



Newsletter of the Invertebrate Conservation & Information Network of South Asia

United Nations Decade on Biodiversity 2011-2020

The United Nations General Assembly proclaimed the period from 2011 to 2020 as the United Nations Decade on Biodiversity in its Resolution 65/161:

Decides, following the invitation of the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity, to declare 2011-2020 the United Nations Decade on Biodiversity, with a view to contributing to the implementation of the Strategic Plan for Biodiversity for the period 2011-2020, requests the Secretary-General, in this regard, in consultation with Member States, to lead the coordination of the activities of the Decade on behalf of the United Nations system, with the support of the secretariat of the Convention on Biological Diversity and the secretariats of other biodiversity-related conventions and relevant United Nations funds, programmes and agencies, and invites Member States in a position to

do so to contribute, on a voluntary basis, to the funding of the activities of the Decade;

The Decade coincides with and supports the implementation of the Strategic Plan for Biodiversity 2011-2020 adopted by the Conference of the Parties at its tenth meeting held in Nagoya, Japan. A strategy to celebrate the Decade will be made available to all Parties soon.

The Secretariat encourages all Parties that have established a national committee for the International Year of Biodiversity to extend its mandate for the celebration of the United Nations Decade on Biodiversity.

<http://www.cbd.int/doc/notifications/2011/ntf-2011-004-un-db-en.pdf>

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Foraging behaviour of butterflies

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Over the entire period of their active life, butterflies engage in a spectrum of plant feeding relationships which are often very complex involving co-evolution and obligate mutualism. Such interactions can be a major factor in generating patterns of diversity in both partners (Enrich and Raven 1965, Gilbert 1975a,b). Butterflies are often dependent on specific host plants and have a complex life cycle. They are vulnerable to the activities of man, which disturbed their habitat. Pollard (1996) added that butterflies offer good opportunities for studies on population and community ecology. Many species are strictly seasonal preferring only a particular set of habitats (Krishnameah Kunte 2000). Being good indicators of climatic conditions as well as seasonal and ecological changes, they can serve in the formulating strategies for conservation. It is hence encouraging that butterflies are now being included in biodiversity studies and biodiversity conservation prioritization programmes (Gadgil 1996). The ability of most adult Lepidoptera to obtain and utilize the carbohydrate in nectar, which can be converted to and stored as fats, becomes a major asset with the rise and spread of flowering plants. This study is intended to summarize the present state of knowledge in butterfly plant interaction and feeding habits and also the food sources of adult butterflies.

Study Area

The present study was carried out in two different areas of Kochi, located between 9°58'N - 76°14'E about 10km away from Ernakulam town (Fig 1). The selection is based on the type of vegetation (quarry land with shrubs and herbs boarded by tall trees) and difference in the ecological conditions.

Materials and Methods

Unidentified butterflies were collected and identified by comparing with the collections of Maharaja's College and personal communications with entomologists. Associated plant species were identified with the help of Botanist. Basic books in Taxonomy of plants by Singh and Jain (1987) were referred for further details of plants. During the observation the flight of butterfly in which flowers it took rest, number of visits, behaviours like resting posture, feeding, resting time, terrestrial behaviour were noted and tabulated. Observations were made during daytime, morning (7–9 am) and afternoon (12–3 pm) for a period of two months.

Results and Discussion

Studies were carried out in two different localities of Kochi and about 21 species of butterflies belonging to 8 different families were observed for their foraging behaviour and food habitat (Table 1). Almost all the butterflies found on these sites were, visiting flowers for nectar except some. Basking in sun is of great significance among butterflies. In order to fly, cold blooded animals like butterflies must warm their flight muscles to sufficient temperature. For this butterflies bask in the sun with open wings to keep the thoracic muscle warm for the next flight. They seldom select shaded areas and prefer larger nectar source bushes which serve as a resting and roosting area (Michael 2004).

Butterflies act as good pollinating agents. Butterflies visit flowers for pollen and nectar. The study of butterflies is important in relation to the biodiversity studies and as pollinating agents. Adult butterflies feed mainly on fluids, especially flower nectar using a long thin, attractive proboscis. With this association butterflies obtain their food from plants. Availability of pollen, nectar, perfumes, protective as well as visual sites, and of sexual attraction are among the principle attractants responsible for establishing blossom pollinator relationship. The role of floral odours in pollination is well known and pollinators are known to be attracted to specific chemical compounds produced by floral structure of flowers. Flower visitation and consequent nectar use by the butterflies are regulated by both behavioural and physical determinants. Butterfly proboscis is clearly adapted for reaching nectar at the base of long-tubed flowers and different species vary greatly in their proboscis length. Flower colour, especially in the ultra violet range, is a clue for many species. Flower position on the plant is also important as many butterflies will visit flowers facing upwards. Only a few will visit flowers that are directed towards the ground (Krishnamegh Kunte 2000). The present study revealed that butterflies belonging to *Nymphalidae*, *Pieridae*, *Papilionidae* families prefer flowers of Compositae family mainly *Tridax procumbens*, *Mickenia cordata*, *Lantana camara* and *Ageratum conyzoids*. In nature the disc florets of compositae are protandrous and hence when the stigmas emerge through the staminal column they carry pollen grains along their lower surface. The nectar encircles the base of the style which possesses minute stomata with varying patterns of distribution in different species, with the guard cells containing plenty of starch grains. The secretion of

nectar coincides with the pollen maturation, maximal secretion, occurring when the stigmas are receptive, providing an opportunity for fertilization by the foraging insects with mature pollen on their body. According to Shuel (1961) these relationships seem to have a coordinating mechanism between the events culminating in pollen maturation and those leading to nectar secretion. It is striking that the larger the floral the greater is the number of stomata on the nectary, resulting in the regulation or attraction of more insect visitors, diversified qualitatively and quantitatively to achieve the target function of pollination. The relative degree of constancy might depend on the relative abundance of the nectar resource (Grant 1949). If the resource is bountiful, the butterflies tend to remain constant. This can be clearly found in the case of flowers like *Sida rhombifolia* and *Tridax procumbans*. The number of flowers visited at unit time and the time spent at the flowers is an indication of the mobility of the insects which in turn speaks of the effective time to utilize the floral resource. Each species of butterfly differ from the other in the duration of time spent and the time spent by the same species on different plants also differ. Cruden (1976) related the length of foraging visits to the amount of accumulated nectar. When little nectar is available the visits are short but many flowers are visited. When relatively large amount of nectar accumulate, the butterfly requires more time to extract the nectar and fewer flowers are visited. It was observed that the time spent by butterflies on the flower of *Sida procumbans* were less (only 1-2 sec). Butterflies' visit on *Sida* flowers of Malvaceae are short but they used to visit many flowers. This indicates that nectar content is less. But in the case of butterflies visit to compositae flowers time spent is more and number of flower visit is less, which indicates greater amount of nectar. It is similar to Cruden's observation. Butterflies actually prefer nectar with high aminoacid content (Javanne, 2005). They frequently visit the flowers of Compositae family due to this reason which has to be studied in detail.

An examination of foraging behaviour of butterflies recorded in this study indicates that selection of flowers by butterflies as food sources is not as random as it appears as sited in the observations. For example, the butterflies do not feed indiscriminately from any flowers that they might find. In laboratory experiments Common mormon (*Papilio polytes*) preferred sugar solutions to glucose solution. There are preferences for nectar with specific chemical composition which has to be studied in detail. Other factors which affects flower selection by butterflies are nectar store in flower, flower colours, flower position and flower type.

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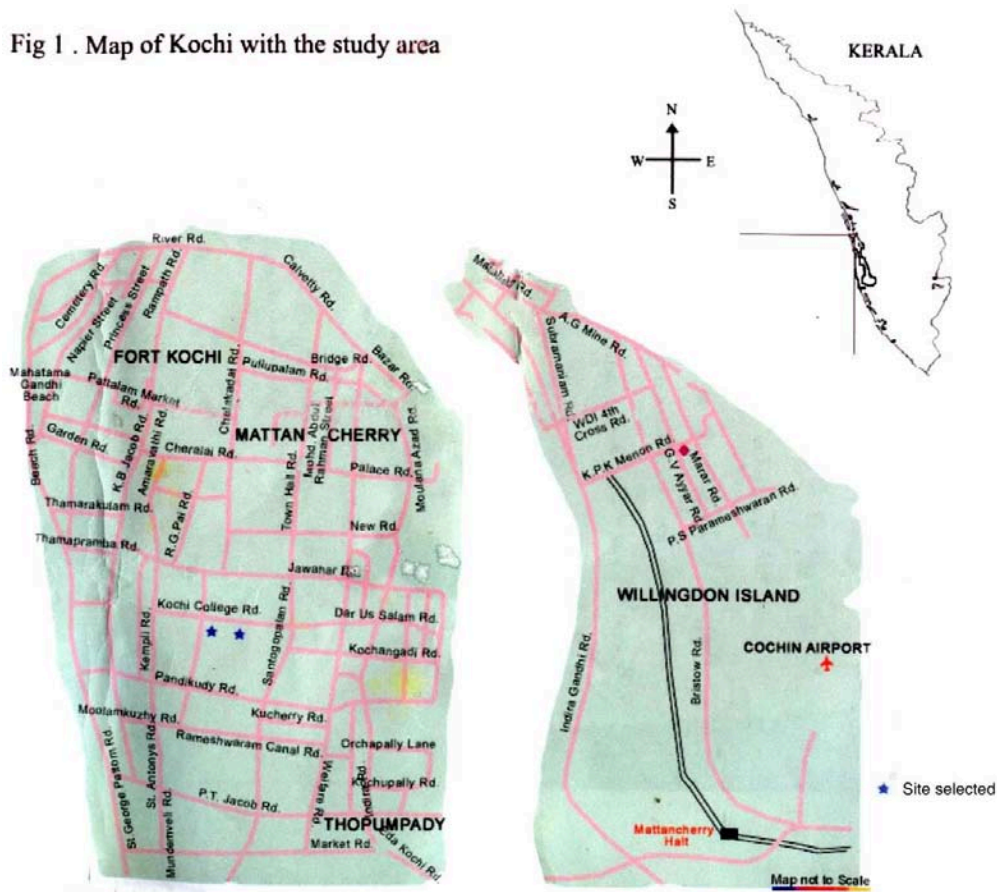
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Table 1. A systematic list of butterflies with their foraging behaviour

Species	Food plant	Average Time spent	Flower type	Flower position	Flower colour	Observation & Behaviour
Nymphalidae	<i>Mickenla cordata</i>	3-5 Sec	Inflorescence	Axillary	Pale white	Nectar feeding along with pollen (Krishamegh Kunte, 2000). No specific methodology was used. The time spent by the butterflies on flowers of composite family is more. Very active but weak on the wing, flies
<i>Ergois merione</i>	<i>Riccnus communis</i>	4-6 Sec	Inflorescence	Axillary	Pale white	Gracefully as of sailing through the air among dense vegetation, rest on top canopy, prefer shady places, wings are moved slowly sideways while rest.
	<i>Sida rhobifolia</i>	1-2 Sec	Solitary	Axillary	Pale yellow	
	<i>Tridax procumbans</i>	5-6 Sec	Racemose	Terminal	Bright yellow	
<i>Neptis hylas</i>	-	10 - 15 m in the same place	-	-	-	Basking in sun, also attracted to human sweat, Rarely visit flowers, flies by flipping their wings repeatedly and then gliding respectively.
<i>Precis atlites</i>	<i>Ageratum conizoids</i> <i>Lantana camara</i>	3-4 Sec 30-33 Sec	Racemose Inflorescence	Axillary Axillary	Lilac Pink	Nectar feeding along with pollen.
<i>Pantoporia perius</i>	-	12 - 15 m in the same place	-	-	-	Basking in the sun, flies close to the ground without even settling except rarely on damp patches.
<i>Precis almana</i>	<i>Tridax procumbans</i>	9-10 Sec	Racemose Inflorescence	Terminal	Bright yellow	Nectar feeding along with pollen, while feeding butterflies rotate around the flower for changing the position of the proboscis.
<i>Precis iphita iphita</i>	-	10 - 15	-	-	-	Usually seen in damp patches and shady places & were found sucking juice from rotting jack fruit.
Danaidae						
<i>Danais chrysippus</i>	<i>Sida</i> spp	4-6 Sec	Solitary	Axillary	Pale yellow	Nectar feeding, usually fly in an undulating fashion and remains on wing for few seconds
	<i>Aerva lanata</i>	9-10 Sec	Inflorescence	Axillary	Pale white	
Acraeidae						
<i>Telchinia violae</i>	<i>Sida</i> spp	3-5 Sec	Solitary	Axillary	Red	Nectar feeding, flies slowly, close to ground, fluttering their wings unsteadily, often found basking in early morning sun.
Pieridae						
<i>Catopsilia crocale</i>	<i>Mickenla</i> spp	9-10 Sec	Inflorescence	Axillary	Pale white	Nectar feeding along with pollen, flies very fast, covering long distance, high above the ground in straight, powerful long up and down curved flight.
<i>Catopsilia pyranthe</i>	<i>Ageratum conizoids</i>	5-10 Sec	Inflorescence	Axillary	Lilac	Nectar feeding
	<i>Sida</i> spp	4-6 Sec			Pale yellow	
<i>Leptosia nina nina</i>	<i>Tridax</i> spp <i>Sida</i> spp	4-5 Sec 10-11 Sec	Racemose Inflorescence Solitary	Terminal Axillary	Pale white Pale yellow	Nectar feeding along with pollen, slow and irregular flight, flies very close to the ground with rhythmic slow closing and opening of the wings, rest on lower side of the leaf with their wings closed.
<i>Terias hecabe</i>	<i>Sida</i> spp	5-7 Sec	Solitary	Axillary	Pale yellow	Nectar feeding, mud puddlers.
	<i>Leucas</i>	3-4 Sec	Inflorescence	Axillary	White	
Papilionidae						
<i>Zetides agamemnon</i>	<i>Lantana</i> spp	4- 5 sec	Inflorescence	Axillary	Pink	Nectar feeding.
<i>Papilio polytes polytes</i>	<i>Pentas</i>	5-6 sec	Dischasiat chyme	Axillary	Dark lilac	Nectar feeding
<i>Tros aristolochiae</i>	<i>Lantana</i> spp	4-5 sec	Inflorescence	Axillary	Pink	Nectar feeding

Lycaenidae						
<i>Azanus ubaldus</i>	<i>Sida</i> spp	4-8 sec	Solitary	Axillary	Pale yellow	Nectar feeding, flies fast.
<i>Everes parrhasius</i>	<i>Tridax</i> spp	2-3 sec	Racemose	Axillary	Pale white	Nectar feeding along with pollen, rotates around the flower.
<i>Zinzeeria maha ossa</i>	<i>Sida</i> <i>Leucas</i> spp	5-6 sec 6-8 sec	Solitary Inflorescence	Axillary Axillary	White Pale yellow	Nectar feeding
Hesperidae						
<i>Baoris mathios</i>	<i>Clerodeneron-fragrans</i>	5-10 m	Solitary	Axillary	White	Nectar feeding
Satyridae						
<i>Melanitis leda ismene</i>	<i>Lantana</i> spp	5- 7 sec	Inflorescence	Axillary	Orange	Nectar feeding active at dawn and just before dusk, weak and jerky flight.
<i>Ypthima huebueri</i>	-	-	-	-	-	Found among fallen leaves and fruits of large trees.

Fig 1 . Map of Kochi with the study area



Butterflies of Kizhpathupet sacred grove, South East coast, Tamil Nadu

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Kizhpathupet is one of the famous sacred grove and it is situated in the south east coast of Marakkanam taluk of Tamil Nadu covering hedge between two States, Pondicherry and Tamil Nadu. It is geographically located between 12° 03' N - 79° 52' E and covers area of 12 ha/29.65 acres. Temperature ranges from 27° to 31° C; average annual rainfall is 1250 mm. *Acacia leucophloea*, *Butea monosperma*, *Diospyros ferrea*, *Memecylon umbellatum*, *Acacia nilotica*, *Toddalia asiatica*, *Ficus amplissima*, *Lepisanthes tetraphylla*, *Pterospermum spinosum* and *Syzygium cumini* are the major flora of this area.

A survey of the butterflies of the sacred grove was conducted during the month of April, 2004. Butterflies were identified and verified following Wynter-Blyth (1957) and nomenclature according to Varshney (1983). A total of 18 species belonged to 16 genera and four families were recorded. Butterfly population was commonly encountered in the ecotone of the agricultural ecosystem and sacred grove and other trimming areas. Very small population of different butterflies as well as individual species could be seen in the open areas which are suitable habitats for small mammals.

Butterflies species recorded in Kizhpathupet Sacred Grove

Papilionidae

Common Mormon *Papilio polytes* (Linnaeus)

Pieridae

Common Emigrant *Catopsilia pomona* (Fabricius)

Common Gull *Cepora nerissa* (Fabricius)

Common Jezebel *Delias eucharis* (Drury)

Pioneer *Belevois mesentina* (Leicester)

Psyche *Leptosia nina* (Fabricius)

Yellow orange tip *Ixias pyrine* (Linnaeus)

Lycaenidae

Gram blue *Euchrysops cnejus* (Fabricius)

Nymphalidae

Blue Pansy *Precis orithya* (Cramer)

Blue Tiger *Danais limniace* (Cramer)

Chocolate Pansy *Precis iphita iphita* Cramer

Common Bush brown *Mycalesis perseus blasius* (Fabricius)

Common Castor *Ariadne merione* (Cramer)

Common Indian Crow *Euploea core* (Cramer)

Dark Blue Tiger *Tirumala septentrionis* (Butler)

Dark Brand bush Brown *Mycalesis mineus* (Linnaeus)

Nigger Pansy *Orsotrioena medus* (Fabricius)

Tawny Castor *Telchinia violae* (Fabricius)

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Lepidopteran fauna of Punjabi University campus, Patiala, Punjab, India

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An attempt has been made to study the Lepidopterous fauna (Butterflies and moths) of Punjabi university campus. Altogether 63 species of butterflies belonging to seven families viz., Danaidae, Papilionidae, Nymphalidae, Lycaenidae, Acraeidae, Satyridae, Hesperridae and 86 species of moths belonging to 15 families viz., Pterophoridae, Tortricidae, Caprosinidae, Brachodidae, Gelechiidae, Lecithoceridae, Oecophoridae, Perrissomasticinae, Plutellidae, Drepanidae, Euterotidae, Sphingidae, Lymantridae, Arctiidae, and Noctuidae have been recorded in the present study. The Punjabi university campus located in the erstwhile princely city of Patiala, in the south east of Punjab, was established in 1962. This campus is sprawling across 316 acres far away from the city markets and roads includes a beautiful botanical garden, a nursery, a conservatory, a cactus house and a green house. The collection of moths and butterflies have been done during different seasons for the last twelve years. Identification of all the species has been authenticated with the comparison of already identified collections lying in different National museums like Zoological Survey of India (ZSI), Kolkata, Indian Agricultural Research Institute (IARI), New Delhi and Forest Research Institute (FRI), Dehradun. The classification given by Hampson (1894) has been followed in the present study.

Check list of species collected

Order: Lepidoptera

Sub order: Rhopalocera: Butterflies

Danaidae

1. *Danaus chrysippus* (Linnaeus)
2. *D. plexippus* (Linnaeus)
3. *Tirumala limine* (Cramer)
4. *Euploea core* (Cramer)

Papilionidae

5. *Papillio polytes romulus* Cramer
6. *Papillio demoleus demolius* Linnaeus
7. *Leptosia nina nina* (Fabricius)
8. *Delias eucharis* (Drury)
9. *Delias belladonna belladonna* (Fabricius)
10. *Pontia daplidice* Moorie (Rober)
11. *Anaphaeis aurota aurota* (Fabricius)
12. *Ixias Marianne* (Cramer)
13. *Ixias pyrene evippe* (Drury)
14. *Pieris brassicae nepalensis* Gray
15. *Pieris candida indica* Evan

16. *Colias erate erate* (Esper)
17. *Colias fieldi* Menetries
18. *Eurema hecabe* (Linnaeus)
19. *Eurema brigitta brigitta* (Stoll)
20. *Catopsilia pomona pomona* (Fabricius)
21. *C. crocale* (Cramer)
22. *C. florella florella* (Fabricius)
23. *C. pyranthe* (Linnaeus)
24. *Cepora nerissa* (Fabricius)

Nymphalidae

25. *Vanessa cardui* (Linnaeus)
26. *V. indica* (Herbst)
27. *Hypolimnus bolina* (Linnaeus)
28. *H. missipus* (Linnaeus)
29. *Phalanta phalantha phalantha* Drury
30. *Junonia almanac* (Linnaeus)
31. *J. almana* (Linnaeus)
32. *J. lemonias* (Linnaeus)
33. *J. hierta* (Fabricius)
34. *J. attites* (Johanssen)
35. *J. iphita* (Cramer)
36. *Ariadne merione* (Cramer)
37. *Kallima inachus* (Boisduval)
38. *Neptis hylas varmona* Moore
39. *Polyhra athamus* (Drury)
40. *Euthalia acconthea garuda* (Moore)
41. *Argyreus hyperbius* (Johanssen)

Lycaenidae

42. *Lampidus boeticus* (Linnaeus)
43. *Freyera putli* (Kollar)
44. *Castalius rosimon* (Fabricius)
45. *Spindasis vulcanus* (Fabricius)
46. *Spindasis ictis* (Hewitson)
47. *Pseudozizeeria maha* (Kollar)
48. *Catochrysops strabo* (Fabricius)
49. *Zizina otis* (Fabricius)
50. *Zizeeria karsandra* (Moore)
51. *Tarucus balbanicus* (Frayer)
52. *T. alteratus* Moore
53. *Leptotes plinius* (Fabricius)

Acraeidae

54. *Acraea violae* (Fabricius)

Satyridae

55. *Mycalesis mineus mineus* Linnaeus

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56. *Malinitis leda ismene* (Cramer)
 57. *Ypthima inica* Hewitson
 58. *Y. huebneri* Kirby
 59. *Y. singala* Felder

Hesperridae

60. *Pelopidus mathias* (Fabricius)
61. *Hasora chromus* (Cramer)
62. *Telicota colon* (Fabricius)

Sub-Order Heterocera: Moths and Skippers

Pterophoridae

1. *Deuterocopus planeta* Meyrick
2. *Sphenarches anisodactylus* (Walker)
3. *Exelastis phlyctaenias* (Meyrick)
4. *Exelastis pumilio* (Zeller)
5. *Megalorrhypida defactalis* (Walker)
6. *Stenodecma wahlbergi* (Zeller)

Tortricidae

7. *Archips machlopi* (Meyrick)
8. *Metsumuraeses melanaula* (Meyrick)
9. *Karacaoglania xerophila* (Meyrick)
10. *Strepsicrates rhotia* (Meyrick)
11. *Loboschiza koenigiana* (Fabricius)
12. *Crociosema plebijana* Zeller
13. *Helictophanes dejocoma* (Meyrick)
14. *Acanthoclita iridorphna* (Meyrick)
15. *Ancylis lutescens* Meyrick
16. *Gatesclakeana erotias* (Meyrick)
17. *Bactra truculenta* Meyrick
18. *Bubonoxena ephippias* (Meyrick)
19. *Dudua aprobola* (Meyrick)
20. *Temnolopha mosaica* Lower
21. *Ophiorrhabda cellifera* (Meyrick)
22. *Lobesia aeolopa* Meyrick
23. *Parasa hilaris* Westwood
24. *Corsocasis coronias* Meyrick

Caprosinidae

25. *Brenthia luminifera* Meyrick

Brachodidae

26. *Phycodes radiate* (Ochsenheimer)
27. *Phycodes minor* Moore

Gelechiidae

28. *S. comissata* Meyrick
29. *Anarsia didymopa* Meyrick
30. *Anarsia triglypta* Meyrick
31. *Helcystogramma hibisci* (Stainton)

Lacithoceridae

32. *Lacithocera immobilis* Meyrick

Oecophoridae

33. *Apethistis metoeca* Meyrick
34. *Psorosticha zizyphi* (Stainton)
35. *Stathmopoda balanarcha* Meyrick
36. *Cosmopterix hieraspis* Meyrick
37. *Pyroderces ptilodelta* Meyrick
38. *Limnaecia scalosema* Meyrick
39. *Eretmocera impectella* (Walker)

Perissomasticinae

40. *Edosa opsigona* (Meyrick)

Plutellidae

41. *Plutella xylostella* Linnaeus
42. *Hyperythra susceptaria* (Walker)
43. *Petelia distracta* (Walker)
44. *Chiasma frugaliata* (Guenee)
45. *Palagodes veraria* (Guenee)
46. *Tramindra mundissima* (Walker)

Drepanidae

47. *Euthrix pyriformis* (Moore)
48. *Gastropacha paradalis* (Walker)

Eupterotidae

49. *Eupterote undata* Blanchard
50. *Eupterote assimilis* Moore
51. *Eupterote minor* Moore
52. *Eupterote diffusae* Walker

Sphingidae

53. *Agrius convolvuli* (Linnaeus)
54. *Psilogamma menophron menophron* (Cramer)
55. *Nephele didyma didyma* (Rothschild)
56. *Theretra clotho* (Drury)
57. *Theretra alecta* (Linnaeus)
58. *Theretra oldenlandiae* (Fabricius)
59. *Hyles euphorbiae nervosa* (Rothschild & Jorden)
60. *Hippotion celerio* (Linnaeus)
61. *H. rafflesi* (Butler)

Lymantridae

62. *Laelia testacea* Walker
63. *Somena scintillans* Walker
64. *Sphrageidus xanthorrhoea* (Kollar)
65. *Euproctis lunata* Walker

Arctiidae

66. *Amata minor* (Warren)
67. *Argina astrae* (Drury)
68. *Asota fins* (Fabricius)
69. *Cretonotos transiens* Walker
70. *Cretonotos interruptus* (Linnaeus)
71. *Eressa confines* (Walker)
72. *Syntomoides imaon* Cramer

73. *Syntomoides hydantia* Butler
 74. *Miltochrista linga* (Moore)
 75. *Spilarctia oblique* Walker
 76. *Utethesia pulchella* Walker
 77. *Utethesia lotrix* Moore
 78. *Utethesia shiba* Bhattacharjee and Gupta

Noctuidae

79. *Asota alciphron* (Cramer)
 80. *Digama hearseyana* Moore
 81. *Mocis undata* (Fabricius)
 82. *Hypcola defloreta* (Fabricius)
 83. *Indocala punjabensis* Rose and Srivastava

84. *Aedia leucomelas* (Linnaeus)
 85. *Anomis fulvida* Guenee
 86. *Agrotis ypsilon* (Rottenburg)

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On a Collection of Aquatic beetles from Bhibhutibhusan Wildlife Sanctuary, West Bengal

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Among the major faunal elements of an ecosystem the aquatic Coleoptera constitutes one of the most important groups of indicator organisms. Knowledge on the aquatic beetle fauna of the conservation areas is very scanty. So an attempt has been made to study the aquatic beetle fauna of Bibhutibhusan Wildlife Sanctuary. Bibhutibhusan Wildlife Sanctuary (BBWLS) is located at Parmadan in North 24 Parganas District of West Bengal. Spread out over 640 hectares of forestland, the park lies on the bank of Ichhamati River. This present communication reports three species of Family Dytiscidae and one species of Family Hydrophilidae for the first time from this sanctuary.

Key to the Families

1. Base of hind leg not extending posteriorly to divide the first abdominal segment; metasternal spine present or absent..... [Hydrophilidae](#)
 - Base of hind leg extending posteriorly to divide the first abdominal segment; metasternal spine always absent..... [Dytiscidae](#)

Family Dytiscidae

Canthydrus laetabilis (Walker)

1858. *Hydroporus laetabilis* Walker, *Ann. Mag. nat. Hist.*, (3)2: 205, Type-locality: Ceylon.

1977. *Canthydrus laetabilis*; Vazirani, *Cat. Orient. Dytiscidae*: 6.

Material examined: 8 exs, Bibhutibhusan Wild Life Sanctuary, Parmadan, North24 Parganas district, 11.01.2008, coll. B. Mitra.

Distribution: India: Andhra Pradesh, Assam, Bihar, Delhi, Gujarat, Kerala, Maharashtra, Orissa, Punjab, Rajasthan, Uttar Pradesh;
 Elsewhere: Myanmar, Nepal, Pakistan, Sri Lanka, Congo

Laccophilus anticatus anticatus Sharp

1890, *Laccophilus anticatus* Sharp, *Trans. Ent. Soc. London*: 341. **Type-locality:** Ceylon, Colombo.
 1983, *Laccophilus anticatus anticatus*: Brancucci, *Ent. Arb. Mus. Frey* 31/32: 302-304.

Material examined: 9 exs, Bibhutibhusan Wild Life Sanctuary, Parmadan, North24 Parganas district, 11.01.2008, coll. B. Mitra.

Distribution: India: Assam, Bihar, Maharashtra, Manipur, Orissa, Uttar Pradesh, West Bengal.

Elsewhere: Bangladesh, Indonesia (Sumatra), Sri Lanka,

Laccophilus flexuosus Aube

1890. *Laccophilus flexuosus* Aube, in *Dejeans Species Coleopteres*, 6: 430, Type-locality: Sumatra.

Material examined: 1 ex, Bibhutibhusan Wild Life Sanctuary, Parmadan, North24 Parganas district, 12.01.2008, coll. B. Mitra.

Distribution: INDIA: Andhara Pradesh, Bihar, Gujarat, Himachal Pradesh, Karnataka, Maharashtra, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh. ELSEWHERE: Asia from Iraq to Japan, Iran, Hongkong, Indonesia (Sumatra), Myanmar, Sri Lanka.

Family **Hydrophilidae**

Amphiops pedestris Sharp

1890, *Amphiops pedestris* Sharp, *Trans. Ent. Soc. Lond.*;

354. **Type-locality:** Not Known

Material examined: 1 ex, Bibhutibhusan Wild Life Sanctuary, Parmadan, North 24 Parganas district, 11.01.2008, coll. B. Mitra.

Distribution : India: Pondicherry, Tamil Nadu, West Bengal
Elsewhere: Sri Lanka, Sumatra; Saigon.

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Distribution and diversity of spiders in agroecosystems of Tirunelveli and Thoothukudi districts of Tamil Nadu, India

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There are more than 3694 genera and 40,462 spider species have been recognized all over the world (Platnick, 2008). Recent reports show that the number of spider species reported so far from south Asia is 2299 belonging to 552 genera of 67 families (Manju Siliwal and Sanjay Molur, 2007). Spiders play an important role in regulating insect pests in agricultural ecosystems. In India, studies on the population and abundance of the spider assemblages in agricultural crops are limited. Pathak and Saha (1999), Bhattacharya (2000), Sebastian et al., (2005) Bhatnagar et al., (1983) carried out some basic studies about the distribution of spiders in agroecosystems.

Groundnut, *Arachis hypogaea* (Lin.) was introduced in India about 350 years ago and now it has become one of the important cash crops of India (Khatana et al., 2001), particularly for small-scale farmers in semi-arid regions of India (FAO, 2001). According to Sahayaraj and Raju (2003) groundnut is being infested by more than 100 species of insects. Recent studies (Nandagopal and Ranga Rao, 2008) showed that more than 180 species of insects and mites have been reported to infest groundnut. Among various spider families reported, Thomisidae, Clubionidae and Araneidae species have been reported from groundnut cultivation (Bhatnagar et al., 1983).

A detailed study on the population buildup of the spiders and pests are an utmost necessity for the successful crop production and also a prerequisite. Furthermore, information of natural enemies in an area is very essential for the

successful crop protection. However information is lacking in Southern districts of Tamil Nadu particularly in Tirunelveli and Thoothukudi groundnut agroecosystems and therefore, considered desirable to study the spiders and the insect-pests in Tirunelveli and Thoothukudi Districts, Tamil Nadu, India from 2003 to 2005.

Materials and Methods

Field survey was conducted from 2003 to 2005 in two different seasons viz., summer (February-May) and Kharif (June-August) at Tirunelveli and Thoothukudi, Tamil Nadu, India. Four villages were randomly selected from each district for this study. In each village 1 ha of land was considered as an experimental field. A sweep net was used for collecting small size and fast moving spiders. Slow moving spiders were collected using fine camel hairbrush or fine forceps.

Results

The collection yielded 31 spider species belonging to nine families and 18 genera (Table 1). Among the nine families, Oxyopidae (25.81) represented maximum number of species followed by Araneidae (22.58%), Lycosidae (19.35%), Salticidae (12.90%) and Gnaphosidae (06.45%). The family, Amaurobiidae, Eresidae, Theridiidae and Heteropodiidae yielded the least number of species (03.23%). Thirteen species were recorded uniformly in studied groundnut fields from two districts of Tamil Nadu.

Out of the 31 species collected, Thoothukudi district harboured more species (31) than the Tirunelveli district (28). However, statistical analysis like DMRT showed that the predator number did not vary significantly between the two districts. 86.96 per cent of the recorded spiders were found in both the districts. *Stegodyphus pacificus* is available in Elluvilai, *Drassodes parvidens* is distributed in Elluvilai and Soliakkudyiruppu of Thoothukudi District. *Amarobius cribellatae* is present in Elluvilai, Solayikkudiruppu and Arumuganeri. All the 31 species were present in Elluvilai and Solayikkudiruppu. Amongst the different study areas, spider population was significantly higher in Elluvilai than other study areas. Amongst the different species of spiders, *Peucetia viridana* population was significantly higher in Elluvilai, Solaikkudyiruppu, Seydunganallur, and Surandai. In Elluvilai, *Peucetia viridana* population was significantly higher followed by *Oxyopes hindostanicus*, *Gnaphosa poonaensis*, *O. ratnae*, *Marpissa decolata*, and *P. latikae*. *Amaurobius cribellate*, *Olios punctipes* and *Stegodyphus pacificus* was the least number of spiders in groundnut agroecosystem.

Among the 31 species, 54.84 per cent spiders are non-web weavers remaining are weaving funnel (16.12 %), orb (12.90 %), irregular mesh web (9.67 %) and dome web (2.23 %). Among the web spinners the webs are higher spherical shape or irregular shape.

Discussion

Surveys conducted in groundnut cultivations of Tirunelveli and Thoothukudi district of Tamil Nadu, India during 2003 to 2005 revealed the occurrence of *Peucetia viridana*, *Oxyopes ratnae*, *P. latikae*, *L. pseudoannulata*, *L. quadrifer*, *L. phipsoni* and *G. poonaensis* species of hunting spiders belonging to Oxyopidae, Lycosidae and Gnaphosidae. In India, Lycosidae, Salticidae, Gnaphosidae, Thomisidae and Araneidae are the predominant spiders (Tikader, 1987).

The study reveals that maximum number of spiders recorded were Oxiopidae having very good reproducing capacity can contributed for the higher number of spiders. Moreover Patel (1987) reported the occurrence of five species of Oxyopidae in cotton. Of the same genera of spiders, *P. viridana*, *Oxyopes hindostanicus* and *O. ratnae* were found to be prevalent in all the locations. The abundance of particular species and its density may be due to the effect of inter-specific competition of spiders (Miyashita, 2002). *Peucetia viridiana* was found to be one of the main components of Oxyopidae sub-community in the groundnut field. This result confirms the result of Zhang (1989) and Shi et al. (1991) that *L. pseudoannulata* was found to be one of the important species of Lycosid sub-community in the rice fields. Moreover, Miyashita (2002) reported that availability of host in a particular ecosystem

alter the population of spiders. Present study reveals that groundnut cultivation mainly consists of *A. craccivora*, *S. litura* and *A. crenulata*.

Table -1: Taxonomical diversity of spiders collected from groundnut agro-ecosystems of two Southern Districts of Tamil Nadu

Sub-family	Number of genera	Number of species	% of species in relation to total species
Oxyopidae	2	8	25.81
Lycosidae	3	6	19.35
Araneidae	4	7	22.58
Salticidae	3	4	12.90
Gnaphosidae	2	2	06.45
Amaurobiidae	1	1	03.23
Eresidae	1	1	03.23
Heteropodiidae	1	1	03.23
Theridiidae	1	1	03.23
Total	18	31	--

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Table 2: Diversity of spiders based on morphology and web type and shape

Name	Web		Locality*
	Type	Shape	
<i>Amarurobius cribellatae</i>	-	-	1,2,3
<i>Argiope anasuja</i> Thorell 1887	Orb	Spherical	All
<i>Arctosa indicus</i> Tikader and Malhotra 1980	Funnel	Irregular	All
<i>Argiope catenulata</i> Doleschall 1859	Orb	Spherical	1,2,3,4, 5,6, 7,8,9,10
<i>Cyrtophora cicastroa</i> Stoliczka	Dome	Dome	All
<i>Drassodes parvidens</i> Caporiacco 1934	-	-	1,2
<i>Gastracathum unquifera</i> Simon	Irregular mesh	Irregular	All
<i>Gnaphosa poonaensis</i> Tikader 1973	-	-	All
<i>Latrodectus hasselti</i> Thorell 1870	Irregular mesh	Irregular	All
<i>Leucauge dorsotuberculata</i> Tikader 1970	Irregular mesh	Irregular	All
<i>Leucauge pandae</i> Tikader 1970	-	-	All
<i>Lycosa pseudoannulata</i> (Bösenberg & Strand, 1906)	Funnel	Irregular	All
<i>Lycosa quadrifer</i> Gravely 1924	Tunnel	Irregular	All
<i>Lycosa phipsoni</i> Pocock 1899	Funnel	Irregular	All
<i>Marpissa decorata</i> Tikader 1974	-	-	All
<i>Marpissa dhakuriensis</i> Tikader 1974	-	-	All
<i>Marpissa mandali</i> Tikader 1974	-	-	All
<i>Neoscona lugubris</i> Walckenaer 1842	Orb	Spherical	All
<i>Olios punctipes</i> Simon 1884	-	-	All
<i>Oxyopes hindostanicus</i> Pocock 1901	-	-	All
<i>Oxyopes javanus</i> Thorell 1887	-	-	All
<i>Oxyopes lineatipes</i> Koch 1847	-	-	All
<i>Oxyopes ratnae</i> Tikader 1970	-	-	All
<i>Oxyopes rufisternum</i> Thorell	-	-	All
<i>Pardosa birmanica</i> Simon 1884	Funnel	-	All
<i>Pardosa leucopalpis</i> Gravely 1924	-	-	All
<i>Peucetia latikae</i> Tikader 1970	-	-	All
<i>Peucetia viridana</i> Stoliczka 1869	-	-	All
<i>Phidippus indicus</i> Tikader 1974	-	-	All
<i>Plexippus paykullinii</i> Audoin	-	-	All
<i>Stegodyphus pacificus</i> Pocock 1900	Irregular mesh	Irregular	1

1. Elluvailai; 2. Solaikkudiyiruppu; 3. Arumuganeri; 4. Seydungalur; 5. Sivanthipatti; 6. Mannarpuram; 7. Tiruchendur; 8. Thalalvaipuram; 9. Ittamozhi; 10. Paraikulam; 11. Surandai; 12. Nallur; 13. Thisayanvilai; 14. Aralvaimozhi; 15. Alangulam



On collections of aquatic and semi-aquatic bugs and beetles of KBR National Park, Hyderabad, Andhra Pradesh

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Kasu Brahmananda Reddy National Park, is perhaps the only park developed on a forest land in the country, with an area of 156.50 hectares, located at Jubilee Hills, Hyderabad. Established in 1994 to safeguard the biodiversity and richness of the area, it is named after Late Kasu Brahmananda Reddy, the former Chief Minister of Andhra Pradesh. It houses 3 small ponds with an area of 0.5 to 1 hectare, one which is comparatively big (one hectare) and perennial one. This Park is right at the top of the most significant catchment in the heart of the city, which is helping surface charge of the streams emptying into Banjara and Hussain Sagar Lakes. The nature of the vegetation and absence of paths and gullies in the park which could carry the water away has helped the water charges into streams even in summer month. Equally significant is the role of this Park and its vegetation in recharging ground water of the area through humus and top soil. This is giving much needed relief to citizens living in an area without major water resources. This picturesque park is unique in its own way. It houses the other historic structures and shares its neighbourhood with significant landmarks. It is a house to nearby 113 species of birds, 20 species of reptiles, 15 species of butterflies, 20 species of mammals and numerous invertebrates. (Information from DFO, Wildlife management Division, K.B.R.National Park, Hyderabad), 8 species of Rotifer fauna were also reported (Chandrasekhar & Rajesh, 2006). Besides having over 200 varieties of flora and fauna, KBR National Park houses the erstwhile Nizams' Chiran Palace. It discharges the ecological function of preserving biodiversity i.e., conservation of flora and fauna which comprise several species of plants some of which have yet to be studied for their taxonomic qualities and even as germplasm for sustainable human use.

Being a preliminary study the results of the study on aquatic insects (Hemiptera & Coleoptera) has revealed 20 species belonging to 15 genera under 7 families which forms the first report from the KBR National Park.

MATERIAL AND METHODS

During the course of monthly local surveys in connection with project entitled "Taxonomic and ecological studies of Aquatic insects of lakes in and around Hyderabad" assigned to Fresh water Biological Station, ZSI, Hyderabad, three seasonal surveys (September 2007, December 2007 and March, 2008) were made to KBR, National Park and aquatic insects were collected from ponds of the park.

Collections were made with the help of hand-operated nets of varying sizes by randomly netting different areas of wetland. While surface floating/ swimming insects were collected with small circular nets made of either coarsely meshed cotton cloths or finely meshed polyester mosquito curtain cloth. Macrophytes associated insects were collected with help of hand operated D framed sweep nets. The design and operation of the net was roughly based on those described by Junk (1977). Insects collected for study were preserved in 70% alcohol. The collections were identified with the aid of standard literature on the group viz., Thirumalai (1999, 2007) and Bal and Basu (1994a & 1995b), Vazirani (1973), Biswas & Mukhopadhyay (1995), Mukhopadhyay (2007).

Systematic list

Order : Hemiptera

Sub order : Heteroptera

Infraorder : Nepomorpha

Family : Nepidae

Subfamily : Ranantrinae

Tribe : Ranatrini

Genus : *Ranatra* (Fabricius)

1. *Ranatra elongata* (Fabricius)
2. *Ranatra filiformis* (Fabricius)
3. *Ranatra digitata* (Hafiz & Pradhan)

Sub family : Nepinae

Tribe : Nepini

Genus: *Laccotrephus* (Stal)

4. *Laccotrephus griseus* (Guerin-Meneville)
5. *Laccotrephus ruber* (Linnaeus)
6. *Laccotrephus elongatus* (Montadon)

Family : Belostomatidae

Subfamily –Belostomatinae

Genus-*Diplonychus* (Laporte)

7. *Diplonychus rusticus* (Fabricius)
8. *Diplonychus molestus* (Dufour)

Family : Corixidae

Sub family : Micronectinae

Genus : *Micronecta* (Kirkaldy)

9. *Micronecta scutellaris scutellaris* (Stal)

Infra order: Gerromorpha

Family: Gerridae

Sub family : Gerrinae

Genus : *Limnogonus* (Stal)

10. *Limnogonus (Limnogonus) nitidus* (Mayr)

Genus : *Limnometra*

11. *Limnometra fluviorum* (Fabricius)

Order: Coleoptera

Family: Dytiscidae

Subfamily : Hydroporinae

Genus : *Hydrovatus* (Sharp).

12. *Hydrovatus confertus* (Sharp)

Subfamily: Laccophilinae

Genus: *Laccophilus* (Leach)

13. *Laccophilus elegans* (Sharp)

Subfamily Dytiscinae

Genus *Cybister* (Curtis)

14. *Cybister convexus* (Sharp)

Subfamily: Notorinae

Genus: *Canthydrus* (Walker)

15. *Canthydrus laetabilis* (Walker)

Family: Hydrophilidae

Subfamily : Hydrophilinae

Genus: *Hydrophilus* (Bedel)

16. *Hydrophilus olivaceus* (Fabricius)

17. *Helochaeres anchoralis* (Sharp)

Sub family : Berosini

Genus : *Regimbartia* (Zaitz)

18. *Regimbartia attenuata* (Fabricius)

Family : Gyrinidae

Subfamily : Enhydrinae

Genus: *Dineutus*(Macleay)

19. *Dineutus (Protodineutus) indicus* (Aube)

Subfamily: Gyrininae

Genus: *Gyrinus* (Geoffroy)

20. *Gyrinus convexiusculus* (Mackleay)

The earlier study on aquatic insects (Hemiptera & Coleoptera) from Pocharam lake, Medak Dist. Andhra Pradesh reported the presence of 11 species belonging to 6 families and 8 genera (Deepa and Rao, 2007). In spite of 31 species of aquatic Hemiptera and 55 species of aquatic Coleoptera known from Andhra Pradesh (Bal, 2007; Mukhopadhyay, 2007; Mukhopadhyaya and Ghosh, 2007) only 11 species of Bugs and 9 species of Beetles are reported from the Park. The earlier knowledge and scientific contribution on Indian aquatic bugs (Bal and Basu, 1994 a,b; Biswas *et al.* 1995; Thirumalai, 1994; Thirumalai and Raghunathan, 1988) and aquatic beetles (Vazirani, 1968, 1970, 1984; Mukhopadhyay, 2007) are noteworthy to understand the present fauna. Being a preliminary study,

only two insect orders are covered. More intensive survey spread over different seasons would be required to provide a complete picture of the entomofaunal diversity of this area. Study had been undertaken on aquatic entomofauna (Bugs and Beetles) collected from the water ponds of KBR National Park, Hyderabad. The study reports the presence of 20 species belonging to 15 genera under 7 families which forms the first report of this group from KBR National Park.

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A check list of Crane flies (Tipulidae: Diptera) in Tamil Nadu

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Tipulids commonly known as crane flies or daddy-long-legs are the largest among the Dipterans with world-wide in distribution. Crane flies have been traditionally treated as a single family, the Tipulidae s.l., and are now placed in the super family Tipuloidea that comprises 4 families namely Cylindrotomidae, Limoniidae, Pediciidae and Tipulidae and 15, 276 recognized species. Their greatest diversity is recorded from the humid forests in tropical countries including India. The Oriental region contains 3454 species of which India alone represents 1473 species. The crane fly taxonomy of India has been initiated by Brunetti (1912) with little over 100 recorded species. Subsequently Joseph (1971-1979) made extensive revisionary studies on Indian crane fly faunas based on Brunetti's work as well as his own surveys materials leading 397 recorded species. The taxonomy of Indian crane fly faunas especially at higher taxonomic category level has been under the rigorous scrutiny as result their nomenclature changes have been updated (<http://nlbif.eti.uva.nl/ccw/>).

Crane flies are important, both as larvae and adults, in providing food for other species as, besides being eaten by other invertebrates, fishes and amphibians. In many freshwater habitats, especially ponds, streams and floodplains, tipulid larvae play an important role in "shredding" riparian leaf litter, thus making it available to other species that can feed only by "gathering" smaller organic particles. Hence tipulids are important fresh water indicators.

Taxonomic list of Crane flies in Tamil Nadu

Family Tipulidae

Subfamily Tipulinae

Angarotipula frommeri (Alexander, 1966)
Holorusia bitruncata (Alexander, 1950)
Holorusia dravidica (Edwards, 1932)
Holorusia impictipleura (Alexander, 1957)
Holorusia inclyta (Alexander, 1949)
Holorusia lineaticeps (Edwards, 1932)
Holorusia molybros (Alexander, 1957)
Holorusia nudicaudata (Edwards, 1932)
Holorusia siva (Alexander, 1950)
Holorusia striaticeps (Alexander, 1957)
Holorusia sufflava (Alexander, 1957)
Indotipula brachycantha (Alexander, 1949)
Indotipula dilatistyla (Alexander, 1949)
Indotipula melacantha (Alexander, 1961)
Indotipula palnica (Edwards, 1932)
Indotipula tetradolos (Alexander, 1970)
Nephrotoma bellula Alexander, 1969
Nephrotoma dodabettiae Alexander, 1951
Nephrotoma globata Alexander, 1951

Nephrotoma kodaikanalensis Alexander, 1951
Nephrotoma megascapha Alexander, 1951
Nephrotoma pleurinotata (Brunetti, 1912)
Nephrotoma quadrilata Alexander, 1951
Nephrotoma rajah Alexander, 1951
Nephrotoma semicincta Alexander, 1951
Nephrotoma toda Alexander, 1951
Tipula (Platytipula) hampsoni Edwards, 1927
Tipula (Ramatipula) flavithorax Brunetti, 1918
Tipula (Schummelia) dravidiana Alexander, 1961
Tipulodina brunettiella (Alexander, 1923)
Tipulodina susainathani (Alexander, 1968)
Tipulodina xanthippe (Alexander, 1951)

Family Tipulidae

Subfamily Dolichopezinae

Dolichopeza (Mitopeza) kanagaraji Alexander, 1952
Dolichopeza (Mitopeza) trichochora Alexander, 1974
Dolichopeza (Nesopeza) compressior Alexander, 1952
Dolichopeza (Nesopeza) infuscata Brunetti, 1912
Dolichopeza (Nesopeza) laetipes Alexander, 1952
Dolichopeza (Nesopeza) parvicornis (Alexander, 1927)
Dolichopeza (Nesopeza) praesul Alexander, 1962
Dolichopeza (Nesopeza) seticristata Alexander, 1969
Dolichopeza (Nesopeza) setilobata Alexander, 1968

Family Tipulidae

Subfamily Ctenophorinae

Pselliophora laeta trilineata Brunetti, 1911

Family Limoniidae

Subfamily Limoniinae

Antocha (Antocha) brevifurca Alexander, 1974
Antocha (Antocha) madrasensis Alexander, 1970
Antocha (Antocha) platystylis Alexander, 1974
Antocha (Antocha) postnotalis Alexander, 1974
Antocha (Antocha) stenophallus Alexander, 1974
Antocha (Antocha) studiosa Alexander, 1951
Dicranomyia (Dicranomyia) dravidiana (Alexander, 1951)
Dicranomyia (Dicranomyia) flavocincta (Brunetti, 1918)
Dicranomyia (Dicranomyia) vama (Alexander, 1952)
Dicranomyia (Dicranomyia) ventralis (Schummel, 1829)
Dicranomyia (Dicranomyia) whiteae (Alexander, 1941)
Dicranomyia (Euglochina) dravidica (Alexander, 1951)
Dicranomyia (Nealexandriaria) nigroephippiata (Alexander, 1952)
Elephantomyia (Elephantomyodes) affluens Alexander, 1949
Elephantomyia (Elephantomyodes) nana Alexander, 1951
Elephantomyia (Elephantomyodes) nigropedata Alexander, 1956
Geranomyia deccanica (Alexander, 1968)
Geranomyia fimbriarum (Alexander, 1949)
Geranomyia malabarensis (Alexander, 1952)
Geranomyia nigronotata Brunetti, 1918
Helius (Helius) anamalaiensis Alexander, 1967
Lechria argyrospila Alexander, 1957
Lechria fuscomarginata Alexander, 1956
Lechria interstitialis Alexander, 1953

Lechria longicellula Alexander, 1950
Libnotes (Libnotes) greeni Edwards, 1928
Libnotes (Libnotes) laetinita (Alexander, 1963)
Libnotes (Libnotes) perplexa (Alexander, 1951)
Libnotes (Libnotes) thyestes (Alexander, 1950)
Limonia submurcida Alexander, 1968
Limonia (Uncertain) shushna Alexander, 1952
Limonia (Uncertain) tigriventris Alexander, 1968
Prothelium nilgircus Alexander, 1960
Rhipidia (Rhipidia) monophora (Alexander, 1952)
Thaumastoptera (Thaumastoptera) nilgiriensis Alexander, 1951
Toxorhina (Toxorhina) brevirama Alexander, 1953
Toxorhina (Toxorhina) scita Alexander, 1962
Toxorhina (Toxorhina) sparsiseta Alexander, 1962
Trentepohlia (Anchimongoma) simplex (Brunetti, 1918)
Trentepohlia (Mongoma) alboposticata Alexander, 1960
Trentepohlia (Trentepohlia) bellipennis Alexander, 1955
Trentepohlia (Trentepohlia) trentepohlii (Wiedemann, 1828)
Trichoneura (Xipholimnobia) madrasensis (Alexander, 1970)
Trichoneura (Xipholimnobia) umbripennis Alexander, 1949

Family Limoniidae

Subfamily Chioneinae

Atarba (Atarbodes) trimelania Alexander, 1963
Baeoura angustisterna Alexander, 1966
Baeoura irula Alexander, 1966
Baeoura nilgiriana (Alexander, 1951)
Cheilotrichia (Empeda) accomoda (Alexander, 1951)
Cheilotrichia (Empeda) simplicior (Alexander, 1951)
Clydonodozus nilgircus Alexander, 1953
Conosia irrorata irrorata (Wiedemann, 1828)
Ellipteroides (Protagonomyia) nilgiranus (Alexander, 1950)
Erioptera (Erioptera) orientalis Brunetti, 1912
Erioptera (Teleneura) nebulifera Alexander, 1953
Gnophomyia neofraterna Alexander, 1950
Gonomyia (Gonomyia) hyperacuta Alexander, 1956
Gonomyia (Gonomyia) matsya Alexander, 1955
Gonomyia (Gonomyia) subaperta Alexander, 1957
Gonomyia (Leiponeura) ambiens Alexander, 1950
Gonomyia (Leiponeura) dissimilis Alexander, 1961
Gonomyia (Leiponeura) nilgiriensis Alexander, 1964
Gonomyia (Leiponeura) ornatipes (Brunetti, 1912)
Gonomyia (Leiponeura) tetrastyla Alexander, 1950
Gymnastes (Gymnastes) violaceus nilgircus Alexander, 1967
Gymnastes (Paragymnastes) imitator Alexander, 1951
Idiocera (Idiocera) absona (Alexander, 1956)
Idiocera (Idiocera) megastigma (Alexander, 1970)
Idiocera (Idiocera) metatarsata metatarsata (de Meijere, 1911)
Idiocera (Idiocera) recens (Alexander, 1950)
Molophilus (Molophilus) dravidianus Alexander, 1969
Molophilus (Molophilus) flavotibialis Alexander, 1969
Molophilus (Molophilus) lancifer Alexander, 1953
Molophilus (Molophilus) laxus Alexander, 1950
Molophilus (Molophilus) macrothrix Alexander, 1969
Molophilus (Molophilus) nilgircus Edwards, 1927
Molophilus (Molophilus) peculiaris Alexander, 1973
Molophilus (Molophilus) perattenuatus Alexander, 1969
Molophilus (Molophilus) sublancifer Alexander, 1973
Rhabdomastix (Rhabdomastix) nilgirica Alexander, 1949
Riedelomyia chionopus Alexander, 1949
Styringomyia flava Brunetti, 1911
Styringomyia kala Alexander, 1955
Styringomyia monochaeta Alexander, 1970
Styringomyia pentachaeta Alexander, 1970
Styringomyia thetis Alexander, 1949

Styringomyia vritra Alexander, 1955
Teucholabis (Teucholabis) gudalurensis Alexander, 1950
Teucholabis (Teucholabis) pruthiana Alexander, 1942
Teucholabis (Teucholabis) susainathani Alexander, 1950

Family Limoniidae

Subfamily Limnophilinae

Eloeophila dravidiana (Alexander, 1971)
Epiphragma (Epiphragma) adoxum Alexander, 1953
Eupilaria guttulifera Alexander, 1949
Eupilaria incana Alexander, 1949
Eupilaria suavis Alexander, 1949
Hexatoma (Eriocera) anamalaiiana Alexander, 1949
Hexatoma (Eriocera) arcuaria Alexander, 1974
Hexatoma (Eriocera) arcuata Alexander, 1951
Hexatoma (Eriocera) artifex Alexander, 1961
Hexatoma (Eriocera) atroantica Alexander, 1957
Hexatoma (Eriocera) atrodorsalis (Alexander, 1927)
Hexatoma (Eriocera) dharma Alexander, 1955
Hexatoma (Eriocera) flavicosta (Edwards, 1921)
Hexatoma (Eriocera) glomerosa Alexander, 1960
Hexatoma (Eriocera) indra Alexander, 1955
Hexatoma (Eriocera) nigroantica Alexander, 1957
Hexatoma (Eriocera) nigrocoxata Alexander, 1957
Hexatoma (Eriocera) paenulatoides Alexander, 1949
Hexatoma (Eriocera) perelongata Alexander, 1969
Hexatoma (Eriocera) phaeton Alexander, 1961
Hexatoma (Eriocera) politovortex Alexander, 1950
Hexatoma (Eriocera) purpurata Alexander, 1949
Hexatoma (Eriocera) quadriaurantia Alexander, 1950
Hexatoma (Eriocera) rama Alexander, 1955
Hexatoma (Eriocera) susainathani Alexander, 1949
Hexatoma (Eriocera) tacita Alexander, 1951
Hexatoma (Eriocera) tenuis (Brunetti, 1912)
Hexatoma (Eriocera) testacea (Brunetti, 1912)
Hexatoma (Eriocera) triangularis (Brunetti, 1912)
Hexatoma (Eriocera) tripunctipennis (Brunetti, 1918)
Hexatoma (Eriocera) uniflava Alexander, 1969
Hexatoma (Eriocera) vama Alexander, 1961
Hexatoma (Eriocera) vulpes Alexander, 1961
Hexatoma (Eriocera) walayarensis Alexander, 1951
Hexatoma (Hexatoma) madrasensis Alexander, 1961
Limnophila (Indolimnophila) dravidica Alexander, 1971
Paradelphomyia (Oxyrhiza) krisna Alexander, 1957
Paradelphomyia (Oxyrhiza) mitra Alexander, 1953
Polymera (Polymera) furiosa Alexander, 1950
Pseudolimnophila (Pseudolimnophila) costofimbriata Alexander, 1927
Pseudolimnophila (Pseudolimnophila) dravidica Alexander, 1974
Pseudolimnophila (Pseudolimnophila) multipunctata (Brunetti, 1912)
Pseudolimnophila (Pseudolimnophila) productivena Alexander, 1951
Pseudolimnophila (Pseudolimnophila) rhanteria Alexander, 1927
Pseudolimnophila (Pseudolimnophila) subhonestata Alexander, 1974

Of the 1473 species of crane flies known from India, 177 species representing 45 genera and 4 families are found in Tamil Nadu. The spatial and temporal distributions of crane flies of Tamil Nadu are biologically important as (i) several species are unique either to the Eastern ghats or to the Western ghats; (ii) some of the higher taxonomic group such as Limoniidae has the representative's of lower

Cretaceous Burmese amber fossils suggesting that crane fly faunas of Tamil Nadu probably had the Gondwana origin. Further research on the taxonomy of Tipulids is urgently needed before their natural habits are shrunken due to deforestation, industrialization, pollution and other anthropogenic activities.

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A preliminary report on the predaceous diving beetles (Dytiscidae: Coleoptera) of Binsar Wildlife Sanctuary, Uttarakhand

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It is always interesting to study the aquatic life of conservation areas particularly on aquatic beetle fauna. Dytiscidae (predaceous water beetles) is one of the largest and most commonly encountered groups of aquatic beetles. Both adults and larvae are predaceous, and will attack a wide variety of small aquatic organisms.

Binsar (Alt. 2412 mts.) is a comparatively small wildlife sanctuary in Uttarakhand, covering only an area of 47.04 sq. kms, situated 30 kms north of the state Uttarakhand. Today, Binsar supports a wide variety of floral species, faunal species as well as avi-fauna including some of the unique species found in the Himalayan range. But nothing has been reported on the aquatic beetle fauna of this sanctuary.

In view to study the aquatic beetle fauna of Binsar wildlife sanctuary of Uttarakhand an attempt has been made. This present communication reports five species of predaceous beetle of Binsar wildlife sanctuary along with their taxonomic keys, valid scientific names and zoogeographical distribution in India and outside India.

Subfamily Hydroporinae

Tribe Hydroporini

Genus *Potamonectes* Zimmermann, 1921

1. *Potamonectes balli* Vazirani

1970. *Potamonectes (s. str.) balli* Vazirani, *Orient. Ins.*, 4: 127, Type-Locality: Pakistan: Khewra Salt range.

Material examined: 4 exs., Uttarakhand, dist. Almora, Binsar, l.ix.2003, coll. B. Mitra.

Distribution: INDIA : Himachal Pradesh, Uttarakhand ; PAKISTAN .

Subfamily Colymbetinae

Key to the tribes

1. Metafemora with a group of cilia at the posterior apical angle[Agabini](#)

Metafemora without a group of cilia at the posterior apical angle2

2. Posterior claws equal[Hydronebrini](#)

Posterior claws unequal[Colymbetini](#)

Tribe Agabini

Genus *Agabus* Leach, 1817

Key to the Subgenera

1. Anterior series of punctures on pronotum not interrupted in middle[Gaurodytes](#)
—Anterior series of punctures on pronotum interrupted in middle[Dichonectes](#)

2. *Agabus (Dichonectes) biguttatus* (Oliver)

1775. *Dytiscus biguttatus* Oliver, *Hist. nat. Ins. Coleopteres*, 3 no. 40: 26 (Type-Locality: France 'Fregus')

1882. *Agabus biguttatus*: Sharp, *Sci. trans. R. Dublin Soc*, 2 : 499

1958. *Agabus (Dichonectes) biguttatus* Guignot, *Bull. Mens. Soc. Linn. Lyon*. 27: 29

1977. *Agabus (Dichonectes) biguttatus*: Vazirani, *Cat. Orient. Dytiscid*, 6: 62

Material examined: 6 exs., Uttarakhand, dist. Almora, Binsar, 30.ix.2001, coll. B. Mitra.

Distribution : INDIA: Uttarakhand, Kashmir; IRAN; AFGAN-ISTAN; MONGOLIA; U.S.S.R.; TURKESTAN; ASIA MINOR; NORTH & N. E. AFRICA; EUROPE.

3. *Agabus (Gaurodytes) amoenus sinuaticollis* Regim-bart

1899. *Agabus sinuaticollis* Regimbart, *Ann. Soc. Ent.Fr.* 68 : 271

1933. *Agabus amoenus* Solsky, *Ann.Soc.ent.Fr.*, 68: 176.

1970. *Agabus (Gaurodytes) amoenus sinuaticollis*: Vazirani, *Orient. Insect.*, 4:336.

Material examined: 2exs., Uttarakhand, dist. Almora, Binsar, 30.ix.2001, coll. B. Mitra.

Distribution: INDIA : Uttarakhand , Himachal Pradesh, Meghalaya; CHINA.

Tribe Hydronebrini

Genus *Platynectes* Regimbart, 18874.

Platynectes kashmirensis Balfour- Brown

1944. *Platynectes kashmirensis* Balfour- Brown, *Ann. Mag. nat. Hist.*, (II) 11: 352. nom.nov.Type-locality:

Kashmir 1977. *Platynectes kashmirensis*.Vazirani, *Cat. Orient. Dytiscid*,

Material examined: 4 exs., Uttarakhand, dist. Almora, Binsar, 30.ix.2001, coll. B. Mitra.

Distribution: INDIA: Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Punjab, Sikkim, Uttarpradesh, West Bengal.

Tribe Colymbetini

Genus *Rhantus* Stephens, 1835

5. *Rhantus sikkimensis* Regimbart

1899. *Rhantus sikkimensis* Regimbart, *Ann. Soc. Ent. Fr.* 68:306, Type-Locality: Sikkim.

1977. *Rhantus sikkimensis*, Vazirani, *Cat. Orient. Dytiscid*, Occ. Paper 6:72-73.

Material examined: 6 exs., Uttarakhand, dist. Almora, Binsar, 30.ix.2001, coll. B. Mitra.

Distribution: INDIA : Uttarakhand, Himachal Pradesh, Punjab , Sikkim , Uttar Pradesh, West Bengal; CHINA; MYANMAR; PAKISTAN.

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***Gongylus gongylodes* (Linnaeus) (Insecta: Mantodea): A new record for Madhya Pradesh, India**

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The compilation work of Mukherjee et al (1995) on Mantid fauna of India includes 16 species belonging to 11 genera from Madhya Pradesh. Subsequently, Mukherjee and Shishodia (1999) added 5 more species to the State fauna raising the number to 21. During the recent faunistic survey of Khargone district, Madhya Pradesh a few curious and uncommon mantid specimens were collected. On closer examination they were identified as *Gongylus gongylodes* (Linnaeus). This species was not reported in earlier works, thus intended to record its occurrence from the State of Madhya Pradesh. This species has been reported earlier from Andhra Pradesh, Kerala, Maharashtra, Tamil Nadu and West Bengal. From outside India it is known from Indonesia and Sri Lanka. The updated list of species (15 genera and 22 species) so far reported from the State has also been appended here.

***Gongylus gongylodes* (Linnaeus)**

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

1767. *Mantis gongylodes* Linnaeus, *Syst. Nat.* 2(10): 690

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

ORDER: MANTODEA

Family: Hymenopodidae

Subfamily: Acromantinae

Tribe: Acromantini

Ephestiasula intermedia Werner

Ephestiasula amoena (Boliver)

Ephestiasula pictipes (Wood-Mason)

Subfamily: Hymenopodinae

Creobroter laevicollis (Saussure)

Family: Mantidae

Subfamily: Choeradodinae

Choeradodis cancellata (Fabricius)

Subfamily: Tarachodinae

Didymocorypha lanceolata (Fabricius)

Dysaules himalyanus Wood-Mason

Subfamily: Liturgusinae

Humbertiella ceylonica Saussure

Humbertiella indica Saussure

Humbertiella similis Giglio-Tos

Humbertiella affinis Giglio-Tos

1995. *Gongylus gongylodes* Mukherjee, Hazra & Ghosh, *Oriental Insects*, 29: 331

Material examined: Madhya Pradesh, Khargone, Narmada nagar, Indore Road, 2 Males, 3.x.2007, Coll. D.K. Harshey (Registration No. A/12400).

Diagnostic characters: Body colour brown. Dilation of pronotum rhomboidal, width roughly one third the length of pronotum, lateral angles sharp. Body length (excluding protuberance) 71.0 – 76.0; pronotum 31.0- 35.0; width 8.0-9.0; metazona 28.0-29.0; coxa 16.0-17.0; femur 18.0-19.0; tibia 9.0-10.0; forewing 47.0-48.0. Other details as per Mukherjee et al (1995).

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Acknowledgement

The authors are thankful to Dr. Ramakrishna, Director, Zoological Survey of India, Kolkata for facilities and encouragement.

Subfamily: Thespinae

Tribe: Parathespini

Parathespis humberiana Saussure

Subfamily: Schizocephalinae

Schizocephala bicornis (Linn.)

Subfamily: Amelinae

Tribe: Amelini

Memantis gardeneri Werner

Subfamily: Mantinae

Tribe: Miomantini

Deiphobe indica Giglio-Tos

Deiphobe infuscata (Saussure)

Tribe: Mantini

Hierodula tenuidentata Saussure

Hierodula ventralis Giglio-Tos

Mantis religiosa Linn.

Statilia maculata (Thunberg)

Family: Empusidae

Subfamily: Empusinae

Empusa fasciata Brulle'

**Gongylus gongylodes* (Linn.)



First record of the ant, *Centromyrmex feae* Emery, 1889 (Subfamily Ponerinae) from Mangalore District, Karnataka

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The ant, *Centromyrmex feae* Emery (*Spalacomymex*) collected during June, 2008 from the back Garden of my house at Kadri, Mangalore (N 12°52' 51" and E 74°51' 22") situated at an altitude of 105 m is a first record from Dakshina Kannada District, Karnataka.

Mangalore is a coastal city. The average rainfall recorded for June month was 35.04 mm, whereas the mean temperature and relative humidity varied from 25.1 to 32.8° C and 93.03 % to 80.4% respectively

Earlier Musthak Ali (1991) reported this species from Bangalore in Karnataka and at Sakleshpur (Hassan district) & Hongarahalla (Kempole) in the Western Ghats region (Rajagopala *et al.*, 1998) along the National Highway No 48. The ant (Fig 1) is honey dew yellowish, without eyes and

have stout legs suited for a subterranean habitat. The length of the worker is 3.5 mm

The identity of the ant has been confirmed by Dr Thresiamma Varghese, Centre for Ecological Science, Indian Institute of Science, Bangalore

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Musthak Ali, T. M (1991). Ant fauna of Karnataka I. *Newsletter of IUSSI – Indian Chapter*, 5(1&2): 1-8.

Rajagopal D, Musthak Ali, T.M. and Chakravarthy, A.K (1998). Ant species richness, across the altitude gradient in the western ghats of Karnataka. *Zoo's Print*, (5):10-13.



Figure 1. The ant is honey dew yellowish, without eyes and have stout legs suited for a subterranean habitat.



Occurrence of the earthworm *Perionyx simlaensis* (Michaelsen) from West Bengal

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Beddard (1883, 1900, 1901, 1902), Michaelsen (1907), Stephenson (1916, 1917, 1920, 1923) had contributed to the taxonomic studies of earthworm from West Bengal. Later a considerable work on various aspects of earthworm has been done by Gates' (1937, 1938a, b, 1951, 1958), Halder and Julka (1967), Julka (1975), Soota and Halder (1977, 1981), Halder (1998), Chowdhury and Hazra (2006, 2007, 2009), Chowdhury et al. (2007). So far, 63 species of earthworm under 26 genera were reported from West Bengal. Present study carried out in little or unexplored areas of 24 parganas district to know the present state of earthworm fauna of West Bengal.

External characters

Length 85 -125 mm, diameter 3-5 mm, 106 - 131 segments. Prostomium epilobic, tongue open. Pigmented, dorsum violet-red; ventrum pinkish to white. First dorsal pore in 4/5 or 5/6. Setae present from ii, more closely spaced in ventrum than dorsum. Clitellum annular, xiii-xvii, xviii. Setae perichaetine; aa = 1.3 -1.7 ab = 1.3-1.7 bc = 1-1.5 yz = 0.5 - 1 zz on xi, aa = 1 - 1.8 ab = 1.3 - 1.7 bc = 0.5 - 1 yz = 0.3 - 0.6 zz on xxiii, 37-49 on ii, 47-56 on vii, 53-61 on xii, 51-62 on xx, 4-5 between spermathecal pore lines on vii., 6-7 between male pore lines on xvii. Male genital area on xviii, depressed, rectangular with rounded angle, extending laterally to setae ef, containing a pair of swollen disc or pad each of which bears a well developed club or rod shaped penes. Combined male and prostatic pores minute, at the centre of the disc, in line with cd, 0.06-0.08 body circumference apart. Setae absent between the male pores as well as in the lateral margin of the disc. Female pore minute, single and median on xiv. Spermathecal pore two pairs in 7/8 - 8/9 at c lines, 0.07-0.08 body circumference apart. Nephridiopores inconspicuous (Photo 1, Fig. 1).

Internal characters

Septa 4/5 - 6/7 delicate, 7/8 - 11/12 slightly muscular. Oesophagus with a small and slightly muscular gizzard in v. Intestines begins in xvii; calciferous glands, typhlosole, intestinal caeca and supra intestinal glands absent. Dorsal blood vessel single and complete; supra-oesophageal vessel in ix – xiii. Lateral hearts originating from supra-oesophageal vessel with a connection to dorsal vessel in x – xiii; last pair of hearts in xiii. Holandric, testes and male funnels free in x and xi. Seminal vesicles three to four pairs, in x - xii or x -xiii. Prostates disc-shaped in xviii, ducts

thick with slight muscular sheen and slightly looped. Penial setae absent. Spermathecae paired in vii and viii. Spermathecal ampulla large, ovoidal with cluster of spheroid structures; duct shorter than ampulla; seminal chambers represented by few small rounded knobs at the ectal end of the duct but not always recognizable. Holonephric.

Material Examined: 1 clitellate ex., 2. vi. 2005; coll. A. Chowdhury. 2 clitellates exs., 11. vii. 2005; coll. A. Chowdhury. 3 clitellates and 1 aclitellate exs., 9. viii. 2005; coll. A. Chowdhury. 1 clitellate ex., 13. iv. 2006; coll. A. Chowdhury. 2 clitellates and 1 aclitellate exs., 11. v. 2006; coll. A. Chowdhury. 5 clitellates exs., 16. ix. 2006; coll. A. Chowdhury. All specimens were collected from the same locality at Madhyamgram (North 24 Pgs. district) near muddy canal with high amount of decomposed and semi decomposed organic matter.

Earlier Records

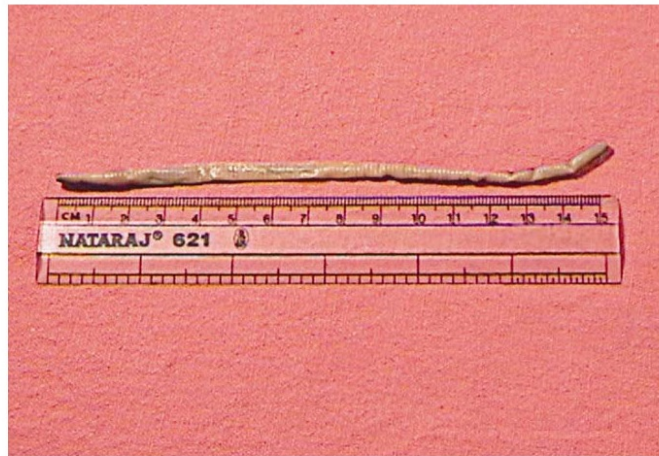
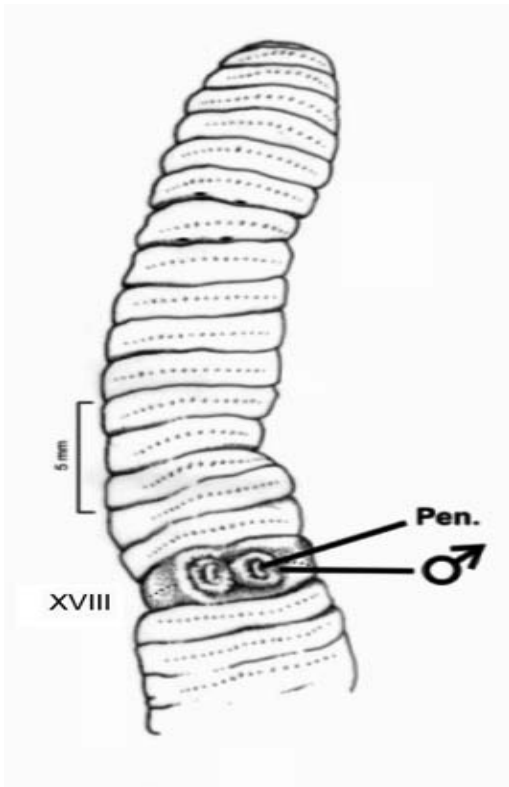
Michaelsen (1907), Stephenson (1923) recorded this species from Himachal Pradesh. Julka and Paliwal (2005) reported this species from Uttaranchal.

Remarks

The specimens of *Perionyx simlaensis* Michaelsen from West Bengal agree well with the original description of the species, except differing slightly in following characters. Penes club or rod shaped but in original description, it is conical pointed. Three specimens with three pairs of seminal vesicles. Seminal vesicle absent in segment ix, when present in xiii extend to septum 14/15. Clitellum not interrupted ventrally in xiii. Spermathecal region distinct and swollen. This species previously known from Western part of the Gangetic plains and foothills of the Western Himalaya. Its' present record from West Bengal of great significance as its range is now extended to eastern Gangetic plain.

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Authors are indebted to Dr. J. M. Julka, Emeritus scientist, Zoological Survey of India, Solan for confirming the earthworm species. Authors are grateful to the Director, Zoological Survey of India for providing laboratory facilities and to Professor A. P. Nandi, Department of Zoology, University of Burdwan for his encouragement.



a

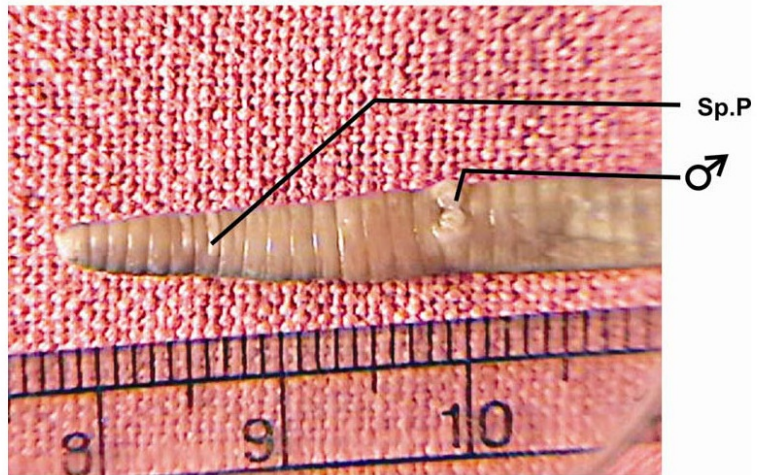


Fig. 1. *Perionyx simlaensis* (Michaelsen), anterior end, ventral view, Pen, penes.

Photo. 1. *Perionyx simlaensis* (Michaelsen). a. Entire worm, ventral view.
b. Anterior end, ventral view showing male genital and spermathecal pore region; Sp.P, spermathecal pore.

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A note on the range extension of Whip-spider *Phrynichus andhraensis* (Phrynichidae: Amblypygi) from Andhra Pradesh, India

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The Amblypygids are spectacular animals with a flat body and a narrow constriction between carapace and abdomen. They are most secretive, raptorial with extremely long pedipalps and an exceptionally long, whip like modified first pair of legs.

Whip-spiders (Amblypygi) from Indian subcontinent are represented by a few species that were described by Pocock (1900). Recently Weygoldt (1996) has revised and updated the Amblypygid fauna from Asia and Africa under the family Phrynichidae. In India, the genus *Phrynichus* is represented by only two species that is, *Phrynichus phipsoni* Pocock, 1900 and *Phrynichus andhraensis* Bastawade *et al.*, 2005. *Phrynichus phipsoni* Pocock, 1900 so far reported from Western Ghats, while the newly described *Phrynichus andhraensis* Bastawade *et al.* 2005 was till now known only from central Eastern Ghats of Andhra Pradesh, India.

On 10th February 2007, at 18.26 hrs, during a nature trek the first author sighted a whip-spider near a waterfall behind the Perantalapally Temple (17°27' N & 81°26' E, elevation 160 ft above msl), which is located on the right bank of river Godavari in the Papikonda Hills of northern Eastern Ghats, Khammam district, Andhra Pradesh (Fig.1). The whip-spider was identified as a female *Phrynichus andhraensis* Bastawade *et al.*, 2005 (Image 3). Detailed examination of all the morphological characters of the captured live specimen was done with the help of a hand held high magnifying lens and the specimen was released after ascertaining identity and gathering photo proofs (OUNHM.PIC.ARA.1-2008 and OUNHM.PIC.ARA.2-2008) that have been deposited in the Natural History Museum of Osmania University, Hyderabad.

Diagnosis: Small body, yellowish-brown in colour and darker on carapace. Carapace, abdomen and appendages are closely granular on dorsal side. Chelicerae and pedipalps are long and slender. Pedipalp bearing 32 spines in total (Image 4) and distitibiae of IV leg with 33 trichobothria.

Measurement: Carapace - 6 mm long and 12mm wide. Abdomen - 10mm long and 6mm wide. Total body length - 16mm.

Habitat: The habitat is dry and hot, having some dense and open forest on hilly terrain, adjacent to a tribal hamlet - Perantalapally on the right bank of the river Godavari. The Whip-spider was located on a boulder in a riparian habitat (Image 1-2). The vegetation of the microhabitat comprises of ferns, grasses and trees including mango and tamarind. The temperature during day was 22°C and at night it was about 13°C. The habitat has typical Southern tropical dry deciduous and Southern tropical moist deciduous forest types intermingled with scrub (Champion & Seth, 1968).

Known Distribution: *Phrynichus andhraensis* Bastawade *et al.*, 2005 is so far only known from the type locality, that is, Mamidiselu (16°04'N & 78°54' E), Nagarjunasargar-Srisailem Tiger Reserve, Kurnool District and Mallelathertham (16°14' N & 78°49' E), Nagarjunasargar-Srisailem Tiger Reserve, Mehaboobnagar District, Andhra Pradesh (Fig. 1).

The present record extends the known range of *Phrynichus andhraensis* Bastawade *et al.*, 2005 to the north of Eastern Ghats by 320 km (aerial distance) north of the type locality in Andhra Pradesh.

Acknowledgements

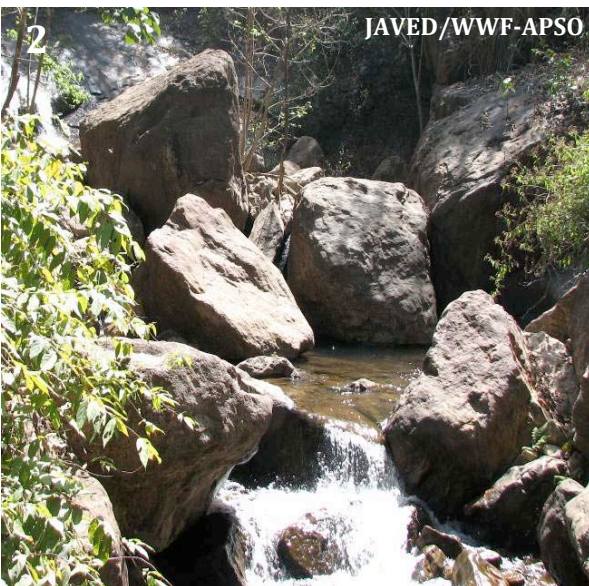
The authors wish to acknowledge the constant support and encouragement received from Sri Anil Kumar V. Epur, Chairman, WWF-AP State Committee and Sri Ravi Singh, Secretary General & CEO, WWF-India, New Delhi. We are thankful to Dr. D.B. Bastawade, Senior Scientist (Retd.) & Dr. N.P.I. Das, Senior Research Fellow, ZSI, WRS, Pune, Maharashtra for providing reference articles and other information. CS acknowledges CSIR, New Delhi for funding and Head, Department of Zoology, Osmania University, Hyderabad for encouragement. Lastly we would like to thank P.S.M. Srinivas, Manager Corporates, WWF-APSO, Hyderabad for exploring new places and opening a new vista for biodiversity studies.

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Images 1-4

1-2. Different micro habitats of whip-spider *Phrynichus andhraensis* at Perantalpally, Papikonda Hills, northern Eastern Ghats, Andhra Pradesh.

3. Dorsal view of whip-spider *Phrynichus andhraensis* Bastawade et al., 2005.

4. Ventral view of whip-spider *Phrynichus andhraensis* Bastawade et al., 2005 pedipalp showing arrangement of spines.

1. Dorsal side of Whip-spider *Phrynichus andhraensis* on the rock at Perantalapally,

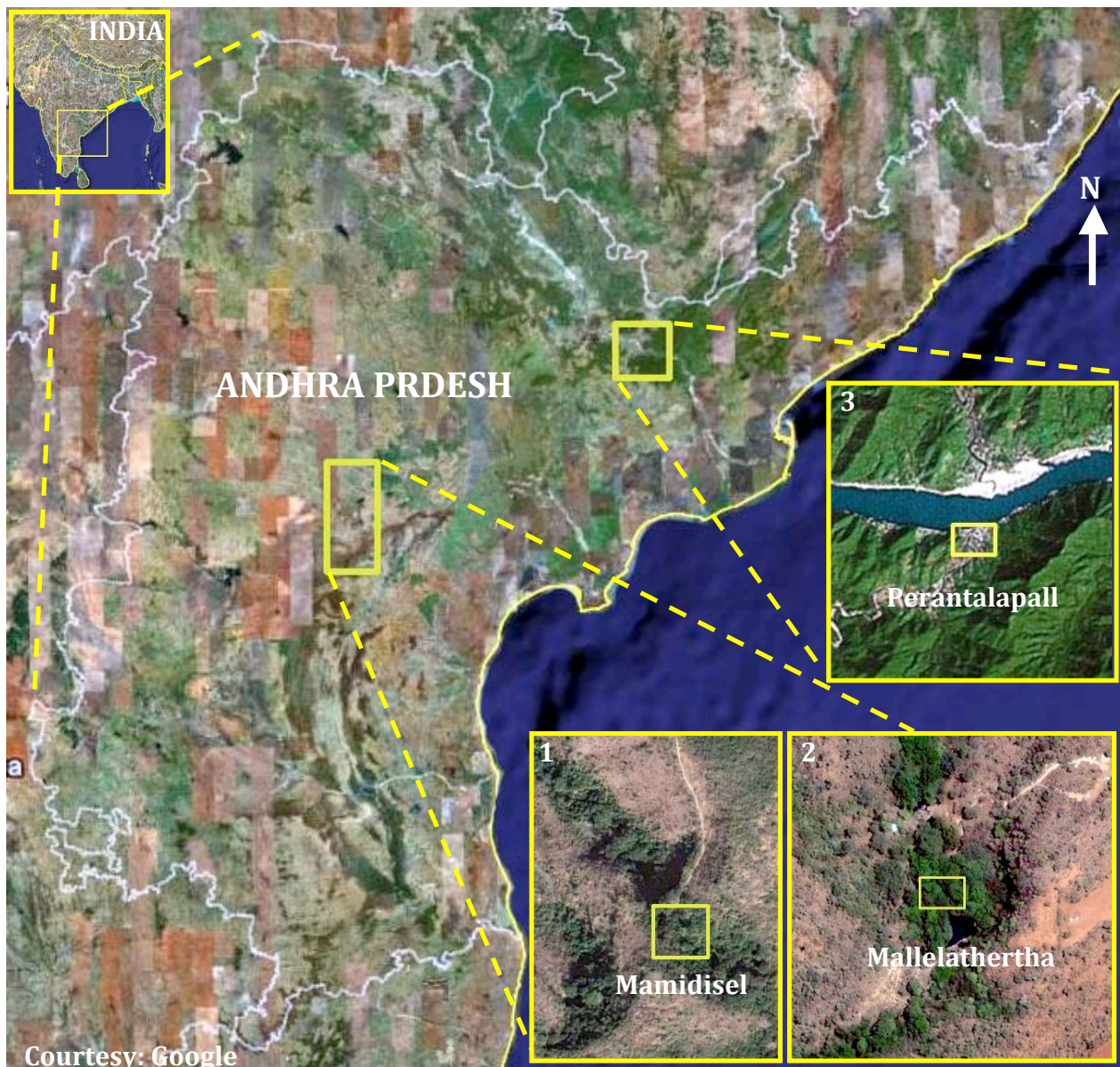


Figure 1: Satellite image showing map (not to scale) depicting three distribution sites of whip-spider *Phrvnichus andhraensis* Bastawade et al. 2005 in the Eastern Ghats of Andhra



New record of Rotifer *Horaella brehmi* Donner, 1949 from Pune, Maharashtra

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The Rotifer fauna of Maharashtra state is inadequately studied. Few attempts have been made from Nagpur, Mumbai and Ujani wetland by some workers. There is need for proper documentation and study of these beautiful invertebrates. Sampling was done using a plankton net (mesh size 55 µm) along the littoral region in a stone quarry, Chinchwad, Pune, Maharashtra (18°39'10.48" N and 73°47'58.35" E).

The sample was immediately observed for live Rotifers under Olympus CH-20i microscope for detailed study. Specimens of Rotifer *Horaella brehmi* Donner, 1949 were observed in the samples. This is new record to Pune district and Maharashtra state as well. *H. brehmi* is a widely distributed species of biogeographical interest (Sharma and Sharma, 2001). *H. brehmi* was first described from Bihar (Donner, 1949) and later the records were limited to the North Indian territories. *H. brehmi* is considered to occur in special waters, but warrants detailed study (Sharma, 1998). This interesting illoricate Rotifer has been recorded in Oxygen depleted (anoxic) regions of a crater lake (Chapman *et al.*, 1998) and was also seen in only one of the floodplains studied in Brahmaputra River (Sharma & Sharma, 2001).

Water parameters as Temperature: 26.3°C, pH: 8.96, Conductivity: 1210 µS/cm, TDS: 0.86 ppt. and Salinity: 0.60 ppt. was checked on-site using Multiparameter PCS Testr 35 (Eutech, Singapore).

Horaella brehmi Donner, 1949

Specimen Examined: (Fig. 1) collected from littoral zone from Stone quarry, Chinchwad, Pune.

Characters: Body is saclike and transparent. On the short neck is placed a single circular ring of cilia. Foot is absent. Cloacal aperture elevated and bulging. Trophi malleoramte, with two large horizontally opposed teeth and 16-17 smaller unci teeth.

Measurements: Total length 190-210 µm, Total width 140-150 µm.

Distribution: Assam, Bihar, Meghalaya, Orissa, Punjab, Tripura, West-Bengal, Uttar Pradesh, Maharashtra (**present record**). *Else where:* Africa, Australia, Oriental, Europe regions.

Remarks: The specimens were smaller in dimensions as compared with those by Sharma (Table 1)

Table 1: Comparisons of Length-Width of *H. brehmi* specimens

<i>Horaella brehmi</i>	Sharma, 1979	Sharma, 1980	Vanjare <i>et al.</i> , 2008
Length (µm)	275	280	190-210
Width (µm)	200	200	140-150

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Figure 1. *Horaella brehmi* Donner, 1949, dorsal view



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Thanks are due to the Head, Department of Zoology, University of Pune and Officer in charge, Zoological Survey of India, Pune for providing necessary facilities. The Grants from UGC/2008 and ISRO-UoP/2007 is duly acknowledged.

Odonate (Insecta) fauna of temporary water bodies of Salem, Tamil Nadu

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The order Odonata of class Insecta, comprising suborders Anisoptera (dragonflies), Anisozygoptera and Zygoptera (damselflies) contains some of the most common insects hovering over water bodies. Six temporary water bodies (TWB) viz., Boominaicken Patty tank, Commonyeri tank, Nallagoundam Patty tank, Kamalapuram tanks one and two and Omalur tank present in the Salem district of Tamil Nadu were sampled for their dragon - and damselflies species composition. Water in all the six water bodies is temporary and stagnant and they dried up during summer months. Sampling was done preceding (July – September, 2006) and after (January – April, 2007) North-East monsoon. Adult dragonflies and damselflies were collected with the help of sweep net by slowly walking around the TWB between 9.00am and 2.00pm. Collected specimens were identified by following the keys given by Fraser (1933, 1934, 1936). A total of 205 individuals (155 dragonflies and 50 damselflies) were collected during the study and they comprised 15 species (11 species of dragonflies and 4 species of damselflies) belonging to 12 gen-

era under 3 families (Table 1). Suborder Anisoptera was represented by two families viz., Gomphidae and Libellulidae and Zygoptera by a family Coenagrionidae. Of the three families, Libellulidae was represented by maximum number of species (10) followed by Coenagrionidae (4 species) and Gomphidae (1 species). Among the 15 species, *Brachythemis contaminata* (Fabricius) (Libellulidae) was dominant among dragonflies and *Ischnura aurora* (Brauer) (Coenagrionidae) among damselflies. Among the TWB, Nallagoundam Patty tank yielded maximum number of species (11) followed by Kamalapuram tanks one and two, Omalur tank, Commonyeri tank and Boominaicken Patty tank. *Diplacodes trivialis* (Rambur), *Orthetrum sabina* (Drury) and *Pantala flavescens* (Fabricius) (Libellulidae) were recorded from all the six TWB while *Tamea limbata* (Desjardins) confined to Nallagoundam Patty tank.

Reference

Fraser, F. C. (1933, 1934, 1936). *The Fauna of British India, Including Ceylon and Burma. Odonata*. Vol. I, II and III. Taylor and Francis Ltd., London.

Table 1. Abundance of dragon- and damselflies in the temporary water bodies of Salem district, Tamil Nadu

Name of the species	Water bodies						Total
	A	B	C	D	E	F	
Suborder Anisoptera							
Family Gomphidae							
<i>Ictinogomphus rapax</i> (Rambur)	-	-	3	2	-	-	5
Family Libellulidae							
<i>Brachythemis contaminata</i> (Fabricius)	2	12	-	-	-	15	29
<i>Crocothemis servilia</i> (Drury)	-	-	4	3	15	2	24
<i>Diplacodes trivialis</i> (Fabricius)	2	1	3	2	8	5	21
<i>Orthetrum sabina</i> (Drury)	2	2	3	2	6	7	22
<i>Pantala flavescens</i> (Fabricius)	2	4	3	2	5	4	20
<i>Tholymis tillarga</i> (Fabricius)	-	-	-	-	7	6	13
<i>Tamea limbata</i> (Desjardins)	-	-	-	-	3	-	3
<i>Tamea basilaris</i> (Palisot de Beauvois)	-	-	1	1	2	-	4
<i>Trithemis aurora</i> (Burmeister)	-	-	-	3	2	-	5
<i>Trithemis pallidinervis</i> (Kirby)	-	3	2	2	2	-	9
Suborder Zygoptera							
Family Coenagrionidae							
<i>Agriocnemis pygmaea</i> (Rambur)	-	-	3	2	-	-	5
<i>Ceriagrion coromandelianum</i> (Fabricius)	-	4	3	4	3	-	14
<i>Ischnura aurora</i> (Brauer)	-	15	-	-	4	4	23
<i>Ischnura senegalensis</i> (Rambur)	-	3	2	-	-	3	8
Total	8	44	27	23	57	46	205

A - Boominaicken Patty tank; B - Commonyeri tank; C - Kamalapuram tank 1; D - Kamalapuram tank 2; E - Nallagoundam Patty tank; F - Omalur tank

On a documentation of Haddon's Carpet anemone (*Stichodactyla haddoni*) (Saville-Kent 1893) (Anthozoa: Actiniaria: Stichodactylidae) and its unique symbiotic fauna from Gulf of Kutch

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Sea anemones are primitive forms belonging to the phylum Cnidaria. The characteristic feature of this group is the presence of nematocysts for protection and prey capture. Sea anemones are known to prey upon many fish species by means of venomous tentacles (Gudger 1941; Mariscal 1966a), but they are also known for their symbiotic association with different fishes (Mariscal 1972; Day 1878), different shrimps (Bruce 1976) and crabs (Biosearch v 1.2, 2009).

One such anemone is *Stichodactyla haddoni* (Fig. 2) which was first described by Saville-Kent in 1893. Reef associate Haddon's anemone occurs in shallow tropical and subtropical seas from the red sea, throughout the Indian Ocean to New Caledonia, Japan to Australia and in Singapore (Dunn 1981, Fautin and Allen 1992, Fautin 2008 and 2009).

The size of *S. haddoni* ranges from 300-500 mm in diameter and rarely more. Broad flat to shallow undulating oral disc is densely covered with hundreds of slightly tapering tentacles. Oral disc around mouth bare, yellowish to orange colored tentacles. Column commonly whitish or brownish with rose or purple colored verrucae; tapering to pedal disc and are much narrower than the oral disc (Dunn 1981, Fautin and Allen 1992).

In Indian coral reef regions *S. haddoni* were recorded from Andaman and Nicobar Islands (Madhu et al. 2007), Gulf of Mannar (Mahadevan and Nair 1965) as well as from Gulf of Kutch (Trivedi 1975 and Parulekar 1989).

In previous literature it was reported as *Stoichactis giganteum* (Trivedi 1975 and Parulekar 1989) which was the synonym of *S. haddoni* as reported from the Andaman and Nicobar Islands (Madhu et al. 2007). In Indian regions *S. haddoni* is reported in association with clown fish *Amphiprion* sp. (Day 1878, Mahadevan and Nair 1965, Trivedi 1974) and with anemone shrimp *Periclimenes* sp. (Schenkel 1902) (Arthropoda: Malacostraca: Decapoda: Palae-monoidea) (Trivedi 1975).

In this present study, attempts were made to ascertain the availability of *S. haddoni* and its symbiotic fauna, habitat,

distribution and abundance from Gulf of Kutch. The Gulf of Kutch forms almost the northern limits of coral formation in the Indian Ocean. It consists of 42 islands at its southern side, 34 of which have corals on one or the other shores. The remainder of the Gulf of Kutch consists of silt and clay with patches of fine coralline sand and the redistribution of sediments from its interactions with tidal currents results in irregular topography of the Gulf (Hashimi et al 1978). Extensive studies were conducted in the coral reef areas of Gulf of Kutch (Fig. 1) such as Mithapur (22° 24'N 68° 58'E), Narara Island (22° 27'N 69° 40'E), Karumbhar Island (22° 27'N 69° 38'E), Goose reef (22° 29'N 69° 49'E) and Munde reef (22° 30'N 69° 50'E). Karumbhar is the largest of 42 islands in the Gulf of Kutch, having an area of around 60km². The reef at Karumbhar Island is platform reef, which contains coralline sand at its bed. The sea bed of Narara reef and Mithapur area was rocky with coralline sand and with luxuriant growth of coral colonies in scattered patches. The sea bed of Munde and Goose reefs were covered with patch type coral formations. The bottom substratum of Munde reef was covered with enormous dead coral pieces and sandy clay (Sen Gupta et al. 2003). Studied reef flat area for Mithapur was around 3km long having 200-250m wide lower intertidal region. About 4km long Narara reef area was accessed which showing largest lower intertidal region of about 400-650m wide. Karumbhar Island and Munde reef possesses 3km and 1km long reef flat area with 100-150m and 200-300m wide lower intertidal region. Goose reef stands unique among the study area as it submerged completely during high tide, about 1km area was studied during low tide. Preliminary surveys were carried out in the above study site from April – May 2010 by snorkeling and visual census was also carried out in the selected sites by laying 100x100m quadrates during low tide to find out the population density. Three quadrates (QI, QII, and QIII) were laid randomly at the interval of 100m in each study site in the lower intertidal region and the observations were recorded (Table 1). Haddon's anemones are found to be restricted to lower intertidal region and in subtidal up to 7-8m accessed depth. Habitat preference by anemones was also observed in intertidal pools having sandy substratum. Under water documentations were

also made by using under water camera. Water visibility was poor at Munde reef due to muddy substratum.

Table 1: Population density of Haddon's anemone (*S. haddoni*) (Total = 26) and its symbiotic fauna (*P. brevicarpalis*) (Total = 37) in different quadrates from the study area (Gulf of Kutch).

Study area	Host anemone (<i>S. Haddoni</i>)				Anemone Shrimp (<i>P. brevicarpalis</i>)			
	Q I	Q II	Q III	Total	Q I	Q II	Q III	Total
Mithapur (Okha)	0	1	2	3	0	2	2	4
Karumbhar Island	3	4	3	10	6	7	4	17
Narara Island	3	4	1	8	4	5	0	9
Goose Reef	0	1	1	2	0	2	2	4
Munde Reef	1	1	1	3	1	0	2	3

The study showed the presence of availability of 26 Haddon's anemone and 37 anemone shrimps (*Periclimenes brevicarpalis*) within the observed quadrates. Maximum density was observed in Karumbhar Island n=10 and at Narara site n=8 with 17 and 9 anemone shrimps respectively (Table 1). Less density of anemones was observed in Mithapur n=3, Goos reef n= 2 and Munde reef n=3 is might be due to more siltation by construction of harbours in the vicinity of these reef areas (Sen gupta et al. 2003). Anemone shrimps (*P. brevicarpalis*) were mostly found in a pair with the host anemone (Fig. 3). Host anemone with single anemone shrimp (male and female) was also reported (Fig. 4, Fig. 5). Sexual dimorphism can be easily done, because berried or white patched female is larger than the transparent male ones.

In our present study *P. brevicarpalis* was documented as a symbiotic fauna of *S. haddoni* from the above selected study area. In previous literature, Clown fish *Amphiprion polymnus* were recorded from Mithapur area as a symbiotic fauna associated with *Stoichactis giganteum* (Trivedi 1975). No other study/literature was recorded from the above study region after 1975 related to the symbiotic association of *Amphiprion* sp. and the host anemone. Our present study reveals that the *P. brevicarpalis* was documented as a unique symbiotic fauna of Haddon's anemone from Gulf of Kutch. Association of anemone with *Amphiprion* sp. was not observed during the entire study. Absence of symbiotic anemone clown fishes was probably due to the anthropogenic activities carried out in the Gulf of Kutch region in recent periods. More detailed sub-tidal diving is required to create a baseline data and to gain the knowledge of species diversity, status of population and identification of potential areas are of prime importance in effective management and conservation of reef associated faunal resources.

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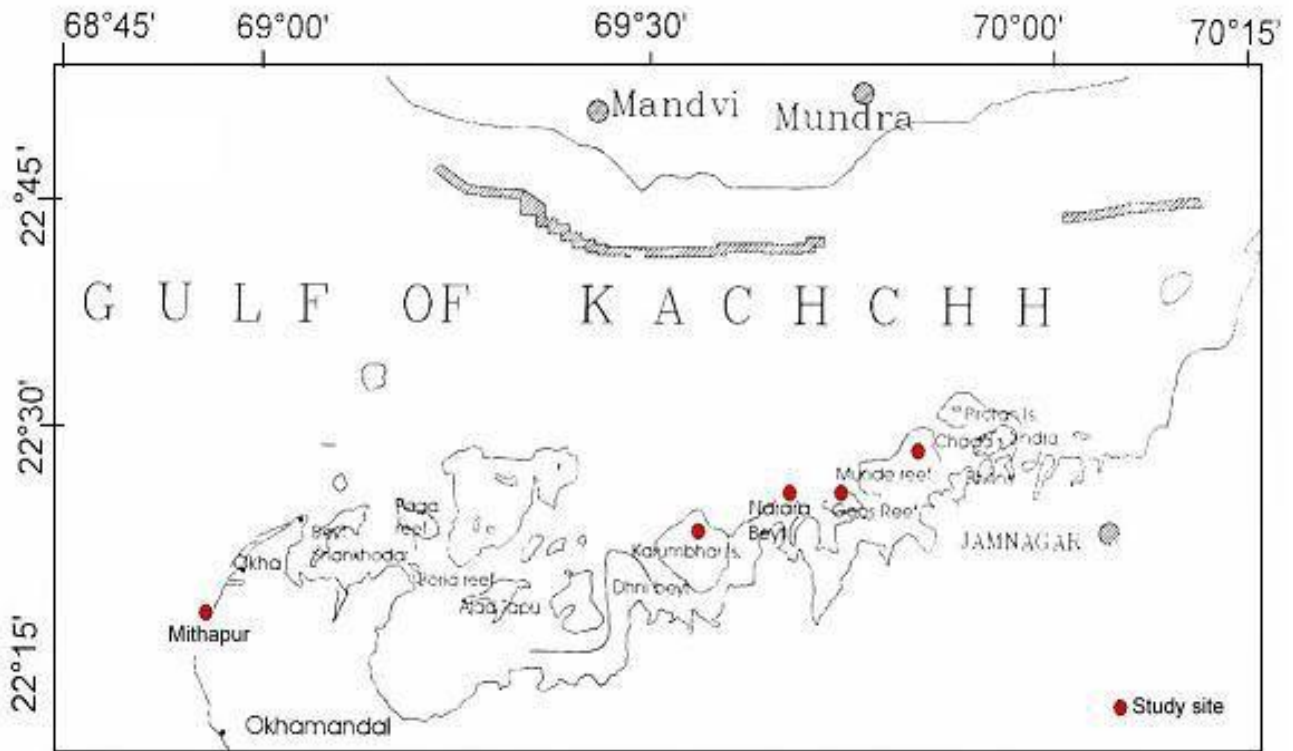


Figure 1: Study area from Gulf of Kutch (Source Sen Gupta et al., 2003)



Figure 2: Haddon's Sea anemone *Stichodactyla haddoni* from Mithapur.
Photo: Unmesh Katwate



Figure 3: Presence of anemone shrimp *Periclimenes brevicarpalis* (in pair) with its host anemone *S. hadoni* from Karumbhar Island.

Photo: Unmesh Katwate



Figure 4: Presence of anemone shrimp *P. brevicarpalis* (Male) with its host anemone from Mithapur

Photo: Unmesh Katwate



Figure 5: Presence of single anemone shrimp (Female) *P. brevicarpalis* with its host anemone from Narara Island

Photo: Unmesh Katwate

Further records of *Argyrodes flavescens* (Araneae: Theridiidae) from Andhra Pradesh, India

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Spiders of the genus *Argyrodes* Simon, 1864 (commonly called as *Argyrodes* or Silver dew drop spiders) are commonly found hanging upside-down in the webs of other araneid spiders including species belonging to the genera *Argiope*, *Cyrtophora* and *Thelacantha*; Nephilid spiders including species belonging to the genera *Nephila* and *Herennia*. Though the genus *Argyrodes* is predominantly kleptoparasitic, it does occasionally exhibit commensalism and predation with its host, the relation being dependent on factors like size and feeding rate of the host, and morphology of the web. They live in their host webs without constructing any web of their own, but often they add fine lines between the spirals of the host's web. Occasionally they live independently making their own theridid webs (Exline and Levi 1962).

So far fifteen species of the genus *Argyrodes* have been reported from India (Tikader 1966, Jose 2005, Siliwal and Molur 2007, Javed et al. 2010). Recently, Javed et al. (2010) reported the presence of three species of the genus *Argyrodes* from Andhra Pradesh. Through this paper we report the extension of range of *Argyrodes flavescens* in Andhra Pradesh, India.

Argyrodes flavescens is commonly known as red silver spider and it has been recorded as a kleptoparasite in the webs of Araneids and Nephilids. When alive they are orange in color (Fig. 1) but turn reddish brown on preservation. The legs are black and the fourth tarsus is often yellow and the femora sometimes with yellow annulations. Abdomen has several pairs of silver spots on the dorsal and lateral surfaces and with two black spots on the top and at the posterior end (Akio et al. 1996). Clypeal projection slender, extending anteriorly, but slightly equal or shorter than head. Females are similar to males in coloration, but do not possess cephalic projection. They are comparatively bigger in size than males.

The species *Argyrodes flavescens* is reported from Andhra Pradesh for the first time from the banks (18°16'N & 83°02'E) of river Gosthani near Borra caves, Ananthagiri mandal, Vishakhapatnam District (Javed et al. 2010). Recently, we have observed and collected specimens from the Godavari River Basin Forests in Tadicherla (18°33'N &

79°51'E), Karimnagar district and Tekulaboru (17°39'N & 81°13'E), Khammam district (Fig 2). The collected specimens have been preserved in 70% alcohol and deposited in the Natural History Museum of Osmania University and were identified following Sebastian & Peter (2009) and Javed et al. (2010). The specimen from Tadicherla was found on the web of *Cyrtophora* sp. while that from Tekulaboru was on the web of *Nephila pilipes*. At the later locality *Argyrodes flavescens* was observed to be very aggressive and as has been Koh and Li (2002) was observed to steal freshly captured prey items from the host and damage host webs.

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Figure 1. *Argyrodes flavescens* from Tekulaboru, Khammam District, Andhra Pradesh



Figure 2. Distribution of *Argyrodes flavescens* Andhra Pradesh (Green Open Circle, earlier report *vide* Javed et al. 2010; Blue Open Circle, new distribution records)

New distributional record of *Scolia (Discolia) binotata binotata* Fabricius (Hymenoptera: Scoliidae) from Assam and Tripura, India

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During studies of the collections of Scoliidae present in the Hymenoptera Section of Zoological Survey of India, Kolkata (NZSI), I found two new records of the taxon *Scolia (Discolia) binotata binotata* Fabricius: one from Assam and one from Tripura. Jonathan & Gupta (2000) listed the scoliid species from Tripura and Gupta & Jonathan (2003) published on the fauna of the Scoliidae of the Indian subregion. Kumar (2009) reported further distributional record of this species from Andhra Pradesh. This short communication is intended to report the extended distribution of this taxon to Assam and Tripura.

Scolia (Discolia) binotata binotata Fabricius

Scolia binotata Fabricius, 1804, Syst. Peiz: 244. Male, Tranquebar (Type in Copenhagen Museum).

Scolia (Discolia) cucullata Bingham, 1897, Fauna British India, Hymn., 1:82. Female, Sikkim, West Bengal (Types in British Museum).

Scolia quadripustulata var. *binotata* Fabricius: Bingham, 1908, Rec. Indian Mus., 2(4): 352, Male, Sri Lanka.

Scolia (Discolia) binotata binotata Fabricius: Krombein, 1978, Smithsonian Contr. Zool., 283: 41-43. Female, Male; Sri Lanka.

Material examined: 1 male, 23-24.v.1979, Dehangi, N. Cachar, Assam, India, Coll. S.B. Roy & Party, In NZSI, 10098/H3; 1 male, 25.v.1978, Ambassa, Tripura, India, Coll. A. Issar, In NZSI, 10099/H3.

Diagnosis: Male. Length 11-17 mm. Body black, usually third and fourth tergites with paired, rounded, light red spots, sometimes only third or fourth tergites with such spots, rarely gaster entirely black. The males from eastern

Himalaya and northeast India having, sometimes, red marks on frons, vertex and scapula. Vestiture black mixed with white on head and thorax anteriorly, legs and ventral side of abdomen predominantly white. Wings dark brown at base and paler at apices with bluish purple effluence.

Distribution: India: Andhra Pradesh, Arunachal Pradesh, Assam, Delhi, Karnataka, Kerala, Manipur, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand and West Bengal. Sri Lanka.

Remarks: This is the first report of *S. (D.) binotata binotata* from Assam and Tripura.

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