 ex. Palmaner, Chittor Dist., 21-i-1999, P. Mukherjee & Party coll.

Distribution : India : Andhra Pradesh, South India, Goa and West Bengal.

Remarks : It appears to be an indigenous species. Recorded for the first time from Andhra Pradesh.

5. *Scymnus (Scymnus) nubilus* Mulsant

1850. *Scymnus nubilus* Mulsant, *Ann. Soc. Agric. Lyon*, (2)2 : 972 (Type-loc.-Assam).

1931. *Scymnus (Scymnus) nubilus*; Korschefsky, *Coleoptm., Cat.*, **16**(118) : 143.

1972. *Scymnus (Scymnus) nubilus*, Kapur, *Rec. zool. Surv. India*, **66**(1-4) : 311.

Material studied : 2 exs., kondapelle, 31-X-1997 and 1 ex., Mendavelli, 1-X-1997, Krishna Dist., P. Mukhopadhyay & party coll.; 3 exs., Kasibugga, Srikakulam Dist., 8-xi-1998, M. Prasad & party coll. 1 ex., Rajendranagar, Rangareddi Dist., 6-iii-1999, S.K. Chatterjee & party coll.

Distribution : India : Andhra Pradesh, Goa, Bengal and Assam.

Elsewhere : Myanmar.

Remarks : A well distributed species. Recorded for the first time from Andhra Pradesh.

Subfamily III CHILOCORINAE

Tribe 4. Chilacorini

Genus 4. *Brumus* Mulsant

1850. *Brumus* Mulsant, *Spec. Trim. Securipalp.* : 492.

1932. *Brumus*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 265.

6. *Brumus suturalis* (Fabricius)

1798. *Coccinella suturalis* Fabricius, *Suppl. Ent. Syst.*, (Type-Loc.-India).

1850. *Brumus suturalis* (Fab.) : Mulsant, *Ann. Soc. Agric. Lyon*, (2)2 : 494.

1932. *Brumus suturalis*, Korschefsky, *Coleoptm. Cat.*, **16** (120) : 267.

Material studied : 3 exs., Mendavella, Krishna Dist. 1-xi-1997; 1 ex. Bheemanipattnam, Visakhapatnam Dist. 9-xi-1997; 1 ex., Kamalturu, dist. Nellore, 16-i-1999, P. Mukhopadhyay & party coll. 1 ex. Cuddapah, 1-i-2000 and 2 exs. Vempalle. 2.i.2000, Dist. Cuddapah, G.C. Sen & party coll. 2 exs. Karvetnagar, 5-vi-2000; 6 exs. Nagar, 4-vi-2000; 10 exs. Patagunta, 6-vi-2000; all from Chittoor Dist, S.K. Chatterjee & party coll.

Distribution : India : Andhra Pradesh, Karanataka, Maharashtra, Madhya Pradesh, Goa, West Bengal, Tripura, Meghalaya, Manipur and Sikkim.

Elsewhere : Nepal, Bhutan, Sri Lanka and Luzon.

Remarks : Widely distributed species. Recorded for the first time from Andhra Pradesh.

Subfamily IV COCCINELLINAE

Key to the tribes of subfamily COCCINELLINAE

1. Anterior margin of clypeus with an anterior projection on each side; antennae inserted very close to the eyes, antennal club compact, the preapical segment broader than long; mandibles always with a bifid tip, inner margin entire; maxillary galea conical; anterior margin of pronotum usually deeply emarginate and with angulate corners; body yellow to reddish testaceous with usually black marking on the pronotum and elytra; habit carnivorous COCCINELLINI
- Anterior margin of clypeus truncate, without any projection on each side; antennae inserted in front a little away from the eyes, antennal club loosely segmented, the pre-apical segment longer than broad; mandibles bifid, often with multidenticulate tip, inner margin finely serrated; maxillary galea quadrate; anterior margin of pronotum weakly sinuate with rounded corners; body yellowish or light testaceous, pronotum with a pair of black spots but elytra without any black markings; habit fungivorous PSYLLBORINI

Tribe 5. Coccinellini

Key to the genera of tribe Coccinellini known from Andhra Pradesh

1. The terminal segment of antennae convergent apically; elytral epipleurae about one-sixth as broad as body width, entire, prosternal process with a pair of Carinae, smaller in size 2.
- The terminal segment of antennae divergent, transverse, often with a truncate apex; elytral eiplerae broader, not entire, prosternal process with a pair of Carinae only at the base reaching a little beyond the anterior margin of coxal cavity 4

2. The terminal segment of antennae pointed, antennae short, as long as or slightly shorter than frons, antennal club distinct and compact, 11 segmented, the 10th segment nearly as wide as long with an oblique apical side, 9th segment transverse; first abdominal sternite with an incomplete femoral line; prosternal carinae running two-third of its length from base ***Menochilus*** Timberlake
 - The terminal segment of antennae not pointed 3
3. Antennae short, club compact, subfusiform; elytral epipleurae not marked with foveae; thoracic foveae well marked; prosternal carinae reaching almost to the anterior margin of the prosternal process ***Oenopia*** Mulsant.
 - Antennae long, slender, club loosely set; elytral epipleura with distinct foveae; thoracic foveae not marked; prosternal carinae reaching almost half of the prosternal process ***Coelophora*** Mulsant.
4. Anterior margin of mesosternum straight. Medium sized beetles, pronotum black, except the anterolateral corners which are testaceous or white in colour and appears square in shape ***Coccinella*** Linnaeus
 - Anterior margin of mesosternum emarginate 5
5. Smaller beetles, oval, convex; pronotum reddish brown, basal margin black with two black spots arising from the basal margin at middle ***Micraspis*** Dejean
 - Larger beetles, elongated, depressed; pronotum reddish brown with an almost square, large black spot on the disc, leaving a narrow reddish margin anteriorly and a little more than one-fourth of the width reddish brown area laterally, often the square black spot is replaced by 2 or 4 oblique black streak in the middle ***Harmonia*** Mulsant

Genus 5. ***Oenopia*** Mulsant

1850. *Oenopia* Mulsant, *Spec. Trim. Securipalp.*, : 420.

1932. *Oenopia*, Karschewsky, *Coleoptm. Cat.*, 16(120) : 287

7. ***Oenopia luteopustulata*** Mulsant

1850. *Oenopia luteopustulata* Mulsant. *Spec. Trim. Securipalp.*, : 421 (Type-loc.-Assam).

1932. *Oenopia luteopustulata*, Karschewsky, *Coleoptm. Cat.*, 16(120) : 288.

Material studied : 1 exs, kondapalle, Krishna Dist., 31-x-1997, P. Mukhopadhyay & party coll.; 1 ex. Ichchapuram, 4-ii-1998 and 1 ex. palasa, 7.ii.1998, Srikakulam Dist., M. Prasad & party coll.; 2 exs. Ramchandrapur, Medak Dist., 5-iii-1999; 1 ex. Rajendranagar, Distt. Rangareddi, 6-iii-1999; 1 ex. Rajendranagr, Dist. Rangareddi, 6-iii-1999, S.K. Chatterjee & party coll.; 1 ex. Gutkha, Dist. Rangareddi, 17-i-2004, D.R. Maulik & party coll.

Distribution : India : Andhra Pradesh, Plains of U.P., Simla, Kumaon Hills, West Bengal, Meghalaya, Assam, Tripura, Manipur, Sikkim and Andaman Islands.

Elseshere : Nepal, Bhutan, Myanmar, Tibet, Thailand and Chamba.

Remarks : It is a very widely distributed species. The colour pattern of the elytra varies very much. The species is recorded for the first time from Andhra Pradesh.

Genus 6. *Coelophora* Mulsant

1850. *Coelophora* Mulsant. *Spec. Trim. Securipalp.*, : 374-390.

1932. *Coelophora*, Korschefsky, *Coleoptm, Cat.*, 16(120) : 290.

8. *Coelophora unicolor* (Fabricius)

1792. *Coccinella unicolor* Fabricius, *Ent. Syst.*, 1 : 267 (Type-loc.-India).

1932. *Coelophora unicolor*; Korschefsky, *Coleoptm, cat.*, 16(120) : 297.

Material studied : 1 ex. Vellatura, Dist. Cuddapah, 1-i-2000, G.C. Sen & party.

Distribution : India : Andhra Pradesh, Pondicherry, Chota-Nagpur (Bihar), Sikkim, Himalayan Border and Andaman Islands.

Elsewhere : Thailand.

Remarks : This is the first time record of the species from Andhra Pradesh. The species is recognised by the reddish-testaceous colour of the pronotum and elytra, without any black marking or spots.

Genus 7. *Menochilus* Timberlake

1943. *Menochilus* Timberlake, *Hawaii, Plant. Rec.*, 47(1) : 40.

1965. *Menochilus*, Kamiya, *Mem. Fac. Lib. Arts.*, Fukui Univ. Ser.11, *Nat. Sci. No.*, 15 : 61.

9. *Menochilus sexmaculatus* (Fabricius)

1781. *Coccinella sexmaculata* Fabricius, *Spec. Ins.*, : 96 (Type-loc.-East India).

1943. *Menochilus sexmaculatus*, Timberlake, *Bull. Hawaiian Sug. Plrs. Ass. Exp. Stn.*, (Ent. series) 47(22) : 40-41.

Material studied : 4 exs., Visanapeta, 30-x-1997; 1 ex, kondapelle, 31-x-1997; 2 exs., Mendavelli, 1-xi-1997, all from Krishna Dist., 1 ex, Elamanchili, 8-xi-1997 and 4 exs., Kottavalasa, 7-xi-1997 Dist. Visakhapatnam, 1 ex. Aduripalle, 12-i-1999; 1 ex., Isakapalle, 13-i-1999; 1 ex., kamalturru, 16-i-1999; 1 ex., Mantespuram, 17-i-1999, all from Nellore dist.; 3 exs., Palmaner, Chittoor Dis., 21-i-1999, P. Mukhopadhyay & party coll. 2 exs. Dormal, Srisailam, Dist., Prakasam, 22-ix-1998; 1 ex, Venkateshwar National Park, Dist.

Chittoor, 1-x-1998; 4 exs., Gondipet, Dist. Hyderabad, 24-viii-1999; 2 exs., Maola, 25-viii-1999, 8 exs., polemaru, 26-viii-1999, and 1 ex., Rampur, 28-viii-1999, all from Dist. Adilabad, S. K. Mondal & party coll. 1 ex., Chittoor, Dist. Chittoor, 11-x-1997; 1 ex., Paranki, Dist. Vijaywada, 2-i-1999; and 2 exs., Katheru, Rajamany, Dist. East Godavari, 6-i-1999, B.C. Das & party coll. 1 ex., Laxmipet, Dist. Adilabad, 6-xii-1999, P.H. Roy & Party coll. 2 exs., Medchal, Dist. Hyderabad, 22-xii-1999 and 1 ex. Cuddapah, Dist. Cuddapah, 1-i-2000, G. C. Sen & party coll. 2 exs, kasibugga, Palsa, Dist. Srikakulam, 8-xi-1998, M. Prasad & party coll. 1 ex., Dewaripet, Dist. Nalgonda, 21-viii-2001; 2 exs. Kodar, 27-viii-2001 and 1 ex. karepalle, 28-viii-2001; Dist. Khammam, I. B. Dutta & party coll. 1 ex., Kurkalpally, Dist. Rangareddi, 12-i-2004; 1 ex., Nagarjuna Sagar, Dist. Nalgonda, 23-i-2004; 1 ex., koringa wildlife sanctuary, 1-xi-2004 and 1 ex. Samalkot, Kakinada, 2-xi-2004, both from Dist. East Godabari, D. R. Maulik & party coll. 1 ex kiorjuta, 7-iii-1999 and 29 exs., Ramchandrapur, Dist. Rangareddi, 8-iii-1999; 21 exs. Ramchandrapur, Dist. Medak, 8-iii-1999, 7 exs., Gandipet, Dist. Rangareddi, 11-iii-1999; 6 exs, Venkatachalam, Dist. Nellore, 23-v-2000; 2 exs. Chitval, Dist. Nellore (S), 28-v-2000; 2 exs. Nagar, 4-vi-2000 and 1 ex. Karvetnagar, 5-vi-2000, Dist. Chittoor, S. K. Chatterjee & party coll.

Distribution : India : Andhra Pradesh, West Bengal, Sikkim, Meghalaya, Tripura, Manipur and Andaman Islands.

Elseshere : Nepal, Japan, Indonesia, Philippines, Thailand, Celebes and New Guinea.

Remarks : The species is recorded for the first time from Andhra Pradesh. From its wide range of distribution and huge number of collection it appears to be a pre-dominant species of the state.

Genus 8. *Micraspis* Dejean

1835. *Micraspis* Dejean, *Cat. Coleopt.*, : 459.

1965. *Micraspis*, Kamiya; *Mem. Fac. Lib. Arts, Fukui Univ.*, Ser. II, *Nat. Sci.*, No., 15 : 59.

Key to the species of the genus *Micraspis* Dejean known from Andhra Pradesh

1. Elytra yellowish brown, without any spot or marking, sutural margin black, slightly thickened at middle; pronotum yellowish brown with a narrow basal black marking and two discal small black spots *discolor* (Fab.)
- Elytra testaceous or reddish brown, with black spot or markings 2.
2. Elytra testaceous, each elytron with a black long external semicircular marking, starting near the scutellum and running two-third of the elytral length, there are another black marking inside the semicircular one, almost straight anteriorly and bented externally at the posterior end, a small black spot near the apex; pronotum and sutural margins as in *discolor* *Cardoni* (Weise)

- Elytra reddish yellow, each elytron with one longitudinal narrow black marking starting from humeral callus and extending upto the sub-apical zone; pronotum and sutural margin almost similar to *discolor*..... *Vincta* (Gorham)

10. *Micraspis Cardoni* (weise)

1892. *Verania cradoni* Weise, *Ann. Soc. ent. Belg.*, **36** : 19 (Type-loc.-Choto Nagpur).

1932. *Coelophora cardoni*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 588.

1943. *Micraspis cardoni*; Timberslake, *Bull. Hawaiian sug. plrs. Ass. Exp. Stn. (Ent. Ser.)*, No. **22**, **47** : 28.

Material studied : 1 ex, koraturu, Dist. Godavari, 13-iv-1996, S. K. Chatterjee & party coll. and 1 ex., Chandragiri, Dist. Chittoor, 19-i-1999, P. Mukhopadhyay and party coll.

Distribution : India : Andhra Pradesh, Karnataka, Maharashtra, Goa, Bihar and West Bengal.

Elsewhere : Sri Lanka.

Remarks : It is the first record of the species from Andhra Pradesh.

11. *Micraspis discolor* (Fabricius)

1798. *Coccinella discolor* Fabricius, *Suppl. Ent. Syst.*, : 77 (Type-loc.-India).

1850. *Verania discolor*, Mulsant, *Spec. Trim. Securipalp*, : 369.

1965. *Micraspis discolor*; Kamiya, *Mem. Fac. Lib. Arts., Fukui Univ., Ser. II. Nat. Sci. No.*, **15** : 60.

Material studied : 7 exs., palasa, Dist. Srikakulam, 7-ii-1998, 4 exs., kasibugga, palasa, 8-ii-1998 and 2 exs. kasibugga, Dist. Srikakulam, 13-ii-1998, M. Prasad & party coll. 1 ex. Venkateswara National Park, Dist. Chittoor, 1-x-1998, S. K. Mondal & party coll. 1 ex. Mettabhumi, Dist. Vijaywada, 3-i-1999, B. C. Das & party coll. 1 ex. Aduripalle, 12-i-1999; 2 exs. kanigiri, 15-i-1999 and 4 exs. Mantapuram, 17-i-1999, all from Dist. Nellore, P. Mukhopadhyay & party coll. 6 exs. Ravindranagar, 6-iii-1999; 8 exs. Ramchandrapur, 8-iii-1999; Dist. Rangareddi & Medak; 2 exs., Karvetnagar, 5-vi-2000 and 2 exs. Patagunta, 6-vi-2000, Dist. Chittoor; 1 ex. Venkatachalam, Dist. Nellore, 23-v-2000. S. K. Chatterjee & party coll. 1 ex, Medahal, Dist. Hyderabad, 22-xii-1999; 6 exs. yellaturu, i-i-2000 and 2 exs. Vimpalle, Dist. Cuddapah, 2-i-2000, G. C. Sen & party coll.

Distribution : India : Andhra Pradesh, Tamil Nadu, West Bengal, Meghalaya, Tripura, Manipur, Goa and Andaman Islands.

Elsewhere : China, Japan, Taiwan, Thailand, Philippines, Sri Lanka, Timor and Ryukyus.

Remarks : The species is very widely distributed one. Recorded for the first time from Andhra Pradesh.

12. *Micraspis vincta* (Gorham)

1895. *Verania vincta* Gorham, *Ann. Mus. Civ. Genova*, **34**(2) : 686 (Type-loc.-Burma).

1968. *Micraspis vincta*; Sasaji, *Mushi*, Furuoka, **42** : 132.

Material studied : 1 ex. Addatijala F.R.H. Compound, Dist. E. Godavari, 8-v-1996; 9 exs. Kaikalur, Dist. Krishna. 19, 22-iv-1996, S. K. Chatterjee & party coll. 16 exs, Ichchapuram, 4-ii-1998; 1 ex. Sompeta, 5-ii-1998; 4 exs., palasa, 7-ii-1998; 13 exs., kasibugga, 8-ii-1998; 2 exs, Vijrapukotturu, 9-ii-1998; 11 exs, palasa, 10-ii-1998; 7 exs. Bendkonda, 11-ii-1998; 13 exs. kasibugga, 13-ii-1998, Dist. Srikakulam; 1 ex. Vizianagram, Dist. Vizianagaram, 16-ii-1998 and 3 exs. Pondurti, Dist Visakhapatnam, 18-ii-1998, M. Prasad & party Coll. 1 ex. Addatigala F.R.H. compound. Dist. Godavari, 8-iv-1996; 9 exs. Kalikalur, Dist. Krishna, 19-iv-1996, 22-iv-1996, S. K. Chatterjee & party Coll. 8 exs. Mettabhumi, Dist. Vijaywada, 3-i-1999; 9 exs. Kadiayam, Rajamany, Dist. E. Godavari, 5-i-1999; 5 exs. katheru, Rajamany, Dist. E. Godavari, 6-i-1999, B.C. Das & party coll. 1 ex. Medehel, Dist. Hyderabad, 27-x-1997 and 2 exs. Bhumunipattanam, Dist. Visakhapattanam, 9-xi-1997, P. Mukhopadhyay & party coll. 8 exs. Coringa Wildlife Sanctuary, Dist. E. Godavari, 26-xi-2000 P. H. Roy & party coll. 1 ex., Samalkot, Kakidada, 2-ii-2004, and 3 exs. Ramanupallam, Dist. E. Godavari, 3-ii-2004, D.R. Maulik & party coll.

Distribution : India : Andhra Pradesh, South India, Bihar, West Bengal, Tripura, Meghalaya, Assam and Manipur.

Elsewhere : Myanmar, Bangladesh, Thailand, Nepal and Bhutan.

Remarks : The species was recorded earlier from south India. This time is specifically recorded from Andhra Pradesh.

Genus 9. *Coccinella* Linnaeus

1758. *Coccinella* Linnaeus, *Synst. Nat.*, ed. **10** : 364.

1965. *Coccinella*, Kamiya, *Mem. Fac. Lib. Arts*, Fukui Univ. Ser. 11, *Nat. Sci.*, No. **15** : 35.

13. *Coccinella transversalis* Fabricius

1781. *Coccinella transversalis* Fabricius, *Spec. Ins.*, : 97 (Type-loc.-Corromandel, S. India).

1980. *Coccinella transversalis*, Chunaram & Sasaji, *Oriental Insects*, **14**(4) : 485.

Material studied : 1 ex. Medchal dist. Hyderabad, 27-x-1997; 1 ex. Vissamapeta, Dist. Krishna, 30-x-1997; 2 exs. Badangi, Dist. Vizianagaram, 3-xi-1997; 1 ex. Bhogapuram, Dist. Vizianagaram, 5-xi-1997; 2 exs. Aduripalle, 12-i-1999 and 3 exs. Kamalturnu, 16-i-1999 both from Dist. Nellore, P. Mukhopadhyay & party coll. 1 ex. Ichchapuram Dist. Srikakulam, 4-ii-1998 and 1 ex. phoolbag, Dist. Vizianagaram, 15-xi-1998, M. Prasad & party coll. 1 ex. Chikatpalli, 5-iii-1999; 2 exs. Rajendranagar, 6-iii-1999 and 1 ex. kisaguta, 7-iii-1999, all

from Dist. Rangareddi; 1 ex. Ramchandrapur, Dist. Medak, 8-iii-1999, S. K. Chatterjee & party coll. 1 ex. Medechal, Dist. Hyderabad, 22-xii-1999 G. C. Sen & party coll. 1 ex. Paranki, Dist. Vijaywada, 2-i-1999; 2 exs. Hyderabad, 31-xii-1998; 2 exs. Arakuvalley, 12-i-1999 and 2 exs. Visakhapatnam, 14-i-1999 both Dist. Visakhapatnam, B. C. Das & party coll. 1 ex. Rampur, Dist. Adilabad, 28.viii.1999; 9 exs. Venkateswar National Park, 1-3-x-1998, Dist. Chittoor; 1 ex. Tagrapavie Sea, Dist. Visakhapatnam, 9-x-1998, S. K. Mondal & party coll. 1 ex. Marla Forest, Dist. Adilabad, 29-xi-1999, P. H. Roy & party coll. 1 ex. Indranagar Garden, 15-i-2004, 1 ex. kichar, 16-i-2004; 1 ex. Gutkha, 17-i-2004; 1 ex. kaji pally, 19-i-2004 all from Dist. Rangareddi; 1 ex. koringa wildlife sanctuary, Dist. East Godavari, 1-ii-2004 and 1 ex. Agrampuri, Dist. Visakhapatnam, 6-ii-2004, D. R. Maulik & party coll.

Distribution : India : Andhra Pradesh, S. India, Kerala, Goa, West Bengal, Sikkim, Tripura, Meghalaya, Manipur and Andaman Islands.

Elsewhere : Myanmar China, Thailand, Japan, Taiwan, Sri Lanka, Moluccas, Tasmania, Sunda Island, New Guinea and Australia.

Remarks : The species is a very widely distributed one. It is found almost all over the plains of India. Easily recognised by a pair of transverse wavy black bands on each elytron. It is a new record of the species from Andhra Pradesh.

Genus 10. *Harmonia* Mulsant

1850. *Harmonia* Mulsant, *Spec. Trim. Securipalp.*, : 74-75.

1932. *Harmonia*, Korschefsky. *Coleoptm. Cat.*, 16(120) : 280.

14. *Harmonia arcuata* (Fabricius)

1787. *Coccinella arcuata* Fabricius, *Mantissa Insectorum* etc., 1 : 55 (Type-loc.-China).

1850. *Harmonia arcuata* (Fab.) : Mulsant, *Ann. Soc. Agric. Lyon*, 2(2) : 77.

1954. *Harmonia arcuata* (Fab.) : Kapur, *Rec. India Mus.*, 52(2-4) : 332.

Diagnostic Characters : Body elongate oval, less convex, yellowish brown in colour; pronotum with two pairs black spots (two basal, two discal); each elytron with two humeral, one transverse post-median and one apical black spots; scutellum black; sutural margin black.

Material studied : 2 exs. Narsapur, Dist. Medak, 11-12-1993. A. K. Poddar & party coll. 1 ex. Kaikalur, Dist. Krishna, 19-4-1996; 1 ex. Ramchandrapur, Dist. Rangareddi, 9-3-1999; 1 ex. Tirmala, Dist. Chittoor, 2-5-2000, S. K. Chatterjee & party coll. 1 ex. palasa Dist. Srikakulam, 10-2-1998, M. Prasad & party coll. 1 ex. Atmakur, Dist. Kurnool, 26-12-1999; 1 ex. Cuddapah, 2-1-2000; and 1 ex. Kuduru, 4-1-2000, Dist. Cuddapah, G. C. Sen & party coll. 1 ex. Market palli, Dist. Guntur, 18-1-2004, D. R. Maulik & party coll.

Distribution : India : Andhra Pradesh, Goa, Andaman Islands, West Bengal, Meghalaya and Manipur.

Elsewhere : Myanmar, China, Formosa, Philippines, Indonesia, Sunda Islands, New Guinea and Australia.

Remarks : This is a new record of the species from Andhra Pradesh.

Tribe 6. *Psylloborini*

Genus 11. *Illeis* Mulsant

1850. *Illeis* Mulsant, *Spec. Trim. Securipalp.*, : 1026.

1932. *Illeis*, Korschefsky, *Coleoptm. Cat.*, 16(120) : 558.

15. *Illeis cincta* (Fabricius)

1798. *Coccinella cincta* Fabricius, *Suppl. Ent. Syst.*, : 77(Type-loc.-India orientalis).

1874. *Thea cincta*, Crotch, *Revision of Coccinellidae*, : 135.

1932. *Illeis cinta*; korschefsky, *Coleoptm. Cat.*, 16(120) : 558.

Material studied : 2 exs. kasibugga, palasa, 8-ii-1998; 1 ex. palasa, 10-ii-1998; 3 exs. Bendkonda, 11-ii-1998; all from Dist. Srikakulam; 2 exs. Vizianagaram, Dist. Vizianagaram, 16-ii-1998; 2 exs. Pendurti, Dist. Visakhapatnam, 18-ii-1998, M. Prasad & party coll. 4 exs. Rampur, Dist. Adilabad, 28-viii-1999, S. K. Mondal & party coll., 1 ex. Cuddapah, Dist. Cuddapah, 2-i-2000, G. C. Sen & party coll. 1 ex. Ramanupattam, Dist. E. Godavari, 3-ii-2004; 1 ex. kurkalpally, 12-i-2004; 1 ex. Gutkha, 17-i-2004 and 1 ex. koti, Secunderabad, 18-i-2004; all from Dist. Rangareddi, D. R. Maulik & party coll.

Distribution : India : Andhra Pradesh, Goa.

Elsewhere : China, Japan, Formosa, Phillippines and Sunda Islands.

Remarks : The species has been recorded mainly from the Southern India (Kapur, 1972). Although this is the first record from Andhra Pradesh. Externally, this species is very similar to *I. indica* except the body is a little elongated.

Subfamily V. EPILACHNINAE

Tribe 7. *Epilachnini*

Genus 12. *Henosepilachna* Li

1961. *Henosepilachna* Li, *Pacific Insects*, 3 : 35.

16. *Henosepilachna* nsp.

Material studied : 1 ex., kisaguta, Dist. Rangareddi, 7-3-1999, S. K. Chatterjee & party coll.

Remarks : The species does not tally with any known species. May be described as new to science. Due to the paucity of further examples, it is kept unnamed at present. It will be published later.

SUMMARY

The present paper deals with 462 examples of sixteen species under twelve genera belonging to seven tribes under five subfamilies. All these species are recorded for the first time from the state. Keys to the subfamilies, tribes, genera and species have been provided. Relevant synonymies, collection data and geographical distribution have also been provided.

ACKNOWLEDGEMENTS

Author is thankful to the Director, Zoological Survey of India, Kolkata for providing facilities to this work. Thanks are also due to Dr. P. Mukhopadhyay, Scientist-D, O/C, Coleoptera Section and Dr. A.K. Hazra, Scientist-E, Divisional Head, for their valuable suggestions. In this opportunity I must thank the forest personnels of Andhra Pradesh. At last, I offer my thank to our insect setter Sri H. S. Saha for his sincere effort.

REFERENCES

- Bielawski, R. 1961. Bemerkungen Über die mannlichen genitalien von arten der Gattung *Illeis* Muls., nebst Beschreibung einer neuen Art and einter unterart (Coleoptera : Coccinellidae). *Annals. Zool. warsz.*, **19** : 353-368.
- Bielawski, R. 1979. Ergebnisse der Bhutan Expedition 1972, des Natur historischen Museums, in Basel, Coleoptera : Coccinellidae. *Entomologica Basiliensia*, **4** : 83-125.
- Chakraborty, S.K. and Biswas, S. 2000. Insecta : Coleoptera : Coccinellidae. *Fauna of Meghalaya, State Fauna series*, **4**(part 5) : 201-233. *Zool. Surv. India*.
- Chakraborty, S.K. and Biswas, S. 2000. Insecta : Coleoptera : Coccinellidae, *Fauna of Tripura, State Fauna Series*, **7**(part 3) : 113-137. *Zool. Surv. India*.
- Crotch, G.R. 1874. A revision of the Coleopterous family Coccinellidae, London. : 311.
- Dieke, G.H. 1947. Lady beetles of the genus *Epilachna* (Sensolato) in Asia, Europe and Austrlia. *Smithson. Misc. Colln.*, **106**(15) : 1-183.
- Kamiya, H. 1965. A revision of the tribe Coccinellini of Japan and the Ryukyus (Coleoptera : Coccinellidae) *Mem. Fac. Lib. Arts., Fukui Univ., Ser. II. Nat. Sci.*, No. **15**(Part 3) : 27-71, pls. 1-III.
- Kapur, A. P. 1948. A revision of the tribe *Aspidimerimi* weise (Coleoptera : Coccinellidae). *Trans. R. ent. Soc. Lond.*, **99**(2) : 77-128.

- Kapur, A. P. 1950. A note on *Epilachna ocellata* Redt. (Coleoptera : Coccinellidae) with description of three species hitherto confused with it, *Rec. Indian Museum.*, **48**(3 & 4) : 17-29.
- Kapur, A.P. The Coccinellidae of Nepal. *Rec. Indian Mus.*, **53**(3 & 4) : 309-338.
- Kapur, A.P. 1996. The Coccinellidae (Coleoptera) of the Andamans. *Proc. nat. Inst. Sci. India*, **32** (3-4) : 148-149.
- Kapur, A.P. 1972. The Coccinellidae (Coleoptera) of Goa. *Rec. zool. Surv. India*, **66**(1-4) : 309-320.
- Korschevsky, R. 1931-32. Coccinellidae *Coleopterorum Catalogus*, W. Junk editas, A.S. Shenkling, pars 118, 120 : 659.
- Li, C.S. and Cook, E.F. 1961. The *Epilachninae* of Taiwan (Coleoptera : Coccinellidae). *Pacific Insects*, **3**(1) : 31-91.
- Mulsant, M. E. 1850. Species de Coleopteres Trimeres Securipalpes. *Ann. Soc. Agric. Lyon*, **2**(2) : 1-1104.
- Sasaji, H. 1968. Phylogeny of the family Coccinellidae (Coleoptera). *Etigenia*, No. **35** : 375.

Chart showing districtwise distribution of the species of the family COCCINELLIDAE known from Andhra Pradesh

Name of the species	Srikakulam	Vizianagaram	Vijaywada	Visakhapatnam	East Godavari	Khammam	Krishna	Warangal	Hyderabad	Karimnagar	Adilabad	Nizamabad	Medak	Rangareddi	Nalgonda	Mahabubnagar	Guntur	Prakasam	Nellore	Kurnool	Anantapur	Cuddapah	Chittoor
1. <i>Jaurauvia simplex</i> (Walker)																			+				+
2. <i>Pseudaspidimerus circumflexa</i> (Mots.)				+																			
3. <i>Scymnus (p) brunne-scens</i> Mot.							+																
4. <i>Scymnus (p) cocciv-ora</i> Aiyar																							+
5. <i>Scymnus (scy.) nubilus</i> Muls.	+						+							+									
6. <i>Brumus suturalis</i> Fab.				+			+																
7. <i>Oenopia luteopustu-lata</i> Muls.	+						+						+	+									
8. <i>Coelophora unicolor</i> (Fab.)																						+	
9. <i>Menochilus sexmacu-latus</i> (F.)	+	+	+	+		+	+		+		+			+	+							+	+
10. <i>Micraspis cardoni</i> (weise)					+																		+
11. <i>Micraspis discolor</i> (Fab.)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
12. <i>Micraspis vincta</i> (Gorham)	+	+	+	+	+		+		+														
13. <i>Coccinella transver-salis</i> Fab.	+	+	+		+		+		+				+	+			+					+	
14. <i>Harmonia arcuata</i> (Fab.)	+						+						+	+		+			+		+	+	
15. <i>Illeis Cincta</i> (Fab.)	+	+	+	+						+			+								+		

INSECTA : COLEOPTERA : HISTERIDAE

S. K. CHAKRABORTY

Zoological Survey of India, M-Block, New Alipore Kolkata-700 053

INTRODUCTION

The family Histeridae belongs to Superfamily Histeroidea. Members of this family are very small to medium in size with hard exoskeleton, generally black and shining in colour and round oval or elongated in shape. They are predaceous in habit both in larval and adult form and occur in a variety of habitats. Most common habitats are soil, termite and ant nests, dung and dead bodies of various animals. Some are found under bark of felled trees and predate on the under-bark fauna.

The Indian fauna of Histeridae was studied by earlier workers like Fabricius (1798), Paykul (1811), Wiedmann (1819-21) and others. Marseul (1853-54), Lewis (1892-1906) and Bickhardt (1913-21) described a large number of Indian species. Recently Therond (1970-78), Mazur (1975-85) and Gomy (1976) contributed further knowledge to our national fauna. Biswas and Pal (1985), Biswas and Chakraborty (1995-2000) worked out National Fauna of Histeridae.

Till now about 175 species under 34 genera are known from India in comparison to about 3000 species under 200 genera from all over the World.

As regards Histeridae fauna of Andhra Pradesh nothing was recorded earlier. All the species dealt with in this paper are new records from the state. The material belongs to 8 species of 6 genera under a single subfamily.

SYSTEMATIC ACCOUNT : LIST OF TAXA

Family	HISTERIDAE
Subfamily	HISTERINAE
Tribe 1.	Exosternini
Genus 1.	<i>Cyrturus</i> Erichson 1834

1. *C. thugi* Lewis

Tribe 2. **Platysomini**Genus 2. *Apobletes* Marseul 1860

- 2.
- A. nirvana*
- Lewis

Tribe 3. **Histerini**Genus 3. *Atholus* Thomson 1862

- 3.
- A. coelestis*
- (Mars.)

Genus 4. *Peranus* Lewis 1906

- 4.
- P. bimaculatus*
- (Linnaeus)

- 5.
- P. daldorffi*
- (Fab.)

Genus 5. *Hister* Linnaeus 1767

- 6.
- H. Javanicus*
- Payk

Genus 6. *Santalus* Lewis 1906

- 7.
- S. orientalis*
- (Payk.)

- 8.
- S. Parallelus*
- (Redt.)

Subfamily **HISTERINAE**

Members of this subfamily is separated from the others by the antennal groove situated at the anterior angles of Prosternum.

Key to the tribes of Subfamily HISTERINAE

1. Anterior margin of mesosternum with an extended process to fit in the notch at the base of prosternum **EXOSTERNINI**
- Anterior margin of mesosternum emarginate to receive round base of the prosternum.
2. Tarsal groove of front tibiae straight, only at the inner edge distinctly emarginate **HISTERINI**
- Tarsal groove of front tibiae "S" shaped, strongly cleft, sharply defined **PLATYSOMINI**

Tribe 1 **Exosternini**Genus 1. *Cypturus* Erichson1834. *Cypturus* Erichson in *klug Jahrb. Ins.*, 1 : 125.1910. *Cypturus*, Bickhardt, *Coleopt. Cat.*, 8, Pars 24 : 32.

1. *Cypturus thugi* Lewis

1894. *Cypturus thugi* Lewis. *Ann. Mag. Nat. Hist.*, (6) 14 : 178. (Type -loc. Barway in India).

1910. *Cypturus thugi* Lewis : Bickhardt, *Coleopt. Cat.*, 8, pars 24, p. 32.

Material examined : 2 exs.; Aduripalle; Dist. Nellore, 16.i.1999, ex. "cowdung" ; 2 exs.; Chandragiri, dist. Chittoor, 19.i.1999; ex. "Leaf litter"; 6 exs., Palmaner, dist. Chittoor, 21.i.1999, ex. "cowdung", Coll. P. Mukhopadhaya. 2 exs. Betamcherla, dist. Kurnool. 14.iii.1999 ex. "haystack"; 2 exs., Kandukur, dist. Prakasam, 17.iii.1999, ex. "cowdung"; 2 exs.; Matur, dist. Prakasam, 19.iii.1999; ex. "cowdung", Coll. S.K. Chatterjee & Party.

Distribution : Known only from India. Barway and Andhra Pradesh.

Remarks : This species is recorded for the first time from Andhra Pradesh.

Diagnostic characters : Oblong-oval, convex, brassy-black, head obscurely punctate, strigose between the eyes frontal stria interrupted, pronotum laterally, broadly punctate, disk smooth, elytral striae 1-4 complete 5th wanting, sutural abbreviated before the middle. Both the pygidium punctate.

Tribe 2. **Platysomini**Genus 2. *Apobletes* Marseul

1860. *Apobletes* Marseul, *Ann. Soc. Ent. Fr.*, (3) 8 : 852.

1910. *Apobletes*, Bickhardt, *Coleopt. Cat.*, 8, Pars 24 : 16.

2. *Apobletes nirvana* Lewis

1891. *Apobletes nirvana* Lewis. *Ann. Mus. Genova*, (2)12 : 20. (Type-loc.— Burma).

1910. *Apobletes nirvana* Lewis : Bickhardt, *Coleopt. Cat.* 8, pars 24 : 17.

Material examined : 1 ex.; Maipadu, Dist. Nellore, 14.i.1999, P. Mukhopadhaya Coll., ex. "under bark of a log"

Distribution : India : Andhra Pradesh. Also known from Burma and Bhutan.

Remarks : Recorded for the first time from Andhra Pradesh.

Diagnostic characters : Small beetles, body evenly depressed oblong oval, nearly black, frons impressed, finely and densely punctate, stria interrupted on either side; pronotum finely punctate at the sides, disc smooth; elytral stria 1-3 complete, 4-5 apical, 4 more than half of 5th, apical margin punctate; propygidium biimpressed, pygidium with large punctures; prosternum without stria, finely punctate, mesosternum sinuous anteriorly, striate only at the sides.

Tribe 3. **Histerini****Key to the genera of Tribe Histerini**

1. Pronotum with distinct foveae in the anterolateral angles, inside the single lateral stria.
 - Pronotum without such foveae 3
2. Mesosternum roundedly truncated in front; frontal stria arched, entire; elytra with a subhumeral, five dorsal and one sutural striae **Atholus** Thomson
 - Mesosternum sinuous anteriorly; frontal stria biarcuate, entire; elytra generally without any humeral stria, 5th and sutural stria when complete, join at the base **Peranus** Lewis
3. Body oblong, parallel laterally, mandibles somewhat long and bidentate; pronotum transverse with the lateral external stria shortened and inner stria distant from the margin; antennal fossettes longitudinally excavated behind the angle and not open to view from above; elytrae generally with 1-4 dorsal striae complete with the 5th much shortened anteriorly **Santalus** Lewis
 - Body oval, elongate or shortened; mandibles projecting with variable shape; pronotum bordered on sides with a fine marginal stria, at least in the anterior angle; with an internal lateral stria, often with an external stria, shortened; antennal fossettes well limited; elytrae generally with 5 dorsal striae of which internals and suturals are often short or absent **Hister** Linn.

Genus 3. *Atholus* Thomson

1862. *Atholus* Thomson, *Skand. Coll.*, 4 : 228.

1906. *Atholus* Thomson : Lewis, *Ann. Mag. Nat. Hist.*, (7)18 : 402.

1910. *Atholus* Thomson : Bickhardt, *Coleopt. Cat.*, 8 Pars. 24 : 53.

3. *Atholus coelestis* (Marseul)

1857. *Hister coelestis* Marseul, *Ann. Soc. Ent. Fr.*, (3)5 : 416-417 (Type-Loc.– China).

1910. *Atholus Coelestis* (Mars.) : Bickhardt, *Coleopt. Cat.*, 8, pars 24, : 53.

Material Studied : 4 exs., Rajendranagar, Dist. Rangareddi, 6.iii.1999; 3 exs.; Gani Reserve Forest, Dist. Kurnool, 15.iii.1999, ex. "cowdung"; 4 exs., Srikalahasti, Dist. Chittoor, 3.vi.2000, S. K. Chatterjee Coll.

Distribution : India : Andhra Pradesh, Tamil Nadu, West Bengal, Sikkim, Meghalaya and Tripura.

Elsewhere : China, Myanmar and Sri Lanka.

Remarks : It is a very widely distributed species. Recorded for the first time from Andhra Pradesh.

Diagnostic characters : Small beetles, convex, black. Pronotum with well defined rounded impression at the anterior angles, punctate ; elytrae with six striae, 5th and sutural striae of same length, reaching the middle; internal subhumeral stria reduced to an oblong puncture.

Genus 4. *Peranus* Lewis

1906. *Peranus* Lewis, *Ann. Mag. Nat. Hist.*, (7) 18 : 401.

1909. *Atholister* Reitter, *Fauna Germanica*, II : 286.

1910. *Peranus* Lewis : Bickhardt, *Coleopt. Cat.*, 8, Pars. 24 : 53.

Key to the species of the genus *Peranus*

1. Smaller species. Length 3.33-4.50 mm width 2.22 - 3 mm, each elytron diagonally (humeral to sutural angle) divided into a basal black and apical red part. Frons plane *bimaculatus* (L.)
- Larger species. Length 5 mm., width 3.33–3.50 mm. each elytron with a small, oval red spot on the middle. Frons impressed above the epistome. *daldorffi* (Fab.)

4. *Peranus bimaculatus* (Linnaeus)

1758. *Hister bimaculatus* L. *Syst. Nat.*, ed. X 1, P.358.

1909. *Atholister bimaculatus* (L.) : Reitt. *Fauna Germanica*, II, : 286.

1910. *Peranus bimaculatus* (L.) : Lewis, *Ann. Mag. Nat. Hist.*, (8), 6, : 56.

1910. *Peranus bimaculatus* (L.) : Bickhardt, *Coleopt. Cat.*, 8, pars. 24, : 53.

Material studied : 1 ex.; Matur, Prakasam Dist., 19.iii.1999; 2 exs.; Betamcherla, dist. Kurnool, 14.iii.1999, S. K. Chatterjee Coll.; ex. "cowdung"

Distribution : India : Andhra Pradesh.

Elsewhere : Europe, North America and Argentina.

Remarks : A very widely distributed species. Here it is recorded from Andhra Pradesh for the first time.

5. *Peranus daldorffi* (Fabricius)

1798. *Hister bipustulatus* F. : *Syst.El.*, 1, p.87.

1906. *Hister daldorffi* (F.) : Bedel, *Bull. Soc. Ent. Fr.*, 9 : 91.

1906. *Peranus daldorffi* (F.) : Lewis, *Ann. Mag. Nat. Hist.*, (7)18 : 401-402.

1910. *Peranus daldorffi* (F.) : Bickhardt, *Coleopt. Cat.*, 8, Pars. 24, : 53.

Material studied : 2 exs., Kandukur, Prakasam dist., 17.iii.1999. S. K. Chatterjee Coll., ex. "cowdung"; 1 ex., Polemaru, Adilabad dist., 26.viii.1999, S. K. Mondal Coll.

Distribution : India : Andhra Pradesh, Kerala, Coimbatore and Pondichery.

Elsewhere : Sri Lanka, Malayasia, Bangladesh, Myanmar and Indo-China.

Remarks : Recorded first time from Andhra Pradesh.

Genus 5. *Hister* Linnaeus

1767. *Hister*, Linnaeus, *Syst.Nat.*, ed. 12. II, : 566.

1910. *Hister*, Bickhardt, *Coleopt. Cat.*, 8, Pars. 24, : 35.

6. *Hister Javanicus* Paykul

1811. *Hister javanicus* paykul, *Men.*, P. 30, t4, f.2.

1910. *Hister javanicus* Payk. : Bickhardt, *Coleopt. Cat.*, 8, Pars. 24, : 44.

Material studied : 1 ex., Aduripalle, Nellore Dist., 16.i.1999, P. Mukhopadhyaya Coll., ex. "cowdung"; 2 exs. polemaru, dist. Adilabad, 26.viii.1999, S. K. Mondal Coll.

Distribution : India : Andhra Pradesh, Kerala and West Bengal. Also known from Java, Sri Lanka and Burma.

Remarks : This species is first time recorded from Andhra Pradesh.

Diagnostic characters : Smaller species oval, weakly convex, shining black, frontal stria semi circular; pronotal internal stria entire, external stria shortened at the middle; elytrae with 1-4 entire striae, 5th apical, short, represented by some punctures, sutural reduced on both sides; propygidium subbifoveolate, pygidium punctate at the base.

Genus 6. *Santalus* Lewis

1906. *Santalus* Lewis, *Ann. Mag. Nat. Hist.*, (7) 17 : 341.

1910. *Santalus*, Bickhardt, *Coleopt. Cat.*, 8, Pars. 24, : 36.

Key to the species of the genus *Santalus*

1. Propygidium moderately and strongly punctate, 3rd and 4th ventral abdominal suture slightly concave in the middle *orientalis* Payk
- Propygidium sparsely and feebly punctate, 3rd and 4th ventral abdominal suture running parallel *parallelus* Redt.

7. *Santalus orientalis* (Paykul)

1811. *Hister orientalis* Paykul, *Mon.*, : 17, t. 13, f. 7.

1906. *Santalus orientalis* (Payk.) : Lewis, *Ann. Mag. Nat. Hist.*, (7), 17 : 341.

1910. *Santalus orientalis* (Payk.) : Bickhardt, *Coleopt. Cat.*, 8, pars 24, P.36.

Material studied : 1 ex., puttur, 20.i.1999 and 4 exs., Palmaner, 21.i.1999, both from Chittoor Dist., P. Mukhopadhyaya Coll., ex. "cowdung"; 1 ex., Chinuarutla, dist. Prakasam, 23.ix.1998, S. K. Mondal Coll.

Distribution : India : Andhra Pradesh, West Bengal.

Elsewhere : Sri Lanka.

Remarks : It is a new record of the species from Andhra Pradesh.

8. *Santalus parallelus* (Redtenbacher)

1848. *Hister parallelus* Redtenbacher, in *Hugel, Kaschmir*, 4 (2) : 514.

1854. *Hister elongatulus* Marseul, *Ann. Soc. Ent. Fr.*, (3) 2 : 194-195.

1906. *Santalus parallelus* (Redt.) : Lewis, *Ann. Mag. Nat. Hist.*, (7) 17 : 341.

1910. *Santalus parallelus* (Redt.) Bickhardt, *Coleopt. Cat.*, 8, Pars 24, : 36.

Material studied : 1 ex., Chinuarutla, dist. Prakasam, 23.ix.1998, S. K. Mondal Coll.; 2 exs., Srikala Basti, Dist., Chittoor, 23.i.1999, P. Mukhopadhyaya Coll., ex. "cowdung"

Distribution : India : Andhra Pradesh, West Bengal, Bihar, Kashmir and Tripura.

Elsewhere : Myanmar.

Remarks : It is a new record of the species from Andhra Pradesh.

SUMMARY

The present paper deals with 46 examples of 8 species of 6 genera under a single sub family. All this species are recorded for the first time from Andhra Pradesh. Keys to the tribes, genera and species have been provided. Relevant collection data and important references have been also provided under each species.

ACKNOWLEDGEMENTS

Author is thankful to the Director, Zoological Survey of India for providing facilities to this work. Thanks are also due to Dr. P. Mukhopadhyaya, Scientist-SE, O/C, Coleoptera Section and Dr. A. K. Hazra, Scientist-E, Divisional Head, for their valuable suggestions. In this opportunity I must appreciate the cooperation extended to us by the forest personnels. I must thank our Insect Setter Sri H. S. Saha, for his sincere effort.

REFERENCES

- Bickhardt, H. 1910. Histeridae, Coleopterorum Catalogus, vol. 8, pars-24, W. Junk & Schenkling ed. 1-137.
- Chakraborty, S. K. and Biswas, S. 1995. Insecta : Coleoptera, Histeridae. *Fauna of West Bengal, State Fauna Series*, 3(Part-6(A)) : 169-199.
- Chakraborty, S. K. and Biswas, S. 2000. Insecta : Coleoptera. Histeridae. *Fauna of Meghalaya, State Fauna Series*, 4(Part-5) : 93-113.
- Chakraborty, S. K. and Biswas, S. 2000. Insecta : Coleoptera. Histeridae. *Fauna of Tripura, State Fauna Series*, 7(Part 3) : 53-61.
- Desbordes, H. 1918-19. Contribution la Connaissance des Histerides - Etude des Histeridae de l'Indo-China, *Ann. Soc. Ent. France*, 87 : 341-424.
- Lewis, G. 1888. Histeridae from Burma. *Ann. Mus. Genova*, (2)6 : 630-645.
- Lewis, G. 1892. Histeridae from Burma. *Ann. Mus. Genova*, (2)12 : 16-39.
- Marseul, M.S.A. 1879. Enumeration des Histerides rapportes de l'Archipel Malais, de la Nouvelle Guinee et de l'Australie boreale par M. M. Le Prof. O. Beccari et L.K. D'Albertis - *Ann. Mus. Civ. Stor. Nat. Genova*, 14 : 254-286.
- Pal, T. K. and Biswas, S. 1985. Histeridae Fauna of Namdapha, Arunachal Pradesh - *Rec. Zool. Surv. India*, 82 (1-4) : 129-137.

Chart showing districtwise distribution of the species of the family Histeridae known from Andhra Pradesh.

Name of species	Srikakulam	Vizianagaram	Vishakhapatnam	East Godavari	West Godavari	Khammam	Krishna	Warangal	Karimnagar	Adilabad	Nizamabad	Medak	Rangareddi	Nalgonda	Mahbubnagar	Guntur	Prakasam	Nellore	Kurnool	Anantapur	Cuddapha	Chittoor
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. <i>Cyrturus thugi</i> Lewis																	+	+	+			+
2. <i>Apobletes nirvana</i> Lewis																		+				
3. <i>Atholus coelestis</i> (Mars.)													+						+			+
4. <i>Peranus bimaculatus</i> (L.)																	+		+			
5. <i>P. daldorffi</i> (Fab.)										+							+	+				
6. <i>Hister javanicus</i> Payk										+								+				
7. <i>Santalus orientalis</i> (Payk.)																	+					+
8. <i>S. parallelus</i> (Redt.)																	+					+

INSECTA : COLEOPTERA : POLYPHAGA : HYDROPHILOIDEA : HYDROPHILIDAE

P. MUKHOPADHYAY

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

Hydrophilidae is one of the dominant family among the aquatic coleoptera under the superfamily Hydrophiloidea of the suborder Polyphaga. Members of this family are commonly known as 'Water Scavenger beetles. Knitsch (1924) divided the family Hydrophilidae into eight subfamilies. Of which, five subfamilies viz. Hydraeninae, Spercheinae, Hydrochinae, Sphaeridiinae and Hydrophilinae are well represented in India along with a few number of species under the genus *Helophorus* belonging to the subfamily Helophorinae.

Majority of this group of insects are truly aquatic and form the important constituent of fresh water ecosystem. They are also terrestrial and also found in moist places like dung, decaying vegetable heaps, under crevices in oozing tree trunk, rotten banana stem etc. The major workers who dealt the group are Balfour Browne (1948), Sharp (1890), d'orchymont (1928). D'Orchymont (1928) published a check list of species recorded upto 1920 from India and adjoining areas.

So far Hydrophilidae of Andhra Pradesh is concerned, not a single species was recorded earlier from this state. Present study recorded 19 species under 12 genera belonging to 4 subfamilies for the first time from this state. Relevant collection data, distributional records within and outside state have also been given. Keys to the subfamilies, tribes and genera known from the state has also been included.

SYSTEMATIC ACCOUNT

Family HYDROPHILIDAE

Subfamily 1. HYDRAENINAE

Genus 1. *Hydraena* Kugelann, 1794

1. *H. maculicollis* Champion

Subfamily II. HYDROCHINAE

Genus 2. *Hydrochus* Leach, 1817

2. *H. binodosus* Mots.

Subfamily III SPHAERIDIINAE

Tribe 1. SPHAERIDIINI

Genus 3. *Dactylosternum* Woll., 1854

3. *D. abdominale* F.

Genus 4. *Sphaeridium* F., 1775

4. *S. dimidiatum* Gory

5. *S. quinquemaculatum* F.

Tribe II. MEGASTERNINI

Genus 5. *Pachysternum* Motsch., 1863

6. *P. nigrovittatum* Mots.

Subfamily IV. HYDROPHILINAE

Tribe I. HYDROBINI

Genus 6. *Paracymus* Thoms. 1867

7. *Paracymus evanescens* (Sharp)

Genus 7. *Helochares* Muls., 1844

8. *H. anchoralis* Sharp

9. *H. crenatus* Regimbart

10. *H. densus* Sharp

11. *H. lentus* Sharp

12. *H. pallens* (Macleay)

Genus 8. *Enochrus* Thoms., 1859

13. *E. esuriens* Walker

Tribe II. HYDROPHILINI

Genus 9. *Sternolophus* Sol., 1834

14. *S. rufipes* (F.)

Genus 10. *Hydrophilus* Leach, 1764

15. *H. olivaceus* F.

Tribe III. Berosini

Genus 11. *Berosus* Leach, 1817

16. *B. indicus* Mots.

17. *B. fairmairei* Zaitzev

18. *B. pulchellus* Macleay

Genus 12. *Regimbartia* Zaitz., 190819. *R. attenuata* F.

Family HYDROPHILIDAE

Key to the subfamilies of the family HYDROPHILIDAE

1. .Antennal club composed of five pubescent segments; Last tarsal joint nearly as long as or longer than preceding four joints together; venation staphyliniform HYDRAENINAE
- .Antennal club composed of less than five pubescent segments; last tarsal joint nearly as long or longer than preceding four joints together 2.
2. .Body contour not uniformly curved and not regularly convex; prothorax narrower than hind body and distinctly separated therefrom HYDROCHINAE
- .Body contour uniformly curved and regularly convex; prothorax not narrower than hind body and not distinctly separated therefrom 3.
3. .Antennae usually longer than maxillary palpi SPHAERIDIINAE
- .Antennae shortened, as long as and often shorter than maxillary palpi HYDROPHILINAE

Subfamily HYDRAENINAE

Genus *Hydraena* Kugel, 17941794. *Hydraena* Kugel, in Schneid. Mag. 5 : 579.1924. *Hydraena*, Knisch, *Col. Cat.*, 14 (Pars 79) : 33-511. *Hydraena maculicollis* Champion1920. *Hydraena maculicollis* Champion, *Ent. Month. Mag.*, 56 : 70.

Material examined : 21 ex., India : Andhra Pradesh : Srikalahasti in Chittor dist., 23.i.1999, Dr. P. Mukhopadhyay.

Distribution : India : Uttaranchal, Andhra Pradesh.

Remarks : This species is recorded here for the first time from this state.

Subfamily HYDROCHINAE

Genus *Hydrochus* Leach, 18171817. *Hydrochus* Leach, *Zool. Misc.*, 3 : 90.1924. *Hydrochus*, Knisch, *Col. Cat.*, 14 (79) : 96-104.

2. *Hydrochus binodosus* Motschulsky

1860. *Hydrochus binodosus* Motschulsky *Schrenka Reis.*, 2 : 104.
 1922. *Hydrochus binodosus* d'Orchymont, *Rec. Ind. Mus.*, 8 : 624.
 1995. *Hydrochus binodosus* Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part-6A) : 149.

Material examined : 5 ex, India : Andhra Pradesh : Palmaner in Chittor dist., 20.i.1999, Dr. P. Mukhopadhyay.

Distribution : India : West Bengal, Assam.

Elsewhere : Annam, Tonkin.

Subfamily SPHAERIDIINAE

Key to the tribes of the subfamily SPHAERIDIINAE

1. Antennae inserted below the laminated border, concealing base of antennae from above; head not narrowed immediately before eyes SPHERIDIINI.
2. Antennae inserted freely and not under the laminated border; head abruptly narrowed before eyes MEGASTERINI.

Tribe Sphaeridiini

Key to the genera of the tribe Sphaeridiini

1. Pygidium exposed; Elytra with a sutural stria. Scutellum as an elongate triangle. First ventral segment not carinated; Antennae 8 segmented *Sphaeridium* F.
2. Pygidium not exposed; elytra normally with sutural stria and several other striae with seriatly arranged large puncture. Scutellum short triangular. First ventral segment well developed and usually carinated along its whole length *Dactylosternum* Woll.

Genus *Dactylosternum* Wollaston, 1854

1854. *Dactylosternum* Woll., *Ins. Mader.*, : 99, t.3, f. 1.
 1924. *Dactylosternum*, Knisch, *Col. Cat.*, 14(79) : 115-118.

3. *Dactylosternum abdominale* Fabricius

1792. *Dactylosternum abdominale* F., *Entom Syst.*, 1 : 98.
 1924. *Dactylosternum abdominale*, Knisch, *Col. Cat.*, 14 (79) : 115.

Material examined : 12 ex. India : Andhra Pradesh : Addatigala Village, in East Godavari dist., 7. IV. 1996, S. K. Chatterjee & Party; 2 ex., Chandragiri in Chittor dist., 19.i. 1999, Dr. P. Mukhopadhyay.

Distribution : India : West Bengal, Manipur, Andhra Pradesh.

Elsewhere : North, Middle and South America.

Genus *Sphaeridium* F., 1775

1775. *Sphaeridium* F., *Syst. Ent.*, p. 66.

1924. *Sphaeridium* Knisch; *Col. Cat*; 14 : (79) : 119-127.

Key to the species of the genus *Sphaeridium*

- 1..Species comparatively larger and elytral colouration less variable
..... *dimidiatum* Gory
- .Species smaller, colouration on elytra varies and usually with five black patch
..... *quinquimaculatum* F.

4. *Sphaeridium dimidiatum* Gory

1834 (1842). *Sphaeridium dimidiatum* Gory, in guerin, *Icon, Regne Anim & Ins* : 73, fig. 15.

1924. *Sphaeridium dimidiatum*, Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 6(A)) : 151.

Material examined : 3 ex. India : Andhra Pradesh : Betamcherla in kurnool dist, 14.iii.1999, S. K. Chatterjee & Party. 7 ex., Gani Reserve forest in Kurnool dist., 15.III.1999, S. K. Chatterjee & party. 10 ex., Matur in Prakasan dist., 9.iii. 1999, S. K. Chatterjee & Party.

Distribution : India : West Bengal, Andhra Pradesh.

Elsewhere : Sri Lanka, China, S. Asia, Formosa, Sunda Is., Indonesia, Philippine.

5. *Sphaeridium quinque maculatum* F

1798. *Sphaeridium quinque maculatum* Fabricius, *Ent. Syst. Suppl.*, p. 39.

1924. *Sphaeridium quinque maculatum* Knisch, *Col. Cat.*, 14 (79) : 121.

1995. *Sphaeridium quinque maculatum* Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 151-152.

Material examined : 2 ex. India : Andhra Pradesh : Addatigola Village in East Godavari dist., 8 iv. 1996, S. K. Chatterjee & party; 1 ex., Palmaner in Chittor dist., 21.i.1999, Dr. P. Mukhopadhyay; 1 ex., Sri Kalahasti in Chittor 1dist, 23.i.1999, Dr. P. Mukhopadhyay; 2 ex., Betamcheria in Kurnool dist., 14.iii.1999, S. K. Chatterjee & Party. 4 ex., Gani Reserve Forest in Kurnool dist, 15. iii. 1999, S. K. Chatterjee & party. 28 ex., Matur in Prakasan dist., 19.iii. 1999, S. K. Chatterjee & Party. 1 ex., Polenaru in Adilabad dist., 26. viii, 1999, Dr. S. K. Mandal & Party.

Distribution : India : West Bengal, Assam, Meghalaya, Bihar, Manipur, Andhra Pradesh.

Elsewhere : Sri Lanka, Pakistan, China, S. Asia, Formosa, Sunda Is., Indonesia, Philippines.

Tribe Megasternini

Genus *Pachysternum* Motsch., 1863

1863. *Pachysternum* Motschulsky, *Bull. Soc. Nat. Moscou*, 36(1) : 446.

1924. *Pachysternum*, Knisch., *Col. Cat.*, 14 (79) : 158-159.

6. *Pachysternum nigrovittatum* Motschulsky

1863. *Pachysternum nigrovittatum* Motsch., *Bull. Soc. Imp. Nat. Moscou*, 36(2) : 447, t. 9. g. 22.

1924. *Pachysternum nigrovittatum* : Knisch, *Archiv. Naturg.*, 85 (A-8) : 88 (1921).

1926. *Pachysternum nigrovittatum*; d'Orchym., *Ann. & Bull. Soc. Ent. Belg.*, 66 : 222, 227.

2003. *Pachysternum nigrovittatum* : Mukhopadhyay & Sengupta, *Zool Surv. India, Fauna of Sikkim, State Fauna Series*, 9(Part 3) : 38-39.

Material examined : 3 ex. India : Andhra Pradesh : Betamcherla in Kurnool dist., 14.iii.1999, S. K. Chatterjee & Party; 1 ex., Matur in Prakasan dist., 19.iii.1999, S. K. Chatterjee & Party.

Distribution : India : Andhra Pradesh, Sikkim, West Bengal, Manipur, Tamil Nadu.

Elsewhere : Sri Lanka, Singapore, Tonkin, Hongkong.

Subfamily HYDROPHILINAE

Key to the tribes of the Subfamily HYDROPHILINAE

1. Antennae 7-8 segmented, eyes convex, prominent without canthus, hind legs with long swimming hairs **Berosini**
- Antennae 9 segmented, ... 2
2. Meso and metasternal carina not reunited intimately **Hydrobiini**
- Meso and meta sternal carina reunited and form one ridge **Hydrophilini**

Tribe Hydrobiini

Key to the genera of the tribe Hydrobini

1. Maxillary palpi robust and short, nearly as long as antennae or shorter
..... **Paracymus** Thomson

- Maxillary palpi more or less slender and longer than antennae..... 2
- 2. Second segment of maxillary palpi convex on anterior side and concave posteriorly
.....***Enochrus*** Thomson
- Second segment of maxillary palpi concave or straight on anterior side and convex on
posterior side.....***Helochares*** Mulsant

Genus ***Paracymus*** Thomson, 1867

1867. *Paracymus* Thomson, *Skand. Col.*, **9** : 119-120.

1924. *Paracymus*, Knisch, *Col. Cat.*, **14** (79) : 165-168.

7. ***Parcymus evanescens*** (Sharp)

1890. *Hydrobius evanescens* (Sharp) *Trans. Ent. Soc. London* : 349.

1924. *Paracymus evanescens*, Knisch, *Col. Cat.*, **14** (79) : 167.

1995. *Paracymus evanescens*, Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, **3**(Part 6A) : 156.

Material examined : 10 ex. India : Andhra Pradesh : Palmaner in Chittor dist., 21.i.1999, Dr. P. Mukhopadhyay.

Distribution : India : West Bengal, Andhra Pradesh, Bihar.

Elsewhere : Sri Lanka, Singapore, Tonkin, Indonesia, Philippines.

Genus ***Helochares*** Muls., 1844

1844. *Helochares* Mulsant, *Palp.*, p. 197.

1924. *Helochares*, Knisch, *Col. Cat.*, **14**(79) : 192-199.

8. ***Helochares ancholaris*** Sharp

1890. *Helochares ancholaris* Sharp, *Trans. Ent. Soc. Lond.*, : 352.

1924. *Helochares ancholaris*, Knisch, *Col. cat.*, **14**(79) : 193.

1995. *Helochares ancholaris* Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, **3**(Part 6A) : 157.

Material examined : 1 ex. India : Andhra Pradesh : Addatigala F.R.H. in East Godavari dist., 2.iv. 1996, S. K. Chatterjee & Party; 12 ex. Aduripalle in Nellore dist., 12.i.1999, Dr. P. Mukhopadhyay.

Distribution : India : West Bengal, Bihar, Andhra Pradesh.

Elsewhere : Sri Lanka, Indochina, Indonesia, Philippines, F.M.S., Laos, Tonkin, Cambodia, Annam.

9. *Helochares crenatus* Regimbart

1903. *Helochares crenatus* Regimbart, *Ann. Soc. ent. Fr.* 72 : 54.
 1924. *Helochares crenatus*, *Knisch Col. Cat.*, 14(79) : 193.
 1995. *Helochares crenatus*, Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, States Fauna series*, 3(Part 6A) : 157.

Material examined : 1 ex. India : Andhra Pradesh : Vontimitta R. H. 25 km from cuddapah, 27.xi.1998, P. H. Roy, 5ex., Srikalahasti in Chittor dist, 23.i.1999, Dr. P. Mukhopadhyay; 2 ex, Rampur in Adilabad dist, 28.iii.1999, S. K. Mondal & Party.

Distribution : India : West Bengal, Bihar, Tripura, Andhra Pradesh , Pondicherry.

Elsewhere : Indonesia, Sunda Is, F.M.S Philippines, Indonesia, Cochinchina, Tonkin, Cambodia.

10. *Helochares densus* Sharp

1890. *Helochares densus* Sharp, *Trans. Ent. Soc. London*, : 352.
 2000. *Helochares densus*, Ghosh, Mukhopadhyay & Biswas, *Zool. Surv. India, Fauna of Tripura, State Fauna Series*, 7(Part 3) : 47-48.

Material examined : 1 ex. India : Andhra Pradesh, Palmaner in Chittor dist, 21.i.1999, Dr. P. Mukhopadhyay; 1 ex., Tirupati in Chittor dist, 23.i.1999, Dr. P. Mukhopadhyay; 1 ex., Rajendranagar, Raugareddi, 6.iii. 1999, S.K. Chatterjee & Party.

Distribution : India : Tripura, Andhra Pradesh.

Elsewhere : Sri Lanka.

11. *Helochares lentus* Sharp

1890. *Helochares lentus* Sharp, *Trans. Ent. Soc. London*, : 352.
 1924. *Helochares lentus* Knisch, *Col. Cat.*, 14(79) : 193.
 1995. *Helochares lentus*, Biswas & Mukhopadhyay, *Zool Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 157-158.

Material examined : 3 ex. India : Andhra Pradesh, Srikalahasti in Chittor dist, 23.i.1999, Dr. P. Mukhopadhyay.

Distribution : West Bengal, Bihar, Tripura, Andhra Pradesh.

Elsewhere : Indonesia, Philippines, Egypt.

12. *Helochares pallens* (Macleay)

1825. *Helochares pallens* (Macleay), *Annual. Javan.*, p. 35.

1926. *Helochares pallens* d'Orchymont, *Ann. Bull. Soc. Ent. Belg.*, **66** : 232.

1995. *Helochares pallens*, Biswas & Mukhopadhyay, *Zool. surv. India, Fauna of West Bengal, State Fauna Series*, **3**(Part 6(A)) : 157-158.

Material examined : 2 ex. India : Andhra Pradesh : Koratuni F.R.H. in West Godavari dist., 13.iv.1996, S.K. Chatterjee & party.; 1 ex, Isakapalle in Nellore dist., 13.i.1999, Dr. P. Mukhopadhyay, 4 ex, Kamalturnu in Nellore dist., Dr. P. Mukhopadhyay.

Distribution : India : West Bengal, Bihar, Assam, Andhra Pradesh.

Elsewhere : Indonesia, Tonkin, Philippines, Egypt, Syria, Madagascar.

Genus *Enochrus* Thomson, 1859

1859. *Enochrus* Thomson, *Skand. Col.*, **1** : 18.

1924. *Enochrus*, Knisch, *Col. Cat.*, **14**(79) : 200-219.

13. *Enochrus esuriens* Walker

1858. *Enochrus esuriens* Walker, *Ann. Mag. Nat. Hist.*, (3)**2** : 209.

1924. *Enochrus esuriens*, Knisch, *Col. Cat.*, **14**(79) : 208.

1995. *Enochrus esuriens*, Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, **3**(Part 6A) : 158.

Material examined : 4 ex. India : Andhra Pradesh : Aduripalle in Nellore dist., 12.i.1999, Dr. P. Mukhopadhyay; 15 ex, Isakapalle in Nellore dist, 13.i.1999, Dr. P. Mukhopadhyay; 4 ex., Kamalturnu in Nellore dist., 16.i.1999, Dr. P. Mukhopadhyay; 1 ex., Rampur in Adilabad dist., 28.vii.1999, Dr. S. K. Mandal.

Distribution : India : West Bengal, Manipur, Nicobar Is.

Elsewhere : Sri Lanka, Indonesia, F.M.S., Siam, Annam, Tonkin, Cochin China, Vietnam, Sunda Is., Indochina, Australia, Philippines.

Tribe **Hydrophilini**

Key to the genera of the tribe Hydrophilini

1. Prostital carina ridge like with an anterior brush of long setae and sometimes posteriorly with small emargination ***Sternolophus*** Solier
- Prostital carina not cultriform, excavate to receive the anterior side which is widely emarginated ***Hydrophilus*** Muller

Genus *Sternolophus* Solier, 1834

1834. *Sternolophus* Solier, *Ann. Soc. ent. Fr.*, **3** : 302, 310

1924. *Sternolophus*, Knisch, *Col. Cat*, 14(79) : 226-228.

14. *Sternolophus rufipes* (Fabricius)

1792. *Hydrophilus rufipes* F., *Entom. Syst.*, 1 : 183.

1840. *Sternolophus rufipes*, Laporte, Castelnau, *Hist. Nat. Ins.*, 2 : 54.

1995. *Sternolophus rufipes*, Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, 3 (Part 6A), : 159.

2000. *Sternolophus rufipes*, Mukhopadhyay, Ghosh, Saha & Biswas, *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series*, 4(Part 5) : 90.

Material examined : 4 ex. India : Andhra Pradesh : Sunnipetta, Srikailam Prakasan, 23.ix. 1998, Dr. S. K. Mandal & Part; 3 ex., Domlapenta in Kurnool dist, 24.ix. 1998, Dr. S. K. Mandal; 1 ex. Borsa in Vishakapattnam dist, 15.x.1999. Dr. S. K. Mandal & Party; 4 ex., Aduripalle in Nellore dist., 12.i.1999, Dr. P. Mukhopadhyay; 3 ex, Mantespuram in Nellore dist, 17.i.1999, Dr. P. Mukhopadhyay, 1 ex., Srikalahasti in Chittor dist., 23.i.1999, Dr. P. Mukhopadhyay, 1 ex., Tirupati in Chittor dist., 23.i.1999, Dr. P. Mukhopadhyay, 6 ex, Betamcherla in Kurnool dist., 14.iii.1999, S. K. Chatterjee & Party; 1 ex., AFRH in Adilabad dist., 28. viii. 1999, Dr. S. K. Mandal & Party.

Distribution : India : West Bengal, Bihar, Meghalaya, Tripura, Maharashtra, Punjab, Kashmir, Manipur, Andhra Pradesh.

Elsewhere : Trop. Asia, W. Asia, Myanmar, Sunda Is., Philippines, Japan, Formosa, Indonesia, F. M. S., Indochina, China, Sri Lanka.

Genus *Hydrophilus* Muller, 1764

1764. *Hydrophilus* Muller, *Fauna Ins. Fridrichsdalina*, p. 16.

1924. *Hydrophilus*, Knisch, *Col. Cat.*, 14(79) : 236-242.

1980. *Hydrophilus*, Smetna, *Mem. ent. Soc. Canada*, 111 : 10-11.

15. *Hydrophilus olivaceus* Fabricius

1781. *Hydrophilus olivaceus* F. *Spec. Ins.*, 1 : 289.

1995. *Hydrophilus olivaceus*, Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 160.

Material examined : 1 ex. India : Andhra Pradesh : Vasalamarri Reserve Forest in Nalgonda dist., 9 xii. 1993. A. K. podder.

Distribution : India : West Bengal, Manipur, Maharashtra, Andhra Pradesh.

Elsewhere : Nil.

Tribe **Berosini**Key to the genera of the tribe **Berosini**

1. Antennae seven segmented and usually with a more or less prominent 6th retractile ventral segment ***Berosus*** Leach
- Antennae composed of 8-segments and the fifth ventral segment is retractile, more or less prominent and emergent in male ***Regimbartia*** Zaitzev

Genus ***Berosus*** Leach, 1817

1817. *Berosus* Leach, *Zool. Misc.*, 3 : 92.

1924. *Berosus* Knisch, *Col. Cat.*, 14 : 261-276.

16. ***Berosus indicus*** Motschulsky

1861. *Berosus indicus*, Mots., *Bull. Soc. Imp. Nat. Moscou*, 34(1) : 110.

1924. *Berosus indicus*, Knisch. *Col. Cat.*, 14(79) : 263.

1996. *Berosus indicus*, Biswas & Mukhopadhyay, *Fauna of West Bengal, State Fauna Series*, 3(Part 63) : 163.

2000. *Berosus indicus*, Ghosh, Mukhopadhyay & Biswas, *Zool. Surv. India, Fauna of Tripura, State Fauna Series*, 7(Part-3) : 49.

Material examined : 3 ex. India : Andhra Pradesh : Addatigala F. R. H. in East Godavari dist., 2 iv. 1996, S. K. Chatterjee & Party; 15 ex. Addatigala Village in East Godavari dist., 5.iv.1996, S. K. Chatterjee & Party; 6 ex., Addatigala F.R.H. Camp. in East Godavari dist., 8.iv.1996, S. K. Chatterjee & Party; 3 ex., Koratuni F.R.H. Camp in West Godavari dist., 14.iv. 1996, S. K. Chatterjee & Party; 1 ex., Koraturu in West Godavari dist, 15.iv.1996, S. K. Chatterjee & Party; 3 ex., Kaikalur Village in Krishna dist., 19.iv.1996, S. K. Chatterjee & party, 1 ex., Isakapalle in Nellore dist., 13.i.1999, Dr. P. Mukhopadhyay; 6 ex., Mantespuram in Nellore dist., 17.i.1999, Dr. P. Mukhopadhyay.

Distribution : India : West Bengal, Manipur, Bihar, Punjab, Rajasthan, Tripura, Uttar Pradesh, Karnataka, Goa, Kerala, Pondicherry, Andhra Pradesh, Tamil Nadu.

Elsewhere : Sri Lanka, S. Asia, Sunda Is., Pakistan, Nepal, Myanmar, China, Formosa, Philippines, Indonesia, F. M. S., Cambodia, Laos, Annam, Indochina, Tonkin, Siam.

Berosus fairmairei Zaitzev

1817. *Berosus fairmairei* Zaitzev, *Hor. Soc. Ent. Ross.*, 38 : 355.

1924. *Berosus fairmairei*, Knisch, *Col. Cat.*, 14 (79) : 179, 263.

1996. *Berosus fairmairei*, Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 162.

Material examined : 6 ex. India : Andhra Pradesh : Addatigala F. R. H. Camp in East Godavari dist., 2. iv. 1996, S. K. Chatterjee & Party; 13 ex. Addatigala Village in East Godavari dist., 5. iv. 1996, S. K. Chatterjee & Party; 3 ex., Addatigala F.R.H. Camp. in East Godavari dist., 8.iv.1996, S. K. Chatterjee & Party; 4 ex., Koratuni F. R. H. Camp in West Godavari dist., 14.iv.1996, S. K. Chatterjee & Party; 1 ex., Koraturu in West Godavari dist, 15.iv.1996, S. K. Chatterjee & party.

Distribution : India : West Bengal, Manipur, Bihar, Rajasthan, Delhi, Andhra Pradesh, Kerala, Andaman Is.

Elsewhere : Indochina, Formosa, Indonesia, Tonkin, Laos, Annam, Siam, F.M.S., Philippines, Pakistan, Nepal, Bangladesh, Myanmar, China, Hong Kong, Thailand, Malaysia Burma, Cambodia, Laos, Annam, Tonkin.

***Berosus pulchellus* Macleay**

1825. *Berosus pulchellus* Macleay, *Annul. Jav.* : 35.

1995. *Berosus pulchellus* Macleay, Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 63) : 163.

2000. *Berosus pulchellus*, Mukhopadhyay & Ghosh, *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series*, 4(Part 5), : 89.

Material examined : 1 ex. India : Andhra Pradesh : Addatigala F.R.H. in East Godavari dist., 2. iv. 1996, S. K. Chatterjee & Party; 2 ex. Addatigala Village in East Godavari dist., 5.iv.1996, S. K. Chatterjee & Party; 2 ex., Isakapalle in Nellore dist., 13.i.1999, Dr. P. Mukhopadhyay; 2 ex., Mantespurnam in Nellore dist., 17.i.1999, Dr. P. Mukhopadhyay.

Distributiion : India : West Bengal, Meghalaya, Rajasthan, Delhi, Haryana, Uttar Pradesh, Kerala, Karnataka, Pondicherry, Tamil Nadu, Maharashtra, Andhra Pradesh.

Elsewhere : Sri Lanka, Mynamar, Tonkin, Annan, Australia, Philippine, Indonesia, Formosa, Indochina, Myanmar, Iran, Nepal, Bangladesh, Laos, Vietnam, China, Japan, Hongkong, Thailand, Taiwan, Malaysia.

Genus *Regimbartia* Zaitzev, 1908

1908. *Regimbartia* Zaitzev, *Horae Soc. Ent. Ross.*, 38 : 362.

1924. *Regimbartia*, Knisch, *Col. Cat.*, 14(79) : 276.

19. *Regimbartia attenuata* F.

1801. *Regimbartia attenuata* F., *Syst. Eleuth.*, 1 : 253.

1924. *Regimbartia attenuata*, Knisch. *Col. Cat.*, 14(79) : 276-276.

1995. *Regimbartia attenuata*, Biswas & Mukhopadhyay, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 163.

2000. *Regimbartia attenuata*, Ghosh, Mukhopadhyay & Biswas, *Zool. Surv. India, Fauna of Tripura, State Fauna Series*, 7(Part-3) : 49.

Material examined : 1 ex., India : Andhra Pradesh : Aduripalle in Nellore dist., 12.i.1999, Dr. P. Mukhopadhyay.

Distribution : India : West Bengal, Meghalaya, Andhra Pradesh, Tripura, Bihar, Manipur.

Elsewhere : Sri Lanka, South Asia, Sunda Is., Australia, Indochina, Annam, CochinChina Cambodia, Indonesia, Formosa, Japan.

SUMMARY

The present paper deals with 19 species belonging to 12 genera under 4 subfamilies. All the species recorded here are for the first time from Andhra Pradesh. Keys to the subfamilies, tribes, genera included in this paper have been provided. Selected synonymies, collection data have been given for each species. Distributional data within and outside state have also been added.

ACKNOWLEDGEMENTS

Authors are grateful to the Director, Zoological Survey of India for facilities of work. Thanks are also due to Dr. Ramakrishna, Scientist-E and Dr. A. K. Hazra, Scientist-E & Incharge of Entomology division for their suggestions for improvement of work. We are also thankful to Chief Conservator of Forests and other officials for giving permission as well as for helping in the collections in different districts of Andhra Pradesh.

REFERENCES

- Baemul, F. 1993. Omicrini from Sulawesi Utara Indonesia (Col : Hydrophilidae : Sphaeridiinae. *Invertebr. Taxen*, 7 : 751-778.
- Balfour-Browne, J. 1948. A revision of the genus *Psalitrus* d' Orchymont (Col : Palpicornia : Sphaeridiinae) *Ann. Mag. nat. Hist. London*, (12) 1 (6) : 377-391.
- Biswas, S. and Mukhopadhyay, P. 1995. *Insecta : Coleoptera : Hydrophilidae. Zool. Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 143-148.
- D'orchymont, A. 1928. *Coleoptera : Hydrophilidae. Catalogue of Indian insects*, Part-14 : 1-46, Govt. of India Publication.
- Knisch, A. 1924. *Coleopterorum Catalogus*, S. Schenkling edited, 14 (79) : 1-306.
- Schodl, S. 1993. Revision der Gattung *Berosus* Leach 3 : Tiel : Die Palaarktischen and Orientalis Chen Arten der Untergattung *Berosus* S. Str. (Col : Hydrophilidae).
- Sharp, D. 1890. On some Coleoptera from Ceylon. *Trans. Ent. Soc. London* : 349-357.

INSECTA : COLEOPTERA : STAPHYLINIDAE

P. MUKHOPADHYAY and A. SAR

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The members of the family Staphylinidae are commonly known as 'Rove beetles' and one of the largest family of the superfamily Staphylinoidea distributing throughout the world. About 30,000 species are known from the world. Of which more than 2000 species are recorded so far from India. The pioneer workers who dealt the group are Motschulsky (1858), Kraatz (1859), Fauvel (1895) and Bernhauer (1915) etc. prior to Cameron's work on the Fauna of British India series (1930, 1931, 1932). Since the work of Cameron (1930-45) no comprehensive work on Indian fauna of Staphylinidae have been done by any authors. However Biswas & Biswas (1995 to 2004) has published the consolidated work on the fauna of Staphylinidae of West Bengal, Meghalaya, Tripura, Sikkim, and Manipur. Further he (1989) revised the genus *Bledius* Leach from India. Till to date there is no comprehensive work on this family from Andhra Pradesh.

Present study is based on 122 examples of Staphylinidae spreading over the subfamilies like Oxytelinae, Paederinae Staphylininae, Aleocharinae and Tachyporinae collected from different districts of Andhra Pradesh by various recent survey parties of Zoological Survey of India and other collections present in the National Zoological collections. Selected synonyms, collection data of each species have also given. Distributional data of each species has also given from the published record as well as actual study of the specimens. Present study include a total of 31 species under 13 genera belonging to 5 subfamilies of which 30 species are recorded for the first time from Andhra Pradesh and the species, *Philonthus fuscatus* kr is recorded for the first time from India.

SYSTEMATIC ACCOUNT

Family STAPHYLINIDAE

Subfamily 1. OXYTELINAE

Tribe Oxytelini

Genus (1) *Oxytelus* Grav., 1802Subgenus *Caccoporus* Thoms.

1. *O. (C.) varipennis* Kraatz.
2. *O. (C.) bengalensis* Er.

Subfamily II. PAEDERINAE

Tribe Paederini

Genus (2) *Paederus* F., 1775

3. *P. fuscipes* Curt.
4. *P. melampus* Er.
5. *P. extraneus* Wied

Genus 3. *Astenus* Stephens, 1832

6. *A. SP.*

Genus 4. *Stilicus* Latr., 1825

7. *S. gracilis* Epp.
8. *S. ceylanensis* Kr.
9. *S. velutinus* Fauv.
10. *S. pygmaeus* Kr.

Genus 5. *Medon* Steph., 1832

11. *M. brevisculus* (Kraatz)

Genus 6. *Charichirus* Sharp, 1889

12. *C. chinensis* (Boh.).

Genus 7. *Stilicoderus* Sharp, 1889

13. *S. fenestratus* Fauv.
14. *S. umbratus* Fauv.

Genus 8. *Cryptobium* Mannerh., 1830

15. *C. abdominale* Motsch, var. *indicum* Kraatz.
16. *C. marginatum* Motsch.
17. *C. bernhaueri* Cam.

Subfamily III. STAPHYLININAE

Tribe 1 Xantholinini

Genus 9. *Leptacinus* Erichson, 1837-39

18. *L. parumpunctatus* (Gyll.)
19. *L. gracilis* Fauv.

Genus 10. *Indoscitalinus* Heller, 1900

20. *I. dispilus* (Er.)

Tribe II. **Staphylinini**

Subtribe STAPHYLINI

Genus 11. *Philonthus* Curtis, 1825

21. *P. cinctulus* (Gravely)
 22. *P. delicatulus* Boh.
 23. *P. aleger* Epp.
 24. *P. convalescens* Eppelsheim
 25. *P. sikkimensis* Biswas
 26. *P. maindroni* Fauv.
 27. *P. assamensis* Cameron
 28. *P. fuscatus* Kr.

IV. Subfamily ALEOCHARINAE

Tribe **Myrmedoniini**Genus 12. *Zyras* Steph., 1832Subgenus *Glossacantha* Gemmn et Har.

29. *Z. (G). reversus* Cameron

V. Subfamily TACHYPORINAE

Tribe **Tachyporini**Genus 13. *Conosoma* Kraatz, 1856-58

30. *C. subtestaceum* Cam.
 31. *C. birmanum* Fauv.

Family STAPHYLINIDAE

Subfamily OXYTELINAE

The subfamily Oxytelinae includes eight tribes viz. Oxytelini, Piestini, Leptochirini, Pseudopsini, Proteinini, Omaliini, Osorini and Eleusiini. Of which the tribe Oxytelini includes 148 species under 13 genera from India (Cameron, 1930). The members of them are usually found in the habitat like dung, carcasses, rotten fruits etc. Present study recorded two species under the genus *Oxytelus* (*Caccoporus*) from Andhra Pradesh.

Genus *Oxytelus* Grav., 1802

1802. *Oxytelus* Grav., *Col. Micr. Brunsv.* : 101.

1930. *Oxytelus* : Cameron, *The Fauna of British India incl. Ceylon & Burma, Fam. Staphylinidae* 1 : 211.

Subgenus *Caccoporus* Thoms.Key to the species of genus *Oxytelus* (*Caccoporus*)

1. Species sub opaque *bengalensis* Erichson
 – Species shiny, head black, thorax pitchy or black *varipennis* Kraatz

1. *Oxytelus* (*Caccoporus*) *varipennis* Kr.

1802. *Oxytelus varipennis* Kr., Arch. Naturg., 25(1) : 172.
 1930. *Oxytelus* (*Caccoporus*) *varipennis* Kr. : Cameron, *The Fauna of British India incl. Ceylon & Burma*, Family Staphylinidae : Oxytelinae, 1 : 234-235.
 1995. *Oxytelus* (*Caccoporus*) *varipennis*, Biswas & Biswas, *Fauna of West Bengal, State Fauna Series*, 3(Part 6(A)) : 239. *Zool. Surv. India*.
 2003. *Oxytelus* (*Caccoporus*) *varipennis*, Biswas, *Fauna of Sikkim, State Fauna Series*, 9(Part 3) : 251. *Zool. Surv. India*.

Material examined : 1 ex. India : Andhra Pradesh : Addatigala village, N.E. of Rajahumundry, East Godavari dist., 3. IV. 1996, S. K. Chatterjee 2 ex., Koraturu Village in West Godavari dist., 13.IV.1996, S. K. Chatterjee Coll.

Distribution : India : Andhra Pradesh (Addatigala : East Godavari, Koraturu : West Godavari), West Bengal, Tripura, Sikkim, Uttarakhand.

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded here for the first time from Andhra Pradesh.

2. *Oxytelus* (*Caccoporus*) *bengalensis* Er.

1840. *Oxytelus bengalensis* Er. *Gen. Spec. Staph.* : 789.
 1859. *Oxytelus bicolor* Walker, *Ann. Mag. Nat. Hist.*, 3(3) : 52.
 1930. *Oxytelus* (*Caccoporus*) *bengalensis* Cameron, *The Fauna of British India, Incl. Ceylon & Burma*, Col : Staphylinidae : Oxytelinae 1 : 232-233.
 1995. *Oxytelus* (*Caccoporus*) *bengalensis*, Biswas & Biswas, *Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 240. *Zool. Surv. India*.
 2003. *Oxytelus* (*Caccoporus*) *bengalensis*, Biswas, *Fauna of Sikkim, State Fauna Series*, 9(Part 3) : 251. *Zool. Surv. India*.

Material examined : 1 ex., India : Andhra Pradesh : Addatigala village; East Godavari dist., 8.iv.1996, S. K. Chatterjee Coll., ex. near pond.

Distribution : India : Andhra Pradesh (Addatigala : East Godavari dist.), West Bengal, Tripura, Sikkim, Uttarakhand.

Remarks : Present study recorded the species for the first time from Andhra Pradesh.

Subfamily III. PAEDERINAE

The subfamily Paederinae is divided into two tribes viz. Paederini and Pinophilini and includes 324 species under 33 genera from India and neighbouring countries. Of which the tribe Paederini include 274 spp. under 29 genera and 50 spp. under 4 genera under the tribe Pinophilini. The members of them are usually found in the habitat like damp vegetable debries, trunks of decaying trees, on bush, trees and leaf litter, in moss, under stone near stream, may be associated with ants and *Astenus* spp.

Tribe Paederini

Key to the genera of the tribe Paederini

1. Antennae strongly geniculate *Cryptobium* Mannerh.
 – Antennae not geniculate 2
2. 4th tarsal joint biolobed 2
 – 4th tarsal joint simple 3
2. 4th segment of maxillary palpi short, broad and wart like *Paederus* F.
 – 4th segment of maxillary palpi very slender and sabulate, labrum emarginated in the middle *Astenus* Stephens
3. Labrum tri-dentate *Stilicoderus* Sharp
 – Labrum bi dentate or unidentate 4
4. Neck very slender and tongue bilobed *Stilicus* Latr.
 – Neck as broad as the base of the head 5
5. Labrum bidentate at middle or at least trisinuated; prosternal epimera present, the stigma concealed *Medon* Steph.
 – Labrum unidentate; prosternal epimera absent; stigma exposed; abdomen distinctly keeled at the middle *Charichirus* Sharp

Genus 2. *Paederus* F., 1775

1775. *Paederus* Fab., *Syst. Ent.*, P. 268.

1931. *Paederus* : Cameron. *The Fauna of British India* incl. Ceylon & Burma (Col : Staphylinidae), 2 : 33-63.

Key to the species of the genus *Paederus* F.

1. Head and last two abdominal segments black *fuscipes* Curt.
 – Head black and first four abdominal segments reddish following black 2
2. Elytra blue. Legs including coxae dark. Length 7.2 mm *extraneus* Wied.
 – Elytra steel blue, Legs with coxae pitchy black, Length little shorter
 *melampus* Er.

3. *Paederus fuscipes* Curt

1823-40. *Paederus fuscipes* Curtis, *Ent. Brit.*, 3 : 108.

1839-40. *Paederus aestuans* Er., *Gen. Spec. Staph.*, : 655.

1876. *Paederus fennicus* J. Sahlb., *En. Col. Brach. Fenn.*, : 38.

1902. *Paederus breviceps* Bernh., *D. E. Z.*, : 37.

1931. *Paederus fuscipes* : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae) 2 : 40-41.

2003. *Paederus fuscipes* Biswas, *Fauna of Sikkim, State Fauna Series*, 9(Part 3) : 259. *Zool. Surv. India*.

Material examined : 1 ex., India : Andhra Pradesh; Thirumala : Chittor, 2.iv.2000. S. K. Chatterjee.

Distribution : India : Andhra Pradesh (Thirumala : Chittor), West Bengal, Bihar, Karnataka, Madhya Pradesh.

Elsewhere : This species is recorded here for the first time from Andhra Pradesh.

4. *Paederus melampus* Er.

1839-40. *Paederus melampus* Er., *Gen Spec. Staph.*, : 660.

1931. *Paederus melampus* : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 2 : 43.

1995. *Paederus melampus*, Biswas & Biswas, *Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 275. *Zool. Surv. India*.

Material examined : 2 ex., India : Andhra Pradesh : Nayadupeta in Nellore dist., 24.v.2000, S. K. Chatterjee; ex. Sweeping; 6 ex., Vankatachalam : Nellore dist., 23.v.2000, S. K. Chatterjee, ex. sweeping 1 ex., Penchalakon : Nellore (W) dist., 29.v.2000, S. K. Chatterjee coll.

Distribution : India : Andhra Pradesh (Nayadupeta, Venkatachalam, Penchalakon : Nellore dist.), Maharashtra, West Bengal.

Elsewhere : Bangladesh.

Remarks : In the present study this species is recorded for the first time from Andhra Pradesh.

5. *Paederus extraneus* Wied.

1818. *Paederus extraneus* Wied. *Zool. Mag.*, 2(1) : 133, 200.

1839-40. *Paederus extraneus* Er., *Gen. Spec. Staph.*, : 661.

1859. *Paederus extraneus* Kr., *Arch. Naturg.*, 25(1) : 152.

1931. *Paederus extraneus* : Cameron, *The Fauna of British India incl. Ceylon & Burma*, Col : Staphylinidae, 2 : 41.

Material examined : 2 ex. India : Andhra Pradesh : Rapur : Nellore dist., 25.v.2000, S. K. Chatterjee, ex. bamboo leaves.

Distribution : India : Andhra Pradesh (Rapur : Nellore dist), West Bengal.

Remarks : Present study recorded the species for the first time from Andhra Pradesh.

Genus 3. *Astenus* Stephens, 1832

1832. *Astenus* Steph., *Ill. Brit. Ent. Mand.*, 5 : 275.

1835. *Astenus* Boisd. et. Lacord., *Faun. Ent. Paris*, 1 : 435.

1889. *Astenus* Fauv., *Rev. d'Ent.*, 8 : 254.

1895. *Astenus* Ganglb., *Kaf. Mitt. Eur.*, 2 : 539.

6. *Astenus* Sp.

Material examined : 1 ex. India : Andhra Pradesh : Panchalakon : Nellore dist., 29.v.2000, S.K. Chatterjee.

Distribution : India : Andhra Pradesh (Penchalakon : Nellore).

Remarks : More example needed for further identification.

Genus (4) *Stilicus* Latr., 1825

1825. *Stilicus* Latreille, *Encycl. Meth.*, 10 : 495.

Key to the species of the genus *Stilicus* Latr.

1. Species smaller (2-2.4 mm.). Head subquadrate. Elytra brownish yellow *pygmaeus* Kr.
- Species larger (4-6.2 mm). Elytra deep brown in colour..... 2
2. Elytra unicolourous *gracilis* Epp.

- Elytra bicolourous 3
- 3. 6th ventral segments of abdomen obtusely excised; penultimate segment of antennae as long as broad *velutinus* Fauv.
- 6th ventral segments of abdomen with broad, rather shallow arcuate emargination; penultimate segment of antennae transverse *ceylanensis* Kr.

7. *Stilicus gracilis* Epp.

1895. *Stilicus gracilis* Epp., W.E.Z., 14 : 63.

1924. *Stilicus proelongus* Cam., Trans., Ent. Soc. Lond., P. 182.

1931. *Stilicus gracilis*, Cameron, *The Fauna of British India including Ceylon & Burma* (Col. : Staphylinidae), 2 : 104-105.

2003. *Stilicus gracilis* Biswas, *Fauna of Sikkim, State Fauna Series*, 9(Part-3) : 263. *Zool. Surv. India*.

Material examined : 1 ex., India : Andhra Pradesh : Koraturu, F.R.H. Compound, W. Godavari dist., 14.iv.96, S. K. Chatterjee, ex. at light.

Distribution : India : Andhra Pradesh (Koraturu : Godavari dist.), Himachal Pradesh, Sikkim.

Elsewhere : Nil.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

8. *Stilicus ceylanensis* Kraatz

1859. *Stilicus ceylanensis* Kr., Arch. Naturg., 25(1) : 126.

1931. *Stilicus ceylanensis* : Cameron, *The Fauna of British India including Ceylon & Burma* (Col. : Staphylinidae), 2 : 105-106.

2003. *Stilicus ceylanensis*, Biswas, *Fauna of Sikkim, State Fauna Series*, 9(Part-3) : 262. *Zool. Surv. India*.

Material examined : 2 ex. India : Andhra Pradesh : Doulatabad in Medak dist., 1. VIII. 90, S. K. Chatterjee; 1ex, Palmaner in Chittor dist., 21.i.1999, P. Mukhopadhyay.

Distribution : India : Andhra Pradesh (Doulatabad : Medak dist. Palmaner : Chittor dist.), Tamil Nadu, Nagaland, Uttarakhand, Sikkim.

Elsewhere : Sri Lanka.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

9. *Stilicus velutinus* Fauvel

1895. *Stilicus velutinus* Fauv., Revue d' Ent., 14 : 226.

1931. *Stilicus velutinus* : Cameron, *The Fauna of British India including Ceylon & Burma* (Col. : Staphylinidae), 2 : 103-104.

1995. *Stilicus velutinus*, Biswas & Biswas, *Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 290. *Zool. Surv. India*.

Material examined : 1 ex. India : Andhra Pradesh : Palmaner in Chittor dist., 21.i.99, P. Mukhopadhyay.

Distribution : India : Andhra Pradesh (Palmaner : Chittor dist.), West Bengal, Sikkim, Uttar Pradesh.

Remarks : In the present study this species is recorded for the first time from Andhra Pradesh.

10. *Stilicus pygmaeus* Kraatz

1859. *Stilicus pygmaeus* Kr., *Arch. Naturgesch*, 25 (1) : 126.
1931. *Stilicus pygmaeus*, Cameron, *The Fauna of British India including Ceylon & Burma* (Col. : Staphylinidae), 2 : 109.
1995. *Stilicus pygmaeus*, Biswas & Biswas, *Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 289. *Zool Surv. India*.

Material examined : 1 ex., India : Andhra Pradesh : Podalakur in Nellore dist., 27.v.2000, S. K. Chatterjee, ex. haystack.

Distribution : India : Andhra Pradesh (Podalakur : Nellore dist.), West Bengal.

Elsewhere : Sri Lanka, Malaysia, Saigon and Timor.

Remarks : Present study recorded this species for the first time from Andhra Pradesh.

Genus 5. *Medon* Steph., 1832

1832. *Medon* Steph., III. *Brit. Ent. Mand.*, 5 : 273.
1931. *Medon* : Cameron, *The Fauna of British India including Ceylon & Burma* (Col : Staphylinidae), 2 : 129-155.

11. *Medon brevisculus* Kr.

1859. *Lithocharis brevisculus* Kr., *Arch. Naturg.*, 25 (1) : 137.
1931. *Medon brevisculus* (Kr.) : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 2 : 149.
2003. *Medon brevisculus*, Biswas, *Fauna of Sikkim, State Fauna Series*, 9(Part-3) : 263. *Zool Surv. India*,

Material examined : 5 ex., India : Andhra Pradesh : Palmaner in Chittor dist., 21.i.99, P. Mukhopadhyay.

Distribution : India : Andhra Pradesh (Palmaner : Chittor dist.), Sikkim.

Elsewhere : Sri Lanka.

Remarks : Present study recorded this species for the first time from Andhra Pradesh.

Genus 6. *Charichirus* Sharp, 1889

1889. *Charichirus* Shp., *Ann. Mag. Nat. Hist.* (6) 2 : 262.
 1895. *Charichirus* : Fauv., *Rev. d'ent.*, 14 : 227.
 1931. *Charichirus* : Cameron, *The Fauna of British India including Ceylon & Burma* (Col. : Staphylinidae), 2 : 165-168.

12. *Charichirus chinensis* (Boh.)

1858. *Lathrobium chinensis* Boh, *Resa Eugen*, : 32.
 1858. *Lithocharis dimidiatus* Mots., *Bull. Mosc.*, 31 (2) : 645.
 1859. *Lithocharis obliquus* Walker, *Ann. Mag. Nat. Hist.* (3), 3 : 52.
 1859. *Lithocharis spectabilis* Kraatz, *Arch. Naturgesch.*, 25(1) : 135.
 1931. *Charichirus chinensis* (Boh.) : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 2 : 167-168.
 2003. *Charichirus chinensis*, Biswas, *Fauna of Sikkim, State Fauna Series*, 9(Part-3) : 265. *Zool. Surv. India*.

Material examined : 1 ex. India : Andhra Pradesh, Daulatabad in Medak dist., 1. VIII, 90, S. K. Chatterjee; 1 ex., Bydapuram in Nellore dist., 26.v.2000, S. K. Chatterjee, ex. Bamboo leaves.

Distribution : India : Andhra Pradesh (Daulatabad; Medak dist., Bydapuram : Nellore dist.), West Bengal, Sikkim.

Elsewhere : Sri Lanka, Japan.

Genus 7. *Stilicoderus* Sharp, 1889

1889. *Stilicoderus* Sharp, *Ann. Mag. Nat. Hist.*, (6) 3 : 320.
 1895. *Stilicoderus* : Fauv., *Rev d' Ent.*, 14 : 226.
 1931. *Stilicoderus* : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. Staphylinidae), 2 : 110-114.

13. *Stilicoderus fenestratus* Fauvel

1895. *Stilicoderus fenestratus* Fauv., *Rev. d'Ent.*, 14 : 225.
 1931. *Stilicoderus fenestratus* : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 2 : 112-114.

Material examined : 1 ex., India : Andhra Pradesh : Betamcheria in Kurnool dist., 14.iii.1999, S. K. Chatterjee, ex. hip of cowdung; 1ex., Vankatachalam in Nellore dist., 23.v.2000, S. K. Chatterjee, ex. cowdung.

Distribution : India : Andhra Pradesh (Betamcheria : Kurnool dist., Vankatachalam : Nellore dist.), Nagaland, Uttarakhand.

Elsewhere : Myanmar.

Remarks : Earlier this species was recorded from near to running water. Present study recorded the species for the first time from Andhra Pradesh as well as from the habitat like cowdung.

14. *Stilicoderus umbratus* Fauvel

1904. *Stilicoderus umbratus* Fauv., *Rev. d'Ent.*, **23** : 52.

1931. *Stilicoderus umbratus* : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), **2** : 114

Material examined : 2 ex. India : Andhra Pradesh : Dakkili, F. R. H. in Nellore dist., 27.v.2000, S. K. Chatterjee, at light.

Distribution : India : Andhra Pradesh (Dakkili : Nellore dist.), West Bengal, Tamil Nadu.

Remarks : Present study recorded this species for the first time from Andhra Pradesh.

Genus 8. *Cryptobium* Mannerh., 1830

1830. *Cryptobium* Mannerh., *Brach.*, p. 38.

1931. *Cryptobium* : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. Staphylinidae), **2** : 225-250.

Key to the species of the genus *Cryptobium* Mannerh

1. Species larger (10-11 mm); head distinctly transverse and with double puncturation of larger and smaller punctures;*bernhaueri* Cam.
- Species smaller (6-7 mm) head densely and uniformly punctured 2
2. Elytra except the basal third red; 6th ventral segment in male with rather broad, triangular emarginatiion with round apex*abdominale* Motsch. var. *indicum* Kr.
- Elytra black with its posterior margin narrowly reddish yellow; 6th ventral segment in male with small triangular excision with rounded apex*marginatum* Motsch.

15. *Cryptobium abdominale* Motsch. Var. *indicum* Kr.

1858. *Cryptobium abdominale* Motsch., *Bull. Mosc.*, **31** (2) : 651.

1859. *Cryptobium pygiale* Kr., Arch. Naturg., 25(1) : 121.
1895. *Cryptobium pygiale* var. *discoideum* Epp., D. E. Z., p. 402.
1859. *Cryptobium pygiale* var. *indicum* Kr., Arch. Naturg., 25(1) : 121.
1858. *Cryptobium abdominale* var. *rufipenne* Motsch., Bull. Mosc., 31(2) : 651.
1931. *Cryptobium abdominale* Motsch. Var. *indicum* Kr. : Cameron, The Fauna of British India incl. Ceylon & Burma (Col. : Staphylinidae), 2 : 243-244.
1995. *Cryptobium abdominale* Motsch. var. *indicum*, Biswas & Biswas, Fauna of West Bengal, State Fauna Series, 3(Part 6A) : 293. Zool. Surv. India.

Material examined : 1 ex., India : Andhra Pradesh : Dakkili in Nellore dist., 25.v.2000, S. K. Chatterjee.

Distribution : India : Andhra Pradesh (Dakkili : Nellore dist.), West Bengal.

Elsewhere : Sri Lanka, Indian Archipelago.

Remarks : Present study recorded this species for the first time from Andhra Pradesh.

16. *Cryptobium marginatum* Motsch.

1858. *Cryptobium marginatum* Motsch., Bull. Mosc., 31(2) : 652.
1859. *Cryptobium limbatum* Kr., Arch. Naturg., 25(2) : 652.
1931. *Cryptobium marginatum* Motsch. : Cameron, The Fauna of British India incl. Ceylon & Burma (Col. : Staphylinidae), 2 : 240-241.

Material examined : 1 ex. India : Andhra Pradesh : Sydapuram in Nellore dist., 26.v.2000, S. K. Chatterjee, ex. Bamboo leaves; 1 ex, Rapur in Nellore dist., 25.v.2000, S. K. Chatterjee, ex bamboo leaves.

Distribution : India : Andhra Pradesh (Sydapuram and Rapur in Nellore dist.), West Bengal, Tamil Nadu, Uttarakhand.

Elsewhere : Sri Lanka.

Remarks : Present study recorded this species for the first time from Andhra Pradesh.

17. *Cryptobium bernhaueri* Cam.

1924. *Cryptobium bernhaueri* Cam., Trans. Ent. Soc. London, P. 196.
1931. *Cryptobium bernhaueri* : Cameron., The Fauna of British India incl. Ceylon & Burma (Col. Staphylinidae), 2 : 239-240.
2003. *Cryptobium bernhaueri* var. *distinctum* Cameron : Biswas, Fauna of Sikkim, State Fauna Series, 9(Part 3) : 267. Zool. Surv. India.

Material examined : 1 ex., India : Andhra Pradesh : Betamcheria in Kurnool dist.,

14.iii.1999, S. K. Chatterjee, ex. heap of cowdung; 1 ex., Rapur in Nellore dist., 25.v.2000, S. K. Chatterjee, ex. bamboo leaves.

Distribution : India : Andhra Pradesh (Betamcheria : Kurnool dist., Rapur : Nellore dist.), Uttarakhand, Sikkim, Siwaliks.

Elsewhere : Nil.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

III. Subfamily STAPHYLININAE

Tribe 1. Xantholinini

Genus 9. *Leptacinus* Erichson, 1837-39

1837-39. *Leptacinus* Er., *Kaf. Mark. Brand.* : 429.

1857-59. *Leptacinus* Jacq. Du Val, *Gen. Col. d'Eur.*, 2 : 32.

1856-58. *Leptacinus* Kraatz, *Naturg. Ins. Deutsch.*, 2 : 645.

1860. *Leptacinus* C. G. Thoms., *Skand. Col.*, 2 : 192.

1895. *Leptacinus* Ganglb., *Kaf. Mitt. Eur.*, 2 : 486.

1906. *Leptacinus* Casey, *Trans. Ac. St. Louis*. 16 : 368-399.

Key to the species of the genus *Laptacinus* Er.

1. Species larger (5.5-6.5 mm) and more robust; lateral sulci of the front long and extending beyond the end of the median *parumpunctatus* Gyll.
- Species smaller (3.5–4 mm) and narrower; lateral sulci of the front short and ill defined, the median long and distinct *gracilis* Fauv.

18. *Leptacinus parumpunctatus* (Gyll.)

1827. *Staphylinus parumpunctatus* Gyll., *Ins. Succ.*, 4 : 481.

1906. *Leptacinus parumpunctatus* (Gyll.) : Casey, *Trans. Ac. St. Louis*, 16 : 400.

1932. *Leptacinus parumpunctatus* : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 3 : 8-9.

2003. *Leptocinus parumpunctatus*, Biswas, *Fauna of Sikkim, State Fauna Series*, 9(Part 3) : 269. *Zool. Surv. India*.

Material examined : 7 ex., India : Andhra Pradesh : Doulatabad in Medak dist., 1. VIII. 1990, S. K. Chatterjee Coll.

Distribution : India : Andhra Pradesh (Medak dist. : Doulatabad). Sikkim. Cosmopolitan.

Remarks : This species is cosmopolitan and distributed throughout India. Present study has recorded the species for the first time from Andhra Pradesh.

19. *Leptacinus gracilis* Fauv.

1895. *Leptacinus gracilis*, Fauv., *Rev. d'Ent.*, **14** : 240.

1932. *Leptacinus gracilis*, Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), **3** : 9-10.

2003. *Leptacinus gracilis*, Biswas, *Fauna of Sikkim, State Fauna Series*, **9**(Part 3) : 269. *Zool. Surv. India*.

Material examined : 4 ex. India : Andhra Pradesh : Rajendranagar in Medak dist., 1. VIII. 1990, S. K. Chatterjee; 1 ex., Rangareddi in Medak dist., 6. III. 1999, S. K. Chatterjee, ex. cowdung.

Distribution : India : Andhra Pradesh (Medak dist. Rajendranagar and Rangareddi), Tamil Nadu, Assam, Uttar Pradesh, Uttarakhand, Sikkim.

Elsewhere : Maynmar, Indonesia.

Remarks : Present study recorded this species for the first time from Andhra Pradesh.

Genus 10. *Indoscitalinus* Heller, 1900

1900. *Indoscitalinus*, Heller, *Abh. Mus. Dresd.*, **9** (5) : 5.

20. *Indoscitalinus dispilus* (Er.)

1839-40. *Xantholinus dispilus* Er., *Gen. Spec. Staph.* : P. 317.

1859. *Xantholinus dispilus* Kr., *Arch. Natur.*, **25**(1) : 104.

1932. *Indoscitalinus dispilus* (Er.) : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), **3** : 39-40.

Material examined : 2 ex. India : Andhra Pradesh : Addatigala village in East Godavari dist., 4.iv.1996, S. K. Chatterjee; 1ex., Vankatachalam in Nellore dist., 23.v.2000, S. K. Chatterjee, 1 ex., Koraturu village in West Godavari dist., 13.iv.1996, S. K. Chatterjee, 1ex. kazipeta in Cuddapah dist., 30.v.2000, S. K. Chatterjee, ex. cowdung.

Distribution : India : Andhra Pradesh (Addatigala : East Godavari dist., Vankatachalanm : Nellore dist., Koraturu : West Godavari dist., Kazipeta : Cuddapah dist.), West Bengal, Uttarakhand.

Elsewhere : Nil.

Remarks : Present study recorded this species for the first time from Andhra Pradesh.

Tribe II. **Staphylinini**Subtribe **Staphylini**Genus 11. *Philonthus* Curtis, 1825

1825. *Philonthus* Curtis, *Brit. Ent.*, 13, tab : 610.

1932. *Philonthus*, Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 3 : 62.

Key to the species of the genus *Philonthus* Curtis

1. Prothorax with two rows of punctures on either side; antennae testaceous; elytra pitchy in colour *sikkimensis* Biswas
 - Prothorax with more than two rows of punctures on either side 2
2. Prothorax with 3-rows of punctures (dorsally); antennae reddish and elytra coppery in colour *cinctulus* Kr.
 - Prothorax with more than 3-rows of punctures (dorsally) 3
3. Prothorax with dorsal rows of 4-punctures 4
 - Prothorax with dorsal rows of more than 4-punctures 7
4. Thorax red; abdomen entirely black, very closely and finely punctured and pubescent throughout *assamensis* Cameron
 - Thorax black or metallic 5
5. Penultimate joints of antennae distinctly longer than broad; elytra black with slight metallic reflex *maindroni* Fauv.
 - Penultimate joints of antennae as long as broad or transverse 6
6. Head, thorax and elytra, greenish blue; abdomen densely punctured *aeger* Epp.
 - Head and thorax black; elytra pitchy black, the sutural, humeral and apical marginal spot are reddish yellow *delicatulus* Boh.
7. Species larger (8.5 mm); antennae black 6th ventral segment in male with acute triangular impression, the base arcuately emarginate; prothorax with dorsal row of five rather small punctures *convalescens* Epp.
 - Species smaller (4.5 mm); The first three joints of antennae reddish yellow; 6th ventral segment triangularly impressed, its base arcuately emarginate in male; prothorax with dorsal row of six punctures *fuscatus* Kr.

21. *Philonthus cinctulus* (Gravely)

1802. *Philonthus cinctulus* Gr., *Col. Micr. Brunsv.* : 167.
 1932. *Philonthus cinctulus* (Gr) : Cameron, *The Fauna of British India incl. Ceylon and Burma* (Col. : Staphylinidae), **3** : 77-78.
 1995. *Philonthus cinctulus*, Biswas & Biswas, *Fauna of West Bengal, State Fauna Series*, **3**(Part 6(A)) : 314. *Zool. Surv. India*.

Material examined : 4 ex., India : Andhra Pradesh : Srilakalahasti in Chittor dist., 3.v.2000, S. K. Chatterjee; 1 ex., Addatigala village in East Godavari dist., N. E. of Rajahmundry, 8.iv.1996, ex. near pond; 2 ex., Venkatachalam in Nellore dist., 23.v.2000, S. K. Chatterjee, ex. cow dung; 1ex., Aduripalle in Nellore dist., 12.i.1999, P. Mukhopadhyay.

Distribution : India : Andhra Pradesh (Srikalahasti : Chittor dist., Addatigala : East Godavari dis., Katachalam & Aduripalle : Nellore dist.), West Bengal.

Elsewhere : Sri Lanka, Annam.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

22. *Philonthus delicatulus* Boh.

1858. *Philonthus delicatulus* Boh., *Eugen. Resa*, 29.
 1858. *Philonthus lativentris* Notsch., *Bull. Mosc.*, **30** (2) : 663.
 1859. *Philonthus subirideus* Kr., *Arch. Naturg.*, **25**(1) : 81.
 1932. *Philonthus delicatulus*, Cameron, *The Fauna of British India and incl. Ceylon & Burma* (Col. : Staphylinidae), **3** : 98.

Material examined : 1 ex., India : Andhra Pradesh; Koraturu village in West Godavari dist., 13.iv.1996, S. K. Chatterjee; 3 ex., F.R.H. compound, N. W. of Rajamundry, 12.iv.1996, S. K. Chatterjee; 1 ex., Addatigala village in East Godavari dist., 4.iv.1996, S. K. Chatterjee.

Distribution : India : Andhra Pradesh (Koraturu : West Godavari, Addatigala : East Godavari), Sikkim.

Elsewhere : Tibet, Sri Lanka, China.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

23. *Philonthus aeger* Epp.

1895. *Philonthus aeger* Epp. *W.E.Z.* : 59.
 1932. *Philonthus aeger* Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), **3** : 83-84.

Material examined : 1 ex., India : Andhra Pradesh, Addatigala village in East Godavari dist., 5.iv.96, S. K. Chatterjee.

Distribution : India : Andhra Pradesh (Addatigala : East Godavari dist.), Uttarakhand, Himachal Pradesh.

Elsewhere : Nil.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

24. *Philonthus convalescens* Eppelsheim

1890. *Philonthus convalescens* Epp., *W. E. Z.*, **9** : 276.

1932. *Philonthus convalescens* Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), **3** : 109-110.

2003. *Philonthus convalescens* Biswas, *Fauna of Sikkim, State Fauna Series*, **9**(Part-3) : 272. *Zool. Surv. India*.

Material examined : 1 ex., India : Andhra Pradesh, Addatigala in E. Godavari dist., Uttarakhand, Himachal Pradesh, Sikkim.

Elsewhere : Nil.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

25. *Philonthus sikkimensis* Biswas

2003. *Philonthus sikkimensis* Biswas, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9** (Part-3) : 272-273.

Material examined : 1 ex., India : Andhra Pradesh, Addatigala village in East Godavari dist., 4. iv. 1996, S. K. Chatterjee; 1 ex. Rajendranagar in Rangareddi dist., 6. III. 1999, S. K. Chatterjee, ex. cowdung.

Distribution : India : Andhra Pradesh (Addatigala : East Godavari dist., Rajendranagar : Rangareddi dist.), Sikkim.

Elsewhere : Nil.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

26. *Philonthus maindroni* Fauv.

1903. *Philonthus maindroni* Fauv., *Rev. d'Ent.*, **22** : 158.

1932. *Philonthus maindroni* Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), **3** : 88.

2003. *Philonthus maindroni* Biswas, *Fauna of Sikkim, State Fauna Series*, **9**(Part-3) : 272. *Zool. Surv. India*.

Material examined : 1 ex., India : Andhra Pradesh : Kazipeta in Cuddapah dist., 31.v.2000, S. K. Chatterjee, ex. cowdung.

Distribution : India : Andhra Pradesh (Kazipeta : Cuddapah dist), Uttarakhand, Sikkim, Tamil Nadu, Meghalaya, Uttar Pradesh.

Elsewhere : Nil.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

27. *Philonthus assamensis* Cameron

1932. *Philonthus assamensis* Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. Staphylinidae), 3 : 100.

2000. *Philonthus assamensis* Biswas, *Fauna of Sikkim, State Fauna Series*, 9(Part 3), : 273. *Zool. Surv. India*.

Material examined : 4 ex., India : Andhra Pradesh : Koratura, F.R.H. Compound in West Godavari dist., 12-15.iv.1996, S. K. Chatterjee, ex. at light.

Distribution : India : Andhra Pradesh (Koratura : West Godavari dist.), Assam, Manipur, Meghalaya, Tripura, Sikkim.

Elsewhere : Nil.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

28. *Philonthus fuscatus* Kr.

1859. *Philonthus fuscatus* Kr., *Arch Naturg.*, 25(1) : 95.

1932. *Philonthus fuscatus* Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 3 : 141.

Material examined : 1 ex., India : Andhra Pradesh : Rapur in Nellore dist., 25.v.2000, S. K. Chatterjee, ex. bamboo leaves; 3 ex., Sydapuram, 26.v.2000, S. K. Chatterjee, ex. bamboo leaves.

Distribution : India : Andhra Pradesh (Rapur, Sydapuram in Nellore dist.).

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded her for the first time from India (Andhra Pradesh).

IV. Subfamily ALEOCHARINAE

Cameron (1939) has divided the subfamily into 14 tribes and included 817 sepcies under 103 genera. Of the tribe, Myrmedoniini include 403 species belonging to 35 genera. The subgenus *Glossacantha* of the genus *Zyras* Steph include 17 species (Cameron, 1939) but no species was recorded from Andhra Pradesh. Present study recorded the species *Zyras* (G.) *reversus* Cameron for the first time from Andhra Pradesh.

Tribe **Myrmedoniini**Genus 12. **Zyras** Steph., 1832

1832. *Zyras* Steph., *Ill. Brit. Ent. Mandib.*, 5 : 430.
 1910. *Zyras* Blatchely, *Col. Indiana*, 1 : 358.
 1920. *Zyras* Fenyès, *Gen. Ins.*, 173(B) : 293.
 1926. *Zyras* Bernh., *Arch. Naturg. Ab. t. A.*, 10(102) : 19-22.
 1929. *Zyras* Scheerp., *Kol. Rundsch.*, 15 : 19.
 1930. *Zyras* id, *Tierwelt Mitteleur.*, 5(2) : 76.

Subgenus **Glossacantha** Gemm. et. Har.

1868. *Glossacantha* Gemm. et. Har., *Cat. Col.*, 2 : 519.
 1926(1928). *Glossacantha* Berth. *Arch. Naturg. Abt. A.*, 10(102) : 20, 36, 40.

29. **Zyras** (*Glossacantha*) *reverses* Cameron

1939. *Zyras* (G.) *reverses* Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 4 (Part 2) : 530-531.

Material examined : 6 ex., India : Andhra Pradesh, Dakkili F.R.H. in Nellore dist., 27.v.2000, S.K. Chatterjee, ex. at light; 1ex., Penchalakona in Nellore (W.) dist., 29.v.2000, S.K. Chatterjee, ex. cowdung; 1ex, Betamcherla in Kurnool dist., 14.iii.1999, S.K. Chatterjee.

Distribution : India : Andhra Pradesh (Dakkili, Penchalakona : Nellore dist., Betamacherla, Kurnool dist.), Uttarakhand.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

V. Subfamily TACHYPORINAE

Cameron (1932) divided the subfamily Tachyporinae into four tribes viz. Bolitobini, Tachyporini, Symmixinini and Hypocyplini. He included 104 species under 10 genera belonging to the tribe Tachyporini from India and its neighboring countries. Till to date no species was recorded from Andhra Pradesh. Present study recorded two species under the genus *Conosoma* Kraatz belonging to the tribe Tachyporini from Andhra Pradesh.

Tribe **Tachyporini**Genus 13. **Conosoma** Kraatz, 1856-58

- 1856-58. *Conosoma* Kr., *Naturg. Ins. Deutschl.*, 2 : 431.
 1861. *Conosoma*, Thoms., *Skand. Col.*, 3 : 147.

1900. *Conosoma* Casey, *Journ. N. York Ent. Soc.*, 8 : 436.

1902. *Consoma*, Luze, *W.Z.B.*, 1(2) : 19.

Key to the species of the genus *Conosoma* Kraatz

1. Species smaller (2.5–3 mm) black; Elytra shorter and about as long as thorax *birmanum* Cam.
- Species comparatively larger (5 mm); light reddish brown in colour Elytra little longer than thorax *subtestaceum* Cam.

30. *Conosoma subtestaceum* Cam.

1926. *Conosoma subtestaceum* Cam., *Trans. Ent. Soc. Lond.* : 176.

1932. *Conosoma subtestaceum*, Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 3 : 362-363.

Material examined : 4 ex., India : Andhra Pradesh, Osmania University in Rangareddi dist., 8.iii.1999, S.K. Chatterjee, ex. cowdung; 1 ex., Koraturu in W. Godavari dist., 12.iv.1996, S.K. Chatterjee; 1 ex., Addatigala village in East Godavari dist., 8.iv.1996, S.K. Chatterjee; 1 ex., Podalakur in Nellore dist., 27.v.2000, S.K. Chatterjee, ex. cowdung; 2 ex., Venkatachalam in Nellore dist., S.K. Chatterjee, ex. cowdung; 1 ex., Lacpalmner in Chittor dist., 21.i.1999, P. Mukhopadhyay.

Distribution : India, Andhra Pradesh (Osmania University : Rangareddi dist., Koraturu : West Godavari dist., Addatigala : E. Godavari, Podalakur : Nellore, Venkatachalam : Nellore, Lacpalmner : Chittor), Uttarakhand.

Elsewhere : Nil.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

31. *Conosoma birmanum* Fauv.

1895. *Conosoma birmanum* Fauv., *Rev. d'Ent.*, 14 : 284.

1932. *Conosoma birmanum* : Cameron, *The Fauna of British India incl. Ceylon & Burma* (Col. : Staphylinidae), 3 : 365-366.

Material examined : 2 ex., India : Andhra Pradesh, Podalakur in Nellore dist., 27.v.2000, S.K. Chatterjee, ex. cowdung; 1 ex., Kazipeta in Cuddapah dist., 31.v.2000, S.K. Chatterjee, ex. cowdung; 1 ex., Koraturu village : W. Godavari dist., 12.iv.1996, S.K. Chatterjee.

Distribution : India : Andhra Pradesh (Podalakur : Nellore, Kazipeta : Cuddapah, Kazipeta : W. Godavari), West Bengal.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

SUMMARY

The present paper consolidates information available on the five subfamilies viz. Oxytelinae, Paederinae, Staphylininae, Aleocharinae and Tachyporinae of the family Staphylinidae of Andhra Pradesh. It deals with 31 species under 13 genera belonging to five subfamilies. Of which 30 species are recorded for the first time from this state and 1 species viz. *Philonthus fuscatus* Kr. for the first time from India. Distribution data of the species has been given from the published records as well as actual study of the specimens. Key to the genera and species has also been provided wherever necessary.

ACKNOWLEDGEMENTS

Authors are grateful to the Director, Zoological Survey of India for providing laboratory facilities. Thanks are also due to Dr. Ramakrishna, Scientist E and Dr. A. K. Hazra, Scientist E and In-Charge of Entomology Division for suggestions and constant encouragement to complete the work.

REFERENCES

- Bernhauer, M. 1915. Zur Staphyliniden fauna des Indo-Malayischen Gebietes, insbedonders des Himalaya. *Coleopterologische Rundschau*, 4 : 49-60.
- Biswas, D. N. and Sengupta, T. 1983. Four new species of *Astenus* Stephens (Col. Staphylinidae : Paederinae) from eastern India. *Bull. zool. Surv. India*, 5 (1) : 1-9 figs. 1-31.
- Biswas, D. N. and Sengupta, T. 1989. Revision of Indian *Bledius* Leach (Col. Staphylinidae). *Rec. zool. Surv. India, Occ. Paper No. 122* : 1-46, figs. 1-133, map 1.
- Biswas, D. N. and Biswas, S. 1995. Insecta : Coleoptera : Staphylinidae. *Zool Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 6(A)) : 201-361.
- Biswas, D. N. and Biswas, S. 2000. Insecta : Coleoptera : Staphylinidae. *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series*, 4(Part 5) : 115-160.
- Biswas, D. N. Biswas, S. 2000. Insecta : Coleoptera : Staphylinidae. *Zool Surv. India, Fauna of Tripura, State Fauna Series*, 7(Part-3) : 63-85.
- Biswas, D. N. 2003. Insecta : Coleoptera : Staphylinidae. *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, 9(Part-3) : 237-281.
- Biswas, D. N. and Mukhopadhyay, P. 2004. Insecta : Coleoptera : Staphylinidae. *Zool. Surv. India, Fauna of Manipur, State Fauna Series*, 10(Part-2) : 385-399.
- Cameron, M. 1930. The *Fauna of British India incl. Ceylon & Burma, Coleoptera : Staphylinidae*, Vol. 1, London v+471 pp., I map.
- Cameron, M. 1931. The *Fauna of British India including Ceylon & Burma, Coleoptera : Staphylinidae*, Vol. II, : London, iii+257 pp., 2 pl.

- Cameron, M. 1932. The *Fauna of British India incl. Ceylon & Burma, Coleoptera : Staphylinidae*, Vol. III, London, v+443 pp., 4 pl.
- Cameron, M. 1939. The *Fauna of British India incl. Ceylon & Burma, Coleoptera : Staphylinidae*, Vol. IV(I), London, v+410.
- Cameron, M. 1939. The *Fauna of British India incl. Ceylon & Burma, Coleoptera : Staphylinidae*, Vol. IV(II), London, : 411-691, 3 pl., 1 map.
- Fauvel, a. 1895. Staphylinidae nouveaux de l'Inde et, de la Malaisie. *Rev. d'Ent*, Caen, 14 : 180-286.
- Hammond, P. M. 1973. Coleoptera : Staphylinidae : Oxytelini from Ceylon. *Ent. Scand. Suppl.*, 4 : 141-178.
- Kraatz, G. 1859. Staphylinen - Fauna von Ostindien, insbesondere der Insel Ceylon, *Archiv, Fur Naturgeschichte*, 25 : 1-193, 3 pl., Sep. Berlin, 196 pp, 3 pl.
- Motschulsky, V. 1858. Enumeration des nouvelles especes de coleopteres rapports de ses voyages (continuation) *Bull. de la Societe Imperiale des naturalistes de Moscou*, 31(2) : 634-670.
- Rougemont, G. de. 1985. Les *Stiliderus* de la collection du Museum de Geneve (Col : Staphylinidae) *Revue Suisse Zool.*, 92(1) : 217-228.
- Rougemont, G. de. 1986. Revision of the genus *Stiliderus* Motschulsky, 1858, Part I : (= *Stilicoderus* Sharp, 1889) (Coleoptera : Staphylinidae : Paederinae). *Ent. Abh. Mus. Tierk. Dresden*, 49 (8) : 139-187.
- Rougemont, G. de. 1986. Revision of the genus *Stiliderus* Mots., 1858, Part II. The species with bilobed IVth tarsomeres (Coleoptera : Staphylinidae : Paederinae). *Ent. Abh. Mus. Tierk. Dresden*, 50(2) : 33-58.

INSECTA : COLEOPTERA (AQUATIC) ADEPHAGA : FAM. GYRINIDAE AND FAM. DYTISCIDAE

P. MUKHOPADHYAY and S. K. GHOSH

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

Of the five families of Adephagan aquatic coleoptera, the present paper deals with the families like Gyrinidae and Dytiscidae. The members of the family Gyrinidae are commonly known as 'whirligig beetles'. They are usually found in groups in fresh water ponds, lake margins, open flowing streams, quiet stream margins, bog, pools, swamps etc. Present study includes only four species under four genera which are already recorded in literature.

Other family, Dytiscidae, form the main constituent of the aquatic biota and are found both in stagnant and running waters. They are also found in fresh as well as brackish waters. The members of this family are commonly known as 'Predacious diving beetles'. Major workers on this group are Balfour Browne (1939, 1945), Guignot (1942-59), Zimmerman (1920-30), Vazirani (1967-80), Brancucci (1983) etc. Later Biswas, Mukhopadhyay & Saha (1995); Ghosh, Mukhopadhyay & Biswas (2000) and Mukhopadhyay & Ghosh (2003) dealt the group from West Bengal, Tripura & Sikkim. The members of this family occur all over the world and of the 4000 world recorded species, 223 species are recorded from India. Present study is based on the collections made by different parties of Zoological Survey of India from different districts of Andhra Pradesh and the materials present in the National Zoological collections. Prior to study 14 species under 4 genera were recorded under this family from Andhra Pradesh. Present study has increased the total number of species to 31 under 15 genera belonging to 4 sub families.

SYSTEMATIC ACCOUNT

Family 1. GYRINIDAE

Subfamily I. ENHYDRINAE

Genus 1. *Dineutus* Macleay, 1825

Subgenus *Dineutus* (*Protodineutus*) Ochs

1. *Dineutus* (*Protodineutus*) *indicus* Aube.

Subfamily II. GYRININAE

Genus 2. *Aulonogyrus* Motschulsky, 1853

2. *Aulonogyrus obliquus* (Walker)

Genus 3. *Gyrinus* Geoffroy, 1762

3. *Gyrinus convexiusculus* Macleay.

Subfamily III. ORECTOCHILINAE

Genus 4. *Orectochilus* Eschscholtz, 1833Subgenus *Orectochilus* (*Patrus*) Aube

4. *Orectochilus* (*Patrus*) *semivestitus* Guerin
5. *Orectochilus* (*Patrus*) *discifer* (Walker).

Family 2. DYTISCIDAE

Subfamily IV NOTERINAE

Tribe HYDROCANTHINI

Genus 5. *Canthydrus* Sharp, 1882

6. *C. laetabilis* (Walker).
7. *C. morsbachii* (Wehncke).
8. *C. ritsemai* Regimbart.

Genus 6. *Hydrocoptus* Motschulsky, 1859

9. *H. subvittulus* Mots.

Subfamily V. LACCOPHILINAE

Genus 7. *Laccophilus* Leach, 1817

10. *L. anticatus anticatus* Sharp.
11. *L. clarki* Sharp.
12. *L. elegans* Sharp.
13. *L. ellipticus* Regimbart.
14. *L. flexuosus* Aube.
15. *L. inefficiens* (Walker).
16. *L. parvulus obtusus* Sharp.
17. *L. uniformis* Motsch.

Genus 8. *Neptosternus* Sharp, 1882

18. *N. taprobanicus* Sharp.

Subfamily VI. HYDROPORINAE

Tribe I. HYDROVATINI

Genus 9. *Hydrovatus* Motschulsky, 1855

19. *Hydrovatus* sp.

Tribe II. BIDESSINI

Genus 10. *Guignotus* Houlbert, 1934

20. *G. flammulatus* (Sharp)

21. *G. inconstans* (Reg.).

22. *G. pendjabensis* Guignot.

Genus 11. *Uvarus* Guignot, 1959

23. *Uvarus* sp.

Genus 12. *Yola* Gozis, 1886

24. *Y. consanguinea* (Regimbert).

Tribe III. HYDROPORINI

Genus 13. *Herophydrus* Sharp, 1882

25. *H. musicus* (Klug.).

Genus 14. *Peschetius* Guignot, 1935

26. *P. toxophorus* Guignot

Subfamily VII. DYTISCINAE

Tribe I. ERETINI

Genus 15. *Eretes* Castelnau, 1833

27. *E. sticticus* (Linnaeus).

Tribe II. HYDATICINI

Genus 16. *Hydaticus* Leach, 1817

28. *H. (Guignotites) fabricii* Macleay

29. *H. (Guignotites) vittatus* (F.)

Tribe III. THERMONECTINI

Genus 17. *Rhantaticus* Sharp, 1882

30. *R. congestus* (Klug)

Genus 18. *Sandracottus* Sharp, 1882

31. *S. dejeani* (Aube)

32. *S. festivus* (Illiger)

33. *S. mixtus* (Blanchard)

Tribe IV. **Cybisterini**Genus 19. ***Cybister*** Curtis, 1827

- 34. *C. (Melanectes) convexus* Sharp
- 35. *C. (Meganectes) plctoralis* Sharp
- 36. *C. (Meganectes) tripunctatus asiaticus* Sharp

Family 1. **GYRINIDAE**Subfamily I. **ENHYDRINAE**Genus 1. ***Dineutus*** Macleay, 1825

- 1825. *Dineutus* Macleay, *Annulosa javanica* ed. 1 : 30.
- 1984. *Dineutus* Vazirani, *The Fauna of India*, Col : Fam. Gyrinidae and Fam. Haliplidae. Govt. of India, : 16.

Subgenus ***Dineutus (Protodineutus)*** Ochs

- 1926. *Dineutus (Protodineutus)* Ochs, *Ent. z. Frankf*, 40 : 66.

1. ***Dineutus (P.) indicus*** Aube

- 1938. *Dineutus indicus* Aube, *Species coleopteres.*, 6 : 772.
- 1926. *Dineutus (Protodineutus) indicus* Ochs., *Ent. Z. Frankf.*, 40 : 13.
- 1984. *Dineutus (P.) indicus* : Vazirani, *The Fauna of India*, col. : Fam. Gyrinidae and Fam. Haliplidae, Govt. of India, : 22-24.

Material examined : Not seen.

Distribution : India : West Bengal, Bihar, Orissa, Kashmir, Himachal Pradesh, Uttar Pradesh, Uttaranchal, Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Andhra Pradesh, Kerala, Tamil Nadu, Pondichery.

Elsewhere : Pakistan.

Subfamily II. **GYRININAE**Genus 2. ***Aulonogyus*** Motschulsky, 1853

- 1853. *Aulonogyus* Motschulsky, *Hydrocanthares Russia*, : 9.
- 1883. *Aulonogyus* : Regimbert, *Ann. Soc. ent. Fr.*, (6)3 : 124.
- 1984. *Aulonogyus* : Vazirani, *The Fauna of India*, Col : Fam. Gyrinidae and Fam. Haliplidae, Govt. of India, : 25-28.

2. *Aulonogyrus obliquus* (Walker)

1958. *Gyrinus obliquus* Walker, *Ann. Mag. nat. Hist.* (3)2 : 205.
 1883. *Aulonogyrus obliquus* : Regimbart, *Ann. Soc. ent. Fr.*, (6)3 : 137.
 1984. *Aulonogyrus obliquus* : Vazirani, *The Fauna of India, Col. : Fam. Gyrinidae and Fam. Haliplidae*, Govt. of India, : 26-28.

Material examined : Not seen.

Distribution : India, Madhya Pradesh, Andhra Pradesh, Tamil Nadu.

Elsewhere : Sri Lanka.

Genus 3. *Gyrinus* Geoffroy, 1762

1762. *Gyrinus* Geoffroy. *Hist. Ins. Paris*, 1 : 93.
 1984. *Gyrinus* : Vazirani, *The Fauna of British India, Col. : Fam. Gyrinidae and Fam. Haliplidae*, Govt. of India, : 29-30.

3. *Gyrinus convexiusculus* MacLeay

1871. *Gyrinus convexiusculus* MacLeay, *Trans. ent. Soc., N. S. Wales*, 2 : 128.
 1984. *Gyrinus convexiusculus* : Vazirani, *The Fauna of India, Col. Fam. Gyrinidae and Fam. Haliplidae*, Govt. of India, : 30-32.

Material examined : Nil.

Distribution : India, Bihar, Assam, Orissa, Meghalaya, Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu.

Subfamily III. ORECTOCHILINAE

Genus 4. *Orectochilus* Eschscholtz, 1833

1883. *Orectochilus* Eschscholtz, in *Dejeans catalogue coleopteres*, ed. II : 59.
 1984. *Orectochilus* : Vazirani, *The Fauna of India, Col : Fam Gyrinidae and Fam. Haliplidae*, Govt. of India, : 36-37.

Subgenus *Orectochilus* (Patrus) Aube

- 1936-38. Patrus Aube, *Iconographic Coleopterus Europe*, 5 : 397.
 1925. *Orectochilus* (Patrus) : Hatch, *Pap. Mich. Acad. Sci.*, 5 : 452.

4. *Orectochilus* (Patrus) *semivestitus* Guerin

1840. *Orectochilus* (Patrus) *semivestitus* Guerin, *Revue. Zool.*, 3 : 38.

1984. *Orectochilus (Patrus) semivestitus* : Vazirani, *The Fauna of India*, col : Fam. Gyrinidae and Fam. Haliplidae, Govt. of India, : 45-46.

Material examined : Nil.

Distribution : India : Karnataka, Andhra Pradesh, Kerala, Tamil Nadu, Pondicherry.

5. *Orectochilus (Patrus) discifer* (Walker)

1859. *Gyrinus discifer* Walker, *Ann. Mag. nat. Hist.*, (3)3 : 51.
 1930. *Orectochilus (Patrus) discifer*, Ochs, *Cat. Ind. Ins.*, pt. 19 : 24.
 1984. *Orectochilus (Patrus) discifer* Vazirani, *The Fauna of India*, col. : Fam. Gyrinidae and Fam. Haliplidae, Govt. of India, : 60-62.

Material examined : Not seen.

Distribution : India, Bihar, West Bengal, Madhya Pradesh, Maharashtra, Andhra Pradesh, Kerala, Tamil Nadu.

Elsewhere : Sri Lanka.

Family 2. DYTISCIDAE

Subfamily IV. NOTERINAE

Tribe Hydrocanthini

Genus 5. *Canthydrus* Sharp, 1882

1882. *Canthydrus* Sharp, *Sci. Trans. R. Dublin Soc.*, 2 : 269, 838.
 1977. *Canthydrus*, vazirani, *Cat. Orient.*, Dytiscidae, : 5.

6. *Canthydrus laetabilis* (Walker)

1858. *Hydroporus laetabilis* Walker, *Ann. Mag. nat. Hist.*, (3)2 : 205.
 1882. *Canthydrus laetabilis*, Sharp, *Sci. Trans. R. Dublin Soc.*, 2 : 277.
 1997. *Canthydrus laetabilis*, Vazirani, *Cat. Orient.*, Dytiscidae, : 6.
 2000. *Canthydrus laetabilis*, Ghosh, Mukhopadhyay & Biswas, *Fauna of Tripura, State Fauna Series*, 7(Part-3) : 39. *Zool. Surv. India*.

Material examined : 10 ex., India : Andhra Pradesh : Nellore : Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & Party; 4 ex, Isakapalle, 13.i.1999, Dr. P. Mukhopadhyay & party; 1 ex., Mantapuram, 17.i.1999, Dr. P. Mukhopadhyay & party; 2 ex., Koraturn in Godavari dist., 14. iv. 1994, S. K. Chatterjee & party.

Distribution : India : West Bengal, Bihar, Orissa, Tripura, Assam, Punjab, Rajasthan, Gujarat, Maharashtra, Uttarpradesh, Andhra Pradesh, Kerala.

Elsewhere : Sri Lanka, Bangladesh, Nepal, Pakistan.

7. *Canthydrus morsbachii* (wehncke)

1876. *Hydrocanthus morsbachii* Wehncke, *Dtsch. ent. Z.*, **20** : 222.

1977. *Canthydrus morsbachii*, Vazirani, *Rec. zool. Surv. India, Occ Paper No. 6* : 7.

1995. *Canthydrus morsbachii*, Biswas, Mukhopadhyay & Saha, *Fauna of West Bengal, State Fauna Series*, **3(Part 6(A))** : 85-86. *Zool. Surv. India*.

Material examined : 4 ex., India : Andhra Pradesh, Nellore, Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India : West Bengal, Orissa, Maharashtra, Andhra Pradesh, Tamil Nadu, Kerala, Goa.

Elsewhere : Thailand, Indonesia, Myanmar, Africa.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

8. *Canthydrus ritsemai* Regimbart

1899. *Canthydrus ritsemai* Regimbart, *Ann. Soc. ent. Fr.*, **68** : 252.

1997. *Canthydrus ritsemai*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 8.

Material examined : Not seen.

Distribution : India : West Bengal, Bihar, Orissa, Assam, Andhra Pradesh.

Elsewhere : Thailand, Myanmar, Vietnam, Indonesia, Malaysia, Singapore.

Genus 6. *Hydrocoptus* Motschulsky, 1859

1859. *Hydrocoptus* Motschulsky. *Etudes Entomologiques*, **8** : 43, 364.

1977. *Hydrocoptus*, Vazirani, *Rec. zool. surv. India, Occ. Paper No. 6* : 2.

9. *Hydrocoptus subvittulus* Motschulsky

1860. *Hydrocoptus subvittulus* Mots., *Etud. Entom.*, **8** : 53.

1977. *Hydrocoptus subvittulus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 4.

2000. *Hydrocoptus subvittulus*, Ghosh, Mukhopadhyay & Biswas, *Fauna of Tripura, State Fauna Series*, **7(Part 3)** : 38. *Zool. Surv. India*.

Material examined : 3 ex, India : Andhra Pradesh, Nellore, Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & party; 1 ex., Isakapalle, 13.i.1999, Dr. P. Mukhopadhyay & party; 2 ex., Mantespuram, 17.i.1999, Dr. P. Mukhopadhyay & Party.

Distribution : India : West Bengal, Bihar, Orissa, Assam, Tripura, Gujarat, Maharashtra, Andhra Pradesh, Tamil Naud.

Elsewhere : Sri Lanka, China.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

Subfamily V. LACCOPHILINAE

Genus 7. *Laccophilus* Leach, 1817

1817. *Laccophilus* Leach, Zool. Misc., 3 : 69.

1882. *Laccophilus*, Sharp, Sci. Trans. R. Dublin Soc., 2 : 287, 841.

1930. *Laccophilus* Zimmermann, koleopt. Rdsch., 16 : 45.

1977. *Laccophilus*, Vazirani, Rec. zool. Surv. India, Occ. Paper No., 6 : 9.

10. *Laccophilus anticatus anticatus* Sharp

1890. *Laccophilus anticatus* Sharp, Trans. Ent. Soc. London : 34.

1977. *Laccophilus anticatus*, Vazirani, Rec. zool. Surv. India, Occ. Paper No., 6 : 9, 94.

1983. *Laccophilus anticatus anticatus*, Brancucci, Ent. Arb. Mus. Frey, 31/32 : 302-304.

Material examined : 1 ex., India : Andhra Pradesh : Nellore, Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India : West Bengal, Bihar, Orissa, Assam, Tripura, Manipur, Uttar Pradesh, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Pondicherry, Kerala.

Elsewhere : Bangladesh, Sri Lanka, Indonesia, East Pakistan,.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

11. *Laccophilus clarki* Sharp

1880-82 *Laccophilus clarki* Sharp, Sci. Trans. R. Dublin Soc., 2 : 3113.

1983. *Laccophilus clarki*, Brancucci, Ent. Arb. Mus. Frey, 31/32 : 364-366.

Material examined : 3 ex., India : Andhra Pradesh : Nellore, Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India : Manipur, Andhra Pradesh.

Elsewhere : Australia.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

12. *Laccophilus elegans* Sharp

1882. *Laccophilus elegans* Sharp, Sci. Trans. R. Dublin Soc., 2 : 302-303.

1977. *Laccophilus elegans*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 11.

1983. *Laccophilus elegans*, Brancucci, *Ent. Arb. Mus. Frey*, **31/32** : 257-259.

1995. *Laccophilus elegans*, Biswas, Mukhopadhyay & Saha, *Zool. surv. India, State Fauna series 3 : Fauna of West Bengal, part 6 (A)*, pp. 88.

Material examined : Not seen.

Distribution : India : West Bengal, Bihar, Orissa, Nagaland, Karnataka, Andhra Pradesh, Andaman & Nicobar Is.

Elsewhere : Indochina.

13. *Laccophilus ellipticus* Regimbart

1889. *Laccophilus ellipticus* Regimbart., *Ann. Soc. ent. Fr.* (6) **9** : 152.

1977. *Laccophilus ellipticus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 11.

1983. *Laccophilus ellipticus*, Brancucci, *Ent. Arb. Mus. Frey*, **31/32** : 312-314.

1995. *Laccophilus ellipticus*, Biswas, Mukhopadhyay & Saha, *Fauna of West Bengal, State Fauna Series, 3(Part 6(A))* : 88. *Zool Surv. India*.

Material examined : Not seen.

Distribution : India : West Bengal, Bihar, Orissa, Assam, Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu, Pondichery, Kerala, Goa.

Elsewhere : Myanmar, Sri Lanka, China, Vietnam, Thailand, Cambodia, Indonesia.

14. *Laccophilus flexuosus* Aube

1838. *Laccophilus flexuosus* Aube, *In Dejeans species coleopteres*, **6** : 430.

1977. *Laccophilus flexuosus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 11.

1983. *Laccophilus flexuosus*, Brancucci, *Ent. Arb. Mus. Frey*, **31/32** : 318-321.

2003. *Laccophilus flexuosus*, Mukhopadhyay & Ghosh, *Fauna of Sikkim, State Fauna Series, 9(Part 3)* : 24. *Zool Surv. India*.

Material examined : 2 ex., India : Andhra Pradesh, Nellore : Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India : West Bengal, Bihar, Orissa, Tripura, Sikkim, Manipur, Punjab, Haryana, Himachal Pradesh, Uttar Pradesh, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Karnataka, Andhra Pradesh, Tamil Nadu, Pondicherry, Andaman & Nicobar Is.

Elsewhere : Myanmar, Sri Lanka, Pakistan, Nepal, China, Indonesia, Iran, Iraq, Japan, Hongkong, Taiwan, Vietnam, Cambodia.

15. *Laccophilus inefficiens* (Walker)

1859. *Hydroporus inefficiens* Walker, *Ann. Mag. Nat. Hist.*, **3** : 51.
 1882. *Laccophilus inefficiens*, Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 287, 797.
 1983. *Laccophilus inefficiens*, Brancucci, *Ent. Arb. Mus. Frey*, **31/32** : 332-335.
 2003. *Laccophilus inefficiens*, Mukhopadhyay & Ghosh, *Fauna of Sikkim, State Fauna Series*, **9(Part-3)** : 24-25. *Zool. Surv. India*.

Material examined : 2 ex., India : Andhra Pradesh, Nellore : Kalnaltumu, 6.i.1999, Dr. P. Mukhopadhyay & Party; 7ex., Palmaner in Chittor dist., 21.i.1999, Dr. P. Mukhopadhyay & party; 1 ex., Isakapalle in Nellore dist., 13.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India : West Bengal, Bihar, Orissa, Sikkim, Tripura, Manipur, Punjab, Maharashtra, Madhya Pradesh, Uttaranchal, Andhra Pradesh, Karnataka, Uttar Pradesh, Tamil Nadu, Kerala, Pondicherry.

Elsewhere : Nepal, Sri Lanka.

16. *Laccophilus parvulus obtusus* Sharp

- 1880-82. *Laccophilus parvulus* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 311.
 1983. *Laccophilus parvulus obtusus*, Brancucci, *Ent. Arb. Mus. Frey*, **31/32** : 360-362.

Material examined : 15 ex., India : Andhra Pradesh : Nellore : Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & party; 1 ex., Palmaner in Chittor dist., 21.i.1999. Dr. P. Mukhopadhyay & party.

Distribution : India : Manipur, Andhra Pradesh, Kerala, Goa, Pondicherry.

Elsewhere : Bangladesh, China, Vietna, Cambodia, Thailand, Indonesia.

17. *Laccophilus uniformis* Motsch.

1859. *Laccophilus uniformis* Motsch., *Etudis Entom.*, **8** : 46.
 1977. *Laccophilus uniformis*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 17.
 1983. *Laccophilus uniformis*, Brancucci, *Ent. Arb. Mus. Frey*, **31/32** : 366.
 2003. *Laccophilus uniformis*, Mukhopadhyay & Ghosh, *Fauna of Sikkim, State Fauna Series*, **9(Part-3)** : 26. *Zool. Surv. India*.

Material examined : 4 ex., India : Andhra Pradesh : Mantespuram in Nellore dist, 17.i.1999, Dr. P. Mukhopadhyay 2 party.

Distribution : India : Sikkim, Manipur, Andhra Pradesh.

Elsewhere : Myanmar, China, Vietnam, Laos, Cambodia, Thailand, Indonesia.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

Genus 8. *Neptosternus* Sharp, 1882

1882. *Neptosternus* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 317, 843.

1977. *Neptosternus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 17.

18. *Neptosternus taprobanicus* Sharp

1890. *Neptosternus taprobanicus* Sharp, *Trans. ent. Soc. Lond.*, 342.

1977. *Neptosternus taprobanicus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 18.

2000. *Neptosternus taprobanicus*, Ghosh, Mukhopadhyay & Biswas, *Zool. surv. India, Fauna of Tripura. State Fauna Series*, 7(Part-3) : 41.

Material examined : Not seen.

Distribution : India : Tripura, Andhra Pradesh.

Elsewhere : Srilanka.

Subfamily VI. HYDROPORINAE

Tribe 1. HYDROVATINI

Genus 9. *Hydrovatus* Motschulsky, 1855

1855. *Hydrovatus* Motsch., *Etudes Entomologiques*, **5** : 82.

1977. *Hydrovatus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 25.

19. *Hydrovatus* Sp.

Material examined : 6 ex., India : Andhra Pradesh, Nellore, Aduripalli, 12.i.1999, Dr. P. Mukhopadhyay & party; 2 ex., Isakapalle, 13.i.1991, Dr. P. Mukhopadhyay & party; 4 ex., Mantapuram, 17.i.1999, Dr. P. Mukhopadhyay & party.

Remarks : The detailed study regarding the species will be dealt separately.

Tribe 2. Bidessini

Genus 10. *Guignotus* Houlbert, 1934

1934. *Bidessus* (Guignotus) Houlbert, *Fauna Ext. Ann. Hydrocanthares*, p. 54.

1945. *Guignotus*, Guignot, *Mem. Mus. natn. Hist. nat.*, **19** : 226.

1977. *Guignotus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 31.

20. *Guignotus flammulatus* (Sharp)

1882. *Bidessus flammulatus* Sharp, *Sci. Trnas. R. Dubhin Soc.*, **2** : 359.

1954. *Guignotus flammulatus*, Guignot, *Opusc. ent. hind.*, **19** : 221.
 1977. *Guignotus flammulatus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 32.
 2003. *Guignotus flammulatus*, Mukhopadhyay & Ghosh, *Fauna of Sikkim, State Fauna series, 9(Part-3)* : 27. *Zool. Surv. India*.

Material examined : 18 ex., India : Andhra Pradesh, Nellore, 12.i.1999, Dr. P. Mukhopadhyay & party; 1 ex., Iskapalle, 13.i.1999, Dr. P. Mukhopadhyay & party, 4 ex., Mantapuram, 17.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India : West Bengal, Bihar, Orissa, Tripura, Sikkim, Manipur, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Uttar Pradesh, Andhra Pradesh, Tamil Nadu.

Elsewhere : Bangladesh, Sri Lanka, Myanmar, Pakistan, China, Japan, Indonesia, Vietnam, Thailand.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

21. *Guignotus inconstans* (Regimbart)

1892. *Bidessus inconstans* Regimbart, *Ann. Soc. ent. Fr.*, **36** : 119.
 1963. *Guignotus inconstans*, Fernando, *Bull. Fish. Res. Stn. Ceylon*, **16(1)** : 26.
 1977. *Guignotus inconstans*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 33-34.
 2003. *Guignotus inconstans*, Mukhopadhyay & Ghosh, *Fauna of Sikkim, State Fauna Series, 9 (part 3)* : 27. *Zool. Surv. India*.

Material examined : 1 ex., India : Andhra Pradesh, Mantapuram in Nellore dist, 17.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India : West Bengal, Bihar, Orissa, Manipur, Sikkim, Tripura, Rajasthan, Maharashtra, Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu, Goa.

Elsewhere : This species is recorded here for the first time from Andhra Pradesh.

22. *Guignotus pendjabensis* Guignot

1954. *Guignotus pendjabensis* Guignot, *Opusc. ent. Lund.*, **19** : 221.
 1975. *Guignotus pendjabensis*, Vazirani, *Rec. zool. Surv. India*, **67** : 296.
 1995. *Guignotus pendjabensis*, Biswas, Mukhopadhyay & Saha, *Fauna of West Bengal, State Fauna Series, 3(Part 6A)* : 97. *Zool. Surv. India*.

Material examined : 1 ex., India : Andhra Pradesh, Nellore : Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & party, 7 ex., Mantapuram, 17.i.1000, Dr. P. Mukhopadhyay & party.

Distribution : India : West Bengal, Orissa, Gujarat, Rajasthan, Maharashtra, Madhya Pradesh, Andhra Pradesh, Goa.

Elsewhere : Bangladesh, Pakistan.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

Genus 11. *Uvarus* Guignot, 1959

1959. *Uvarus* Guignot, *Ann. Mus. R. congo Belg.* (8)70 : 294.

1977. *Uvarus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 41-42.

23. *Uvarus* sp.

Material examined : 1 ex., India, Andhra Pradesh, Nellore : Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & party.

Remarks : This species will be dealt separately.

Genus 12. *Yola* Gozis, 1886

1886. *Yola* Gozis, *Rech. Esp. Typ.*, p.8.

1977. *Yola* Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 41.

24. *Yola consanguinea* (Regimbart)

1892. *Bidessus consanguinea* Regimbart, *Ann. Soc. Ent. Belg.* 36 : 118.

1899. *Yola consanguinea*, Regimbart, *Ann. Soc. ent. Fr.*, 68 : 221-222.

1969. *Yola consanguinea*, Vazirani, *Ori., Ins.*, 2(3-4) : 333-334.

1977. *Yola consanguinea*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 41.

Material examined : Not seen.

Distribution : India : Bihar, Orissa, Gujarat, Maharashtra, Andhra Pradesh.

Tribe 3. **Hydroporini**

Genus 13. *Herophydrus* Sharp, 1882

1882. *Herophydrus* Sharp, *Sci. Trans. R. Dublin Soc.*, 2 : 392, 861.

1977. *Herophydrus*, Vazirani, *Rec. zool. surv. India, Occ. Paper No. 6* : 47.

25. *Herophydrus musicus* (Klug)

1833. *Hydroporus musicus* Klug, *Symb. physicae*, 4 : 33.

1899. *Herophydrus musicus*, Regimbart, *Ann. Soc. ent. Fr.*, 68 : 201.

Material examined : Not seen.

Distribution : India : Bihar, Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh, Andhra Pradesh, Tamil Nadu.

Elsewhere : Myanmar, Sri Lanka, Pakistan, Egypt, Iraq, N. Africa, Syria, U.S.S.R.

Genus 14. *Peschetius* Guignot, 1935

1935. *Peschetius* Guignot, *Rev. ent.*, **2** : 131.

1977. *Peschetius* Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 48.

26. *Peschetius toxophorus* Guignot

1943. *Peschetius toxophorus* Guignot, *Bull. Soc. Et. Sci. nat.*, Vaucluse, p. 21.

1977. *Peschetius toxophorus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 48.

Material examined : 1 ex, India : Andhra Pradesh, Nellore : Aduripalle, 12.i.1999, Dr. P. Mukhopadhyay & party; 2 ex., Palmaner in Chittor dist., 21.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India : Bihar, Orissa, Rajasthan, Gujarat, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

Subfamily VII. DYTISCINAE

Tribe 1. Eretini

Genus 15. *Eretes* Castelnau, 1833

1833. *Eretes* Castelnau, *Ann. Soc. ent. Fr.*, (5) **8** : 450.

1977. *Eretes*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 73.

27. *Eretes sticticus* (Linnaeus)

1767. *Dytiscus sticticus* L., *Syst. Nat.*, ed. 12, pp. 666.

1833. *Eretes sticticus*, Castelnau, *Ann. Soc. ent. Fr.*, (5) **8** : 450.

1977. *Eretes sticticus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 73.

2003. *Eretes sticticus*, Mukhopadhyay & Ghosh, *Fauna of Sikkim, State Fauna Series*, **9**(Part-3) : 30-31. *Zool. Surv. India*.

Material examined : Not seen.

Distribution : India : West Bengal, Bihar, Orissa, Kashmir, Assam, Sikkim, Manipur, Punjab, Uttar Pradesh, Maharashtra, Rajasthan, Gujarat, Delhi, Karnataka, Andhra Pradesh,

Tamil Nadu, Goa, Andaman Is.

Elsewhere : Nepal, Pakistan, Myanmar, Thailand.

Tribe 2. **Hydaticini**

Genus 16. ***Hydaticus*** Leach, 1817

1817. *Hydaticus* Leach, *Zool. Miscell.*, 3 : 69, 72.

1977. *Hydaticus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 75.

28. ***Hydaticus*** (Guignotites) *fabricii* MacLeay

1833. *Hydaticus fabricii* MacLeay, *Annulosa Javanica*, P. 134.

1977. *Hydaticus* (Guignotites) *fabricii*, Vazirani, *Rec. zool. surv. India, Occ. Paper No. 6* : 76-77.

2003. *Hydaticus* (Guignotites) *fabricii*, Mukhopadhyay & Ghosh, *Fauna of Sikkim, State Fauna Series*, 9(Part-3) : 31. *Zool. Surv. India*.

Material examined : 3 ex, India : Andhra Pradesh, Chittor, 21.1.1999, Dr. P. Mukhopadhyay & party, 1 ex., Srikalahasti, 23.i.1999, Dr. P. Mukhopadhyay & party, 3 ex., Pedda Aravidu in Prakasam dist., 18.iii. 1999, Dr. P. Mukhopadhyay & party.

Distribution : India : Sikkim, Manipur, Rajasthan, Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Goa, Andaman Is.

Elsewhere : Indonesia, Vietnam, Philippines.

29. ***Hydaticus*** (Guignotites) *vittatus* (F.)

1775. *Dytiscus vittatus* F., *Syst. ent.*, App. : 825.

1838. *Hydaticus vittatus* (F.) Aube, *In Dejeans species Col.*, 6 : 208.

1977. *Hydaticus* (Guignotites) *vittatus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 81.

2003. *Hydaticus* (Guignotites) *vittatus*, Mukhopadhyay & Ghosh, *Fauna of Sikkim, State Fauna Series*, 9(Part-3) : 31. *Zool. Surv. India*.

Material examined : 3 ex., India : Andhra Pradesh, Palmaner in Chittor dist, 21.i.1999, Dr. P. Mukhopadhyay & Party; 1 ex., Srikalahasti, 23.i.1999, Dr. P. Mukhopadhyay & party; 6 ex., Pedda Aravidu in Prakasam dist., 18.iii.1999, S. K. Chatterjee & party.

Distribution : India : West Bengal, Sikkim, Tripura, Manipur, Gujarat, Rajasthan, Uttar Pradesh, Andhra Pradesh, Tamil Nadu.

Elsewhere : Indonesia.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

Tribe 3. **Thermonectini**Genus 17. ***Rhantaticus*** Sharp, 1882

1882. *Rhantaticus* Sharp, *Sci. Trans. R. Dublin Soc.*, 2 : 691, 911.
1977. *Rhantaticus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 82-83.

30. ***Rhantaticus congestus*** (Klug)

1832. *Hydaticus congestus* Klug, *Symb. physicae, Insectes Madagascar*, 3 : 136.
1977. *Rhantaticus congestus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 83.
1995. *Rhantaticus congestus*, Biswas, Mukhopadhyay & Saha, *Fauna of West Bengal, State Fauna series*, 3(Part 6(A)) : 106-107. *Zool. Surv. India*.

Material examined : Not seen.

Distribution : India, West Bengal, Orissa, Rajasthan, Maharashtra, Andhra Pradesh.

Elsewhere : Africa, Madagascar, Australia, New Guinea, Philippines, Formosa, Nepal.

Genus 18. ***Sandracottus*** Sharp, 1882

1882. *Sandracottus* Sharp, *Sci. Trans. R. Dublin Soc.*, 2 : 685, 910.
1977. *Sandracottus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 83-86.

31. ***Sandracottus dejeani*** (Aube)

1838. *Hydaticus dejeani* Aube, *In Dejean's Species Coleopteres*, Paris, 6 : 165.
1882. *Sandracottus dejeani*, Sharp, *Sci. Trans. R. Dubhin Soc.*, 2 : 686.
1920. *Sandracottus dejeani*, Zimmermann, *Col. Cat.*, 4(71) : 234.
1969. *Sandracottus dejeani*, Vazirani, *Ori. Ins.*, 2(3-4) : 275-277.

Material examined : Not seen.

Distribution : India : Bihar, Orissa, Rajasthan, Madhya Pradesh, Uttar Pradesh, Andhra Pradesh.

Elsewhere : Pakistan.

32. ***Sandracottus festivus*** (Illiger)

1802. *Dytiscus festivus* Illiger, *Mag. Insektenk.*, 1 : 166.
1882. *Sandracottus festivus*, Sharp, *Sci. Trans. R. Dubhin Soc.*, 2 : 686.
1969. *Sandracottus festivus*, Vazirani, *Ori. Ins.*, 2(34) : 273-274.

Material examined : Not seen.

Distribution : India : Bihar, Orissa, Assam, Himachal Pradesh, Andhra Pradesh, Tamil Nadu.

Elsewhere : West Pakistan.

33. *Sandracottus mixtus* (Blanchard)

1853. *Acilius mixtus* Blanchard, *Voy. Pol. Sud.*, 4 : 47.

1994. *Sandracottus mixtus*, Balfour Browne, *Ann. Mag. nat. Hist.* (11) : 355.

1977. *Sandracottus mixtus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 85.

Material examined : 1 ex., India : Andhra Pradesh, Srikalahasti in Chittoor dist., 23.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India, West Bengal, Nagaland, Andhra Pradesh, Tamil Nadu.

Elsewhere : Myanmar, China, Indonesia, Vietnam, Indo China.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

Tribe 4. Cybisterini

Genus 19. *Cybister* Curtis, 1827

1827. *Cybister* Curtis, *Brit. Ent.*, 4 : 151.

1977. *Cybister*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 86.

34. *Cybister* (Melanectes) *convexus* Sharp

1882. *Cybister convexus* Sharp, *Sci. Trans. R. Dublin Soc.*, 2 : 718.

1977. *Cybister* (Melanectes) *convexus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 87.

1995. *Cybister* (Melanectes) *convexus*, Biswas, Mukhopadhyay & Saha, *Fauna of West Bengal, State Fauna Series*, 3(Part 6(A)) : 109. *Zool. Surv. India*.

Material examined : 1 ex., India : Andhra Pradesh, Kamalturnu in Nellore dist., 6.i.1999, Dr. P. Mukhopadhyay & party.

Distribution : India : West Bengal, Assam, Sikkim, Manipur, Uttar Pradesh, Andhra Pradesh.

Elsewhere : China.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

35. *Cybister* (Meganectes) *pectoralis* Sharp

1882. *Cybister pectoralis* Sharp, *Sci. Trans. R. Dublin Soc.*, 2 : 736.

1977. *Cybister* (Meganectes) *pectoralis*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 91-92.

Material examined : Not seen.

Distribution : India : West Bengal, Bihar, Maharashtra, Madhya Pradesh, Andhra Pradesh.

36. *Cybister* (Meganectes) *tripunctatus asiaticus* Sharp

1832. *Cybister asiaticus* Sharp, *Sci. Trans. R. Dublin Soc.*, 2 : 731.

1899. *Cybister tripunctatus* var. *asiaticus*, Regimbart, *Ann. Soc. ent. Fr.*, 68 : 351-352.

1945. *Cybister tripunctatus asiaticus*, Balfour Browne, *Occ. Pap. Bishop Mus.*, 18(7) : 121-122.

1977. *Cybister* (Meganectes) *tripunctatus asiaticus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No. 6* : 62.

2003. *Cybister* (Meganectes) *tripunctatus asiaticus*, Mukhopadhyay & Ghosh, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, 9(Part-3) 32-33.

Material examined : 1 ex, India : Andhra Pradesh, Pedda Aravidu in Prakasam dist., 18.iii.1999, S. K. Chatterjee & party.

Distribution : India : Sikkim, Tripura, Delhi, Gujarat, Rajasthan, Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Andaman Is.

Remarks : This species is recorded here for the first time from Andhra Pradesh.

SUMMARY

All together 36 species under 19 genera belonging to the families viz., Gyrinidae and Dytiscidae have been included in this paper. Of which 14 species under 8 genera belonging to the family Dytiscidae are recorded here for the first time from this state. Distributional data of each species has also been given from the published records as well as actual study of specimens. Important synonymies have also been provided.

ACKNOWLEDGEMENTS

The authors are grateful to the Director, Zoological Survey of India for providing necessary facilities for the work. Authors are also thankful to Dr. Ramakrishna, scientist E. and Dr. A. K. Hazra, Scientist, E & Incharge of Entomology Division for useful suggestions for improvement of the paper.

REFERENCES

- Aube, C. 1838. Species general des Hydrocanthares et Gyriniens 804 Paris.
- Balfour-Browne, J. 1939. A contribution to the study of the Dytiscidae-I (Coleoptera : Adephaga). *Ann. Mag. Nat. Hist.*, Ser. 11, 3 : 97-114.
- Balfour-Browne, J. 1945. Aquatic Coleoptera of Oceania (Dytiscidae, Gyrinidae and Palpicornia). *Occ. Pap. B. Bishop Museum*, 18 (7) : 103-132.
- Biswas, S. Mukhopadhyay, P. and Saha, S. K. 1995. Insecta : Coleoptera : Adephaga : Family Dytiscidae. *Zool Surv. India, Fauna of West Bengal, State Fauna Series*, 3(Part 6A) : 77-120.
- Brancucci, M. 1983. Revision des especes est-palearctiques, orientales et australiennes du genre *Laccophilus* : Col : Dytiscidae. *Ent. Arb. Mus. Frey*, 31/32 : 241-426.
- Castalenau, F. L. 1835. *Etudes Entomologiques*, Pt. 1, Paris : 1-154, 4 pls.
- Curtis, J. 1827. British Entomology, London, 4.
- Fabricius, J. C. 1781. Species Insectorum, Hamburgi & Kilonii 1, : viii + 552.
- Fernando, C. H. 1959. Some observations on aquatic insects found in temporary and artificial habitats in ceylon. *Ceylon J. Sci. (Bio. Sci)* 2 (1) : 1-4.
- Ghosh, S. K. Mukhopadhyay, P. and Biswas, S. 2000. Insecta : Coleoptera : Fam. Gyrinidae, Dytiscidae and Hydrophilidae. *Zool. Surv. India, Fauna of Tripura, State Fauna Series*, 7(Part-3) 35-51.
- Guignot, F. 1942. Seizieme note sur les Hydrocanthares. *Bull-mens. Soc. Linn. Lyon*, 11(6) : 86-88.
- Guignot, F. 1942. Contribution a l'e'tude des *Bidessus*. *Bull Soc. Sci. Nat.*, 10 : 51-61, 10 figs (1939).
- Guignot, F. 1954. Entomological results from the Swedish expedition 1934 to Burma and British India. Coleoptera : Haliplidae et Dytiscidae recueillis par Rene Malaise. *Ark. Zool.*, 6 (32) : 563-367.
- Guignot, F. 1959. Dytiscidae du Pakistan Occidental. *Bull Mens. Soc. Linn. Lyon*, 28 : 8-11.
- Houlbert, C. 1934. *Bull. Soc. Sci.*, Bretagne, 11 : 124 (Fn. ent. armor.).
- Illinger, K. 1802. *Magazin fur Insektenkunde*. Braunschweig, 6 : 1-492.
- Klug, J. C. F. 1834. *Symbolae Physicae*, part 4. *Abhandl. Ak. Wissench*, 1832 : 91-223.
- Leach, W. C. 1817. Synopsis of the stripes and genera of the family Dytiscidae. *Zoological Miscalleny London*, 3 : 68-73.

- Macleay, W. S. 1833. *Annulosa Javanica*, on description des Insectes des Java, Paris, **4** : 1-163, 5 pls.
- Motschulsky, V. 1859. Nouveautes. *Etud. Ent.*, **8** : 1-187.
- Motschulsky, V. 1860. Coleopteres rapportes de la songarie par M. Semenov et decrits. *Bull. Acad. Sci. Peters berg*, 1(1859) : 301-314.
- Mukhopadhyay, P. and Ghosh, S. K. 2003, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9**(Part 3) : 24.
- Ochs, G. 1925. Description of new asiatic Gyrinidae. *Rec. Ind. Mus.*, **27** : 193-204.
- Regimbart, M. 1882. Essai Monographique de la Famille des Gyrinidae. *Annl. Soc. ent. Fr.* (6)**2** : 379.
- Regimbart, M. 1888, Viaggio di Leonardo Fea in Birmania and region vicine. X. Dytiscides et Gyrinidae. *Ann. Mus. Stor. Nat. Genova* (2) **6** : 699-623.
- Regimbart, M. 1889. Contributions A le Faune India-Chinoise. Hydrocanthares. *Ann. Soc. Ent. Fr.* (6)**9** : 148-149.
- Regimbart, M. 1892. Enumeration des Dytiscidae et Gyrinidae recuillis par M. L. fea, dans les voages en Birmanie et regiones voisines. *Ann. Mus. Stor. Nat. Genova*, (2)**10** : 536-554.
- Regimbart, M. 1889, Revision des Dytiscidae de la Region Ino-Sino-Malaise. *Ann. Soc. ent. Fr.*, **68** : 186-367.
- Regimbart, M. 1891. Essai Monographique de la famille des Gyrinidae 2nd supplement. *Annl. Soc. ent. Fr.*, **60** : 663-752.
- Sharp, D. 1880-82. On aquatic carnivorous coleoptera : Dytiscidae. *Sci. Trans. Roy. Dublin Soc.*, **21** : 179-1003.
- Vazirani, T. G. 1967. Contribution to the study of aquatic beetles (coleoptera) 1. on a collection of Dytiscidae from Western Ghats with description of two new species. *Ori. Ins.*, **1** (1-2) : 99-112.
- Vazirani, T. G. 1968. Contribution to the study of aquatic beetles (Coleoptera) 2. A review of the subfamilies. Noterinae Laccophilinae, Dytiscinae and Hydrophilinae (in part) from India. *Ori. Ins.* **2**(3-4) : 221-341.
- Vazirani, T. G. 1969. Two new species and Notes on other sepcies of aquatic coleoptera from ceylon. *Spolia Zeylanica*, **31**(2) : 399-403.
- Vazirani, T. G. 1977. Catalogue of Oriental Dytiscidae. *Rec. zool. Surv. India, Occ. Paper No.* **6** : 1-111.
- Vazirani, T. G. 1980. Dytiscidae : Coleoptera from Himachal Pradesh with a description of a new species. *Bul. zool. Surv. India*, **3**(1-2) : 27-30.

- Vazirani, T. G. 1984. Coleoptera : Fam. Gyrinidae and Fam. Haliplidae. *Fauna of India*, XIV+140 pls, fig. 55.
- Walker, F. 1859. Characters of some apparently undescribed ceylon Insects. *Ann. Mag. Nat. Hist.* (3) **3** : 50-56.
- Wehncke, E. 1876. Zehn new *Hydrocanthus*-Arten. *Deutsch. Ent. Z.*, **20** : 221-223.
- Zimmermann, A. 1920. *Coleopterorum catalogus*, Berlin, **4** : 1-296 [Pars 71 : Dytiscidae, Haliplidae, Hygrobiidae, Amphizoidae].
- Zimmermann, A. 1930. Monographic der palaartischen Dytisciden I. Noterinae, Laccophilinae, Hydroporinae (1 Teil). *Koleopt. Rdsch.*, **16** : 35-118.

INSECTA : COLEOPTERA : SCARABAEIDAE (CETONIINAE, DYNASTINAE & COPRINAE)

S. K. CHATTERJEE

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The Scarabaeidae is one of the large family of Coleoptera, under the superfamily Scaraboidea of the suborder Polyphaga. They are also known as Lamellicornia because of their lamellate antennae. The member of this group commonly called "dung beetles" and "chafers". Many of the Scarabeides are economically important but some of them cause damage to agricultural crops and several others are beneficial as they increase fertility of soil by depositing dung balls.

The Coprinae feed mostly upon the dung, human faeces, dead animal matters etc. The Cetoninae and Melolonthinae feed on leaves, plant juices, flowers, roots and decaying vegetative matters.

The knowledge of Indian Scarabaeidae based mainly on the workers of Brenske (1898), Arrow (1910, 1917, 1931), Balthasar (1963-1964) and Miksic (1976-1977). Later the workers like Biswas and Ghosh (2000), Biswas and Chatterjee (1985), Chatterjee and Biswas (1995, 2000), Chatterjee (2004), Chandra, K. (1999) and Sewak, Ram (2004) have published various Fauna.

The Scarabaeidae knowledge from Andhra Pradesh was not in existence. This paper based on the collections of Andhra Pradesh made by different survey parties of ZSI and specimens present in NZC of ZSI.

Therefore, the paper deals 153 examples comprising 26 species under 13 genera belonging to 3 subfamilies. Key to the subfamily, genera and species have been provided including necessary synonymies. All these species are recorded here for the first time from this state.

SYSTEMATIC ACCOUNT**Classified list of Species**

Family SCARABAEIDAE

Subfamily I CETONIINAE

Genus *Oxycetonia* Arrow

1. *O. versicolor* (F.)

Genus *Clinteria* Burmeister

2. *C. klugi* (Hope)

Subfamily II DYNASTINAE

Genus *Oryctes* Illiger

3. *O. rhinoceros* (L.)

Subfamily III COPRINAE

Genus *Gymnopleurus* Illiger

4. *G. koenigi* (F.)
5. *G. gemmatus* Harold.
6. *G. spilatus* (MacL.)

Genus *Heliocopris* Burmeister

7. *H. bucephalus* (F.)

Genus *Catharismus* Hope

8. *C. Molossus* (L.)
9. *C. sagax* (Quens.)
10. *C. capucinus* (F.)
11. *C. pithecius* (F.)

Genus *Copris* Geoffroy

12. *C. magicus* Harold

Genus *Caccobius* Thomson

13. *C. aterrimus* (F.)
14. *C. vulcanus* (F.)

Genus *Onthophagus* Latreille

15. *O. dama* (F.)
16. *O. catta* (F.)
17. *O. bonasus* (F.)

Genus *Liatongus* Reitter

18. *L. rhadamistus* (F.)

Genus *Oniticellus* Serville

- 19. *O. pallipes* (F.)
- 20. *O. spinipes* Roth.
- 21. *O. cinctus* (F.)

Genus *Drepanocerus* Kirby

- 23. *D. setosus* (Wiedemann)
- 24. *D. runicus* Arrow

Genus *Onitis* Fabricius

- 25. *O. lama* Lansberge
- 26. *O. falcatus* (Wulfen)
- 27. *O. philemon* F.

Key to the Subfamily of SCARABAEIDAE

- 1. Labrum membranous, not visible externally 2
 - Labrum well-developed, visible externally 3
- 2(1) Mandibles not visible externally, front coxae verticle CETONIINAE
 - Mandibles visible externally, front coxae transverse DYNASTINAE
- 3(1) Middle coxae widely separated, hind tibia with one spur COPRINAE

Subfamily 1. CETONIINAE

Key to the genera of Cetoniinae

- 1. Sides of the scutellum straight, convex or sinuous, base of the pronotum not in a transverse line, slightly concave 2
 - Sides of the scutellum concave, apex extremely sharp, clypeus not forming two sharp angles in front 3
- 2(1) Sides of elytra distinctly sinuated behind the shoulders, sternal process board and flat or absent, clypeus flat *Oxycetonia*
- 3(1) Pronotum lobed behind *Clinteria*

Genus *Oxycetonia* Arrow

- 1842. *Gametis* Burmeister, *Handb. Ent.*, 3 : 358.
- 1910. *Oxycetonia* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 163-164

1. *Oxycetonia versicolor* (Fabricius)

1775. *Cetonia versicolor* Fabricius, *Syst. Ent.*, P. 51.

1910. *Oxycetonia versicolor*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 164-166.

Material examined : 1 ex., India, Andhra Pradesh, Domlapeta, Carnool, 24.ix.1998, S. K. Mondal & Party Coll.

Remarks : The species more or less oval, convex and upper surface smooth without hairs or setae. The species may be separated from closely related *O. albopunctata* (F.) by the lobes of clypens, which is very sharp in *O. versicolor* (F.)

Distribution : India; Andhra Pradesh, Tamil Nadu, Karnataka, Madhya Pradesh & West Bengal.

Elsewhere : Bangladesh, Bhutan, Srilanka & Madagascar.

The species is first time recorded from Andhra Pradesh.

Genus *Clinteria* Burmeister

1842. *Clinteria* Burmeister, *Handb. Ent.*, 3 : 299.

1910. *Clinteria*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 176.

2. *Clinteria klugi* (Hope)

1831. *Cetonia klugi* Hope, *Gray's zool. Misc.*, : 25.

1842. *Clinteria hilaris* Burmeister, *Handb. Ent.*, 3 : 303.

1910. *Clinteria klugi*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 187-188.

Material examined : 1 ex., India, Andhra Pradesh, Domlapeta, Carnool, 24.ix.1993, S.K. Mondal coll.

Remarks : The sternal process of the *C. klugi* (Hope) not strongly produced, elytra decorated with 4 to 5 spots on each side. The species very closely to *C. rufipennis* Janson, where lobes of pronotum spotted, which is absent in *C. klugi* (Hope).

Distribution : India : Andhra Pradesh, Maharashtra, Uttar Pradesh.

The species is first time recorded from Andhra Pradesh.

Genus *Oryctes* Illiger

1798. *Oryctes* Illiger, *Kafer Preussens*, P. 11.

1856. *Oryctes* Lacordaire *Gen. Coleopt.* 3 : 430.

1910. *Oryctes*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 272-274.

Oryctes rhinoceros (Linnaeus)

1758. *Scarabaeus rhinoceros* Linnaeus, *Syst. Nat.*, 1 : 346.

1847. *Oryctes rhinoceros* Burmeister, *Handb. Ent.*, 5 : 202.

1910. *Oryctes rhinoceros*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 278-281.

Material examined : 1 ex., India, Andhra Pradesh, Suiampet forest, Karimnagar, 08.xii.1999, P. H. Roy coll.

Remarks : The species is closely related with *O. nasicornis* but its front tibiae tridentate and in *O. rhinoceros* front tibia quadridentate and hind tibiae acutely digitate, the clypeus with a horn which is short and blunt.

Distribution : Maharashtra, Tamil Nadu and West Bengal.

Elsewhere : Myanmar, Thailand, Indonesia, Philippines, Hongkong, Korea and Tiwan.

The species is first time recorded from Andhra Pradesh.

Genus *Gymnopleurus* Illiger

1803. *Gymnopleurus* Illiger, *Inos.*, 2 : 199.

1931. *Gymnopleurus*, Arrow, *Fauna, Brit. India* (Coleoptera : Lamellicornia), 3 : 46-48.

Key to the species of the genus *Gymnopleurus*

1. Sides of the abdomen not carinate at the base, upper surface clothed with fine hairs 2
- Sides of the abdomen sharply carinate at the base, upper surface without hairy clothing 3
- 2(1) Elytra strongly costate *koenigi* (Fabricius)
- Elytra not strongly costate *gemmatus* Harold
- 3(1) Elytra with longitudinal and transverse shining patches *spilotus* MacL.

Gymnopleurus koenigi (Fabricius)

1775. *Scarabaeus koenigi* (Fabricius), *Syst. Ent.*, p. 29

1931. *Gymnopleurus koenigi*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 51-52.

Material examined : 13 exs. India, Andhra Pradesh, Mantapuram, Nellore, 17.I.1999, P. Mukhopadhyay & Party.

Remarks : The species is differ from *G. miliaris* by clypeal structure which is bidentate and deeply notched in the middle, pronotum densely and rugosely punctured but in *miliaris* clypeus quadridentate and blunt, pronotum granulated.

Distribution : India : Andhra Pradesh, Karnataka.

Elsewhere : Srilanka.

The species is first time recorded from Andhra Pradesh.

***Gymnopleurus gemmatus* Harold**

1871. *Gymnopleurus gemmatus* Harold, *Cd. Hafte*, 8 : 117.

1931. *Gymnopleurus gemmatus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 53-54.

Material examined : 3 exs.; 1 ex., India Andhra Pradesh, Kagipeta, Caudapah, 31.IV.2000. Sydapuram, Nellore 26.V.2000, 2 exs., all collected by S. K. Chatterjee.

Remarks : The species is closely related with *G. parvus* but it differs in number of spots on pronotum which is more than six or double, may be more the *G. gemmatus* male tibiae long, narrow slender and slightly curved at the end but in *parvus* male tibiae flat and truncated at the end.

Distribution : India : Andhra Pradesh, Karnataka, Kerala, Tamilnadu, Maharashtra, Madhya Pradesh, Bihar and Orissa.

Elsewhere : Srilanka.

The species is first time recorded from Andhra Pradesh.

***Gymnopleurus spilotus* (Macl.)**

1821. *Scarabaeus spilotus* Macl. *Horae Entom.*, 1 : 517.

1931. *Gymnopleurus spilotus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 55-56.

Material examined : 1 ex., India, Andhra Pradesh, Kagipeta, Caudapah, 31.IV.2000, S. K. Chatterjee coll.

Remarks : This species may be separated from closely related *G. maculosus*, by its numerous spots on the pronotum and elytra having transverse patches. The front tibia of the male is broad and short with flat bifid terminal spur.

Distribution : India : Andhra Pradesh, Tamilnadu, Kerala, Karnataka, Bihar & Orissa.

The species is first time recorded from Andhra Pradesh.

Genus *Heliocopris* Burmeister

1846. *Heliocopris* Burmeister, *Gen. Ins.*, 10 : col. No. 27, figs. 1-8

1931. *Heliocopris*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 84-85

***Heliocoprís bucephalus* (Fabricius)**

1775. *Scarabaeus bucephalus* Fabricius, *Syst. Ent.*, p. 24.

1931. *Heliocoprís bucephalus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 88-90, Plate V, figs. 2,3.

Material examined : 1 ex., India, Andhra Pradesh, Anantagiri, Ranga Reddy, 0.3.XII.1993, A. K. Podder coll.

Remarks : Generally this group is large, broad and massive in structure, the chief distinctive features is stridulating ridges within the hind coxal cavities. Elytra very shining with sculptured. The species is very closely to *H. dominus* but differs in clypeus which is not transcated and male bears a single horn on the head.

Distribution : India : Andhra Pradesh, Maharashtra, Madhya Pradesh, Uttar Pradesh, Bihar and West Bengal.

Elsewhere : Myanmar, Thailand, Malaysia & Indonesia

The species is first time recorded from Andhra Pradesh.

***Catharsius* Hope**

1837. *Catharsius* Hope, *Col. Man.*, 1 : 21.

1931. *Catharsius*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 92.

Key to the species of Genus *Catharsius*

1. Elytra entirely opaque 2
- Elytra not entirely opaque 3
- 2(1) Head with a small smooth area adjoining each eye *molossus* (Linnaeus)
- Head without smooth area adjoining each eye *sagax* (Quenstedt)
- 3(1) Head not very transverse, pronotum of ♂ with four tubercles
..... *capucinus* (Fabricius)
- Head very prominently transverse, pronotum of ♂ with two tubercles
..... *pithecus* (Fabricius)

***Catharsius molossus* (Linnaeus)**

1758. *Scarabaeus molossus* Linnaeus, *Syst. Nat. ed.*, 10 : 347.

1931. *Catharsius molossus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 94.

1963. *Catharsius* (S. Str.) *molossus*, Balthasar, *Monogr. Scarab. Aphod. palaearkt. Orient*, 1 307.

Material examined : 3 exs.; 1 ex., India Andhra Pradesh, Phoolbery, Vizianagaram, 4.XI.1997, P. Mukhopadhyay coll. 1 ex., Keru, North Debeing, Nellor, 1.II.2000, 1 ex., Sri Sailam, F.R.H., Prakasan, 22.X.1998, both collected by S. K. Mondal & party.

Remarks : This species is closely related with *Catharsius granulatus* and *Catharsius sagax* but very prominently it differs by small smooth shining area adjoining each eye. Moreover *C. molomus* are found both in human faeces and dungs of herbivorous animals but other are found on dungs of herbivorous animals.

Distribution : India : Andhra Pradesh, Karnataka, Kerala, Maharashtra, Uttaranchal, Himachal Pradesh, Bihar, Sikkim, Meghalaya, West Bengal and Orissa.

Elsewhere : Bangladesh and Sri Lanka.

The species is first time recorded from Andhra Pradesh.

Catharsius sagax (Quenstedt)

1806. *Copris sagax* Quenstedt., *Schönh. Sny. Ins.*, 1 : 43.

1931. *Catharsius sagax*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 96.

1963. *Catharsius* (S. Str.) *sagax*, Balthasar, *Mongr. Scarb. Aphod. palaearki.*, *Orient*, 1 : 39.

Material examined : 2 exs., India, Andhra Pradesh, Elamanchali, Visakhapatnam, 8.XI.1997, P. Mukhopadhyay & Party Coll.

Remarks : This species is very close to *C. molossus* but main distinguishing characters are rather smaller in size, the cephalic horn less erect, more anteriorly placed.

Distribution : India : Andhra Pradesh, Kerala, Maharashtra, Madhya Pradesh, Punjab, Bihar Meghalaya & West Bengal.

Elsewhere : Bhutan.

The species is first time recorded from Andhra Pradesh.

Catharsius capucinus (Fabricius)

1781. *Scarabaeus capucinus* Fabricius, *Spec. Ins.*, 1 : 25.

1931. *Catharsius capucinus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 99-100.

Material examined : 1 ex., India, Nacerkal, 29.VIII.2000, I.B. Dutta coll.

Remarks : The species is very closely related with *Catharsius pithecius* but main distinguished characters are larger in size, clypeus produced.

Distribution : India : Andhra Pradesh, Tamilnadu, Orissa & Bihar.

Elsewhere : Srilanka.

The species is first time recorded from Andhra Pradesh.

***Catharsius pithecius* (Fabricius)**

1775. *Scarabaeus pithecius* Fabricius, *Syst. Ent.*, : 21.

1842. *Copris sinensis* Hope, *Proc. Ent. Soc. Lond.*, : 60.

1931. *Catharsius pithecius*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 100-101.

1963. *Catharsius* (S. Str.) *pithecius*, Balthasar, *Monogr. Scarab. Aphod., palaearkt. Orient.*, 1 : 30.

Material examined : 1 ex., India, Andhra Pradesh, Nellore, Mantespuram, 17.I.1999. P. Mukhopadhyay & Party coll.

Remarks : This species, closely resembles to *C. capucinus* but can easily be distinguished by its short compact form with shining elytra, and also found in most of the part of India.

Distribution : India : Andhra Pradesh, Karnataka, Kerala, Tamilnadu, Maharashtra, Uttaranchal, Uttar Pradesh & Bihar.

Elsewhere : Srilanka

The species is first time recorded from Andhra Pradesh.

***Copris* Geoffroy**

1762. *Copris* Geoffroy, *Ins. des. Eng. de Paris*, : 87.

1931. *Copris*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 102.

1963. *Copris*, Balthasar, *Monogr. Scarab. Aphod. palaerkt. Orient.*, 1 : 317.

***Copris magicus* Harold**

1881. *Copris magicus* Harold, *Mitth. Munch. Ent. Ver.*, 5 : 88.

1931. *Copris magicus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 112-113.

Material examined : 2 exs., India, Andhra Pradesh, Srisailam F.R.H., Prakasan, 24.IX.1998, S. K. Mondal & Party coll.

Remarks : The species is very closely related to *C. spinator* but differs in metasternum hairs, which very close in *C. magicus* and elytral punctures very fine and close, male clypeus bears a slender, backwardly curved horn.

Distribution : India : Andhra Pradesh, Assam, Nagaland, Manipur.

Elsewhere : Myanmar and Veietnam

The species is first time recorded from Southern part of India.

1863. *Caccobius* Thomson, *Skand. Col.*, **5** : 34.
 1931. *Caccobius*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **3** : 141-142.
 1963. *Caccobius*, Balthasar, *Monogr. Scarab. Aphod. palaearkt. Orient*, **2** : 113.

1. Clypeus not notched or bilobed, simply rounded, setae scarcely visible above..... *aterrimus* (Fabricius)
 – Clypeus more or less bilobed or notched, setae present with minute pale clothing.. *vulcanus* (Fabricius)

1798. *Copris aterrimus* Fabricius, *Ent. Syst. Suppl.*, : 35.
1867. *Caccobius aterrimus* Harold, *Col. Hefte*, 2 : 9.
1931. *Caccobius aterrimus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 143.

Remarks : This species is closely related to *C. diminutives* but differs in clypeus which is short rounded at the front and separated by a feeble carina, Body generally opaque, black.

Elsewhere : Srilanka.

The species is first time recorded from Andhra Pradesh.

1801. *Copris vulcanus* Fabricius, *Syst. Eleut.*, 1 : 41.
1825. *Copris bicuspis* Wiedemann *Zool. Mag.*, 2(1) : 18.
1931. *Caccobius vulcanus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 151-152.

Remarks : This species is very close to *C. indicus* but may be distinguished by its body coppery tinch, elytra with short transverse orange or reddish bar at the posterior.

Elsewhere : Srilanka

The species is first time recorded from Andhra Pradesh.

Onthophagus Latreille

1802. *Onthophagus* Latreille, *Hist. Nat. Crust. et. Ins.*, 3 : 141.
 1883. *Proagoderus* Lansberge, *Notes Lyed. Mus.*, 5 : 15.
 1931. *Onthophagus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 159-162.
 1963. *Onthophagus*, Balthasar, *Monogr. Scarab, Aphod. palearkt. Orient*; 2 : 153.

Key to the species of Genus *Onthophagus*

1. Pronotum granular or rugose, clypeal margin not tridentate, upper-surface smooth or with very fine hairy clothing 2
 - Pronotum punctured, without granules or rugosity, clypeal margin tridentate, upper surface without hair or with only very minute, scanty and inconspicuous setae
 *dama* (Fabricius)
2. Front angles of pronotum not very sharp *catta* (Fabricius)
 - Front angles of pronotum very sharp *bonasus* (Fabricius)

Onthophagus catta (Fabricius)

1787. *Scarabaeus catta* Fabricius, *Mant. Ins.*, 1 : 12.
 1798. *Copris metallicus* Fabricius, *Ent. Syst. Suppl.*, : 28
 1931. *Onthophagus catta* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 230-231.

Material examined : 40 exs., 5 exs., India, Andhra Pradesh, Aduripalle, Nellore, 12.I.1999, 4 exs., Mantespuram, Nellore, 17.I.1999, P. Mukhopadhyay & party coll. 1 ex., Polemaru, Adilabad, 26.VIII.1999, 1 ex., Jannaram, Adilabad, 30.VIII.1999, S. K. Mondal coll. 1 ex., Dakki F.R.H. 22.V.2000, 2 exs. Vankatachalam, Nellore, 23.V.2000, 1 ex. Sydapuram, Nellore, 26.V.2000, 5 exs. Podalakur, Nellore, 27.V.2000, 1 ex., Chitral, Nellore, 28.V.2000, 1 ex., Penchala, 31.V.2000, 5 exs., Tirumala, Chittoor, 2.VI.2000, 1 ex. Srikalahaste, Chittoor, 3.VI.2000, 1 ex., Karuethnagar, Chittoor, 5.VI.2000, 2 exs., Patagunta, 6.VI.2000, S. K. Chatterjee all collected.

Remarks : The species may be separated from closely related *O. bonasus* (F.) by the horns of male less diverge and size smaller.

Distribution : India : Andhra Pradesh, Maharashtra, Madhya Pradesh, Karnataka.

Elsewhere : Pakistan, Africa, Madagascar, Arab.

The species is first time recorded from Andhra Pradesh.

***Onthophagus bonasus* (Fabricius)**

1775. *Scarabaeus bonasus*, Fabricius, *Syst. Ent.*, : 23.

1931. *Onthophagus bonasus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 231-232.

Material examined : 19 exs.; 3 exs., India, Andhra Pradesh, Aduripalle, Nellore, 12.I.1999, P. Mukhopadhyay & Party, 1 ex., Chamdragiri, Chittoor, 19.I.1999, P. Mukhopadhyay & Party, 1 ex., Dakki F.R.H., Nellore, 22.V.2000, 6 exs., Vankatachanlam, Nellore, 23.V.2000, 2 exs., Podalakur, Nellore, 27.V.2000, 5 exs., Kazipeta, Cuddapah, 31.V.2000, 1 ex., Tirumala, Chittoor, 02.VI.2000 all are collected by S. K. Chatterjee.

Remarks : Though it is very much similar to *O. catta* but differs by its size, well prominent thoracic groove and the sharp median process.

Distribution : India : Andhra Pradesh, Maharashtra, Karnataka, Mysore, West Bengal, Uttar Pradesh.

Elsewhere : Pakistan, Srilanka, Myanmar, Indonesia and Campuchia

The species is first time recorded from Andhra Pradesh.

***Onthophagus dama* (Fabricius)**

1798. *Copris dama* Fabricius, *Ent. Syst. Suppl.* : 32.

1931. *Onthophagus dama* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 280-281.

Material examined : 1 ex., India : Andhra Pradesh, Chikatpalt, Rangareddi, 05.III.1999, S.K. Chatterjee coll.

Remarks : Upper surface entirely dark, shining, the species is closely related with *Onthophagus refulgens* but easily separated by its size and elytral shiny luster. The species is widely distributed.

Distribution : India : Andhra Pradesh, Tamilnadu, Karnataka, Maharashtra, Uttaranchal, Bihar and West Bengal.

Elsewhere : Bhutan, Nepal & Srilanka.

The species is first time recorded from Andhra Pradesh.

***Liatongus* Reitter**

1893. *Liatongus* Retter, *Verh. Ver. Brunn.*, 31 : 166.

1931. *Liatongus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 362.

1963. *Liatongus*, Balthasar, *Monogr. Scarab. Aphod. palaearkt. Orient*, 2 : 78.

***Liatongus rhadamistus* Frabicius**

1775. *Scarabaeus rhadamistus* Fabricius, *Syst. Ent.*, : 22.

1931. *Liatongus rhadamistus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 374.

Material examined : 3 exs. 1 ex. India Andhra Pradesh, Ramchandrapur, Medok, 8.III.1999, S. K. Chatterjee coll. 2 exs. Andhra Pradesh, Atmakur, Kurnool, 26.XII.1999, G. C. Sen & Party.

Remarks : This species can easily be distinguished by its large, elongate shape, elytra yellow with black spots and pronotal sides with golden metallic lustre. Male without horned on head.

Distribution : India : Andhra Pradesh, Kerala and Madhya Pradesh.

Elsewhere : Srilanka

The species is first time recorded from Andhra Pradesh.

***Oniticellus* Serveille**

1825. *Oniticellus* Serveille *Encycl. Meth.*, 10 : 356.

1901. *Tiniocellus* Percheron, *Thans. S. Afr. Phil. Soc.*, 12 : 116.

1931. *Oniticellus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 375.

1963. *Oniticellus* Balthasar, *Monogr. Scarab. Aphod. Palaearkt. Orient.*, 2 : 70.

Key to the species of Genus *Oniticellus*

1. Head bearing one or more transverse carinae *pallipes* (Fabricius)
 - Head without carinae 2
2. Upper surface opaque *spinipes* Rothaman
 - Upper surface very smooth and shining *cinctus* (Fabricius)

***Oniticellus pallipes* (Fabricius)**

1781. *Scarabaeus pallipes* Fabricius, *Spec. Ins.*, 1 : 33.

1908. *Oniticellus pallipes*, Arrow *Ann. Mag. Nat. Hist.*, 1(8) : 179.

Material examined : 3 exs., 1 ex., India, Andhra Pradesh, Betamcherla, Kurnool, 14.III.1999, 1 ex., Matur, Prakasan, 19.III.1999, 1 ex., Podalakur, Nellore, 27.V.2000, all collected S. K. Chatterjee.

Remarks : This species is closely related with *O. pallens* but easily separated by its pronotal characters and also other characters like ocular lobes form blunt prominences, pygidium impressed at apex.

Distribution : India : Andhra Pradesh, Tamilnadu, Uttar Pradesh, Uttaranchal, Jammu & Kashmir and West Bengal.

The species is first time recorded from Andhra Pradesh.

***Oniticellus spinipes* Rothman**

1851. *Oniticellus spinipes* Roth Arch. f. Nat., 33 : 128.

1908. *Oniticellus modestus*, Arrow Ann. Mag. Nat. Hist., 50(8) : 182.

1931. *Oniticellus spinipes*, Arrow, Fauna Brit. India (Coleoptera : Lamellicornia), 3 : 378-379.

Material examined : 30 exs.; 1 ex. India, Andhra Pradesh, Gani Reserve Forest, Kurmool, 15.III.1999, 1 ex., Piutur, Prakasam, 19.III.1999, 27 exs., Podalakur, Nellore, 27.V.2000, 1 ex., Chitral, Nellore (South), 28.V.2000, all collected S. K. Chatterjee

Remarks : This species may easily be distinguished by its short compact body with very dark brown colour and characteristic pronotal punctures and longitudinal impressed line.

Distribution : India : Andhra Pradesh, Tamilnadu, Maharashtra, Uttaranchal and Himachal Pradesh.

Elsewhere : Africa, Uganda, Abyssinia, Rhodesia and Transval

The species is first time recorded from Andhra Pradesh.

***Oniticellus cinctus* (Fabricius)**

1775. *Scaraboeus cinctus* Fabricius, Syst. Ent., : 30.

1931. *Oniticellus cinctus*, Arrow, Fauna Brit. India (Coleoptera : Lamellicornia), 3 : 379-380.

Material examined : 7 exs., 1 ex., India, Andhra Pradesh, Gani Reserve, Kurnool, 15.III.1999, 5 exs., Mathur, Prakasam, 19.III.1999, 1 ex., Kadipeta, Cuddapah, 31.V.2000, all collected S. K. Chatterjee.

Remarks : This species can easily be separated from *O. spinipes* by its larger size with smooth, shining black colour on the body, also elytra are deeply striate with finely and closely punctured.

Distribution : India : Andhra Pradesh, Karnataka, Uttaranchal, Maharashtra, Assam and West Bengal.

Elsewhere : Myanmar, Malaysia, Thailand and South China

The species is first time recorded from Andhra Pradesh.

Genus *Drepanocerus* Kirby

1828. *Drepanocerus* Kirby, Zool. Journ., 3 : 521.

1856. *Drepanocerus* Lacordair, *Gen. Col.*, 3 : 111.

1931. *Drepanocerus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 380-381.

1963. *Drepanocerus*, Balthasar, *Monogr. Scarb. Aphod. palaearkt. Orient*, 2 : 61.

Key to the species of the Genus *Drepanocerus*

1. Terminal tooth of the front tibia directed forward; pronotum not ridged at the base *setosus* (Wiedemann)
- Terminal tooth of the front tibia lateral; pronotum with six longitudinal ridges at the base *runicus* Arrow

Drepanocerus setosus (Wiedemann)

1823. *Copris setosus* Wiedemann, *Zool. Mag.*, 2(1) : 19.

1931. *Drepanocerus setosus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 381-382.

Material examined : 2 exs., India : Andhra Pradesh, Podalakur, Nellore, 27.V.2000, S.K. Chatterjee.

Remarks : This species can easily be separated from the closely related *D. sinicus* head finely, not closely punctured, angles of the pronotum distinct.

Distribution : India : Andhra Pradesh, Tamilnadu, Madhya Pradesh, and Uttaranchal.

Elsewhere : Srilanka and Pakistan.

The species is first time recorded from Andhra Pradesh.

Drepanocerus runicus Arrow

1909. *Drepanocerus runicus* Arrow, *Ann. Mag. nat. Hist.*, 4(8) : 93.

Material examined : 2 exs., India, Andhra Pradesh, Podalakur, Nellore, 27.V.2000, S.K. Chatterjee coll.

Remarks : This species may be distinguished from others by its short compact body, black colour and pronotal ridges from its related species and also the prosternum not elevated behind the front coxae.

Distribution : India : Andhra Pradesh, Maghelaya, Assam and Manipur.

Elsewhere : Myanmar and Vietnam.

The species is first time recorded from Andhra Pradesh.

Onitis Fabricius

1798. *Onitis* Fabricius, *Ent. Syst. Suppl.*, : 2

Key to the species of the genus *Onitis*

1. Clypeo-frontal carina simple and entire, pronotum distinctly and moderately closely punctured *lama* Lansberge
 - Clypeo-frontal carina interrupted or with a tubercle in the middle 2
2. Shape narrow, pronotum very feebly punctured, metasternum not transversely excavated in the middle *falcatus* (Wulfen)
 - Shape broad, pronotum well punctured, metasternum longitudinally grooved in front *philemon* Fabricius

Onitis lama Lansberge

1875. *Oritis lama* Lansberge, *Ann. Soc. Ent. Belg.*, 18 : 123.

Material examined : 1 ex., India, Andha Pradesh, Dewaripet, 21.VIII.2001, I.B. Dutta coll.

Remarks : This species having the clypeo frontal carina which is short straight and transverse but in *O. Siva* the clypeo frontal carina absent moreover this species also close resemble with *O. humerosus* where pronotum strongly punctured and metallic but in *O. lama* pronotum lightly punctured and deep black.

Distribution : India : Andhra Pradesh, Punjab, Uttaranchal

The species is first time recorded from Andhra Pradesh.

Onitis falcatus (Wulfen)

1786. *Scarabaeus falcatus* Wulfer, *Descr. cap. Ins.*, p. 14, pl. 2, fig. 17.

1848. *Onitis himalayicus* Redlenbacher, *Hugel's Kashmir*, 4(2) : 518.

1931. *Onitis falcatus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 392-393.

1963. *Onitis falcatus*, Balthasar, *Monogr. Scarab Aphod. palaearkt. Orient.*, 2 : 33.

Material examined : 1 ex. India, Andhra Pradesh, Palmaner, Chittoor, 20.I.1999, P. Mukhopadhyay & Party.

Remarks : This species is closely resembles with *Onitis excavatus* but very easily can be separated by absence of transverse excavation in the middle of metasternum and smaller in size. *O. excavatus* was recorded from Mayanmar & China, after that it was first recroded from Assam, India by Biswas and Ghosh.

Distribution : India : Andhra Pradesh, Tamilnadu, Bihar, West Bengal, Maharashtra, Uttaranchal.

Elsewhere : Bangladesh, Myanmar, Malayasia, Philipines and S. China.

The species is first time recorded from Andhra Pradesh.

***Onitis philemon* Frabricius**

1801. *Onitis philemon* Fabricius, *Syst. Elent.*, 1 : 30.

1931. *Onitis philemon*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 393-394.

1963. *Onitis philemon*, Balthasar, *Monogr. Scarab. Aphod. palaearkt. Orient.*, 2 : 41.

Material examined : 8 exs., India, Andhra Pradesh, Maipadu, Nellore, 14.I.1999, P. Mukhopadhyay & Party; 2 exs., Borra, Vishakhapatnam, 15.X.1998, S. K. Mondal & Party; 3 exs., Rampur Forest area, Adilabad, 5.XII.1999; 2 exs., Suiampet, Kaumanaur West, 8.XII.1999, all collected by P. H. Roy & Party.

Remarks : This species is closely related to *O. singhalensis* but differ in pronotal median area where is well-marked median line in *singhalensis* but in this species which is absent.

Distribution : India : Andhra Pradesh, Tamilnadu, Bihar, Uttaranchal and West Bengal.

Elsewhere : Bangladesh, Myanmar, Malaysia, Philipines Is. and South China.

The species is first time recorded from Andhra Pradesh.

SUMMARY

The present paper deals with 26 species under 13 genera belonging to 3 subfamilies namely Cetoniinae, Dynastinae and Rutelinae of Lamellicorn beetles from Andhra Pradesh. All the species are recorded for the first time from Andhra Pradesh State.

The systematic account, keys to the subfamilies, genera and species have also been given. In the remarks the basic differences between the related species have also been provided.

ACKNOWLEDGEMENTS

The author is grateful to Dr. Ramakrishna, Scientist 'E' and in-charge of Director, Zoological Survey of India for providing necessary facilities for this work, and also thankful to Dr. A. K. Hazra, Scientist 'E', Dr. P. Mukhopadhyay, Scientist 'D', Z.S.I. for their suggestions and encouragement.

REFERENCES

Arrow, G. J. 1910. *The Fauna of British India, including Ceylon and Burma Coleoptera, Lamellicornia (Cetonninae and Dynastinae)*, 1 : i + 322, Pl. II (Taylor & Francis) London.

- Arrow, G.J. 1931. *The Fauna of British India, including Ceylon and Burma, Coleoptera, Lamellicornia* (Coprinae), 3 : i + 428, Pl. I-XIII (Taylor & Francis) London.
- Balthasar, V. 1963. *Monographic der Scarabaeidae und Aphodiinae der palaearktischen und Orientalischen Region (Coleoptera : Lamellicornia)*, 1 : 1-391, pl. XXIV. Verlag der Tschechoslowakischen Akademie der Wissenschaften.
- Biswas, S. & Ghosh, A.K. 2000. *Zool Surv. India State Fauna Ser.*, 4. *Fauna of Meghalaya*, 5 : 513-623.
- Biswas, S. & Chatterjee, S. K. 1985. *Rec. Zool. Surv. India, Insecta : Coleoptera : Scarabeidae : Coprinae*, 82(1-4) : 147-177.
- Brenske, E. 1898. *Die Serica Arten der Erde. Berliner Entomol Zeitschr*, 43 : 205-404.
- Miksic, R. 1976. *Monographic der Cetoniinae der Palaearktischen und Orientalischen Region, Coleoptera : Lamellicornia*, 1 : 1-444.
- Miksic, R. 1977. *Monographic der Cetoniinae der Palaearktischen und Orientalischen Region, Coleoptera : Lamellicornia*, 2 : 1-400.

INSECTA : DIPTERA : SYRPHIDAE

M. MUKHERJEE, P. PARUI and BULGANIN MITRA

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

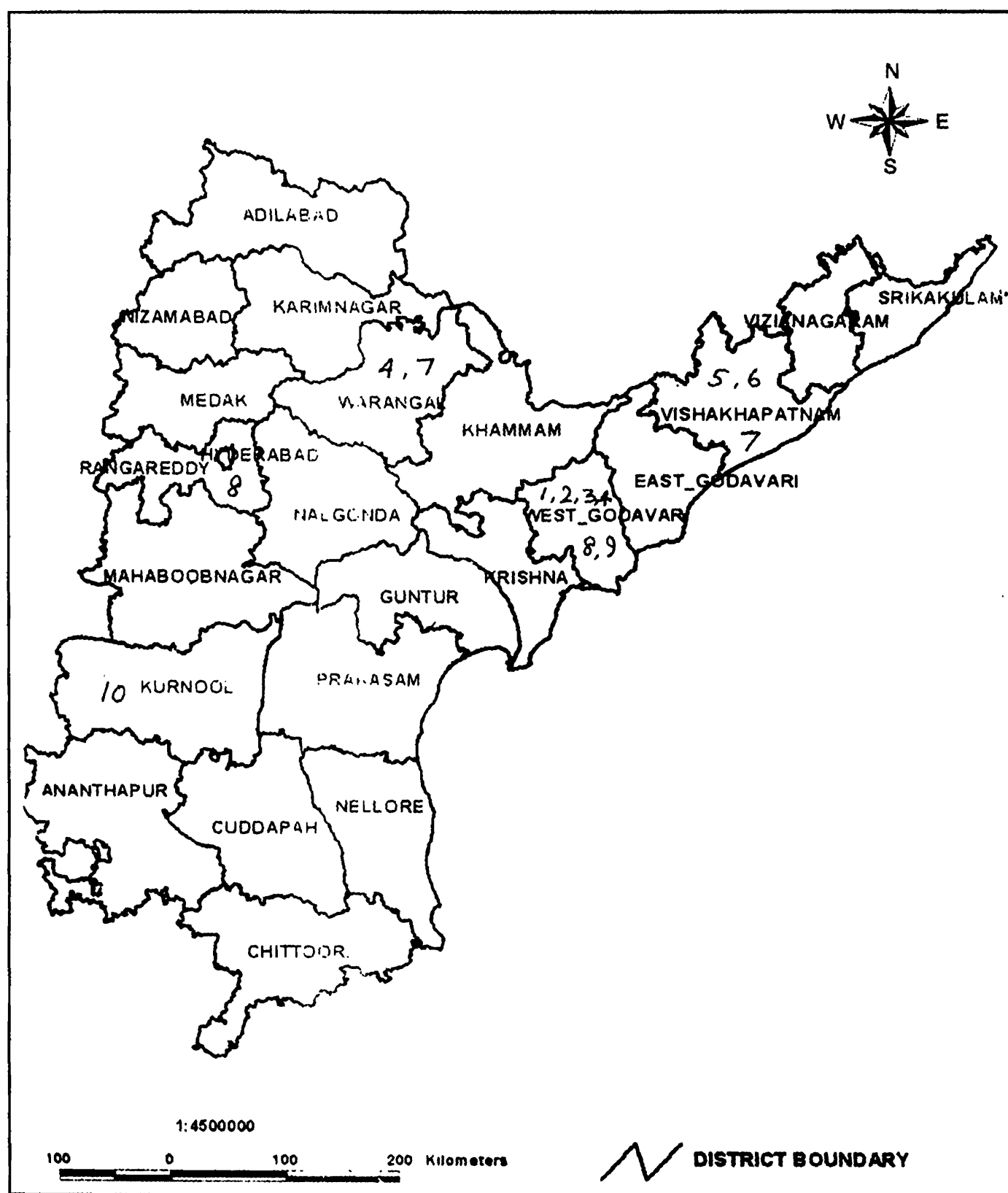
INTRODUCTION

The family Syrphidae belongs to the Asciza of the suborder Brachycera in the order Diptera (Mc Alpine *et al.*, 1989). The family is nearly cosmopolitan in distribution, broken down to 3 subfamilies & 15 tribes & contain more than 5,500 described species in the world. India also holds a rich fauna of 256 species & 5 subspecies under 62 genera in 2 subfamilies (Datta, 1991).

The Syrphidae, commonly known as Hover flies or Flower flies, are range from 4mm to over 25mm & their colouration from bright yellow or orange to dull dark black or grey with a few iridescent forms. They are also, as their name implies, incredibly good at flying & hovering. Many hover flies are clever mimics of bees and wasps though they themselves cannot bite or sting.

As larva, hoverflies feed on a great variety of substances from cowdung, muddy puddles and ditches, to living plant materials and living aphids. Not only are the hoverflies useful because they eat aphids, but they are also the second most important group of insect pollinators after the bees and wasps.

Andhra Pradesh, the fifth largest state in India lies in between latitude 12½°14'N to 19½°54'N and longitude 76½°50' E to 86½°50'E & is located on the eastern coast of the Indian peninsula. The state is surrounded by Orissa, Madhya Pradesh & Maharashtra in the north, to the east Bay of Bengal, to the south Tamil Nadu & to the West Karnataka. It's area is 2, 76, 814 sq.km. & the state has a coast lines of 982 km. West Godavari is the smallest district in the state. The state is likely to harbor a rich & interesting fauna but has ever been neglected in respect of Diptera fauna particularly hover flies fauna. An attempt had been made by Datta & Chakraborti (1986) and worked out the syrphid fauna (43 species) of South India of which only a lone species *Phytomyia (Dolichomerus) crassa* is reported from Andhra Pradesh. The present study revealed 11 species of syrphid species under 10 genera of 2 subfamilies, which included 9 new records (marked with asterix) from this state. Key to the



Map of Andhra Pradesh showing collections localities.

families, genera & species of the family Syrphidae treated here is given and followed after Vockeroth (1969) & Thomson (1972). All the syrphid species reported here were collected by the scientists (1985-1986) of this Institute and accumulated in the Zoological Survey of India, Kolkata.

LIST OF TAXA

Subfamily SYRPHINAE

Tribe SYRPHINI

- *1. *Asarkina* (*Asarkina*) *ericetorum* (Fabricius)
- *2. *Dideopsis* *aegrotus* (Fabricius)
- *3. *Episyrphus* *balteatus* (De Geer)
- *4. *Ischiodon* *scutellaries* (Fabricius)
- *5. *Sphaerophoria* *scripta* (Linnaeus)

Tribe MELANOSTOMATINI

- *6. *Melanostoma* *orientale* (Wiedemann)

Tribe PARAGINI

- *7. *Paragus* (*Paragas*) *serratus* (Fabricius)

Subfamily MILESINAE

Tribe ERISTALINI

- 8. *Eristalinus* (*Eristalinus*) *obscuritarsis* de Meijere
- *9. *Mesembrius* *quadrivittatus* (Wiedemann)
- *10. *Phytomia* (*Phytomia*) *errans* (Fabricius)
- 11. *Phytomia* (*Dolichomerus*) *crassa* (Fabricius)

MATERIALS AND METHODS

The methods prescribed by Datta, Parui & Mukherjee (1997) were employed here for collecting, killing and preserving adult syrphid flies.

MORPHOLOGY AND TERMINOLOGY

The morphology and terminology is followed as in the "Fauna of Meghalaya: Syrphidae" (Datta, 1998).

Key to the Subfamilies of the Family SYRPHIDAE

- 1. Pronotum bare; abdomen with 5 pregenital segments in male SYRPHINAE

- Pronotum pilose; abdomen with 4 pregenital segments in male **MILESINAE**

Subfamily SYRPHINAE

Key to the tribes

1. Tergite 1 well-developed and distinctly extended well beyond scutellum; scutellum at its posterior margin inconspicuously or strongly denticulate; abdomen robust and usually oval **PARAGINI**
- Tergite 1 small and practically covered by scutellum posteriorly smooth and not denticulate; abdomen usually slender 2.
2. Face and scutellum entirely black; anterior flat portion of mesopleuron with only microscopic pubescence; aedeagus undivided, strongly swollen basally and slender tube like apically **MELANOSTOMATINI**
- Face and scutellum usually yellow or yellowish brown; mesopleural hairing variable; aedeagus nearly always 2-segmented, with complex associated structure **SYRPHINI**

Tribe SYRPHINI

Key to the genera

1. Mesopleuron at its anterior flat portion with long fine erect or sub-erect hairs at least postero-dorsally; wing with discrete black sclerotized dots along posterior margin; abdominal tergites with double-banded pattern **Episyrphus** Matsumura & Adachi
- Mesopleuron at its anterior flat portion with only microscopic pubescence or pollinose; wing margin without such dots posteriorly; abdominal tergites patterned otherwise 2
2. Wing with distinct transverse brown band at mid-length extending from costa at least across posterior cross vein **Dideopsis** Matsumura
- Wing clear, occasionally darkened but never with distinct transverse dark band 3
3. Metasternum haired **Asarkina** Macquart
- Metasternum bare 4
4. Hind trochanter in males with ventral spine like process; female tergite 8 well-developed sclerotized and exposed **Ischiodon** Sack
- Hind trochanter in males without such process; female tergite 8 normal, tergite 6 well developed **Sphaerophoria** Lepeletier & Serville

Genus *Asarkina* Macquart

1842. *Asarkina* Macquart, *Dipt. exot.*, 2(2) : 77 (137). Type-species : *Scaeva rostrata* Wiedemann.

Subgenus *Asarkina* Macquart

Diagnosis : Mesonotum with dense anterior collar of long erect hairs; vein R_{4+5} distinctly dipped into cell R_{4+5} , surstylus strongly convergent and nearly transverse in position.

*1. *Asarkina (Asarkina) ericetorum* (Fabricius)

1781. *Syrphus ericetorum* Fabricius, *Spec. Insect.*, 2 : 425.

Material examined : 1 ♀ West Godavari Dist., Eluru, Palasgudam, 15.ii.1986, Coll. A.N.T. Joseph.

Diagnosis : Male frons bright sulphur yellow with long black erect pubescence, a semi-circular shining blackish brown spot on upper side of small antennal prominence; female frons at vertex about one-ninth of head rather rapidly widening to double that width at level of antennae; surstylus broad basally, only slightly narrowed to subtruncate apex.

Distribution : Andhra Pradesh, Arunachal Pradesh, Assam, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Sikkim, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Other parts of the Oriental Region; Africa; Australia, Fiji, Moluccas, New Guinea and Samoa.

Genus *Dideopsis* Matsumura

Dideopsis Matsumura, 1917. *Ent. Mag. Kyoto*, 2 : 142. Type-species *Eristalis aegrotus* Fabricius.

*2. *Dideopsis aegrota* (Fabricius)

1805. *Eristalis aegrotus* Fabricius, *Syst. Antliat.*, 243.

Material examined : 1 ♀, West Godavari Dist. Kannapuram, Munchurulu, 18. ii. 1986, Coll. A.N.T. Joseph.

Diagnosis : Eyes bare; frons black with black hairs; face black with yellow hairs; a black stripe extending from base of antennae to central bump; mesonotum black with brownish hairs except yellowish humerus with yellow hairs, mesonotum with anterior collar of long erect hairs; vein R_{4+5} indistinctly dipped into cell R_{4+5} ; upper and lower sternopleural hair-patches widely separated throughout; postero-median apical angle of hind coxa with a strong tuft of hairs; abdomen oval, with broad yellow bands; sternite 9 in male terminalia with short but distinct setae laterally; distal portion of aedeagus with broad flattened apically rounded postero-dorsal process.

Distribution : Andhra Pradesh, Arunachal Pradesh, Assam, Kerala, Manipur, Meghalaya, Mizoram and West Bengal.

Elsewhere : Nepal and other parts of the SE Asia; Australia, Moluccas and New Guinea.

Genus *Episyrphus* Matsumura & Adachi

1917. *Episyrphus* Matsumura & Adachi, *Ent. Mag. Kyoto*, 2 : 134. Type-species: *Musca balteata* De Geer.

*3. *Episyrphus balteatus* (De Geer)

1776. *Musca balteata* De Geer, *Mem. pour Serv. Hist. Ins.*, 6 : 116.

Material examined : 2 ♀ ♀, West Godavari Dist., Palasgudam, 15. ii. 1986, Coll. A.N.T. Joseph

Diagnosis : Eyes bare; face orange with orange hairs; base of antenna with a black dot above; mesonotum black, with a narrow median and 2 lateral greyish stripes; posterior margin of wing with a series of sclerotized dots; abdomen linear, orange, tergites 3 and 4 mostly yellow with narrow sub-basal and broad apical black bands, a black median spot on tergite 1; surstylus in male terminalia straight, not more than twice as long as broad; superior lobe stout, with ventro-laterally directed tooth apically; distal portion of aedeagus not expanded apically.

Distribution : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Jammu & Kashmir, Kerala, Manipur, Meghalaya, Mizoram, Orissa, Sikkim, Tripura and West Bengal.

Elsewhere : China, Malaya and other parts of the Oriental region; Australia; Bonin Islands and Palaearctic region.

Genus *Ischiodon* Sack

1913. *Ischiodon* Sack, *Ent. Mitt.*, 2 : 5. Type-species : *Ischiodon trochanterica* Sack (= *Scaeva scutellaris* Fabricius)

*4. *Ischiodon scutellaris* (Fabricius)

1805. *Scaeva scutellaris* Fabricius, *Syst. Antliat.*, : 252.

Material examined : 3 ♂ ♂, West Godavari Dist., Palasgudam, 15.ii.1986, Coll. A.N.T. Joseph; 3 ♂ ♂, Warangal Dist., Pakhal Forest, 5.VII.1985, coll. P. Parui.

Diagnosis : Eyes bare; metasternum bare; antennal segment 3 sub-acute apically; wing with vein R_{4+5} upcurved apically and ending appreciably before wing apex; upper margin of sternopleuron with distinct yellow spot; a few short hairs anteriorly below upper patch of sternopleural hairs; hind femur with a sub-apical black ring; surstylus in male terminalia elongate, broadened beyond base, dorsally curved and serrate, ventrally straight and smooth; aedeagal base very large and strongly sclerotized.

Distribution : Andhra Pradesh, Arunachal Pradesh, Bihar, Jammu & Kashmir, Karnataka, Manipur, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Java, Philippines, Taiwan and other parts of the SE Asia; Australia, Hawaii, Japan and Micronesia.

Genus *Sphaerophoria* (Lepeletier & Serville)

1828. *Sphaerophoria* Lepeletier & Serville, *Encycl. Method.* 10 : 513. Type-species : *Musca scripta* L.

*5. *Sphaerophoria scripta* (Linnaeus)

1758. *Musca scripta* Linnaeus, *Syst. Nat. Ed.*, 10 : 594.

Material examined : 1 ♂, Visakhapatnam Dist., Bondavidi, 26.ii. 1986, Coll. A.N.T. Joseph.

Diagnosis : Black and yellow species; eyes bare, face and antennae yellowish; thoracic dorsum black with lateral sides yellow, metasternum haired, hypopleuron bare below metathoracic spiracle and in front of its lower end; scutellum yellow; legs yellow with dark tarsi; abdomen slender and parallel sided and unmargined with yellow transverse bands; male terminalia greatly enlarged, globose, tergite 9 as broad as preabdomen, cerci entirely surrounded by tergite 9.

Distribution : In India apart from present record only from J & K.

Elsewhere : Nepal; Palearctic.

Tribe *Melanostomatini*Genus *Melanostoma* Schiner

1860. *Melanostoma* Schiner, *Wien. Ent. Mschr.*, 4 : 213. Type-species : *Musca mellina* L.

Diagnosis : Syrphines with elongate-oblong abdomen and intermediate tergites usually with pairs of bright yellow spots; male fore tarsus normal and not dilated; surstylus in male terminalia usually not bifid; superior lobe normally triangular.

*6. *Melanostoma orientale* (Wiedemann)

1824. *Syrphus orientalis* Wiedemann, *Analecta Ent.*, : 36.

Material examined : 2 ♀ ♀, Visakhapatnam District, Chintapalli, 25.ii.1986, Coll. A.N.T. Joseph.

Diagnosis : Eyes bare; face with two distinct bumps; arista hairy; abdomen shining black, with large quadrate or oblong orange spots anteriorly on at least terga 3 and 4 laterally leaving a broad median space; surstylus in males narrower and curved at base.

Distribution : Andhra Pradesh, Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Manipur, Meghalaya, Mizoram, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Bhutan, Nepal, Pakistan, Srilanka and other parts of the Oriental region; Palearctic region.

Tribe **Paragini**Genus ***Paragus*** Latreille

1804. *Paragus* Latreille, *Nouv. Dict. Hist. Nat.*, 24 : 94. Type-species : *Syrphus bicolor* Fabricius.

Diagnosis : Head slightly flattened and broader than thorax; eye pilose; face produced to a large central bump; antennal arista bare; thorax quadrate and arched; mesonotum striped; wing with veins M_{1+2} and M_3+C_{ul} undulating apically and crossvein r-m distinctly before middle of discal cell; abdomen as wide as thorax, nearly equilateral; aedeagus in male terminalia undivided, simple and tabular medially with a complex lateral lobe at base on either side.

Subgenus ***Paragus*** Latreille

Diagnosis : Eye with bicolourous pile, with alternating vittae of pale and dark hairs; spuriousvein shorter, not extending beyond discal (r-m) cross-vein.

***7. *Paragus (Paragus) serratus* (Fabricius)**

1805. *Mulio serratus* Fabricius, *Syst. Anliat.*, : 186.

Material examined : 1 ♀, Warangal District, Pakhal Forest, 4.VII.1985, coll. P. Parui, 2 ♂♂, Visakhapatnam District, Araku Valley, Ananthgiri, 28.II.1987, coll. A.N.T. Joseph.

Diagnosis : Eye with 3 vittae of white hairs; scutellum black with yellow margin, strongly denticulate posteriorly; wings with anterior cross vein distinctly before middle of discal cell; abdomen yellow with brown markings; punctate; tergites 3 and each with a whitish band on each side anteriorly, broken in mid-line, tergite 5 with a similar but continuous band placed diagonally.

Distribution : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Jakarta, Java & Malaysia, Nepal, Pakistan and Sri Lanka and Africa and Pupua.

Subfamily **MILESINAE**Tribe **ERISTALINI****Key to the genera**

1. Wing with marginal cell (R_1) narrowly open ***Mesembrius* Rondani**
- Wing with marginal cell (R_1) closed **2**
2. Eye bare; wing with normal submarginal cell (R_3) due to normal length of anterior cross-

vein (r-m); antennal arista usually plumose; metathoracic spiracular pile-patch present ***Phytomia*** Guerin-Meneville

- Eye at least partially pilose; if bare, then submarginal cell narrowed basally due to longer anterior cross vein; antennal arista virtually bare; metathoracic spiracular pile patch usually absent ***Eristalinus*** Rondani

Genus ***Eristalinus*** Rondani

1845. *Eristalinus* Rondani, *Naovi Annali Sci. nat. Bologna*, 2(2) : 453. Type-species : *Musca sepulchralis* L.

Subgenus ***Eristalinus*** Rondani

Diagnosis : Subscutellar fringe absent; metathoracic spiracle at its front without any patch of hairs; hind femur normal and never dilated.

8. ***Eristalinus (Eristalinus) obscuritarsis*** de Meijere

1908. *Eristalis obscuritarsis* de Meijere, *Tijdschr. Ent.*, 51 : 250.

Material examined : 1 ♂, 3 ♀ ♀, West Godavari District, Eluru, Vatluru, 16.ii.1985, Coll. A.N.T. Joseph; 1 ♀, Ranga Reddy Dist., Hyderabad, Zoogarden, 2.vii.1985, coll. P. Parui.

Diagnosis : Eyes with black spots; antennae reddish; thorax black with three longitudinal yellow stripes in addition to similar colour sides stripes; scutellum yellowish; 3rd abdominal segment with a pair of quadrate yellow spots on its sides; femur black at most narrowly pale apically; tarsi of similar colour, at most pale basally.

Distribution : Andhra Pradesh, Gujarat, Karnataka, Kashmir, Kerala, Maharashtra, Orissa, Sikkim and West Bengal.

Elsewhere : Bangladesh, Java, Malay, Singapore, Sri Lanka and Taiwan.

Genus ***Mesembrius*** Rondani

1857. *Mesembrius* Rondani, *Dipterol. ital. Prodr.*, 2 : 50, Type-species : *Helophilus peregrinus* Loew.

*9 ***Mesembrius quadrivittatus*** (Wiedemann)

1819. *Eristalis quadrivittatus* Wiedemann, *zool. Mag.*, 1 : 17.

Material examined : 1 ♂, West Godavari District, Eluru, Vatluru, 16.ii.1986, Coll. A.N.T. Joseph.

Diagnosis : Eyes in male gradually approach but at no point actually touch; thorax bright yellow with three longitudinal black stripes; legs with yellow pubescence, in male hind femora with a distinct comb-like fringe of short, stiff black hairs on inner underside nearly

from base to tip; abdomen mainly orange, 2nd segment with a large triangular brown mark on base, 3rd segment with a flattened black triangle on hind margin, 4th segment with apical half mainly black, remainder with yellow tomentum, 5th segment with a large shining black triangle, remainder yellow.

Distribution : Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Madhya Pradesh, Orissa, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Jawa, Moluccas (Indonesia), Nepal and Sri Lanka.

Genus *Phytomia* Guerin Menenille

1834. *Phytomia* Guerin-Meneville, in *Belanger, Voyage Ind-Orient*, 7 : 509. Type-species : *Eristalis chrysopygus* Wiedemann.

Key to the subgenera

1. Hind femur with a conspicuous tooth below near tip *Dolichomerus* Macquart
- Hind femur unarmed *Phytomia* Guerin-Meneville.

*10. *Phytomia (Phytomia) errans* (Fabricius)

1787. *Syrphus errans* Fabricius, *Mantissa Insect*; 2 : 337.

Material examined : 1♂, Kurnool District, *Allogadha, Ahobala*, 25. Vi. 1985, coll. P. Parui.

Diagnosis : Antenna entirely orange, arista orange, bare; mesonotum usually dull black anteriorly, with two broad stripes and broadly yellowish grey posteriorly; abdomen brownish orange, segments 2, 3 and 4 each with a large blackish brown spot posteriorly.

Distribution : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Karnataka, Kashmir, Kerala, Manipur, Mizoram, Orissa, Tamil Nadu and West Bengal.

Elsewhere : In other parts of the South-East Asia; Japan.

*11. *Phytomia (Dolichomerus) crassa* (Fabricius)

1787. *Syrphus crassus* Fabricius, *Mantissa Insect*, 2 : 334.

Diagnosis : Antenna black, arista orange, plumose on basal half; thorax and scutellum black; abdomen shining black, bare, segments 2, 3 and 4 each with a deep impression of a large circle touching anterior margin.

Distribution : Andhra Pradesh, Assam, Bihar, Goa, Karnataka, Kerala, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Celebes, Laos, Malaya, Nepal, Sri Lanka and Thailand.

SUMMARY

A taxonomic account of 11 species of hover flies belonging to 10 genera under 2 subfamilies from Andhra Pradesh is presented in this paper. Among the 11 species of syrphid flies so far reported from Andhra Pradesh 2 species are restricted within the boundary of the Oriental region, 3 species extended upto Palaearctic region, 2 species extend their distribution upto Australia and 1 species upto Ethiopian region beyond the boundary of the Oriental and Palaearctic. *Asarkina* (*Asarkina*) *ericetorum* (Fabricius), a lone species reported from this state is cosmopolitan in distribution.

ACKNOWLEDGEMENTS

We wish to express our thanks to the Director, Zoological Survey of India, for the necessary facilities and encouragement. Thanks are also due to Dr. A.K. Hazra, Scientist 'E' for kindly going through the manuscript and making useful suggestions.

REFERENCES

- Brunetti, E. 1923. The *Fauna of British India including Ceylon and Burma*. Diptera : Pipunculidae, Syrphidae, Conopidae and Oestridae, 3 : xi+424. Taylor & Francis, London.
- Datta, M and Chakraborti, M. 1983. On a collection of flower (Diptera:Syrphidae) with new records from Jammu & Kashmir. *Rec. zool. Surv. India*, 81:237-253.
- Datta, M and Chakraborti, M. 1986. On a collection of flower flies (Diptera:Syrphidae) from South India., *Rec. zool. Surv. India*, 83(1&2) : 53-67.
- Datta, M., Parui, P. and Mukherjee, M 1991. Animal Resources of India, State of Art, Diptera : 373-417. Zoological survey of India, Calcutta.
- Datta, M., Parui, P and Mukherjee, M 1997. Insecta: Diptera In : *Fauna of West Bengal, State Fauna Ser*, 7(3).1-76. Zoological Survey of India, Calcutta.
- Datta, M 1998. Diptera: Syrphidae, In : *Fauna of Meghalaya, State Fauna Ser*, 4(6) : 113-176. Zoological Survey of India, Calcutta.
- Datta, M. Parui, P. and Mukherjee, M. 2000. Diptera : Syrphidae. In : *Fauna of Tripura, State Fauna Ser*. 7(3) : 241-259. Zoological Survey of India, Calcutta.
- Knutson, L.V., Thompson, F.C and Vockeroth, J.R. 1975. Family Syrphidae. In : *A Catalogue of Diptera of the Oriental Region*. Univ. Hawaii Press, Honolulu : 307-374.

- Mc Alpine, J.F and wood, D.M. 1989. Manual of Nearctic Diptera, 3: Agricultural Canada Monograph, No. 32.
- Thompson, F.C. 1972. A contribution to a generic revision of the Neotropical Milesinae (Diptera : Syrphidae). *Arq. zool.*, Sao Paulo, 23 : 73-215.
- Vockeroth, J.R. 1969. A revision of the genera of the Syrphini (Diptera : Syrphidae). *Mem. ent. Soc. Can.*, 62 : 1-176.

LEPIDOPTERA : FAMILIES : PIERIDAE, HESPERIIDAE, ARCTIIDAE AND CTENUCHIDAE

MRIDULA MAJUMDAR

Zoological Survey of India, M-Block, New Alipore, Kolkata-700053

INTRODUCTION

A consolidated systematic account of butterflies and moths of the four families of lepidoptera viz., Pieridae, Hesperidae, Arctidae and Ctenuchidae from the state of Andhra Pradesh has been provided. The study is based on the material brought by different survey parties of Zoological Survey of India. Altogether 43 spp. in 25 genera, of which the break up may be shown as 27 spp. in 11 genera of the family Pieridae, 10 spp. in 9 genera of the family Hesperidae, 3 spp. in 3 genera of the family Arctidae and 3 spp. in 2 genera of the family Ctenuchidae are dealt with here. Out of 43 species, 4 spp. in 3 genera are recorded as new to this area. Besides, 10 spp. of the family Pieridae and 7 spp. of family Hesperidae have been reviewed from the literature. vide, Home, 1935, Sander, 1936, Talbot, 1939 and Haribal, 1992. The system of different families under study has been followed after Evans (1932, 1949), Hampson (1898, 1900, 1901), Talbot (1939), Varshney (1993) and Wynter-Blyth (1957).

SYSTEMATIC ACCOUNT

LIST OF TAXA

Order **LEPIDOPTERA**

Suborder **RHOPALOCERA**

Family **PIERIDAE**

Subfamily **PIERINAE**

Genus ***Pareronia*** Bingham

1. *Pareronia valeria hippia* (Fabricius)

Genus ***Delias*** Huebner

2. *Delias eucharis* (Drury)

*3. *Delias hyparete indica* (Wallace)

*4. *Delias hyparete ethire* (Doherty)

Genus *Leptosia* Huebner

5. *Leptosia nina nina* Huebner

Genus *Anaphaeis* Huebner

6. *Anaphaeis aurota aurota* (Fabricius)

Genus *Appias* Huebner

*7. *Appias indra indra* (Moore)

*8. *Appias lyncida eleonora* (Boisduval)

9. *Appias libythea libythea* (Fabricius)

*10. *Appias albina darada* (Felder)

Genus *Cepora* Billberg

11. *Cepora nerissa phryne* (Fabricius)

*12. *Cepora nadina nadina* (Lucas)

Genus *Ixias* Huebner

13. *Ixias marrianae* (Cramer)

14. *Ixias pyrene sesia* (Fabricius)

Genus *Colotis* Huebner

*15. *Colotis amata modestus* (Butler)

16. *Colotis fausta fulvia* (Wallace)

17. *Colotis danae danae* (Fabricius)

18. *Colotis etrida etrida* (Boisduval)

*19. *Colotis eucharis* (Fabricius)

Genus *Hebomoia* Huebner

*20. *Hebomoia glaucippe glaucippe* (Linnaeus)

Subfamily COLIADINAE

Genus *Eurema* Huebner

21. *Eurema brigitta rubella* (Wallace)

22. *Eurema laeta laeta* (Boisduval)

23. *Eurema hecabe simulata* (Moore)

*24. *Eurema andersoni andersoni* (Moore)

Genus *Catopsilia* Huebner25. *Catopsilia pomona pomona* (Fabricius)26. *Catopsilia pyranthe pyranthe* (Linnaeus)27. *Catopsilia florella gnoma* (Fabricius)

Family HESPERIINAE

Subfamily HESPERIINAE

Group ANCISTROIDES

Genus *Udaspes* Moore28. *Udaspes folus* (Cramer)

Group PLASTINGIA

Genus *Suastus* Moore*29. *Suastus gremius gremius* (Fabricius)

Group TARACTOCERA

Genus *Telicota* Moore30. *Telicota ancilla bambusae* (Moore)*31. *Telicota augias* (Linnaeus)

Subfamily HESPERIINAE

Group GEGENES

Genus *Pelopidas* Walker32. *Pelopidas mathias mathias* (Fabricius)Genus *Borbo* Evans*33. *Borbo bevani* (Moore)

Subfamily COELIADINAE

Genus *Hasora* Moore*34. *Hasora chromus chromus* (Cramer)

Subfamily PYRGINAE

Group TAGIADES

Genus *Coladenia* Moore*35. *Coladenia indrani indra* Evans

Group PYRGUS

Genus *Gomalia* Moore*36. *Gomalia elna albofasciata* Moore

Genus *Spialia* Swinhoe

*37. *Spialia galba* (Fabricius)

Suborder HETEROCERA

Family ARCTIIDAE

Subfamily NYCTEMERIINAE

Genus *Nyctemera* Huebner

38. *Nyctemera lacticina* (Cramer)

Subfamily SPILOSOMINAE

Genus *Cretonotos* Huebner

39. *Cretonotos gangis* (Linnaeus)

Genus *Olepa* Watson

40. *Olepa ricini* (Fabricius)

Family CTENUCHIDAE

Genus *Ceryx* Wallengren

41. *Ceryx godartii* (Boisduval)

Genus *Syntomis* Ochsenheimer

42. *Syntomis cyssea* (Stoll)

43. *Syntomis passalis* (Fabricius)

Suborder RHOPALOCERA

Key to families

- Forewing vein R5 stalked; antennae approximate at the base PIERIDAE
- Forewing vein R5 not stalked; antennae wide apart at base and often with hooked club
..... HESPERIIDAE

Family PIERIDAE

Key to the Subfamilies

- Palpi always with hair; hindwing with well developed precostal vein curved distal
..... PIERINAE
- Palpi without hair; hindwing without precostal vein or very short, directed basal....
..... COLIADINAE

Subfamily PIERRINAE

1. Fore wing vein R_4 and R_5 coincident 2
 - Fore wing vein R_4 and R_5 separate PARERONIA Bingham
2. Fore wing vein R_2 absent DELIAS Huebner
 - Fore wing vein R_2 from cell 3
3. Fore wing vein R_3 present and stalked with vein R_4 and R_5 4
 - Fore wing vein R_3 absent LEPTOSIA Huebner
4. Fore wing vein R_1 anastomosing with S_C+R_1 ANAPHAEIS Huebner
 - Fore wing vein R_1 free 5
5. Fore wing vein M_1 from the stem of R_4+R_5 and R_3 6
 - Fore wing vein M_1 from cell angle or below it 8
6. Male with hair pencil on the abdomen APPIAS Huebner
 - Male without hair pencil on the abdomen 7
7. Palpi with third segment slender as long as second segment CEPORA Billberg
 - Palpi with third segment short and oval IXIAS Huebner
8. Fore wing vein M_1 from the upper angle of cell COLOTIS Huebner
 - Fore wing vein M_1 from the junction of upper discocellular and middle discocellular HEBOMOIA Huebner

Subfamily PIERINAE

Genus *Pareronia* Bingham

1907. *Pareronia* Bingham, *Fauna Brit. India*, 2 : 276.

Remarks : This genus is represented in India by four species, of which only one is treated from Andhra Pradesh.

1. *Pareronia valeria hippia* (Fabrici)

1787. *Papilio hippia* Fabricius, *Mant. Ins.*, 2 : 55.

1935. *Pareronia valeria hippia* (Fabricius), Home, *J. Bombay nat. Hist. Soc.*, 37 : 893.

1992. *Pareronia valeria hippia* (Fabricius), Varshney, *Oriental Insects*, 27 : 362.

Diagnostic characters : Ground colour pale blue, upper side of wings costal, terminal and apical areas black, apical area with prominent spots continued up to marginal area, hind wing marginal markings prominent.

Material examined : lex., Andhra Pradesh, District-East Godavari, Revulapalem, Rajahamundry, 20.x.1998 (Coll. S.P. Chakraborty); lex., Guntimadugu Black Forest, Khammam, Sathupalli, 12.xii.1999 (Coll. P.H. Roy).

Wing expanse : 78 mm.

Distribution : India including Andhra Pradesh (District-East Godavari) to Myanmar and Thailand.

Genus *Delias* Huebner

1819. *Delias* Huebner, *Verz. bek. Schmett.*, (6).

Remarks : Of the nine species of this genus occurring in India, two are dealt with from Andhra Pradesh.

Key to species

- Forewing upperside with a submarginal black line *eucharis* (Drury)
- Fore wing upperside without submarginal black line *hyparete* (Linnaeus)

2. *Delias eucharis* (Drury)

1773. *Papilio eucharis* Drury, *Illustr. Nat. Hist.*, pl. x. figs. 5, 6.

1935. *Delias eucharis*, (Drury), Home, *J. Bombay nat. Hist. Soc.*, **37** (4) : 892.

1992. *Delias eucharis*, (Drury), Ghosh & Chaudhuri, *Fauna of Meghalaya, State Fauna Series*, **4**(Part 6) : 249.

Material examined : lex., Samsabad, Mahbub Nagar, 10. x. 1998, (Coll. S.P. Chakraborty); lex., Nallimula Forest, Chintala Forest, 24. xi. 1998 3 exs., Kalakudi Forest, 24. xi., 1998, 11. xii. 1999 (Coll. P.H. Roy); lex., District Rangareddi, Secunderabad, Kirkut Pally, 15km. East, 17.I.2004, 2 exs., Gutkha, South east of Secunderabad, 17.i.1904, 3 exs., Rajendra nagar, 18. i. 2004, 5 exs., Turaramgat, 18. ii. 2005, 5 exs., Santhan nagar 19. ii. 2005 (Coll. D.R. Maulik).

Wing expanse : 60-78 mm.

Distribution : India : Andhra Pradesh (District : Rangareddi), Meghalaya, Peninsular India as far as the lower slopes of the Himalayas.

Elsewhere : Srilanka.

3. *Delias hyparete indica* (Wallace)

1867. *Thyca indica* Wallace, *Trans. Ent. Soc. London*, **4** (3) : 351.

1939. *Delias hyparete indica* (Wallace), Talbot, *Fauna Brit. India, Butterflies*, **1** : 357-358.

1992. *Delias hyparete indica* (Wallace), Haribal, Sikkim Nature Conservation Foundation, : 85.

Material examined : Nil.

Wing expanse : 72-88 mm. (Talbot, 1939)

Distribution : India (Andhra Pradesh), Kumaon to Myanmar.

4. *Delias hyparete ethire* Doherty

1886. *Delias ethire* Doherty, *J. Asiat. Soc. Bengal*, **55**, no. 3 : 262.

1936. *Delias hyparete ethire* Doherty, Sander, *J. Bombay nat. Hist. Soc.*, **38** (4) : 800.

1939. *Delias hyparete ethire* Doherty, Talbot, *Fauna Brit. India, Butterflies*, **1** : 357.

Material examined : Nil.

Wing expanse : 70-80 mm (Evans, 1932).

Distribution : Peninsular India including Andhra Pradesh, Chennai to Bengal.

Genus *Leptosia* Huebner

1818. *Leptosia* Huebner, *Samml. Exot. Schmett.*, **1** : 13.

Remarks : A single species *Leptosia nina* (Fabricius) represented this genus in India.

5. *Leptosia nina nina* (Fabricius)

1793. *Papilio nina* Fabricius, *Ent. Syst.*, **3** (1) : 194.

1936. *Leptosia nina nina* (Fabricius), Sander, *J. Bombay nat. Hist. Soc.*, **38** (4) : 800.

1939. *Leptosia nina nina* (Fabricius) Talbot, *Fauna Brit. India, Butterflies*, **1** : 305-307.

Diagnostic characers : Wings upperside white, fore wing bases slightly powdered with black scales, black apex and outer margin with black border extended up to vein Cu la, post discal area with a large pear shaped spot, hind wing uniformly white. Underside white, costal margin and apex of fore wing and the whole hind wing striated with greenish strigae and minute dots.

Material examined : Andhra Pradesh, lex., District Vizianagar, Badangi, 3. xi. 1997 (Coll. P. Mukherjee); lex., District- Vishakhapatnam, Sarabaram, 35km. from guest house, 1. v. 2004, lex., District- Prakasan, 35km. East of Giddalur, 25. ii. 2005, lex., Sidhout, 35km. South from Kadapa District, 1. iii. 2005, 4 exs., District- Chitoor, Tirupati, Bellapalle, 42km. North East, 6. iii. 2005 (Coll. D.R. Maulik).

Wing expanse : 30-38 mm.

Distribution : India : Andhra Pradesh, (District-Vishakapatnam Vizianagar, Kadapa, Prakasan and Chittoor). Peninsular India to Mussorie, Andamans.

Elsewhere : Hainan, Indo China, Myanmar, South China, Thailand.

Genus *Anapheis* Huebner

1819. *Anapheis* Huebner, *Samml. Exot. Schmett.*, 2 : 93.

Remarks : A single species is reported from India, which is dealt with here.

6. *Anapheis aurota aurota* (Fabricius)

1793. *Papilio aurota* Fabricius, *Ent. Syst.*, 3 (1) : 197.

1935. *Belenois mesentina mesentina* Davidson, Home, *J. Bombay nat. Hist. Soc.*, 37 (4) : 892.

1997. *Anapeheis aurota aurota* (Fabricius), Ghosh & Chaudhuri, *Fauna of West Bengal, State Fauna Series* 3(Part 7) : 710.

Diagnostic characers : Wings upperside white, fore wing costal area to base of vein R1 dusky black; a prominent curved jet-black discocellular bar; a broad black apical area narrowing to vein Cu1b and six white spots present in the apical area, of which the anterior four are elongate. Hind wing with a marginal black border from veins Cu 1b to M1 and bearing four rounded spots from vein Cu1b to M2.

Material examined : Andhra Pradesh, lex., District- Nalgonda, Bhongiri, 12. x. 1998 (Coll. S.P. Chakroborty); lex., District-Guntur, Perechalunat Reserve forest, 2. vii. 1999, 2 exs., Guntur, Kondaveelu Reserve Forest, 4. vii. 1999 (Coll. P.H. Roy); 2 exs., Kurkat Pally, 15km. East, 17. i. 2004, 2 exs., District. Rangareddi, Secunderabad, Rajendra Nagar, 18. i. 2004 (Coll. D.R. Maulik).

Wing expanse : 40-55 mm.

Distribution : Throughout India including Andhra Pradesh, (District-Nalgonda, Guntur, Rangareddi) except Assam.

Genus *Appias* Huebner

1819. *Appias* Huebner, *Verz. bek. Schmett.*, : 91.

Remarks : Eight species of this genus recorded from India, of which four are dealt with from Andhra Pradesh.

Key to species

1. Hind wing underside with a black dot at end of cell and black marginal dots between the veins *indra* (Moore)
- Hind wing underside without black dot at end of cell and no black marginal dots between the veins 2

2. Hind wing underside yellow *lyncida* (Cramer)
 - Hind wing underside not yellow 3
3. Fore wing underside with veins in apical and outer marginal area black
 - *libythea* (Fabricius)
 - Fore wing underside with veins in apical and outer marginal area not black
 - *albina* (Boisduval)

7. *Appias indra indra* (Moore)

1857. *Pieris indra* Moore, *Cat. Lep. Mus. E.I.C.*, 1 : 74.

1939. *Appias indra indra* (Moore), Talbot, *Fauna Brit. India, Butterflies*, 1 : 391-393.

1992. *Appias indra indra* (Moore), Haribal, *Sikkim Nature Conservation Foundation*, : 80.

Material examined : Nil.

Wing expanse : 60-70 mm (Talbot, 1939).

Distribution : India (Andhra Pradesh), Nepal to Myanmar also extends to Hainan and South China, the Malaya Peninsula and Cochin China.

8. *Appias lyncida eleonora* (Boisduval)

1836. *Pieris eleonora* Boisduval, *Spec. Gen. Lep.*, 1 : 481.

1992. *Appias lyncida eleonora* (Boisduval), Haribal, *Sikkim Nature Conservation Foundation*, : 79-80.

1998. *Appias lyncida eleonora* (Boisduval), Ghosh & Chaudhuri, *Fauna of Meghalaya, State Fauna Series*, 4(Part 6) : 254.

Material examined : Nil.

Wing expanse : 55-70mm. (Talbot, 1939).

Distribution : India (Andhra Pradesh), Meghalaya, Sikkim, West Bengal.

Elsewhere : Annam, Hainan, Myanmar, Thailand and Tonking.

9. *Appias libythea libythea* (Fabricius)

1775. *Papilio libythea* Fabricius, *Syst. Ent.*, : 471.

1936. *Appias libythea libythea* (Fabricius), Sander, *J. Bombay Nat. Hist. Soc.*, 38 (4) : 801.

1939. *Appias libythea libythea* (Fabricius), Talbot, *Fauna Brit. India, Butterflies*, 1 : 394-395.

Material examined : 1ex., Andhra Pradesh, District-Rangareddi, Rajendranagar, 9. x. 1998 (Cool. S.P. Chakroborty).

Wing expanse : 47mm.

Distribution : Peninsular India including Andhra Pradesh (District. Rangareddi) to Punjab.

10. *Appias albina darada* (Felder)

1865. *Pieris darada* Felder, *Reise. Novara. Lep.*, 2 : 166.

1936. *Appias albina darada* (Felder), Sander, *J. Bombay nat. Hist. Soc.*, 38(4) : 801.

1939. *Appias albina darada* (Felder), Talbot, *Fauna Brit. India, Butterflies*, 1 : 401-403.

Material examined : Nil.

Wing expanse : 60-75mm. (Talbot, 1939).

Distribution : Peninsular India including Andhra Pradesh to Sikkim and Andaman.

Elsewhere : Myanmar and Srilanka.

Genus *Cepora* Billberg

1820. *Cepora* Billberg, *Enumeratio Insecta Orum in Musco Billberg.*, : 36.

Remarks : Two species are reported from India, and both are dealt with here.

Key to species

- Underside of forewing with a black spot at middle of area Cula, separated from the black border by a white spot..... *nerissa* (Fabricius)
- Underside of fore wing without a detached black spot in area Cula
..... *nadina* (Lucas)

11. *Cepora nerissa phryne* (Fabricius)

1775. *Papilio phryne* Fabricius, *Syst. Ent.*, : 473.

1935. *Cepora nerissa evagete* (Cramer), Home, *J. Bombay Nat. Hist. Soc.*, 37(4) : 892.

1997. *Cepora nerissa phryne* (Fabricius), Ghosh & Chaudhuri, *Fauna of West Bengal, State Fauna Series*, 3(Part 7), : 714-715.

Material examined : Andhra Pradesh, 1 ex., District- Krishna, Ambapuram, Kuturipalli, 7, 9.x.1998, 3 exs., District- Vishakapatnam, Central Nursery, Yandala, 25. x. 1998 (Coll. S.P. Chakroborty); 1 ex., District- Guntur, Forest Garden, 3. vii. 1999 (Coll. P.H. Roy); 1 ex., District- Guntur, Amaravati, 43 km. N. of Guntur, 26. i. 2004, 1 ex., Agrampujui, 2km from Guest House, 6. ii. 2004 (Coll. D. R. Maulik).

Wing expanse : 40-48mm.

Distribution : Peninsular India including Andhra Pradesh (District- Krishna, Vishakapatnam, Guntur) to N.W. States.

Elsewhere : Nepal and Srilanka.

12. *Cepora nadina nadina* (Lucas)

1852. *Pieris nadina* Lucas, *Rev. Mag. Zool. Ser.*, (2) 4 : 333.

1992. *Cepora nadina nadina* (Lucas), Haribal, *Sikkim Nature Conservation Foundation*, : 82.

1998. *Cepora nadina nadina* (Lucas), Ghosh & Chaudhuri, *Fauna of Meghalaya, State Fauna Series*, 4 (Part 6) : 256-257.

Material examined : Nil.

Wing expanse : 55-65mm. (Talbot, 1939).

Distribution : India (Andhra Pradesh, Andamans, Meghalaya, Nagaland, Sikkim and South India).

Elsewhere : Myanmar and Srilanka.

Genus *Ixias* Huebner

1819. *Ixias* Huebner, *Verz. bek. Schmett.*, : 95.

Remarks : Of the three species of this genus occurring in India, two species are treated here.

Key to species

1. Ground colour of both wings dorsally pure white *marianne* (Cramer)
- Ground colour of both wings dorsally chrome yellow *pyrene* (Linnaeus)

13. *Ixias marianne* (Cramer)

1779. *Papilio marianne* Cramer, *Pap. Exot.*, 3 : 41, pl. 217, figs. C, D, E.

1935. *Ixias marianne* (Cramer), Home, *J. Bombay Nat. Hist. Soc.*, 37(4) : 893.

1997. *Ixias mariane* (Cramer), Ghosh & Chaudhuri, *Fauna of West Bengal, State Fauna Series*, 3(Part 7) : 713-714.

Material examined : Andhra Pradesh, 1 ex., District. Krishna, Adabinekkalam, 16. x. 1998 (Coll. S.P. Chakraboorty); 2 exs., District Guntur, Kondavindu Reserve Forest, 4. vii. 1999 (Coll. P.H. Roy).

Wing expanse : 50-64mm.

Distribution : India : Andhra Pradesh, District- Krishna, Guntur) Maharashtra, N. W.

Himalayas, Punjab, Tamil Nadu and West Bengal. Also extending from Srilanka to Peninsular India.

14. *Ixias pyrene sesia* (Fabricius)

1777. *Papilio sesia*, Gen. Ins., : 257.

1935. *Ixias pyrene frequens* (Fabricius), Home, J. *Bombay Nat. Hist. Soc.*, 37(4) : 893.

1997. *Ixias pyrene sesia* (Fabricius), Ghosh & Chaudhuri, *Fauna of West Bengal, State Fauna Series*, 3(Part 7), : 714.

Material examined : Andhra Pradesh, 1 ex., District- Chitoor, Tirupati, Mamadur, 35km. South East 7. iii. 2005 (Coll. D.R. Maulik).

Wing expanse : 43mm.

Distribution : Peninsular India including Andhra Pradesh (District-Chitoor) and West Bengal.

Genus *Colotis* Huebner

1819. *Colotis* Huebner, *Verz. bek. Schmett.*, : 97.

Remarks : Of the seven species of this genus occurring in India, five species are treated here.

Key to species

1. Upperside of forewing with a prominent discocellular spot which connects with the dark costal border *amata* Bingham
 - Upperside of forewing with the discocellular spot if present not connected with the dark costal border 2
2. Upperside orange pink; female may be white, Hind wing upperside unmarked except for dark marginal spots or border *fausta* (Olivier)
 - Upperside white; apical area of fore wing crimson or orange. Female : upperside of hind wing with more or less prominent discal band, always indicated at costa 3
3. Fore wing apical area crimson *danae* (Fabricius)
 - Fore wing apical area orange 4
4. Fore wing with orange patch edged with black on the inner side
 - *etrida* (Boisduval)
 - Fore wing of male with orange patch not edged with black on inner side, if present, it is very faint *eucharis* (Fabricius)

15. *Colotis amata modesta* (Butler)

1876. *Teracolus modestus* Butler, *Proc. Zool. Soc Lond.*, : 137.

1932. *Colotis amata modesta* (Butler), Evans, *The Identification of Indian butterflies*, : 82.

1936. *Colotis amata modesta* (Butler), Sander, *J. Bombay nat. Hist. Soc.*, **38** (4) : 801.

Material examined : Nil.

Wing expanse : 35-45 mm. (Evans, 1932)

Distribution : Peninsular India including Andhra Pradesh to Bengal and Srilanka.

16. *Colotis fausta fulvia* (Wallace)

1867. *Idmais fulvia* Wallace, *Trans. Ent. Soc. Lond.*, **4**, Ser. 3 (3) : 392, pl. ix, fig. 5.

1935. *Colotis fausta fulvia* (Wallace), Home, *J. Bombay nat. Hist. Soc.*, **37** (4) : 893.

1939. *Colotis fausta fulvia* (Wallace), Talbot, *Fauna Brit. India, Butterflies*, **1** : 462-464.

Material examined : Andhra Pradesh, 1 ex., District Guntur, Pulladigurila, 7km. From guest house, 25. i. 2004, 1 ex., Nallapachu, 10km. From guest house, 26.i.2004, 1 ex., Chilkaluripet, 35km. N.E. of Guntur, 27. i. 2004 (Coll. D.R. Maulik).

Wing expanse : 48mm.

Distribution : Peninsular India including Andhra Pradesh (District-Guntur) and Sri Lanka (Northern Part).

17. *Colotis danae danae* (Fabricius)

1775. *Papilio danae*, Fabricius, *Syst. Ent.*, : 476.

1935. *Colotis danae danae* (Fabricius), Talbot, *Fauna Brit. India, Butterflies*, **1** : 469-471.

1939. *Colotis danae danae* (Fabricius), Home, *J. Bombay nat. Hist. Soc.*, **37**(4) : 893.

Material examined : 1 ex., District Krishna, Machallipatnam, 15.x.1998 (Coll. S.P. Chakraborty); 1 ex., District Guntur, Machala, 30. vi. 1999. 1 ex., Perichalna, 2. vii. 1999, 1 ex., Kondavidu Reserve Forest, 4. vii. 1999, 1 ex., Venkatgiri, Pulicate lake, 10. vii. 1999 (Coll. P.H. Roy).

Wing expanse : 19-26mm.

Distribution : Peninsular India including Andhra Pradesh (District-Krishna, Guntur) and Sri Lanka.

18. *Colotis etrida etrida* (Boisduval)

1836. *Anthocharis etrida* Boisduval, *Spec Gen. Lep.*, **1** : 576.

1935. *Colotis etrida etrida* (Boisduval), Home, *J. Bombay nat. Hist. Soc.*, **37** (4) : 893.

1939. *Colotis etrida etrida* (Boisduval), Talbot, *Fauna Brit. India, Butterflies*, **1** : 465-466.

Material examined : Andhra Pradesh 2 exs., District-Guntur, Amaravatti, 43km. N. of Guntur 26. i. 2004, 2 exs., Putkerpalli, 36km. From Guntur, 29. i. 2004, 2 exs., Sidhout, 35km., S. from Kadapa District, 1. iii. 2005, Kadapa Vontimitta, 33km. W. of Kadapa, 3. iii. 2005, 2 exs., Mamadur, Tirupati, Chitoor, 35km. S. E., 7. iii. 2005 (Coll. D.R. Maulik).

Wing expanse : 24-36mm.

Distribution : Peninsular India including Andhra Pradesh (District-Guntur, Kadapa) to the Himalayas and Baluchistan.

19. *Colotis eucharis* (Fabricius)

1775. *Papilio eucharis* Fabricius, *Syst. Ent.*, : 472.

1936. *Colotis eucharis* (Fabricius), Sander, *J. Bombay nat. Hist. Soc.*, **38** (4) : 801.

1939. *Colotis eucharis* (Fabricius), Talbot, *Fauna Brit. India. Butterflies*, **1** : 467-469.

Material examined : Nil.

Wing expanse : 40-45mm. (Talbot, 1939).

Distribution : Sri Lanka to Central India and also Andhra Pradesh.

Genus *Hebomoia* Huebner

1819. *Hebomoia* Huebner, *Verz. bek. Schmett.*, : 95.

Remarks : Single species recorded from India, which is treated here.

20. *Hebomoia glaucippe glaucippe* (Linnaeus)

1758. *Papilio glaucippe* Linnaeus, *Syst. Nat. edx.*, : 469.

1992. *Hebomoia glaucippe glaucippe* (Linnaeus), Haribal, *Sikkim Nature Conversation Foundation*, : 83.

2003. *Hebomoia glaucippe glaucippe* (Linnaeus), Majumdar (Chaudhury), *Fauna of Sikkim, State Fauna Series*, 9(Part 4), : 113.

Diagnostic characters : Wings upperside white, occupying large black edged orange patch on the apical portion of forewing, hind wing with few marginal black spots, underside of both wings mottled with brownish red.

Material examined : Nil.

Wing expanse : 80-100 mm (Haribal, 1992).

Distribution : India Andhra Pradesh, Andaman, Sikkim, South India, West Bengal.

Elsewhere : Nepal to Myanmar and Sri Lanka.

Subfamily COLIADINAE

Key to genera

- Hind wing precostal vein absent or obsolete; underside of forewing without tuft on inner area *Eurema* Hubner
- Hind wing precostal vein thick; underside of forewing with a tuft on inner area
..... *Catopsilia* Huebner

Genus *Eurema* Huebner

1819. *Eurema* Huebner, *Verz. bek. Schmett.*, : 96.

Remarks : The genus is represented in India by six species of which, four are dealt with from Andhra Pradesh.

Key to species

1. Fore wing upperside with black border not continued along vein 1A. underside of both wings without discocellular ring spots 2
- Fore wing upperside with black border often continued along vein 1A. underside of both wings with large discocellular ring spots 3
2. Upperside of both wings with black border usually broad, with inner edge regular. Male without or sex brand, Forewing underside with two small discocellular spots
..... *brigitta* (Cramer)
- Upperside of hindwing in male with a sex brand at base of area Rs. Underside of forewing with a sex brand at base of area 1A+ 2A, a single small black discocellular spot present *laeta* (Boisduval)
3. Forewing underside with two spots in cell *hecabe* (Linnaeus)
- Forewing underside with single spot in cell *andersoni* (Moore)

21. *Eurema brigitta rubella* (Wallace)

1867. *Terias rubella* Wallace, *Trans. Ent. Soc. Lond.*, 4 (3) : 323.

1998. *Eurema brigitta rubella* (Wallace), Ghosh & Chaudhuri, *Fauna of Maghalaya, State Fauna Series*, 4(Part 6) : 263.

Material examined : Andhra Pradesh, 3 exs., District-Rangareddi, Hyderabad, 21. x. 1997 (Coll. B.C. Das); 1 ex., Hyderabad, Gundipal, 26. x. 1997 (Coll. P. Mukherjee); 1 ex., Katar, 27. viii. 2001 (Coll. I.B. Dutta); 1 ex., District-Nalgonda, Dupally, 12km. from Nalgonda,

24. i. 2004, 1 ex., District-Vishakapatnam, Agrampuri, 20km. From Guest House, 6. ii. 2004, 1 ex., District Chitoor, Bellapalli, Tirupati, 42km. North East, 6. iii. 2005 (Coll. D.R. Maulik).

Wing expanse : 25-40mm.

Distribution : Andhra Pradesh (District-Rangareddi, Nalgonda, Vishakhapatnam, Chitoor), Karnataka, Maharashtra, Meghalaya, Nicobar Island, Uttar Pradesh, West Bengal.

Elsewhere : Myanmar, South China and Sri Lanka.

22. *Eurema laeta laeta* (Boisduval)

1836. *Terias laeta* Boisduval, *Spec. Gen. Lep.*, 1 : 674.

1936. *Eurema laeta laeta* (Boisduval), Sander, *J. Bombay nat. Hist. Soc.*, 38 (4) : 801.

2004. *Eurema laeta laeta* (Boisduval), Majumdar, *Fauna of Manipur, State Fauna Series*, 10 : 519-520.

Material examined : Andhra Pradesh, 4 exs., District Medak, Doulatabad, Narsapur, 9. iii. 1999 (Coll. S.K. Chatterjee); 1 ex., Khabonam, 25. iii. 2001 (Coll. S.P. Chakraborty).

Wing expanse : 35mm.

Distribution : India : Andhra Pradesh (District-Medak) Manipur, Meghalaya, West Bengal Peninsular India to Western Himalayas.

Elsewhere : Sri Lanka.

23. *Eurema hecabe simulata* (Moore)

1881. *Terias simulata* Moore, *Lep. Ceylon*, 1 : 119.

1935. *Terias hecabe simulata* Moore, Home, *J. Bombay nat. Hist. Soc.*, 37 (4) : 893.

1939. *Eurema hecade simulata* (Moore), Talbot, *Fauna Brit. India*. 1 : 530-531.

Material examined : Andhra Pradesh, 2 exs., District-Vizianagaram, Bhogapuram, 5. xi. 1997, 5 exs., Tallardosa, 6. xi. 1997, 2 exs., District-Nellore, Kamalturnu, 16. xi. 1999 (Coll. P. Mukehrjee); 1 ex., Dist. West Godavari, Ramasaingavaram, 4. x. 1997, 4 exs., District-Prakasan, Dormal, 22. ix. 1998, 1 ex., Chinourtala, 23. ix. 1998, 4 exs., District-Aditabad, Janaram, F.R.H., 1. ix. 1999 (Coll. S.K. Mandal); 1 ex., District-Rangareddi, Rajendranagar, 9. x. 1998, 1 ex., District-Medak, Pathancheru, 11. x. 1998, 1 ex., District-Rangareddi, Golconda, forest, 13. x. 1998, (Coll. S.P. Chakraborty); 1 ex. Sidhapur Naler Tank, Nallamula forest, 10km. From Almakar, 21. xi. 1998, 1 ex., District Chitoor, Jeevakari Forest Area, Tirupati, 2 xii. 1998, 2 exs., Guntimadya Black fort, 12. xii. 1999, 1 ex., District-Vishakapatnam, Paddu, 19. xi. 2000 (Coll. P.H. Roy); 1 ex., Vishakapatnam, 8. i. 1999, 2 exs., Araku Valley, 11. i. 1999 (Coll. B.C. Das); 1 ex., Dist. Chitoor, Srikalahasti, 5. i. 2000 (Coll. G.C. Sen); 3 exs., Dist. Rangareddi, Secunderabad, Indranagar, Gardam, 15. i. 2004, 2 exs., District-Guntur, 26km. N. of Secunderabad, 16. i. 2004, 1 ex., Kichar, 32km. Of Secunderabad, 16.

i. 2004, 2 exs., Kurkut Pally, 15km. E., 17. i. 2004, 1 ex., District-Nalgonda, 21. i. 2004, 3 exs., Dupally, 17km. from Naldonga, 24. i. 2004, 1 ex District-Guntur, Nallapadu 10km. from guest house, 26. i. 2004, 1 ex., Dist, Guntur, Chilakakuripet, 35km. N.E. of Guntur, 27. i. 2004, 1 ex., District-East Godavari Samatkat, 25km. N. of Kakinada, 2. ii. 2004, 5 exs., District-Vishakapatnam, Agrampuri, 20km. From Guest House, 6. ii. 2004, 7 exs., Vishakapatnam, Araku Valley, 3000ft, 7. ii. 2004, 1 ex, District-Kadapa, 2. iii. 2005, 2 exs., Dist. Chitoor, Tirupati, Bellapalli, 42km. N.E., 6. iii. 2005 (Coll. D.R. Maulik).

Wing expanse : 28-42mm.

Distribution : Peninsular India including Andhra Pradesh (District-Vizianagaram, Nellore, East Godavari, West Godavari, Nalgonda, Kadapa, Prakasan, Aditabad, Medak Rangareddi, Chitoor, Guntur, Vishakapatnam) and Central Provinces. Also Sri Lanka.

24. *Eurema andersoni andersoni* (Moore)

1886. *Terias andersoni* Moore, *J. Linn. Soc. Lond. Zool*, 21 : 47, pl. 4, fig. 8.

1939. *Eurema andersoni andersoni* (Moore), Talbot, *Fauna Brit India, Butterflies*, 1 : 535-536.

1992. *Eurema andersoni andersoni* (Moore), Haribal, *Sikkim Nature Conservation Foundation*, : 89.

Material examined : Nil.

Wing expanse : 42-45mm (Talbot, 1939).

Distribution : India : South India including Andhra Pradesh, Andaman, Sikkim to South Myanmar, Sri Lanka.

Genus *Catopsilia* Huebner

1819. *Catopsilia* Huebner, *Verz. bek. Schmett.*, 7 : 98.

Remarks : All the three species of this genus known from India are treated here.

Key to species

1. Underside of wings marked with transverse reddish brown strigae..... 2
 - Underside of wings without reddish brown stridge*pomona* (Fabricius)
2. Fore wing upperside below apex with marginal dark border continuous and often broad
 - *pyranthe* (Linnaeus)
 - Fore wing upperside below apex with a macular marginal dark border always narrow
 - *florella* (Fabricius)

25. *Catopsilia pomona pomona* (Fabricius)

1775. *Pailio pomona* Fabricius, *Syst. Ent.*, : 479.

1935. *Catopsilia pomona* (Fabricius), Home, *J. Bombay Nat. Hist. Soc.*, **37** (4) : 892.

1993. *Catopsilia pomona* (Fabricius), Varshney, *Oriental Insects*, **27** : 362.

Material examined : Andhra Pradesh, 1 exs., District-Chitoor, Gesgasapuram, 13. x. 1997 (Coll. B.C. Das); 2 exs., District-Hyderabad, Gundipel, 26. x. 1997, 1 ex., Dist. Krishna, Kondapelle, 31. x. 1998, 2 exs., District-Vishakapatnam, Elamanchii, 8. xi. 1997 (Coll. P. Mukherjee); 2 exs., District-Prakasan, Dormal, 22. ix. 1998, 1 ex., District-West Godavari, Ramsaingavaram, 4. x. 1998, 2 exs., District-Vishakapatnam, Bimli, 8. x. 1998, (Coll. S.K. Mandal) 1 ex., District-Medak, Pathachera, Golabasti, 11. x. 1998, 1 ex., District-Nalgonda, Bhongiri hill, 12. x. 1998, 1 ex., District-Rangareddi, Golconda, Akbarpura, 13. x. 1998, 1 ex., District-East. Godavari, Rajamundry, Madhupuri, Rajamundry, Madhupuri, 19. x. 1998., 2 exs., Rajamundry, Revulapalem, 20. x. 1998, 2 exs., District-Vishakapatnam Simachalam 22. x. 1998, 1 ex., District-Rangareddi, Kisargupta, 7. iii. 1999, 1 ex., Hyatnagar, 12. iii. 1999 (Coll. S.K Chatterjee); 4 exs., Dist. Rangareddi, Secunderabad, Kurkut Palli, 15km. East Godavari, Vakalapaori, 15km. From Kakinada, 1. ii. 2004, 1 ex., District-Vishakapatnam, Sarabaram, 25km. From Guest House, 5. ii. 2004, 1 ex., District- Vishakapatnam, Araku Valley, 3000ft, 7. ii. 2004, 1 ex., District-Rangareddi, Santhannagar, 19. ii. 2005, 1 ex., Rangareddi, Tukramghat, 18. iii. 2005 (Coll. D.R. Maulik).

Wing expanse : 48-68mm.

Distribution : India (Andhra Pradesh, District-Chitoor, Krishna, Prakasan, Vishakapatnam, East Godavari, West Godavari, Medak, Rangareddi, Nalgonda, Hyderabad), Andaman, Meghalaya, Nagaland, Nicobar Is. Sikkim and West Bengal.

Elsewhere : Australia, Myanmar, Soloman Is., South China and Sri Lanka.

26. *Catopsilia pyranthe pyranthe* (Linnaeus)

1758. *Papilio pyranthe* Linnaeus, *Syst. Nat. Ed.* 10th, : 469.

1935. *Catopsilia pyranthe* (Linnaeus), Home, Home, *J. Bombay nat. Hist. Soc.*, **37** (4) : 893.

1998. *Catopsilia pyranthe pyranthe* (Linnaeus), Ghosh & Chaudhuri, *Fauna of Meghalaya, State Fauna Series*, **4**(Part 6), : 260.

Material examined : Andhra Pradesh, 2 exs., District-East Godavari, Addatigola Forest, 7. iv. 1996 (Coll. A.V. Saha); 2 exs., Dist. Krishna, Vissanapetu, 30. x. 1997, 2 exs., District-Vizianagar, Tallawdasa, 6. xi. 1997 (Coll. P. Mukehrjee); 5 exs., District-Rangareddi, Rajendra nagar, 9. x. 1998, 2 exs., District-Mahbubnagar, Samsabad, 10. x. 1998, 3 exs., District-Nalgonda, Bhongiri, 12. x. 1998, 3 exs., District-Krishna, Ambapuram, Kuturka Palli, 12. 17. x. 1998, 2 exs., District-Rangareddi, Golconda, Akbarpur, 13. x. 1998, 4 exs., District-Krishna, Machalipattanam, 15. x. 1998, 3 exs., District-East Godavari, Revupalem, Rajamundry, 20. x. 1998, 7 exs., District-Vishakapatnam, Simachalam, 22. x. 1998, 2 exs., Vishakapatnam,

Anandapuram, Yamaluhalsa, 23. x. 1998, 2 exs., Kottavalsu, 24. x. 1998, 1 ex., Yandada Central Nursery, 25. x. 1998, (Coll. S.P. Chakroborty); 1 ex., Mahabubnagar, Mannamut, 24. ix. 1998, 2 exs., District-West Godavari, Ramsaingvaram, 4. x. 1998, 2 exs., District-Prakasan, Dormal, 22. x. 1998, 2 exs., District- Adilabad, Rampura, 28. vii. 1999 (Coll. S.K. Mandal); 1 ex., Pulicate Lake, 10. vii. 1999, 3 exs., Nellapatu reserve Forest, 11. vii. 1999, 3 exs. Nagarjuna Sagar, 30. vii. 1999 (Coll. P.H. Roy); 2 exs., District-Cauddapah, Kagipeta, 31. v. 2000, 1 ex., Vantimitta, 1. vi. 2000 (Coll. S.K. Chatterjee).

Wing expanse : 37-69mm.

Distribution : India : Andhra Pradesh (District-Krishna, Rangareddi, Nalgonda, Mahbubnagar, Nalgonda, East Godavari, West Godavari, Vishakapatnam, Vizianagar, Prakasan, Adilabad, Cauddapah), Andaman, Meghalaya, Nagaland, West Bengal.

Elsewhere : Africa, Arabia, Hainan, Indo China, Myanmar, South China and Sri Lanka.

27. *Catopsilia florella gnoma* (Fabricius)

1776. *Papilio gnoma* Fabricius, *Syst. Ent.*, : 528.

1936. *Catopsilia florella gnoma* (Fabricius), Sander, *J. Bombay Nat. Hist. Soc.*, 38 (4) : 801.

2004. *Catopsilia florella gnoma* (Fabricius), Majumdar, *Fauna of Manipur, State Fauna Series*, 10 : 520.

Material examined : Andhra Pradesh, 1 ex., District-Rangareddi, Hyderabad, Gunipel, 26. x. 1997, 1 ex., District-Krishna, Vissanapeta, 30. x. 1997, 1 ex., District-Vizianagaram, Tallavdasa, 6. xi. 1997, (Coll. P. Mukherjee); 1 ex., District-Krishna, Ambapuram, Kutur palli, 17. x. 1998, 1 ex., District-East Godavari, Rajamundry, Revulapalem, 20. x. 1998, 2 exs., District-Vishakapatnam, Anadapuram, Yamalvalsa, 23. x. 1998 (Coll. S. Chakroborty); 1 ex., District-Prakasan, Dormal, Srisailam, 22. ix. 1998, 1 ex., District-Adilabad, Rampur, 28. viii. 1999 (Coll S.K. Mandal); 2 exs., Pulcate Lake, Ventagiri Reserve Forest, 10. vii. 1999, 1 ex., District-Nellore, Nelapalu Res. Forest, 1. vii., 1999, 1 ex. Rusikanda, 7km. From Vishakhapatnam, 23. xi. 2000 (Coll. P.H. Roy); 2 exs., District-East Godavari, Kakinada Light House at sea coast, 10km. From Kakinada, 31.1.2004, 1 ex., Kakinada, Karinga Wild Life Sanctuary, 1. ii. 2004, 1 ex., Kakinada, Samalkat, 25km. N. of Kakinada, 2. ii. 2004 (Coll. D.R. Maulik).

Wing expanse : 36-56mm.

Distribution : India : Andhra Pradesh (District-Rangareddi, Krishna Vizianagaram, East Godavari, Vishakhapatnam, Prakasan, Adilabad, Nellore), Andaman, Maharashtra, Manipur, Nagaland, Sikkim, Tamil Nadu and West Bengal.

Elsewhere : Myanmar to Indo China, Hainan to South China, Africa to Arabia, Persia and Sri Lanka.

Family HESPERIIDAE

Key to Subfamily

1. Forewing vein M_2 closer to M_1 than to M_3 as origin of cell. Abdomen shorter than anal margin of hindwing 2
 - Forewing vein M_2 closer to M_3 than to M_1 at origin of cell. Abdomen more or less equal to anal margin of hindwing HESPERIINAE
2. Labial palpi with second joint upturned, third joint porrect, long and awl shaped ... COELIADINAE
 - Labial palpi with these joints showing variable orientation third joint may be long but never awl shaped PYRGINAE

Subfamily HESPERIINAE

Key to groups

1. Antennal club not constricted before the apiculus. Fore wing vein M_2 usually straight at its origin. Hind wing vein M_2 well marked 2
 - Antennal club constricted before the apiculus. Fore wing vein M_2 usually decurved at its origin. Hind wing vein M_2 not traceable 3
2. Hind wing vein M_2 decurved at its origin Ancistroides group
 - Hind wing vein M_2 not decurved at its origin Plastingia group
3. Antennal apiculus absent or minute. Fascis yellow orange. Fore wing with discal white spots Taractocera group
 - Antennal apiculus present usually right angled. Fascis dark brown. Fore wing with dorsal hyaline spot Gegenes group

Group Ancistroides

Genus *Udaspes* Moore1881. *Udaspes* Moore, *Lep. Ceylon*. 1 : 177.*Remarks* : Only a single–*Udaspes folus* (Cramer) of this genus occurring in India is treated.28. *Udaspes folus* (Cramer)1775. *Papilio folus* Cramer, *Pap. Exot.*, 1 : 118, pl. 74. fig. F.2003. *Udaspes folus* (Cramer), Majumdar (Chaudhury), *Fauna of Sikkim, State Fauna Series*, 9(Part-4), : 123.*Diagnostic characters* : Wings upperside with marginal white spots. Forewing upperside

with large white marking and underside with variegated white patches, brown patches present between vein Cula to M3, another small and white spot present between R5 and SC+R1.

Material examined : Andhra Pradesh, 1 ex., District-East Godavari, Madherpuri, Rajamundry, 19. x. 1998 (Coll. S.P. Chakroborty).

Wing expanse : 40mm.

Distribution : Palaearctic and Oriental region including India (Andhra Pradesh, District-East Godavari) Assam, Meghalaya, North West Himalaya, Orissa, South India and West Bengal.

Group Plastingia

Genus *Suastus* Moore

1881. *Suastus* Moore, *Lep. Ceylon*. 1 : 168.

Remarks : Altogether two species are known from India, of which single species is dealt with here.

29. *Suastus gremius gremius* (Fabricius)

1798. *Hesperia gremius* Fabricius, *Syst. Ent. Suppl.*, : 433.

1935. *Suastus gremius gremius* (Fabricius), Home, *J. Bombay nat. Hist. Soc.*, 37 (4) : 894.

2003. *Suastus gremius gremius* (Fabricius), Majumdar, *Fauna of Sikkim, State Fauna Series*, 9(Part-4) : 124.

Diagnostic characters : Forewing upperside with white spot, underside sometimes with tornus dark beyond a central white in space 2A. Hindwing with conspicuous black cell spot, which is large as any discal spot.

Material examined : Nil.

Wing expanse : Forewing 16-18 mm. (Evans, 1949).

Distribution : Oriental region including India (Andhra Pradesh, Assam, Central India, Meghalaya, North West Himalayas, Sikkim and South India.

Group Taractocera

Genus *Telicota* Moore

1881. *Telicota* Moore, *Lep. Ceylon*. 1 : 169.

Remarks : Five species are recorded from India of which two species are reported from Andhra Pradesh.

Key to species

1. Upperside of forewing with the dark border tranversed by yellow veins; underside of hindwing plain pale yellow *ancilla* Herrich-Schaffer

- Upperside of forewing with a band joined to the apical and tending to penetrate the dark border; underside of hindwing more or less tawny with inconspicuous broad band *augias* (Linnaeus)

30. *Teliocota ancilla bambusae* (Moore)

1878. *Pamphila bambusae* Moore, *Proc. Zool. Soc. Lond.*, : 691

2004. *Telicota ancilla bambusae* (Moore), Majumdar, *Fauna of Manipur, State Fauna Series*, 10 : 521.

Material examined : Andhra Pradesh, 1 ex., District : East Godavari, Rajamundry, F.R.H. (at light) 18. x. 1998 (Coll. S.P. Chakroborty).

Wing expanse : 30mm.

Distribution : Oriental region including India (Andhra Pradesh, (District-East Godavari) Assam, Madhya Pradesh, Manipur, N.W.Himalayas, Orissa, Sikkim and South India).

31. *Telicota augias* (Linnaeus)

1767. *Papilio augias* Linnaeus, *Syst. Nat.*, 1 (2) : 794.

1935. *Astycus augias* (Linnaeus), Home, *J. Bombay Nat. Hist. Soc.*, 37 (4) : 894.

1998. *Telicota augias* (Linnaeus), Ghosh & Chaudhury, *Fauna of Meghalaya, State Fauna Series*, 4(Part-6) : 312.

Material examined : Nil.

Wing expanse : Forewing-17mm (Evans, 1949).

Distribution : India (Andhra Pradesh, Meghalaya and Nagaland).

Elsewhere : Malayan subregion and South Myanmar.

Group *Gegenes*

Key to genera

1. Underside of hindwing with cell spot. Mid tibia heavily spined ... *Pelopidas* Walker
- Underside of hindwing without cell spot. Mid tibia unspined *Borbo* Evans

Genus *Pelopidas* Walker

1870. *Pelopidas* Walker, *Ent.*, 5 : 56.

Remarks : Amongst a total of six species single species is dealt with here.

32. *Pelopidas mathias mathias* (Fabricius)

1798. *Hesperia mathias* Fabricius, *Syst. Ent. Suppl.*, : 433.

2003. *Pelopidas mathias mathias* (Fabricius), Majumdar, *Fauna of Sikkim, State Fauna Series*, 9(Part-4) : 131.

Diagnostic characters : Forewing dorsally with discal stigma in male, lower end of stigma nearer to base than termen and situated well before the origin of Cu 1b, a line joining the cell spot centers.

Material examined : Andhra Pradesh, District-Krishna, Ambapuram, 17. x. 1998 (Coll. S.P. Chakroborty); 1 ex., District-Rangareddi, Santhannagar, 19. ii. 2005 (Coll. D.R. Maulik).

Wing expanse : 40mm.

Distribution : Oriental region including India (Andhra Pradesh, (District-Krishna, Rangareddi), Assam, Central India, Central Nicobar, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan, Sikkim, South India and West Bengal.

Elsewhere : Australian region.

Genus *Borbo* Evans

1949. *Borbo* Evans, *A Catalogue of Hesperidae from Europe, Asia and Australia in Brit. Mus. (nat. Hist.)* : 44.

Remarks : Two species are recorded from India of which single species is treated here.

33. *Borbo beevani* (Moore)

1878. *Hesperia beevani* Moore, *Proc. Zool. Soc. Lond.*, : 688.

1935. *Baoris beevani beevani* (Moore), Home, *J. Bombay nat. Hist. Soc.*, 37 (4) : 894.

2003. *Borbo beevani* (Moore), Majumdar, *Fauna of Sikkim, State Fauna Series*, 9(Part-4) : 131.

Diagnostic characters : Wings broad. Antennal club obtuse. Palpi semierect, hairy, third segment longer pointed and conspicuous. Forewing upperside with two spots in space 2A. Hindwing upperside with dots in spaces M1 to M3.

Material examined : Nil.

Wing expanse : Forewing 13-16mm (Evans, 1949).

Distribution : India (Andhra Pradesh, Assam, Kashmir, Kumaon, Meghalaya and Sikkim).

Elsewhere : Bhutan, Indochina, Malayan Subregion, Myanmar, Peninsular Thailand.

Subfamily COELIADINAE

Genus *Hasora* Moore

1881. *Hasora* Moore, *Lep. Ceylon*. 1 : 159.

Remarks : Of the eight species of this genus occurring in India, only a species is reported from Andhra Pradesh.

34. *Hasora chromus* (Cramer)

1782. *Papilio chromus* Cramer, *Pap. Eot.*, 3, pl. 284, fig. E.

1935. *Hasora alexis alexis* Fabricius, Home, *J. Bombay nat. Hist. Soc.*, 37 (4) : 894.

2003. *Hasora chromus chromus* (Cramer), Majumdar, *Fauna of Sikkim, State Fauna Series*, 9(Part-4) : 136.

Diagnostic characters : Upperside of wings base paler. Forewing dorsum equal to termen, upperside with white spots in space Cu 1a and Cu 1b. Hindwing ventrally with conspicuous purple lusture.

Material examined : Nil.

Wing expanse : Forewing 25mm. (Evans, 1949).

Distribution : Palaearctic, Oriental, Papuan, Australian and Hawaiian region.

Subfamily PYRGINAE

Key to groups

Hindwing vein M_2 straight, but oblique, nearer to vein M_3 at termen and to vein M_1 at its origin. Abdomen smaller than dorsum *Tagiades* group

- Hind wing vein M_2 arises between vein M_1 and M_3 , but decurved at its origin towards vein M_3 . Abdomen equal to dorsum *Pyrgus* group

Tagiades group

Genus *Coladenia* Moore

1881. *Coladenia* Moore, *Lep. Ceylon*. 1 : 180.

Remarks : Altogether five Indian species were reported so far out of which only one is presently dealt with.

35. *Coladenia indrani indra* Evans

1935. *Coladenia indrani indra* Evans, Home, *J. Bombay Nat. Hist. Soc.*, 37 (4) : 894.

1949. *Coladenia indrani indra* Evans, *A Catalogue of the Hesperidae from Europe, Asia and Australia in Brit. Mus. (nat. Hist.)* : 115.

Diagnostic characters : Upperside of forewing cell spot slightly narrowed at upper end, rectangular. Upperside of hindwing uniform dark brown in W.S.F., but paler and more ochraceous in D.S.F.

Material examined : Nil.

Wing expanse : Forewing Male :18mm.

Distribution : India (Andhra Pradesh, Central India, Jabbalpur, Madras, North Kanara, Nilgiris and Orissa).

Group Pyrgus

Key to genera

- Underside of hindwing spot inconspicuous, upperside of hindwing with a compact central white band *Gomalia* Moore
- Upperside of forewing spot conspicuous, in spaces Cu la, Cu lb and in cell, upperside of hindwing without a compact central white band *Spialia* Swinhoe

Genus *Gomalia* Moore

1879. *Gomalia* Moore, *Proc. Zool. Soc. Lond.*, : 144.

Remarks : Single species is represented this genus from India, which is dealt here.

36. *Gomalia elna albofasciata* Moore

1879. *Gomalia elna albofasciata* Moore, *Proc. Zool. Soc. Lond.*, : 144.

1935. *Gomalia elna albofasciata* Moore, Home, *J. Bombay nat. Hist. Soc.*, 37 (4) : 894.

1949. *Gomalia elna albofasciata* Moore, Evans, *A Catalogue of the Hesperidae from Europe, Asia and Australia in Brit. Mus. (nat. Hist.)* : 168.

Diagnostic characters : Upperside of forewing marbled dark green and brown. Both the side of hindwing with a white central band.

Material examined : Nil.

Wing expanse : Male. forewing : 11mm. (Evans, 1949).

Distribution : India (Andhra Pradesh, South India to Poona, Kulu).

Elsewhere : Arabia, Baluchistan, Karachi and Sri Lanka.

Genus *Spialia* Swinhoe

1913. *Spialia* Swinhoe, *Lep. Indica* :

Remarks : Three species of this genus are reported from India, of which single species is treated here.

37. *Spialia galba* (Fabricius)

1793. *Hesperia galba* Fabricius, *Syst. Ent.*, 3 (1) : 352.

1935. *Syrictus galba* Fabricius, Home, *J. Bombay nat. Hist. Soc.*, 37 (4) : 894.

1949. *Spialia galba* (Fabricius), Evans, *A Catalogue of the Hesperidae from Europe, Asia and Australia in Brit. Mus. (nat. Hist.)* : 175.

Diagnostic characters : Upperside of forewing with three cell spots. Underside of hindwing with discal band ending to mid dorsum.

Material examined : Nil.

Wing expanse : Male, Forewing 11-13mm. (Evans, 1949).

Distribution : India (Andhra Pradesh, Assam, Central India, Ganjam, N.W.Himalayas (Kashmir to Kumaon) Sikkim, South India and West Bengal).

Elsewhere : Cutch, Myanmar to S. Shan States, Sind and Sri Lanka.

Suborder HETEROCERA

Key to Families of the Suborder Heterocera

1. Hindwing with vein Sc+R1 ARCTIIDAE
- Hind wing vein Sc+R1 aborted CTENUCHIDAE

Family ARCTIIDAE

Key to subfamilies

1. Antennae bipectinate, wings usually white. Forewing not reduced to dot
..... NYCTEMERIINAE
- Antennae variable, wings usually not white. Forewing markings reduced to dot
..... SPILOSOMINAE

Subfamily NYCTEMERIINAE

Genus *Nyctemera* Huebner

1816. *Nyctemera* Huebner, *Verz. bek. Schmett.*, : 178.

Remarks : The genus is represented by 12 species from Indian region, of which only one species is dealt with here.

38. *Nyctemera lacticinia* (Cramer)

1777. *Phalaena (Geometra) lacticinia* Cramer, *Pap. Exot.*, 2, pl. 128, fig. E.

1894. *Nyctemera lacticinia* (Cramer), *Fauna Brit. India. Moths.* 2 : 47.

Diagnostic characters : Head, collar and thorax yellowish white, spotted with black. Abdomen white, the extremely yellow, three black spots on the first segment and slightly black bands on next six segment, two paired series black spots on lateral side. Forewing light brown, a broad white streak on base of inner margin, oblique post medial band of five white spots. Hindwing white, a board marginal brown band with irregularly curved inner edge.

Material examined : Andhra Pradesh, 1 ex., District-Rangareddi, Santhannagar, 9. ii. 2005 (Coll. D.R. Maulik).

Wing expanse : 38mm.

Distribution : Throughout India including Andhra Pradesh (District-Rangareddi).

Elsewhere : Ceram, China, Java, Myanmar and Sri Lanka.

Subfamily SPILOSOMINAE

Key to genera

1. Antennae ciliate in both sexes. Hind legs with one pair of tibial spurs ***Cretonotos* Hubner**
- Antennae slightly pectinate in male, shortly serrate in female. Hind legs with two pair tibials spurs, the middle pair extremely reduced ***Olepa* Watson**

Genus *Cretonotos* Huebner

1816. *Cretonotos* Huebner, *Verz. bek. Schmett.*, : 169.

Remarks : Only single species is recorded under this genus which is treated here.

39. *Cretonotos gangis* (Linnaeus)

1764. *Phalaena gangis* Linnaeus, *Amoen. Acad.*, 6 : 410.

2003. *Cretonotos gangis* (Linnaeus), Majumdar, *State Fauna Series 9, Fauna of Sikkim*. (Part-4) : 190.

Diagnostic characters : Head and thorax pale pinkish ochreous. Palpi and legs smoky black, the femora yellow. Forewing with a broad black fascia below median nervure, two black spots at end of cell, and a broad streak beyond the lower angle. Hindwing pale fuscous. Abdomen crimson above with dorsal and lateral series of black spots.

Material examined : Andhra Pradesh, District-Krishna, Kaikukur Village, at light, 20. iv. 1996 (Coll. S.K. Chatterjee).

Wing expanse : 35mm.

Distribution : Throughout India including Andhra Pradesh (District-Krishna).

Elsewhere : China, Eastern Asia, Malayasia, Nepal, North Australia, Pakistan and Sri Lanka.

Genus *Olepa* Watson

1980. *Olepa* Watson, *The generic names of the moths world*, 2 : 133.

Remarks : A single species is reported from Andhra Pradesh.

40. *Olepa ricini* (Fabricius)

1775. *Bombay ricini* Fabricius, *Syst. Entom.*, : 583.

2003. *Olepa ricini* (Fabricius), Majumdar, *Fauna of Sikkim, State Fauna Series*, 9(Part-4) : 192.

Diagnostic characters : Head and thorax dark grey brown, collar tinged with crimson. Forewing fuscous brown with numerous pale ringed black spots in the interspaces. Hindwing crimson with antemedial, medial, postmedial and marginal bands. Abdomen crimson with black bands.

Material examined : Andhra Pradesh, 1 ex., no. other data.

Wing expanse : 45 mm.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Assam, Karnataka, Madhya Pradesh, Punjab and Tamil Nadu).

Elsewhere : Bangladesh and Sri Lanka.

Family CTENUCHIDAE

Key to genera

1. Hindwing without vein Cula **Ceryx** Wallengren
- Hindwing with vein Cula..... **Syntomis** Ochshenheimer

Genus *Ceryx* Wallengren

1863. *Ceryx* Wallengren, *Wien Ent. Mon.*, 7 : 140.

Remarks : The genus is represented by eight species from Indian region, of which single species is treated.

N 41. *Ceryx godartii* (Boisduval)

1829. *Syntomis godartii* Boisduval, *Mon. Zyg.*, : 115, pl. 7, fig. 3.

2004. *Ceryx godartii* (Boisduval), Majumdar, *Fauna of Manipur, State Fauna Series*, 10 : 522.

Diagnostic characters : Collar and frons yellowish, labial palpi black. Antennae black throughout except some apical segment which are whitish. Abdomen black with two orange bands. Forewing black; a large wedge shaped hyaline patch present at end of cell; an elongate spot below cell and vein Cu lb; two conjoined spots between vein M3 and Cula, and a large wedge shaped spot above vein R5 with an extremely small one above it, the spot between vein M1 and M2 never present. Hindwing byaline with narrow black margin.

Material examined : Andhra Pradesh, 2 exs., District-Prakashan, Dormal, 22. 1 x. 1998, 2 exs., District-Vizianagaram, 10. x. 1998 (Coll. S.K. Mandal); 3 exs., District Vishakhapatnam, 14. i. 1999 (Coll. B.C. Das).

Wing expanse : 24-28mm.

Distribution : India (Andhra Pradesh (District-Prakashan, Vizianagaram, Vishakhapatnam), Arunachal Pradesh, Assam, Sikkim, South India, and West Bengal).

Elsewhere : Malaya, Myanmar, Sri Lanka, Sumatra.

Genus *Syntomis* Ochshenheimer

1808. *Syntomis* Ochshenheimer, *Eurr. Schmett.*, 2 : 103.

Remarks : The genus is represented by 40 species from India, of which only two are dealt with here.

Key to species

1. Abdomen with two bands, Frons yellow *cyssea* (Stoll)
- Abdomen with more than two bands. Frons black *passalis* (Fabricius)

N 42. *Syntomis cyssea* (Stoll)

1872. *Sphinx cyssea* Stoll, *Pap. Exot.*, 4 : 124, pl. 355B.

1998. *Syntomis cyssea* (Stoll), Ghosh & Chaudhury, *State Fauna Series 4, Fauna of Meghalaya*, Part 6 : 394.

Material examined : Andhra Pradesh, District-Nalgonda, Nagarjuna Sagar, 65km. from Nalgonda, 24. i. 2004 (Coll. D.R. Maulik).

Wing expanse : 26mm.

Distribution : India (Andhra Pradesh (District-Nalgonda), Maharashtra, Meghalaya, N.W. Himalayas, Tamil Nadu and West Bengal).

Elsewhere : Myanmar, Nepal, Pakistan, Sri Lanka.

43. *Syntomis passalis* (Fabricius)

1781. *Zygaena passalis* Fabricius, *Sp. Ins.*, 2 : 159.

2004. *Syntomis passalis* (Fabricius), Majumdar, *State Fauna Series 10, Fauna of Manipur*, : 523.

Material examined : Andhra Pradesh, 1 ex., District-Rangareddi, Golconda Forte, 13. x. 1998, 2 exs., District-Krishna, Machallipattanam, 15. x. 1998 (Coll. S.P. Chakroborty); 1 ex., District-Rangareddi Rajamundry, Kadiayam, 5. i. 1999 (Coll. B.C. Das); 2 exs., District-Rangareddi, Secunderabad, India nagar Garden, 15. i. 2004, 1 ex., District-Rangareddi, Gutkha, 40km. S.E. of Secunderabad, 17. i. 2004, 7 exs., District-Nalgonda, Meralgura, 40km. E. of Nalgonda, 22. i. 2004, 5 exs., Nagarjuna Sagar, 65km. from Nalgonda, 20-23. i. 2004, 2 exs., District-Nalgonda, Halia, 42km. from Nalgonda, 24. i. 2004, 1 ex., Pericherla, 15km. from Guest House, 27. i. 2004, 1 ex., Chilkaluripet, 35km N.E. of Guntur, 27. i. 2004, 1 ex., District-Guntur Puttarpalli, 36km. from Guntur, 29. i. 2004, 1 ex., District-Vishakhapatnam, Agrampuri, 20km. from Guest House, 6. ii. 2004, 1 ex., District-Kadapa, Vontimilitta, 33km. W. of Kadapa, 3. iii. 2005 (Coll. D.R. Maulik).

Wing expanse : 35-45mm.

Distribution : India (Andhra Pradesh (District-Rangareddi, Krishna, Nalgonda, Vishakhapatnam, Guntur Kadapa), Assam, Karnataka, Manipur, Tamil Nadu and West Bengal (and also Sri Lanka.

ACKNOWLEDGEMENT

The author is grateful to the Director, Zoological Survey of India, Kolkata, Dr. A.K. Hazra, Scientist'E, for providing laboratory facilities and to Sri I.J. Gupta, Scientist, C (Retd.) for valuable suggestion to complete the work.

REFERENCES

- Evans, W. H. 1932. Identification of Indian Butterflies, 1+X, 454pp., 32pls. (Bombay Natural History Society).
- Evans, W. H. 1949. A Catalogue of HesperIIDae from Europe, Asia and Australia in Brit. Mus. (nat. Hist.). London. XIX+502pp., 53pls. (Trutees of British Museum).
- Hampson, G.F. 1892. The Fauna of British India including Ceylon and Burma, 1 : 209-228., Taylor & Francies.
- Hampson, G.F. 1894. The Fauna of British India including Ceylon and Burma, 2 : 1-160. Taylor & Francies.
- Hampson, G.F. 1898. Catalogue of the Lepidotera Phalaenae in the British Museum, 1 : xxi+559+20. London (By the trustees).
- Hampson, G.F. 1900. Catalogue of the Lepidoptera Phalaenae in the British Museum, 2 : xx+590+20. London (By the trustees).
- Hampson, G.F. 1901. Catalogue of the Lepidoptera Phalaenae in the British Museum, 3 : xix+690+23. London (By the trustees).
- Haribal, M. 1992. The Butterflies of Sikkim, Himalaya and their Natural History, *Sikkim Nature Conservation Foundation*, 1-217, pls. 60, Sketches 9.
- Home, W.M.L. 1935. The Butterflies of Secunderabad, *J. Bombay nat. Hist. Society*, 37 (4) : 892-894.
- Sander, D.F. 1936. The Butterflies of Secunderabad, *J. Bombay nat. His. Society*, 38 (4) : 800-802.
- Talbot, G. 1939. The Fauna of British India including Ceylon and Burma, Butterflies, 1 : 300-563, London.
- Varshney, R.K. 1993. Index Rhopalocera Indica. Part-III. Genera of Butterflies from India and Neighbouring countries (Lepidoptera : (A) Papilionidae, Pieridae and Danaidae). *Oriental Insects*, 27 : 347-372.
- Wynter-blyth, M.A. 1957. Butterflies of the Indian Region. 523pp., 123pls. (Published by Bombay Natural History Society, Bombay).

INSECTA : LEPIDOPTERA, NYMPHALIDAE (DANAINAE), LASIOCAMPIDAE AND LYMANTRIIDAE

D. R. MAULIK

Zoological Survey of India, M-Block, New Alipore, Kolkata 700 053

INTRODUCTION

Of the 17,000 species of butterflies known from the World, about 1,500 species (8.66 %) are recorded from India. Southern part of India is not rich in butterfly diversity like Northern part of India. Presently, 29 species/subspecies of butterflies of family Papilionidae, Nymphalidae (Danainae), Lasiocampidae and Lymantriidae are treated from the state of Andhra Pradesh.

At present, the studies on the butterflies is based upon in the specimens collected by the several Scientists of the Zoological Survey of India during their surveys of the state of Andhra Pradesh. The specimens available in the old collections of Zoological Survey of India have also examined. As a result, 29 species representing 16 genera under two families of butterflies, Papilionidae and Nymphalidae (Danainae) and two families of moth, Lasiocampidae and Lymantriidae have been dealt with from the state of Andhra Pradesh.

SYSTEMATIC ACCOUNT

Family PAPILIONIDAE

Antennae comparatively short and usually with a distinct club; probosis well developed; palpi short and pressed to frons (accept and projecting in teinopalpus); fore legs fully developed, fore tibiae with spur on innerside, hind tibiae with middle spur, claws simple, rarely with toothed, paronychium and pulvillus absent. Cell closed in both sexes. Fore wing with 12 veins, in addition vein 3A ending on inner margin, a short transverse vein also present near the base of wing between cell and vein 2A (with few exceptions) (vein 7, 8 stalked, vein 2 arising before middle of cell, four veins arising from outer lower edge of the cell. Hind wing usually with a tail at vein 4 which may be slender or broad and spatulate, inner margin of hind wing being frequently folded over and within the fold, in male bearing a patch of specialized scales or scent scales (androconia). Vein 2A absent, the basal cell and precostal vein present.

Subfamily PAPILIONINAE

Key to Tribes

1. Tibiae and tarsi scaled **Leptocircini**
- Tibiae and tarsi unscaled 2
2. Tibiae and tarsi with ventral rows of spines separated from dorsal rows by an impressed spineless space; Hind wing precosta simple, curved distad **Papilionini**
- Tibiae and tarsi with ventral rows of spines not separated from dorsal rows by an impressed spineless space; Hind wing precosta forked, curved distad **Troidini**

Tribes **Leptocircini**I. Genus *Graphium* Scopoli

1777. *Graphium* Scopoli, *Intr. Hist. Nat.*, : 433.

Subgenus *Graphium* Scopoli

Key to species

- Fore wing upperside with double cell spot; tail short *agamemnon* Linnaeus
- Fore wing upperside only one submarginal spot in area 1b; tail absent
..... *Evemon* (Boisduval)

1. *Graphium agamemnon* (Linnaeus, 1758)*Graphium* (*Graphium*) *agamemnon agamemnon* (Linnaeus, 1758)

1758. *Graphium agamemnon* Linnaeus, *Syst. Nat. ed.* 10 : 462.

2014. *Graphium*(*Graphium*) *agamemnon agamemnon* (Linnaeus) : Gupta & Maulik, *Fauna of Nagaland, State Fauna Series*, 12 : 393. *Zool. Surv. India*.

Material examined : Kaddapa district, Kaddapa, Ontimetta, 52 km North from Kaddapa Forest Guest House, Stn. 11, 1♀, 2.iii.05, coll. by D. R. Maulik and party; Rangareddy district, Secunderbad, Rajendra Nagar, 1♂, 18.01.04; Secunderbad, Koti, 1♀, 18.i.04, coll. by D. R. Maulik and party; Kutbur, 32 km South-West of Hyderabad, 1♀, 19.i. 04, coll. by D.R. Maulik and party; Secunderbad, Santhanagar, 1♂, 19. i., 05, coll. by D.R. Maulik and party; District Nalgonda, Meralgura, 1♂, 22.i.2004, coll. by D.R. Maulik and party; Vishakhapatnam district, Rushikonda, 1♂, 1♀, 23. xi. 2000, coll. by P. H. Roy and party ; Araku valley, alt. 3000 ft., 1♂, 1♀, 7.ii.04, coll. by D.R. Maulik and party; Sarabaram, 4 ♂, 1♀, 05.ii.2004, coll. by D.R. Maulik and party; Gopalapattam, 1 ♂, 08. ii. 2004, coll. by D.R. Maulik and party.

Fore wing expanse : ♂ 80, ♀ 95 mm.

Distribution : Andhra Pradesh (Rangareddy, Nalgonda, Vishakhapatnam), widely distributed in India (Talbot 1939).

Elsewhere : Bangladesh, Bhutan, Myanmar, Nepal and Sri Lanka (Talbot, 1939).

***Eurypylus* group**

Fore wing dark bars straight or slight angled, bar 5 broad, with or without median spot; underside of fore wing with base of costa white-scaled.

2. *Graphium evemon* (Boisduval)

***Graphium (Graphium) evemon albociliatis* (Fruhstorfer, 1901a.)**

1901a. *Papilio evemon albociliatis* (Fruhstorfer), *Soc. Ent.*, **16** (14) : 106.

1983. *Graphium (Graphium) evemon albociliatis* (Fruhstorfer) Hancock, *Smithersia*, **2** : 46.

Material examined : Prakasam district, Adimurtipalli, 1 ♂, 24. 02. 05, coll. by D.R. Maulik and party.

Fore wing expanse : ♂ 80 mm.

Distribution : Andhra Pradesh (Prakasam, Adimurtipalli), Assam (Talbot 1939).

Elsewhere : Tavoy, Tonkin (Talbot 1939).

Remarks : This nominated subspecies is new record for Andhra Pradesh and status is rare.

Tribe Troidini

Key to genera

Pattern black with white red spot. Fore wing with R1 arising opposite CuA1. Hind wing tailed, never with golden transparent scales ***Atrophaneura* Reakrit**

II. Genus *Atrophaneura* Reakrit

3. *Papilio aristolochiae* Fabricius

***Atrophaneura (Atrophaneura) aristolochiae aristolochiae* (Fabricius, 1775)
(Common Rose)**

1775. *Papilio aristolochiae* Fabricius, *Syst. Ent.*, (3) **1** : 443.

2003. *Atrophaneura (aristolochiae) aristolochiae* (Fabricius) Maulik, *Fauna of Sikkim, State Fauna Series*, **9(Part-4)** : 4. *Zool. Surv. India*.

Material examined : Prakasam district, Digovametta, 20 km South of Giddalur Forest Guest House, 1 ♂, 1 ♀, 26. 02. 05, coll. by D.R. Maulik and party; Rangareddy District, Secunderbad,

Takaramgat, 1♂, 18. 02. 05, coll. by D.R. Maulik and party.

Wing expanse : ♂ 85, ♀ 100 mm.

Distribution : Andhra Pradesh : (Prakasam, Rangareddy), Arunachal Pradesh, Assam Manipur, Mizoram, Nagaland, Sikkim and widely distributed in India.

Elsewhere : Bangladesh, Bhutan, Nepal, Sri Lanka (Talbot 1939).

4. *Atrophaneura (Atrophaneura) aristolochiae goniopeltis* (Rothchild, 1908.)

1908. *Papilio aristolochiae goniopeltis* Rothchild, *Nov. Zool.*, 15 : 167.

1983. *Atrophaneura (Atrophaneura) aristolochiae goniopeltis* (Rothchild) Hancock, *Smithersia*, 2 : 46.

Material examined : Kaddapah district, Sidhaut, 35 km South of Kaddapah Giddalur Forest Guest House, 1 ♂, 1 ♀, 1. iii. 05, coll. by D.R. Maulik and party.

Distribution : Andhra Pradesh (Kaddapah, Sidhaut).

Elsewhere : Myanmar (Talbot 1939); South China (Talbot 1939); Siam (Talbot 1939).

Remarks : This nominated subspecies is new record for Andhra Pradesh and Indian main land.

5. *Atrophaneura (Atrophaneura) hector* (Linnaeus)

1758. *Papilio hector* Linnaeus, *Sys. Nat. ed.* 10 : 459.

1983. *Atrophaneura (Atrophaneura) hector* (Linnaeus) : Hancock, *Smithersia*, 2 : 46.

Material examined : Kaddapa district, Kaddapa, Mydukur, 35 km East from Kaddapa Forest Guest House, 1 ♂, 4. iii. 05, coll. by D.R. Maulik and party; Kaddapa, Vontimetta, 35 km East from Kaddapa Forest Guest House, 1 ♂, 3.iii.05, coll. by D.R. Maulik and party; Ontimetta, 52 km North from Kaddapa Forest Guest House, 1 ♂, 2. iii. 05, coll. by D.R. Maulik and party; Prakasam district, Kambam, 35 km East of Giddalur Forest Guest House, 3 ♂, 2 ♀, 25. 02. 05, coll. by D.R. Maulik and party; Digovametta, 20 km South of Giddalur Forest Guest House 1 ♂, 26. 02. 05, coll. by D. R. Maulik and party; District Guntur, Narakudupalli, 12 km from Guntur, 3 ♂, 2 ♀, 29.i.2004, coll. by D.R. Maulik and party; Addilabad district, Mannar Forest area, 3 ♂, 30. ii. 1999, coll. by P. H. Roy and Party; West Godabari district, Eluru local garden, 2 ♂, 28. ii. 2000, coll. by P. H. Roy and Party; Vishakhapatnam district, Jadugallapalam Forest area, 1 ♂, 22. ii. 2000, coll. by P. H. Roy and Party; Rushikonda, 7 km. from Vishakhapatnam Forest Guest House, 1 ♂, 1 ♀, 23. xi. 2000, coll. by P. H. Roy and Party.

Wing expanse : ♂ 85, ♀ 105 mm.

Distribution : Andhra Pradesh (Addilabad, West Godabari, Vishakhapatnam, Kaddapa, Guntur, Prakasam), Andaman Islands (Talbot 1939); Tamil Nadu, Nilgiri Hills (Talbot 1939).

Elsewhere : Sri Lanka (Talbot 1939).

Remarks : This nominated subspecies is new record for Andhra Pradesh and Indian main land. Though it is occurring Niligiris from 1000 feet to 7000 feet. Very rare in Andamans (Talbot 1939).

Tribe **Papilionini**

III. Genus ***Chilasa*** Moore

1881. *Chilasa* Moore, *Lep. Ceyl.*, 1 : 153.

Subgenus ***Chilasa*** Moore

Pattern mimetic of Danainae or Uraniidae or moasly blue; tail reduced or absent; frons, thoraxand abdomen often with pale line or spots.

6. ***Papilio clytia*** Linnaeus, 1758

Chilasa (Chilasa) clytia clytia (Linnaeus, 1758)

1758. *Papilio clytia* Linnaeus, *Syst. Nat.*, ed. 10 : 479.

1998. *Chilasa (Chilasa) clytia clytia* Linnaeus : Mondal & Maulik, *Fauna of Meghalaya, State Fauna Series*, 3(Part-6) : 229. *Zool. Surv. India*.

Material examination : District Nalgonda, Meralgura, 40 km. East from Nalgonda, 1 ♂ 22. i. 2004, coll. by D.R. Maulik and party.

Fore wing expanse : ♂ 52, mm.

Distribution : Andhra Pradesh (Nalgonda), Arunachal Pradesh, Manipur, Mizoram, Nagaland, Sikkim and widely distributed in India.

Elsewhere : Bangladesh (Evans 1923), Bhutan (Evans 1923), Myanmar (Talbot 1939); Nepal (Hancock), Sri Lanka (Talbot 1939), Myanmar (Talbot 1939).

IV. Genus ***Princeps*** Huebner

1807. *Princeps* Huebner, *Samml. Schmett.*, 1 : pl. (116) Ausgber.

Subgenus ***Menelaides*** Huebner

1819. *Menelaides* Huebner *Samml. Schmett.*, : 74.

Polytes group

Hind wing in male black with a broad or narrow white discal band; male without androconia.

7. *Princeps polytes* Linnaeus, 1775

Princeps (Menelaides) polytes romulus (Cramer, 1775.)

1775. *Papilio romulus* Cramer, *Pap. Exot.*, 1 : 67.

2003. *Princeps (Menelaides) polytes romulus* (Cramer) : Maulik, *Fauna of Sikkim, State Fauna Series*, 9 (Part-4) : 8. *Zool. Surv. India*.

Material examined : Addilabad district, Mannar Forest area, 3 ♂, 30. ii. 1999, coll. by P. H. Roy and Party; Khammam district, Nelakondapalli Forest, 1 ♂, 11.xii. 1999, coll. by P. H. Roy and Party; Guntimadugo Black Forest, Khammam Sathpally, 2 ♂., 12. xii. 1999, coll. by P. H. Roy and Party; Khammam, Demmupeta Naupally Black Forest, 1 ♂, 13. xii. 1999, coll. by P. H. Roy and Party ; East Godabari district, Rajmundri, Central Forest Nursery, 4 ♂, 2 ♀., 25. ii. 2000, coll. by P. H. Roy and Party; Okavoram, 47 km from Rajmundri, 2 ♂, 25. ii. 2000, coll. by P. H. Roy and Party; West Godabari district, Eluru local garden, 3 ♂., 28. ii. 2000, coll. by P. H. Roy and Party; Kurnool district, Dranachallam, 1 ♂, 25. xii. 1999, coll. by P. H. Roy and Party; Kaddapa district, Kajipeta, 1 ♂, 30. xii. 1999, coll. by G. C. Sen and party; West Godabari district, Kakinda, 15 km. from Kakinda Forest Guest House, 1 ♂., 01. ii. 2004, coll. D. R. Maulik and Party; Vishakhapatnam district, Jadugallapalam Forest area, 3 ♂., 22. ii. 2000, coll. by P. H. Roy and Party.; Rangareddy district, Secunderbad, Kurkutpally, 15 km. East from Secunderbad., 1 ♂, 17. i. 2004, coll. D. R. Maulik and Party; Nalgonda district, Musampally, 10 km from Nalgonda, 1 ♂., 21. i. 2004, coll. D. R. Maulik and Party; District Guntur, Amarabati, 43 km North from Guntur, 1 ♂, 26. i. 2004, coll. by D. R. Maulik and Party.

Fore wing length : ♂ 84, ♀ 97 mm.

Distribution : Andhra Pradesh (Adilabad, Vishakhapatnam, East Godabari, Guntur, Kaddapa, West Godabari, Kurnool, Rangareddi, Nalgonda), Arunachal Pradesh, Assam, Manipur, Mizoram, Nagaland, Sikkim and widely distributed in India.

Elsewhere : Malaya Penninsula (Talbot 1939), Myanmarm (Talbot 1939), Sri Lanka (Talbot 1939), Tonkin (Talbot 1939), Natua (Talbot 1939), and Lingga Island (Talbot 1939).

Subgenus *Princeps* Huebner

1807. *Princeps* Huebner, *Samml. Schmett.*, 1 : pl. (116). Augsber.

Demoleus group

Sexes similar, non-mimetic, black with postdiscal bands and submarginal spots; basal area with dispersed yellow scales; tail reduced or absent; hind wing red and blue spot present; male without androconia.

8. *Papilio demoleus* (Linnaeus, 1758)*Princeps (Princeps) demoleus demoleus* (Linnaeus, 1758)

1758. *Papilio demoleus* Linnaeus, *Syst. Nat. ed.* 10 : 464.

1998. *Princeps (Princeps) demoleus demoleus* (Linnaeus) : Mondal & Maulik, *Fauna of Meghalaya, State Fauna Series*, 4(Part-6), 233. *Zool. Surv. India*.

Material examined : Adilabad district, Kawal, Jannaram, Stn. 12, 1 ♂, 30. xii. 1999, coll. by S. K. Mandal and party coll.) ; Marlo Forest, 2 ♂, 28. xi. 1999, coll. by P. H. Roy and party; Rampur Forest area 1 ♂, 5. xii. 1999, coll. by P. H. Roy and party; Khammam district, Nellore district, Podalakur, 2 ♂, 27. v. 2000, coll. by S. K. Chatterjee and party. Chittoor district, Belapalli, Tirupati, 42 km North East of Tirupati Forest Guest House, 1 ♀, 6. iii. 05, coll. by D. R. Maulik and Party; Kaddapah district, Mydukur, 35 km South of Kaddapah Forest Guest House, 1 ♀, 4.iii. 05, coll. by D. R. Maulik and Party; Guntur district, Kandavadu Reserve Forest, 1 ♂, 4. vii. 1999, coll. by P. H. Roy and party; Gudur 37 km from Nollare, 2 ♂, 8. vii. 1999, coll. by P. H. Roy and party; Nalgonda district, Nagarjun Sagar, Lanka More village, Right Bank of river Krishna, 1 ♂, 08. ii. 2004, coll. D. R. Maulik and Party; Khammam district, Guntimadugu Black Forest, Khammam Sathpally, 1 ♂, 12. xii. 1999, coll. by P. H. Roy and party; Prakasam district, Digovametta, 20 km South of Giddalur Forest Guest House, Stn. 8. 1 ♂, 1 ♀, 26. 02. 05, coll. by D. R. Maulik and Party; Vishakhapatnam district, Rushikonda, 7 km. from Vishakhapatnam Forest Guest House, 1 ♂, 1 ♀, 29. 02. 05, coll. by D. R. Maulik and Party.

Fore wing length : 70 mm.

Distribution : Andhra Pradesh (Adilabad, Kaddapah, Khammam, Guntur, (Nalgonda Nellore, Vishakhapatnam), Meghalaya, Mizoram, Nagaland, Sikkim and widely distributed in India.

Elsewhere : Arabia (Talbot 1939); Bangladesh (Talbot 1939); Bhutan (Talbot 1939); Persia (Talbot 1939); Myanmar (Talbot 1939); Sri Lanka (Talbot 1939).

paris group

Sexes similar, non-mimetic, black with or without metallic blue or green patch; underside with dispersed basal cream scales, upperside with dispersed metallic scales; tail present or absent; hind wing red and blue spots present; blue scales on inner surface of red scales.

9. *Papilio krishna* Moore*Princeps (Princeps) krishna krishna* Moore

1857. *Papilio krishna* Moore, *Cat. Lep. Mus. East India co.*, 1 : 110 pl. 2a. fig. 6.

1983. *Princeps (Princeps) krishna krishna* Moore : Hancock, *Smerthesia* 2 : 48.

Material examined : Adilabad district, Addilabad, Mannar Forest area, 3 ♂, 30. xi. 1999,

coll. by P. H. Roy and Party; Khammam district, Demmupeta Naupally Black Forest, 1 ♂, 13. xii. 1999, coll. by P. H. Roy and Party Guntimadugo Black Forest, Khammam Sathpally, 2 ♂, 12. xii. 2000, coll. by P. H. Roy and Party; East Godabari district, Gokanaram Forest area, 47 km. from Rajmundri, 3 ♂; 25. ii. 2000, coll. by P. H. Roy and Party.

Fore wing length : ♂ 84-95 mm.

Distribution : India : Andhra Pradesh (Adilabad, Khammam), Assam, Manipur, Mizoram, Nagaland, West Bengal, Sikkim, widely distributed in India.

Elsewhere : Bangladesh, Bhutan, Myanmar, Sri Lanka (Talbot 1939).

Family NYMPHALIDAE

Subfamily DANAINAE

Antennae not scaled; eyes naked; fore legs imperfect, useless for walking in both sexes; both wing simple and margin not dented or curved, both wing of cell are closed by tubular vein; fore wing all veins present, vein 2A bifurcated at base, hind wing with precostal vein present. This subfamily is represented in India by nine genera and 71 species of which four genera and species are treated from the state of Andhra Pradesh.

Key to Tribe

1. Pulvilli and paronychial of mid and hind legs vestigial; Tarsal claws almost straight, curved only at tip **Danaini**
- Pulvilli and paronychial of mid- and hind legs distinct; Tarsal claws evenly curved throughout their length **Euploeini**

Tribe *Danaini*

Key to Genus

1. Upperside of fore wing fulvous or white and without vitreous spot and stripes ***Danaus* Kluk**
- Upperside of fore wing pale blue and with vitreous spot and stripes 2
2. Fore wing cell close by a transverse black bar ***Tirumala* Moore**
- Fore wing cell not close by a transverse black bar ***Parantica* Moore**

V. Genus *Danaus* Kluk

1802. *Danaus* Kluk, *Zierzet. Hist. Nat. Poetz. Gospod.*, 4 : 84.

1984. *Danaus* Kluk : Ackery & Vane-Wright, *Milkweed Butterflies* : 201.

10. *Papilio genutia* Cramer***Danaus genutia genutia* (Cramer)**

1779. *Papilio genutia* Cramer, *Pap. Exot.*, 3 : 23, pl. 200, figs. C.D.

2003. *Danaus genutia genutia* (Cramer): Maulik, *Fauna of Sikkim, State Fauna Series*, 9(Part-4) : 11.

Material examined : Adilabad district, Mannaor, 2 ♀, 30.xi.1999, coll. by Dr. P. Mukhapadhyaya and party; Chittor district, Srikalahasti, 1 ♀, 23.i.1999, coll. by Dr. P. Mukhapadhyaya and party; Khammam district, Dernomapela, Naupalli Black Forest, 1 ♂ 13. xii. 1999, coll. by P. H. Roy and Party; Kalaguda Black Forest, 1 ♂, 11. xii. 1999, coll. by P. H. Roy and Party; East Godabari district, Samalkot 25 km from Kakinada Forest Guest House, 1 ♂, 02. ii. 04; Rangareddi district, Secunderbad, Gutkha, South East of Secunderbad, 1 ♂, 2 ♀, 17. i. 04, coll. by D. R. Maulik and party; Secunderbad, Koti, 1 ♂, 18. i. 04, coll. by D. R. Maulik and party; Vishakhapatanam district, Jadugopalam, Vishakhapatanam, 1 ♀ 22. xi. 2000, coll. by P. H. Roy and Party; Sarabaram, 25 km from Forest Guest House, 1 ♂, 1 ♀, 05. ii. 04, coll. by D. R. Maulik and party; Agarampuri, 20 km from Forest Guest House, stn. 35, 1 ♂, 06. ii. 04, coll. by D. R. Maulik and party; Araku Valley, 125 km from Vishakhapatanam, alt. 3000 ft. 1 ♂, 1 ♀, 07. ii. 04, coll. by D. R. Maulik and party.

Fore Wing expanse : ♂ 80, ♀ 90 mm.

Distribution : Andhra Pradesh (Adilabad, Chittor, East Godabari, Khammam, Rangareddi, Vishakhapatanam), widely distributed throughout India (Talbot 1939).

Elsewhere : Annam, Asia Minor, Bangladesh, China, Japan, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Sumatra, Thailand, Tonkin and Yunnan (Talbot 1939).

11. *Papilio chrysippus* Linnaeus, 1758.***Danaus chrysippus chrysippus* (Linnaeus, 1758.)**

1758. *Papilio chrysippus* Linnaeus, *Syat. Nat. ed.* 10 : 471.

1998. *Danaus chrysippus chrysippus* (Linnaeus) : Mondal & Maulik, *Fauna of Meghalaya, State Fauna Series*, 4(Part-6) : 236. *Zool. Surv. India*.

Material examined : Kaddapah district, Kojipeta, 2 ♂, 1 ♀, 31. v. 2000, coll. by S. K. Chatterjee and party; Nellore district, Nellore West, Penchalakana, 1 ♂, 1 ♀ 26. v. 2000, coll. by S. K. Chatterjee and party; Nellore South, Chitval, 1 ♀, 28. v. 2000, coll. by S. K. Chatterjee and party; Nellore, Nagedupeta, 1 ♀, 24. v. 2000, coll. by P. H. Roy and party; East Godabari district, Vokalipuri 15 km from Kakanda Forest Guest House, 2 ♂ 4 ♀ 1. ii.04, coll. by D. R. Maulik and party; Ramanupallam, 32 km from Kakinada Forest Guest House, 5 ♂, 4 ♀, 03. ii. 04, coll. by D. R. Maulik and party; Samalkot, 25 km North of Kakinada Forest Guest House, 2 ♂, 2 ♀, 02. ii. 04, coll. by D. R. Maulik and party; Guntur district, Amarabati, 43 km North of Guntur Forest Guest House, 26. i. 04, coll. by D. R.

Maulik and party; Chillakaluripeta, 35 km North East from Guntur Forest Guest House, 3 ♂, 1 ♀, 27. i.04, coll. by D. R. Maulik and party; Putturpalli 36 km from Guntur Forest Guest House, Stn. 30, 1 ♂, 1 ♀, 29.i.04, coll. by D. R. Maulik and party; Arakudupalli, 12 km from Guntur Forest Guest House, 2 ♂, 1 ♀, 29. i. 04, coll. by D. R. Maulik and party; Nalgonda district, Narkatpalli, 20 km West of Nalgonda Forest Guest House, 1 ♂, 20.i.04, coll. by D. R. Maulik and party; Katangur, 15 km from Nalgonda Forest Guest House, 1 ♂, 1 ♀, 21. i.04, coll. by D. R. Maulik and party; Neralguda, 40 km East of Nalgonda Forest Guest House, 1 ♂, 22.i.04, coll. by D. R. Maulik and party; Halia, 42 km from Nalgonda Forest Guest House, 4 ♂, 24. i. 04, coll. by D. R. Maulik and party; Rangareddi district, Secunderbad, Indra Nagar Garden, 3 ♂, 1 ♀, 15. i.04, coll. by D. R. Maulik and party; Kurkutpalli, 15 km East from Osmania University Guest House, 3 ♂, 1 ♀, 17.i.04, coll. by D. R. Maulik and party; Guntuk, 26 km North of Osmania University Guest House, 1 ♂, 16.i.04, coll. by D. R. Maulik and party; Gutkha 10 km South East of Osmania University Guest House, 1 ♂, 1 ♀, 17.i.04, coll. by D. R. Maulik and party; Kichar, 32 km South Osmania University Guest House, 1 ♂, 1 ♀, 16.i.04, coll. by D. R. Maulik and party.

Fore wing expanse : ♂ 65, ♀ 72 mm.

Distribution : India : Andhra Pradesh (Cuddapah, East Godabari, Guntur, Nellore, Nalgonda, Rangareddi), widely distributed throughout India (Talbot 1939).

Elsewhere : Asia Minor, Bangladesh, Barneo, China, Japan, Malaya, Myanmar, Nepal, Pakistan, Sri Lanka and Sumatra (Talbot 1939).

VI. Genus *Tirumala* Moore, 1880a.

1880a. *Tirumala* Moore, Lep. Ceyl., 1 (1) : 4.

12. *Danais limniace ver leopardus* Butler, 1866b

Tirumala limniace leopardus (Butler, 1866b)

1866b. *Danais limniace ver leopardus* Butler, *Proc. Zool. Soc. London*. 1866b : 52.

2003. *Tirumala limniace leopardus* (Butler): Maulik, *Fauna of Sikkim, State Fauna Series*, 9(Part-4) : 11. *Zool. Surv. India*.

Material examined : East Godabari district, Coppavaram Port, 47 km South of Rajmundri, 2 ♂, 25. xi.2000, coll. by P. H. Roy and party; West Godabari district, Eluru Local Garden, 1 ♂, 1 ♀, 28.xi. 2000, coll. by P. H. Roy and party; Chittor district, Belapalle, Tirupati, 42 km North East of Tirupati Forest Guest House, 1 ♂, 6. iii.05, coll. by D. R. Maulik and party; West Godabari district, Kakinada, Vokalipuri 15 km from Kakanda Forest Guest House, 2 ♂, 1.ii.04, coll. by D. R. Maulik and party; Rangareddy district, Secunderbad, Kichar, 32 km South of Secunderbad, 2 ♂, 16.i.04, coll. by D. R. Maulik and party; Gutkha, 10 km South East of Osmania University Guest House, 3 ♂, 1 ♀, 17.i.04, coll. by D. R. Maulik and party;

Kurkotpalli, 15 km East of Secunderbad, 3 ♂, 17. i. 04, coll. by D. R. Maulik and party; Rajendra Nagar, 1 ♂, 18. i. 04, coll. by D. R. Maulik and party; Secunderbad, Koti, 2 ♂, 18. i. 04; Secunderbad, Takaramgat, Stn. 2. 1 ♂, 18. ii. 05, coll. by D. R. Maulik and party; Secunderbad, Santhanagat, Stn. 3. 1 ♂, 1 ♀, 19. ii. 05, coll. by D. R. Maulik and party; Nalgonda district, Dupally, 12 km from Nalgonda Forest Guest House, 2 ♂, 24.i.04, coll. by D. R. Maulik and party; Katangur, 15 km from Nalgonda Forest Guest House, 1 ♂, 1 ♀, 22. i. 04 ; Narkatpalli, 20 km West of Nalgonda Forest Guest House, 1 ♂, 20. i. 04 ; (D. R. Maulik and party coll.); Prakasam district, Giddalur, Kambam, 35 km East of Giddalur Forest Guest House, 4 ♂, 2 ♀, 25. ii. 05, coll. by D. R. Maulik and party; Giddalur, Digovametta, 20 km South of Giddalur Forest Guest House, 2 ♂, 26. ii. 05, coll. by D. R. Maulik and party; Vishakhapatnam district, Sarabaram, 25 km from Forest Guest House, 6 ♂, 1 ♀, 05. ii. 04 , coll. by D. R. Maulik and party.

Fore wing expanse : ♂ 90, ♀ 98 mm.

Distribution : Andhra Pradesh (East Godabari, West Godabari, Nalgonda, Prakasam, Rangareddi, Vishakhapatnam), Andaman & Nicobar Island, Peninsular India (Talbot 1939).

Elsewhere : Asia Minor (Talbot 1939), Bangladesh (Talbot 1939), China (Talbot 1939), Indo-China (Talbot 1939); Java (Talbot 1939); Malaya (Talbot 1939); Myanmar (Talbot 1939), Nepal (Talbot 1939), Pakistan (Talbot 1939), and Sri Lanka. (Talbot 1939).

Elsewhere : Sri Lanka (Talbot 1939).

VI. Genus *Parantica* Moore

1880. *Parantica* Moore, *Lep. Ceylon*, 1 : 7

14. *Papilio aglea* Stoll, *Parantica aglea melanoides* Moore, 1883.

1883. *Parantica melanoides* Moore, *Proc. Zool. Soc. London*, 1883 : 247.

2004. *Parantica aglea melanoides* (Moore) : Gupta & Maulik, *Fauna of Nagaland, State Fauna Series*, 12 : 21. *Zool. Surv. India*.

Material examined : Vishakhapatnam district, Rushikonda, 7 km from Vishakhapatnam Forest Guest House, 1 ♂, 23. ii. 2000, coll. by P. H. Roy and party

Distribution : Andhra Pradesh (Vishakhapatnam), widely distributed throughout India (Talbot 1939).

Elsewhere : Annam, Bangladesh, China, Hainan, Myanmar, Nepal, Thailand and Vietnam (Talbot 1939).

VII. Genus *Euploea* Fabricius, 1807

1807. *Euploea* Fabricius, *Magazin fur Insekten Kunde* (Illger) *Brunschweig*, 6 : 281.

15. *Papilio core* Cramer, 1780*Euploea core core* (Cramer)

1780. *Papilio core* Cramer, *Pap. Exot.*, 3 : 133. Pl. 266, figs. EF.

2003. *Euploea core core* (Cramer) : Maulik, *Fauna of Sikkim, State Fauna Series*, 9(Part-4) : 10. *Zool. Surv. India*.

Material examined : Adilabad district, Mannaor Forest, 27 km from Adilabad Guest House, 1 ♂, 30. xi. 1999, coll. by P. H. Roy and party; East Godabari district, Rajmundri, Coppavaram Port, 47 km South of Rajmundri, 1 ♂, 25. xi. 2000, coll. by P. H. Roy and party; West Godabari district, Ramanupallam, Stn. 17. 2 ♂, 4. x. 1998, coll. by S. K. Mandal and party; Ramanupallam, 32 km from Kakinada Forest Guest House, 1 ♂, 03. ii. 04, coll. by D. R. Maulik and party; Khammam district, Kalaguda, Sathapalli Black Forest, 15 km from Khammam, 1 ♂, 11. xii. 1999, coll. by P. H. Roy and party; Guntimadugo Black Forest Khammam Sathpally, 1 ♂, 12. xii. 1999, coll. by P. H. Roy and party; Demmupeta, Naupally Black Forest, 1 ♂, 13. xii. 1999, coll. by P. H. Roy and party; Guntur district, Guntur, Pencilana Forest area, 2 ♂, 2. vii. 1999, coll. by P. H. Roy and party; Nalgonda district, Narkatpalli, 15 km West of Nalgonda Forest Guest House, 3 ♂, 20.i.04, coll. by D. R. Maulik and party; Mussampalli, 10 km from Nalgonda Forest Guest House, 1a ♂, 20. i. 04, coll. by D. R. Maulik and party; Rangareddi district, Secunderbad, Kurkutpalli, 15 km East from Osmania University Guest House, 2 ♂, 17. i. 04, coll. by; Gutkha, 10 km South East of Osmania University Guest House, 2 ♂, 1 ♀, 17. i. 04; Indra Nagar Garden, 5 ♂, 1 ♀, 15. i. 04, coll. by D. R. Maulik and party; Guntur, 26 km North of Osmania University Guest House, 2 ♂, 16. i. 04, coll. by D. R. Maulik and party; Rajendra Nagar, 4 ♂, 18. 01. 04, coll. by D. R. Maulik and party; Tukaramgat, 1 ♂, 1 ♀, 17. i. 04, coll. by D. R. Maulik and party; Secunderbad, Koti 12 km South-West of Osmania University Guest House, 2 ♂, 18. 01. 04., coll. by D. R. Maulik and party; Kichar, 32 km South Osmania University Guest House, 2 ♂, 1 ♀, 16. i. 04, coll. by D. R. Maulik and party; Kutbur, 32 km South-West of Hyderabad, 1 ♂, 19. i. 04, coll. by D. R. Maulik and party.

Wing expanse : 65-70 mm.

Distribution : Andhra Pradesh (Adilabad, East Godabari, West Godabari, Khammam, Rangareddi), widely distributed through India including Andamans and Nicobar Islands.

Elsewhere : Bali, Bangladesh, Java, China, Myanmar, Nepal, Pakistan and Sri Lanka (Talbot 1939).

Remarks : This subspecies is mimicked by the female of *Hypolimnias bolina* (Linnaeus) of the subfamily Nymphalinae and *Chilasa* spp. of the Family Papilionidae (Talbot 1939).

16. *Papilio mulicber* Cramer, 1777

Euploea mulciber mulciber (Cramer, 1777)

(*Striped Blue Crow*)

1777. *Papilio mulicber* Cramer, *Pap. Exot.*, 2 : 45; pl. 127, figs. C.D.

1998. *Euploea mulciber* (Cramer) Mondal & Maulik. *Fauna of Meghalaya, State Fauna Series*, 4(Part-6) : 237. *Zool. Surv. India*.

Material exmined : Adilabad district, Mannaor Forest, 27 km from Adilabad Guest House, 1 ♂, 30. xi. 1999, coll. by P. H. Roy and party; East Godabari district, Rajmundri, Coppavaram Port, 47 km South of Rajmundri, 1 ♂, 25. xi.2000, coll. by P. H. Roy and party West Godabari district, Ramanupallam, Stn. 17. 2 ♂, 4. x.1998, coll. by S. K. Mandal and party Ramanupallam, 32 km from Kakinada Forest Guest House, 1 ♂, 03. ii. 04, coll. by D. R. Maulik and party; Khammam district, Kalaguda, Sathapalli Black Forest, 15 km from Khammam, 1 ♂ 11. xii.1999, coll. by P. H. Roy and party; Guntimadugo Black Forest, Khammam Sathpally , 1 ♂ 12. xii.1999, coll. by P. H. Roy and party; Demmupeta, Naupally Black Forest, 1 ♂ 13.xii.1999, coll. by P. H. Roy and party; Guntur district, Guntur, Penchelana Forest area, 2 ♂ 2. vii. 1999, coll. by P. H. Roy and party.

Wing expanse : ♂ 88, ♀ 100 mm.

Distribution : Andhra Pradesh (Adilabad, Mannaor, East Godavari, Khammam, Ramanupallam), Andaman and Nicobar Island, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Himachal Pradesh, Nagaland, Sikkim and West Bengal.

Elsewhere : China, Malaya Peninsula, Myanmar, Nepal, Sumatra, Sunda Island and Vietnam. (Tytler, 1911).

VIII. Genus *Parantica* Moore, 1880

1880. *Parantica* Moore, *Lep. Ceylon*, 1 : 10

17. *Danaida melaneus* (Cramer)

Parantica melaneus plataniston (Fruhstorfer, 1910.)

(*Chocolate Tiger*)

1910. *Danaida melaneus plataniston* Fruhstorfer, *In Seitz. Macrolep. World*, 9 : 210.

1998. *Parantica melaneus plataniston* Fruhstorfer Mondal & Maulik, *Fauna of Meghalaya, State Fauna Series*, 4(Part-6) : 234.

Material examined : Nalgonda district, Narkatpalli, 15 km West of Nalgonda Forest Guest House, 3 ♂, 20. i.04, coll. by D. R. Maulik and Party ; Mussampalli, 10 km from Nalgonda Forest Guest House, 1 ♂, 20. i.04 , coll. by D. R. Maulik and Party; Rangareddi district, Secunderbad, Kurkutpalli, 15 km East from Osmania University Guest House, 2 ♂

17. i.04 coll. by D. R. Maulik and Party; Gutkha, 10 km South East of Osmania University Guest House, 2♂, 1♀, 17. i. 04, coll. by D. R. Maulik and Party; Indra Nagar Garden, 5♂, 1♀, 15. i. 04, coll. by D. R. Maulik and Party; Guntuk, 26 km North of Osmania University Guest House, 2♂, 16. i. 04, coll. by D. R. Maulik and Party; Rajendra Nagar, 4 ♂, 18. i. 04, coll. by D. R. Maulik and Party; Tukaramgat, 1♂, 1♀, 17. i. 04, coll. by D. R. Maulik and Party; Secunderbad, Koti 12 km South-West of Osmania University Guest House, 2 ♂, 18. i. 04, coll. by D. R. Maulik and Party; Kichar, 32 k m South Osmania University Guest House, 2 ♂, 1♀, 16. i. 04, coll. by D. R. Maulik and Party; Kutbur, 32 km South-West of Hyderabad, 1 ♂, 19. i. 04, coll. by D. R. Maulik and Party.

Distribution : Andhra Pradesh (Nalgonda, Rangareddy, Secunderbad, Kurkutpalli), Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : China, Indo-China, Myanmar, Nepal and Thailand.

Family LASIOCAMPIDAE

Antennae bipectinate in both sexes, eyes small, palpi pored and usually long, proboscis absent; legs usually with short special pairs of spurs to mid and hind tibiae, fore wing vein 3A not forked with vein 2A, 3A rarely present, cell middle in position, veins M1 and R5 from angle of cell, vein R3 and R2 always stalked and before the apex of the cell; hind wing with two internal veins, M1 and Rs arising very near the base, vein Sc +R1 curved and almost touching or connected with it by a bar forming a precostal cell, accessory costal veinlet usually present; frenulum present.

IX. Genus *Metanastria* Huebner

1818. *Metanastria* Huebner, Verz : 186.

18. *Metanastria hyrtaca* Cramer, 1780

1780. *Metanastria hyrtaca* Cramer, Pap. Exot., 3 : 249.

1936. *Metanastria hyrtaca* Cramer: Collier, Lep. Cat., 73 : 310.

Material examined : Guntur district, Guntur, Penchelana Forest area, 2 ♂, 2. vii. 1999, coll by P. H. Roy and party.

Fore wing Expanse : ♂ 48, mm.

Distribution : Andhra Pradesh (Guntur, Penchelana), Assam, Maharashtra, Meghalay, Sikkim, Jharkhand, Orissa, Uttar Pradesh, Punjab, Tamil Nadu.

Elsewhere : Sri Lanka.

X. Genus *Trabala* Walker

1856. *Trabala* Walker, *Cat. Lep.Het. Brit. Mus.*, 7 : 1785

Palpi somewhat short and slight. Antennae with branches shorter in female than in male; mid and hind tibiae with a minute terminal pairs of spurs. Fore with broad, the outer margin rounded, the cell open; the stalk of veins 9 and 10 very long. Hind wing with cell open; veins 6 and 7 very near the base; no accessory costal veinlets.

19. *Trabala vishnou* (Lefebvre, 1827)

1827. *Gastropacha vishnou* Lefebvre, *Zool. Journ.*, 3 : 207.

1997. *Trabala vishnou* Lefebvre: Mondal & Maulik, *Fauna of West Bengal, State Fauna Series*, 3(Part-7) : 646. *Zool. Surv. India*.

Material examined : Prakasam district, Adimurtipalli, 10 km West of Giddalur Forest Guest House, 1 ♂, 24. 02. 05, coll by D. R.Maulik and Party.

Fore wing Expanse : ♂ 52 mm.

Distribution : Andhra Pradesh (Prakasam), Andamans Island, Assam, Meghalaya, Sikkim, West Bengal, Himachal Pradesh, Uttaranchal, Tamil Nadu, Maharashtra..

Elsewhere : Bangladesh : Sylhet (Swinhoe 1884); Bhutan (Swinhoe 1884); China (Hampson, 1891); Java (Hampson, 1891); Myanmar (Hampson, 1891) and Sri Lanka (Hampson, 1891).

XI. Genus *Lenodora* Moore, 1883

1883. *Lenodora* Moore, *Cat. Lep. Ceyl.*, 2 : 144.

Palpi rather short and thickly clothed with hair. Antennae with the branches long in male, short in female. Legs thickly clothed with hair; minute terminal pairs of spurs of mid and hind tibiae. Fore wing and broad Rounded ; veins 6 and 7 stalked. Hind wing vein 4 and 5 from angle of cell; 8 curved and met by a bar from 7; the accessory costal veinlets numerous and prominent.

20. *Lenodora vittata* Walker, 1855

1855. *Lasiocampa vittata* Walker, *Cat. Lep.Het. Brit. Mus.*, 6 : 1440.

1891. *Lenodora vittata* Walker: Hampson, *The Fauna of British India including Ceylon and Burma, (Moths)*, 1 : 423.

Material examined : Kaddapah district, Sidhaut, 35 km South of Kaddapah Giddalur Forest Guest House, 1♂, 1♀, 1.iii.05, coll by D. R. Maulik and Party.

Fore wing Expanse : ♂43, ♀48 mm.

Distribution : Andhra Pradesh (Kaddapah), Maharastra, Tamil Nadu, Uttaranchal.

Elsewhere : Myanmar (Hampson, 1891) and Sri Lanka (Hampson, 1891).

Family LYMANTRIIDAE

A family of moths generally of nocturnal flight, mostly clothed with hair-like scales and with very highly developed pectinations to the antennae in the male, the branches often having long terminal spines, and spines to retain them in position; the females often have a largely developed anal tuft of hair for covering the eggs.

Proboscis absent; legs hairy; frenulum present. Fore wing with vein 1 a not anastomosing with 1 b; 1 c absent; 5 from close to lower angle of cell. Hind wing with two internal veins ; 5 from close to lower angle of cell; 8 nearly touching 7 at middle of cell and connected with it by a bar.

XII. Genus *Dasychira* Stephens, 1829

1829. *Dasychira* Stephens, Ill. Brit. Ent. Haust., 2 : 58.

Palpi porrect, the 2nd joint heavily fringed with hair; antennre with the branches long in male, short in female; legs hairy. Fore wing with the outer margin oblique; neuration as in preceding genera. Hind wing with veins 3, 4, 5 from close to angle of cell; 6 and 7 stalked.

21. *Dasychira horsfieldi* Saund, 1848

1848. *Dasychira horsfieldi* Saund, Trans Ent. Soc. Lond., (2) 1 : 162, pl. 12, fig. 1-3.

2003. *Dasychira horsfieldi* Saund : Maulik, Fauna of Sikkim, State Fauna Series, 9(Part-4) : 16. Zool. Surv. India.

Material examined : District Vishakhapatnam, Rushikonda, 7 km. from Vishakapatnam Forest Guest House, 1♂, 1♀, 23. xi.2000, coll by P. H. Roy and Party.

Fore wing Expanse : ♂ 51, ♀ 78 mm.

Distribution : Andhra Pradesh (Kaddapa), Meghalaya, Himachal Pradesh, Sikkim, Tamil Nadu, West Bengal, throughout India.

Elsewhere : Bhutan (Elwes 1886); Java (Hampson, 1891); Myanmar (Hampson, 1891); Sri Lanka (Cotes & Swinhoe, 1887-89).

Remarks : Apparently rare and new record for Andhra Pradesh.

22. *Dasychira bhana* Moore

1865. *Dasychira bhana* Moore, Proc. Zool. Soc. Lond., 1865 : 805.

2003. *Dasychira bhana* Moore, : Maulik, Fauna of Sikkim, State Fauna Series, 9 (Part-4) : 16. Zool. Surv. India.

Material examined : Kaddapa district, Kaddapa, Mydukur, 35 km East from Kaddapa Forest Guest House, 1 ♂, 4. iii. 05, coll by D. R. Maulik and Party; Kaddapa, Vontimetta, 35 km East from Kaddapa Forest Guest House, Stn. 12, 1 ♂, 3. iii. 05, coll by D. R. Maulik and Party; Ontimetta, 52 km North from Kaddapa Forest Guest House, Stn. 11, 1 ♂ 2.iii.05, coll by D. R. Maulik and Party.

Fore wing Expanse : ♂ 45, ♀ 52 mm.

Distribution : Andhra Pradesh (Vishakhapatnam), Meghalaya, Sikkim, Tamil Nadu, West Bengal.

Elsewhere : Bhutan (Elwes 1886).

XIII. Genus *Lymantria* Huebner

1818. *Lymantria* Huebner, *Verz. Brk. Schmett.*, : 160.

Material examined : ♂, Palpi porrect and hairy; antennae with the branches long. Fore wing with veins 3, 4, 5 from close to angle of cell; 6 from below upper angle; 7, 8, 9, 10 stalked, 7 being given off further from the cell than 10. Hind wing with veins 3, 4, 5 from close to angle of cell; 6 and 7 from upper angle. ♀ Antenna serrate; wings either fully developed, or partially aborted, or reduced to scales.

23. *Lymantria incerta* Walker, 1855

1855. *Lymantria incerta* Walker, *Cat. Lep. Het. Brit. Mus.*, 4 : 880.

1934. *Lymantria incerta* Walker : Bryk, *Lep. Cat.*, 20 (62) :

Material examined : District Guntur, Narakudupalli, 12 km from Guntur, Stn. 3. 1 ♂ 2 ♀, 29.i.04, coll by D. R. Maulik and Party.

Fore wing Expanse : ♂ 42, ♀ 55 mm.

Distribution : Andhra Pradesh (Guntur).

Elsewhere : Sri Lanka (Cotes & Swinhoe 1887-89, Hampson, 1891)

Remarks : Apparently rare and new record for Andhra Pradesh.

XIV. Genus *Euproctis* Huebner, 1818

1818. *Euproctis* Huebner, *Verz.* : 150.

24. *Euproctis lunata* Walker, 1855.

1855. *Euproctis lunata* Walker, *Cat. Lep. Het. Brit. Mus.*, 4 : 837.

1998. *Euproctis lunata* Walker : Mondal and Maulik, *Fauna of Meghalaya, State Fauna Series*, 4(Part-6) : 487. *Zool. Surv. India*.

Material examined : Kaddapa district, Kaddapa, Mydukur, 35 km East from Caddapa Forest Guest House, 1 ♂, 4. iii. 05, coll. by D. R. Maulik and Party; Kaddapa, Vontimetta, 35 km East from Kaddapa Forest Guest House, 1 ♂, 3. iii. 05, coll. by D. R. Maulik and Party; Ontimetta, 52 km North from Kaddapa Forest Guest House, 1 ♂, 2. iii. 05, coll. by D. R. Maulik and Party; Addilabad, Mannar Forest area, 3 ♂, 30. ii. 1999, coll. by P. H. Roy and Party; West Godabari district, Eluru local garden, 2 ♂, 28. ii. 2000, coll. by P. H. Roy and Party; Vishakhapatnam district, Jadugallapalam Forest area, 1 ♂, 22. ii. 2000, coll. by P. H. Roy and Party.

Wing expanse : ♂ 85, ♀ 105 mm.

Distribution : Andhra Pradesh (Kaddapa, Vishakhapatnam), Maharashtra; Uttar Pradesh, Mhow, Meghalaya; Punjab, Sikkim; Tamil Nadu; West Bengal.

Elsewhere : Sri Lanka (Hampson, 1891).

25. *Euproctis varians* Walker, 1855

1855. *Artaxa varians* Walker, *Cat. Lep. Het. Brit. Mus.*, 3 : 796.

1998. *Euproctis varians* Walker: Mondal and Maulik, *Fauna of Meghalaya, State Fauna Series*, 4(Part 6) : 487. *Zool. Surv. India*.

Material examined : Andhra Pradesh ; Prakasam district, Khambam, 35 km East of Giddalur Forest Guest House, 1 ♂, 1 ♀, 25. 02.05, coll. by D. R. Maulik and Party; Digovametta, 20 km South of Giddalur Forest Guest House, 1 ♂, 26. ii. 05, coll. by D. R. Maulik and Party; District Guntur, Narakudupalli, 12 km from Guntur, Stn. 3, 1 ♂, 29. i. 04, coll. by D. R. Maulik and Party.

Wing expanse : ♂ 19-23, ♀ 28 mm.

Distribution : Andhra Pradesh (Prakasam, Khambam, Guntur), Andaman and Nicobar Island, Meghalaya, West Bengal, Karnataka, Punjab and Maharashtra.

Elsewhere : ASIA : Bhutan (Dudgeon 1901); Borneo (Cotes & Swinhoe 1887-89, Hampson 1892); China (Cotes & Swinhoe 1887-89, Hampson 1892); Nort China (G.T. Lay; Cotes & Swinhoe 1887-89); Formosa (Hampson 1892); Malaya (Bryk, 1934.); Mergui (Anderson; Cotes & Swinhoe 1887-89); (Burma) Myanmar (Cotes & Swinhoe 1887-89, Hampson 1892); Pakistan (Cotes & Swinhoe 1887-89); Philippines (Bryk, 1934); (Ceylon). Sri Lanka (Cotes & Swinhoe 1887-89, Hampson 1892); South Africa (Cotes & Swinhoe 1887-89) and Tenasserim (Cotes & Swinhoe 1887-89).

26. *Euproctis guttata* Walker, 1855.

1855. *Artaxa guttata* Walker, *Cat. Lep. Het. Brit. Mus.*, 4 : 795.

2004. *Euprotis guttata* (Walker) : Mondal & Maulik, *Fauna of Manipur, State Fauna Series*, 10 : 588. *Zool. Surv. India*.

Material examined : District Guntur, Narakudupalli, 12 km from Guntur, Stn., 3. 1♂, 1♀, 29. i. 04, coll. by D. R. Maulik and Party; Addilabad, Mannar Forest area, 1 ♂, 30. ii. 1999, coll. by P. H. Roy and party; West Godabari district, Eluru local garden, 1 ♂, 28. ii. 2000, coll. by P. H. Roy and party; Vishakhapatnam district, Jadugallapalam Forest area, 1♂, 22. ii. 2000, coll. by P. H. Roy and party; Rushikonda, 7 km. from Vishakhapatnam Forest Guest House, 1 ♂, 1 ♀, 23. xi. 2000, coll. by P. H. Roy and Party coll.).

Wingexpanse : ♂ 28-34, ♀ 39 mm.

Distribution : Andhra Pradesh (Guntur), Addilabad, Vishakhapatnam, Manipur, Meghalaya, Mizoram, West Bengal and Karnataka.

Elsewhere : Bangladesh : Sylhet (Cotes & Swinhoe 1887-89); China (Cotes & Swinhoe 1887-89); Java (Cotes & Swinhoe 1887-89); (Burma) Myanmar (Cotes & Swinhoe 1887-89); Nepal (Cotes & Swinhoe 1887-89) and (Ceylon) Sri Lanka (Cotes & Swinhoe 1887-89).

27. *Euproctis scintillans* Walker, 1855.

1855. *Somena scintillans*, Walker, *Cat. Lep. Het. Brit. Mus.*, 7 : 1734.

2004. *Euproctis scintillans* (Walker) : Gupta & Maulik, *Fauna of Mizoram, State Fauna Series*, 11 : 20. *Zool. Surv. India*.

Material examined : Andhra Pradesh : Prakasam district, Khambam, 35 km East of Giddalur Forest Guest House, 1♂, 1 ♀, 25. ii. 05, coll. by D. R. Maulik and Party; Digovametta, 20 km South of Giddalur Forest Guest House, 1♂, 26. ii. 05. coll. by D. R. Maulik and Party; District Guntur, Narakudupalli, 12 km from Guntur, 1 ♂, 29. i. 04, coll. by D. R. Maulik and Party.

Wing expanse : ♂ 22-30, ♀ 37 mm.

Diagnosis : Head yellow; thorax brown; abdomen blackish, the anal tuft orange. Fore wing vinous brown, irrorated with dark scales, which colour extends as two spurs across the yellow marginal area below the apex and to centre of margin, but sometimes not reaching the margin; costa often yellow. Hind wing yellowish with a broad yellow margin.

Distribution : Andhra Pradesh (Khambam), Mizoram. West Bengal, Himachal Pradesh : Andaman and Nicobar Island and Throughtout India. (Hampson 1892).

Elsewhere : Pakistan : Karachi (Swinhoe 1885); Myanmar (Burma) (Cotes & Swinhoe 1887-89, Hampson 1892); Rangoon, Phayre Museum (Cotes & Swinhoe 1887-89) and Sri Lanka (Ceylon) (Swinhoe 1885).

XV. Genus *Porthesia* Stephens

1829. *Porthesia* Stephens, *Ill. Brit. Ent. Haust.*, 2 : 58.

Palpi long, slender, and obliquely pointed; antennle with the branches long in male. Fore

win with veins 3,4, 5 from angle of cell; 6 from upper angle; 7,8,9,10 stalked, 10 and often 7 also being given off towards apex. Hind wing with veins 3 and 4 from angle of cell; 5 absent; 6 and 7 stalked.

28. *Porthesia xanthorrhoea* Kollar

1848. *Liparis xanthorrhoea*, Kollar, *Kashmir von Huguel*, 4 (2) : 470.

1998. *Euproctis xanthorrhoea* (Kollar) : Mondal and Maulik, *Fauna of Meghalaya, State Fauna Series*, 4(Part- 6) : 479. *Zool. Surv. India*.

Material examined : West Godabari district, Ramanupallam, 1 ♂, 1 ♀, 4. x. 1998, coll. by S. K. Mandal and party; Ramanupallam, 32 km from Kakinada Forest Guest House, 1 ♂, 03. ii. 04, coll. by D. R. Maulik and party; Khammam district, Kalaguda, Sathapalli Black Forest, 15 km from Khammam, 1 ♂, 11. xii. 1999, coll. by P. H. Roy and party; Guntimadugo Black Forest, Khammam Sathpally, 1 ♂, 12. xii. 99; Demmupeta, Naupally Black Forest, 1 ♂, 13. xii. 1999, coll. by P. H. Roy and party; Guntur district, Guntur, Penchelana Forest area, 2 ♂, 2. vii. 1999, coll. by P. H. Roy and party.

Wing expanse : ♂ 28, ♀ 37 mm.

Distribution : Andhra Pradesh (West Godabari, Guntur), Assam, Meghalaya, Sikkim and West Bengal, Tamil Nadu, Kerala, Madhya Pradesh, Himachal Pradesh, Punjab, Jammu and Kashmir, Uttaranchal, Uttar Pradesh and Maharashtra.

Elsewhere : Myanmar (Burma) : I.M, Mergui (Anderson, Cotes & Swinhoe 1887-89); Nepal (Cotes & Swinhoe 1887-89, Bryk 1934) ; Sri Lanka (Ceylon) : I.M., (Ceylon), Colombo Mus. (Cotes & Swinhoe 1887-89, Swinhoe 1893) and Java (Cotes & Swinhoe 1887-89, Bryk 1934).

XVI. Genus *Leucoma* Stephens

1829. *Leucoma* Stephens, *Ill. Brit. Ent. Haust.*, 2 : 64.

Palpi upturned, reaching vertex of head. antennae bipectinated in both sexes, the branches longer in male than female. Hind tibiae with two pairs of spurs. Fore wing with vein 3 from before angle of cell; 4 and 5 from angle; 6 from upper angle; 7, 8, 9 stalked. Hind wing with vein 3 from before angle of cell; 5 from above angle; 6 and 7 stalked or from cell.

29. *Leucoma submarginata* Walker, 1855

1855. *Redoa submarginata* Walker, *Cat. Lep. Hel. Brit. Mus.*, 4 : 836

1998. *Leucoma submarginata* (Walker) : Mondal & Maulik, *Fauna of Meghalaya, State Fauna Series*, 4(Part-6) : 486. *Zool. Surv. India*.

Material examined : Kaddapah district, Sidhaut, 35 km South of Kaddapah Giddalur Forest Guest House, 1 ♂, 1 ♀, 1. iii.05, coll. by D. R. Maulik and Party.

Wing expanse : ♂ 40, 1 ♀ 49 mm.

Diagnosis : Pure white; palpi brownish; two brown spots on frons, and a brown band between the antennae, which have the branches brownish; legs spotted with black. Fore wing irrorated with silvery scales; a black speak at end of cell; costa ochreous towards apex; the wing-membrane slightly corrugated on outer area; cilia of both wings more or less tinged with fuscous.

Distribution : Andhra Pradesh (Kaddapah, Sidhaut), Assam, Andaman and West Bengal

Elsewhere : Australia (Bryk 1934); Bangladesh : Sylhet ; (Cote & Swinhoe 1887-89); Bhutan (Dudgeon 1901); (Burma) Myanmar (Bryk 1934); Java (Cote & Swinhoe 1887-89); Papua; Philippines (Bryk 1934); (Ceylon) Sri Lanka (Swinhoe); West China (Bryk 1934) and Western Malaya (Bryk 1934).

SUMMARY

Twenty nine species /subspecies of butterflies and moths belonging to four families viz., Papilionidae, Nymphalidae (Danainae), Lasiocampidae and Lymantriidae are dealt with from Andhra Pradesh. The family Papilionidae includes 9 species/subspecies in 4 genera whereas family Nymphalidae (Danainae) represents 8 species in 4 genera and Lasiocampidae includes 4 species of 3 genera and Lymantriidae includes 9 species in 5 genera. Out of 29 species/subspecies five spseies are new records from the state and all these species are definitive records from the Andhra Pradesh.

ACKNOWLEDGEMENTS

The authors are grateful to the Director, Zoological Survey of India for providing necessary Laboratory facilities for carrying out present studies on butterflies and moths. They are thankful to Dr J.R.B Alfred, Director, Zoological Survey of India, Dr. A.K. Hazra, Scientist-'E' and Officer-in-Charge of the Entomology Division (A), Dr. A. K. Sidhu, Scientist-B, O/ C, Lepidoptera Section and Mrs. M. Majumder, Zoological Asstt. Lepidoptera Section for encouragement and valuable suggestions; to Shri Rati Ram, Publication Production Officer and, of the same department for various courtsies.

REFERENCES

- Annoymous, 1999. The Wildlife (Protection) Act, 1972 with Wildlife (Protection) Rules, (Published by Law Publishers (India) Pvt. Ltd. Allahabad).
- Asahina, S. 1960. Notes on relationship between Himalayan and Japanese Insect Fauna. *J. Bengal. Nat. Hist. Soc.*, 31 : 69-75.
- Bingham, C.T. 1905. The Fauna of British India including Ceylon and Burma, Butterflies, 1 : viii + 537, pls. (Published by Taylor and Francis, Ltd., London).

- Bingham, C.T. 1907. The Fauna of British India including Ceylon and Burma, Butterflies, 2 : xviii + 537, pls. (Published by Taylor and Francis, Ltd., London).
- Butler, A. G. 1866. Description of new Heterocerous Lepidoptera from Japan. *Trans. Ent. Soc. London*, 29 : 9-12
- Butler, A. G. 1877. *Illustration of typical specimens of Lepidoptera (Heterocera) in British Museum London*, Part-II, 2 : 53-56. ; 1881, 5 : 48-59. ; 7 : 35-38.
- Collenette, C. L. 1934. Notes on genus *Laelia* Stephens (Lepidoptera, Lymantriidae) with description of new species. *Ann. Mag. Nat. Hist. London*, (10) 13 : 216- 217.
- Collenette, C. L. 1951. Some new species of Lymantriidae in the British Museum (Natural History). *Ann. Mag. Nat. Hist. London*, (12) 4 : 216-217.
- De Niceville, L. 1883. Butterflies of India, Burmah and Ceylon, 1 : vii + 327 pp., 17 pls.
- De Niceville, L. 1886. Butterflies of India, Burmah and Ceylon. 2 : iv + 332 pp., 18-24 pls.
- Evans, W. H. 1932. The Identification of Indian Butterflies (2nd edition) : 454 pp., 32 pls., (Published by Bombay Natural History Society, Bombay).
- Gupta, S. L., Farooq, S. I., and Choudhury, H. S. 1980. Taxonomic studies on some of the syntypes of Indian Lymantriidae in British Museum (Natural History) London (Noctuidea : Lepidoptera) 1. *Aroa* spp. *Bull. Ent.*, 21 (1-2) : 55-61.
- Gupta, S. L. *et al.* 1980. Taxonomic studies on some of the syntypes of Indian Lymantriidae in British Museum (Natural History) London (Noctuidea : Lepidoptera) 2. *Dasychira* spp. *Bull. Ent.*, 22(1-2) 1981 : 15-24. 3. *Euproctis* spp. *Bull. Ent.*, 22(1-2) 1981 : 46-60.
- Hampson, G. F. 1892. *The Fauna of British India including Ceylon and Burma. Moths*, 1 : 432-494.
- Hampson, G. F. 1896. The Fauna of British India including Ceylon and Burma. *Moths*, 4 : 489.
- Hampson, G. F. 1897. "Moths of India" Supplementaary paper to the volumes in "Fauna of Britsih India "Part II. *J. Bombay nat. Hist. Soc.*, 11 : 294-296.; 1900. Paart II. 13 : 213-235.; 1905. Part II. 16 : 193-216 ; 1910. Series IV. Part-I. 20 : 112-114. 1930. 34 : 778-787.
- Haribal, M. 1992. The Butterflies of Sikkim Himalaya : 1-217, 60 pls. (Published by Sikkim Nature Conservation Foundation).
- Huebner, J. 1804. *Eur. Schmett.*, : 120.
- Huebner, J. 1818. *Verzeichnia bekannter Schmetterling* Huebner Ver., : 159-164.
- Maulik, D. R. 2003. Insecta : Lepidoptera : Papilionidae, Danaine (Nymphalidae),

Lasiocampidae, Lymantriidae and Ratardidae. *Fauna of Sikkim, State Fauna Series*, 9(Part-4) : 1-25. *Zool. Surv. India*.

Mondal, D. K. & Maulik, D.R. 1991. Insecta : Lepidoptera : Noctuidae. *Fauna of Orissa, State Fauna Series*, 1(3) : 209-226. *Zool. Surv. India*,

Mondal, D. K. & Maulik, D.R. 1991. Insecta : Lepidoptera : Heterocera : Sphingidae and Geometridae. *Fauna of Orissa, State Fauna Series*, 1(3) : 227-233. *Bull. zool. Surv. India*.

Mondal, D. K. & Maulik, D.R. 1991. Insecta : Lepidoptera : Rhopalocera : Nymphalidae; Danaidae. *Fauna of Orissa, State Fauna Series*, 1(3) : 2235-238. *Zool. Surv. India*.

Mondal, D. K. & Maulik, D. R.. 1997. Insecta : Lepidoptera : Heterocera : Sphingidae, Lasiocampidae, Lymantriidae and Ratardidae. *Fauna of West Bengal, State Fauna Series*, 3(Part-7) : 613-687. *Zool. Surv. India*.

Mondal, D. K. & Maulik, D. R. 1997. Insecta : Lepidoptera : Rhopalocera : Papilionidae and Nymphalidae (Danainae). *Fauna of West Bengal, State Fauna Series*, 3(Part-7) : 755 - 793. *Zool. Surv. India*.

Mondal, D. K. Bhattachaya D. P., Maulik, D. R., and Majumder, M. 1997. Lepidoptera : Papilionidae and Hesperidae. *Fauna of Delhi, State Fauna Series*, 6 : 393-407. *Zool. Surv. India*.

Mondal, D. K. and Maulik, D. R. 1998. Insecta : Lepidoptera : Rhopalocera : *Fauna of Meghalaya, State Fauna Series*, 4(Part-6) : 223-242. *Zool. Surv. India*.

Mondal, D. K. and Maulik, D.R. 1998. Insecta : Lepidoptera : Heterocera : Lasiocampidae, Lymantriidae and Ratardidae. *Fauna of Meghalaya, State Fauna Series*, 4(Part-6) : 467-488. *Zool. Surv. India*.

Mondal, D. K. and Maulik, D. R. 1999. Insecta : Lepidoptera : Papilionidae : Danainae (Nymphalidae), Lasiocampidae, Lymantriidae and Ratardidae. *Fauna of Manipur, State Fauna Series*, 10 : 581-590. *Zool. Surv. India*..

Moore. F. 1857. A Catalogue of the Lepidopterous insects in the Museum of Natural History of Hon. *E.I.Co. London*, 2 : 336-367.

Moore. F. 1865. "On the Lepidopterous insects of Bengal" *Proc. Zool. Soc. London*, : 803-806.

Moore. F. 1879. "Description of new India Lepidopterous from the collection of Mr. W.S. Atkinson, Heterocera" Calcutta. *Lep. Atk.*, : xi + 299.

Swinhoe, C. C. 1889. "On the New Indian Lepidoptera" *Proc. Zool. Ssoc. London* : 405-406.

Swinhoe, C. C. 1893. A list of Lepidoptera of the Khasi Hills. Part III. *Trans. Ent Soc. London*, : 267-330.

- Swinhoe, C. C. 1895. A list of Lepidoptera of the Khasi Hills. Part III. *Trans. Ent Soc. London*, (3) : 1-75.
- Swinhoe, C. C. 1907. New species of Eastern and African Heterocera. *Ann. Mag. Nat Hist. London*, (6) 19 : 203
- Talbot, G. 1939. Fauna of British India including Ceylon and Burma, Butterflies, 1 : xviii + 537, pls. (Published by Taylor and Francis, Ltd., London).
- Talbot, G. 1947. Fauna of British India including Ceylon and Burma, Butterflies, 2 : xv + 506 pp., 2 pls., 1 map. (Published by Taylor and Francis, Ltd., London).
- Tytler, H.C. 1911. Notes on butterflies from Naga Hills, Part II. *J. Bombay nat. Hist. Soc.*, 21 (2) : 48-65, pl. A.
- Tytler, H.C. 1912. Notes on butterflies from the Naga Hills, Part II. *J. Bombay nat. Hist. Soc.*, 21 : 588-606, pl. B.
- Tytler, H.C. 1915. Notes on some new and interesting butterflies from the Naga Hills, Part II. *J. Bombay nat. Hist. Soc.*, 23 : 502-515.
- Varshney, R.K. 1994. Index Rhopalocera India. Part II. Genera of Butterflies from India and neighbouring countries. (Lepidoptera: (B) Papilionidae, Pieridae and Danaidae. *Oriental Insects*, 27 : 347-372.
- Walker, F. 1855. List of the specimens of Lepidopterous insects in the collection of the British Museum. *Cat. Lep. Het. Brit. Mus.*, 3 : 663; 4 : 786-883; 1856, 5 : 1172-1176; 7 : 1731-1737; 1862, 25 : 1483; 26 : 11689; 1864, 31 : 321; 1865, 32 : 325-397.
- Walker, F. 1855. Characters of undescribed Heterocerous Lepidoptera. *Journ. Linn Soc. London*, 9 : 181-199.
- Walker F. 1855. List of the specimens of Lepidopterous insects in the collection of the British Museum *Cat. Lep. Het. Brit. Mus.*, 3 : 663; 4 : 786-883; 1856, 5 : 1172-1176; 7 : 1731-1737; 1862, 25 : 1483; 26 : 11689; 1864, 31; 321; 1865, 32 : 325-397.
- Walker, F. 1855. Characters of undescribed Heterocerous Lepidoptera. *Journ. Linn Soc. London*, 9 : 181-199.
- Wynter-Blyth, M.A. 1957. Butterflies of the Indian Region : 1-523 (Published by Bombay Natural History Society, Bombay).

