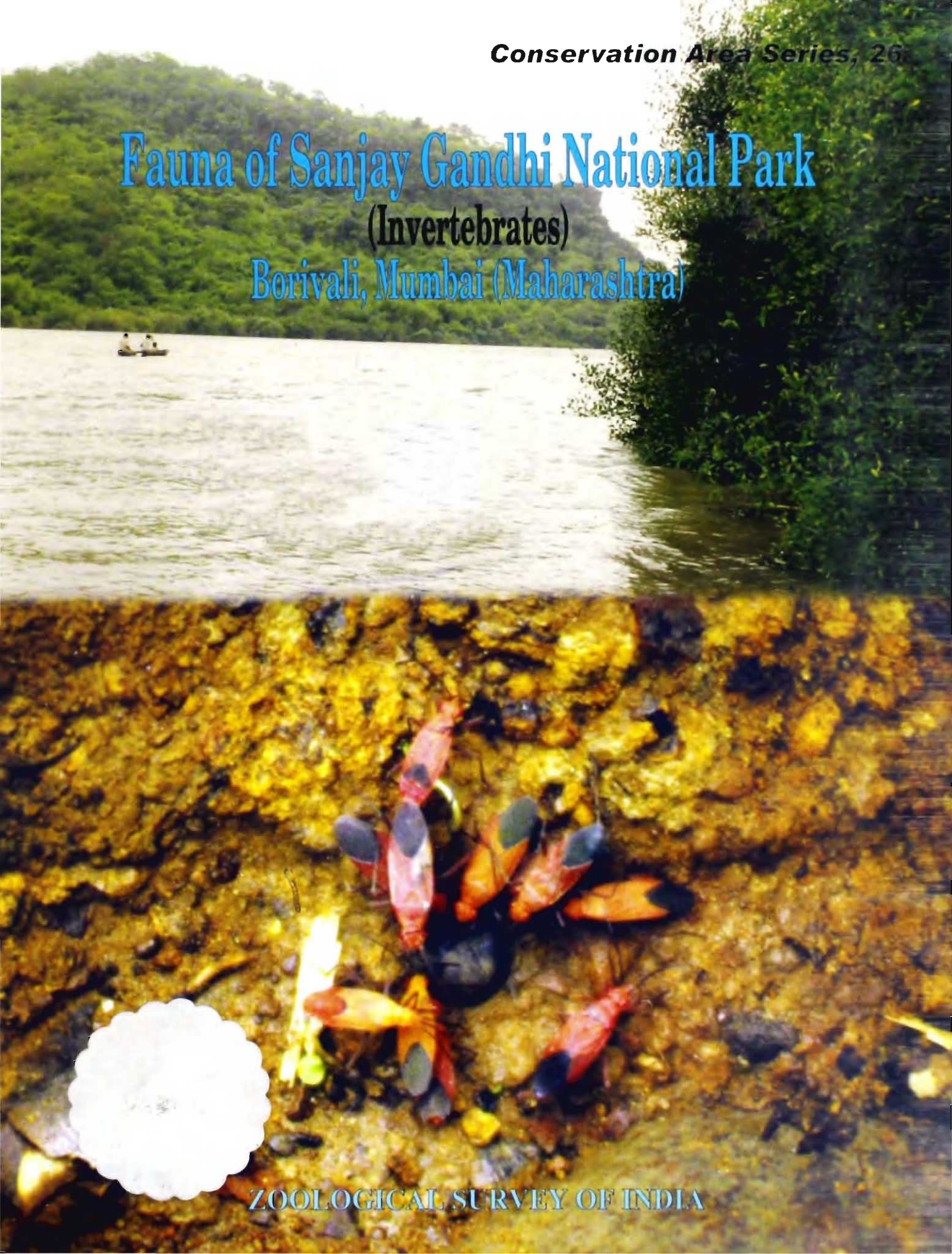


Conservation Area Series, 26

Fauna of Sanjay Gandhi National Park

(Invertebrates)

Borivali, Mumbai (Maharashtra)



ZOOLOGICAL SURVEY OF INDIA

Conservation Area Series, 26

Fauna of Sanjay Gandhi National Park (Borivali, Mumbai)

Edited by the Director, Zoological Survey of India, Kolkata



**Zoological Survey of India
Kolkata**

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**Fauna of
SANJAY GANDHI NATIONAL PARK
(Borivali, Mumbai)**

Conservation Area Series

NO. 26	2006	1-188
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SANJAY GANDHI NATIONAL PARK - AN OVERVIEW

M. S. PRADHAN

Zoological Survey of India, Western Regional Station, Rawet Road, Pune-411044

INTRODUCTION

Amongst the four National Parks in Maharashtra State, Sanjay Gandhi National Park (previously known as Krishnagiri Upawan and later as Borivali National Park) is a beautifully preserved green oasis within the confines of Mumbai Metropolis and the adjacent Thane Dist. Sanjay Gandhi National Park (SGNP) is situated at about 25 kms north of Mumbai city and is only 8 kms from the shores of Arabian Sea. The park exhibits unbelievable diversity of terrain from 30 m to almost 500 m above mean sea level and presents varied habitats ranging from coastal to typical dry and mixed deciduous forests of northern western ghats. It boasts of two large water bodies (Tulsi and Vihar lakes) (Fig. 1) with a combined water spread area of about 8.62 sq. kms and also of a number of 2000 years' old Buddhist caves (104 caves) popularly known as Kanheri caves. The two lakes form one of the major sources of drinking water for Mumbai Metropolis, while Kanheri caves attracts huge masses of tourists every year. Besides, the National Park has been a heaven for field biologists and naturalists since its inception in 1952.

Due to its proximity to Mumbai city, SGNP is one of the most highly visited National Parks in India. SGNP spreads over 103.97 sq. kms and lies at the northern part of the rich forest belt of the Western Ghats. The entire park is hilly and undulating with a few stretches of plain lands. The salient features of SGNP are as follows :

1. Location : Mumbai, Maharashtra State.
2. Longitude : 72°53'E to 72°58"E
3. Latitude : 19°8.8'N to 19°21'N
4. Distance from CST Rly. Stn., Mumbai : About 35 km
5. Distance from CST Airport, Mumbai : About 20 km
6. Distance from Borivali Rly. Stn. : About 3 km

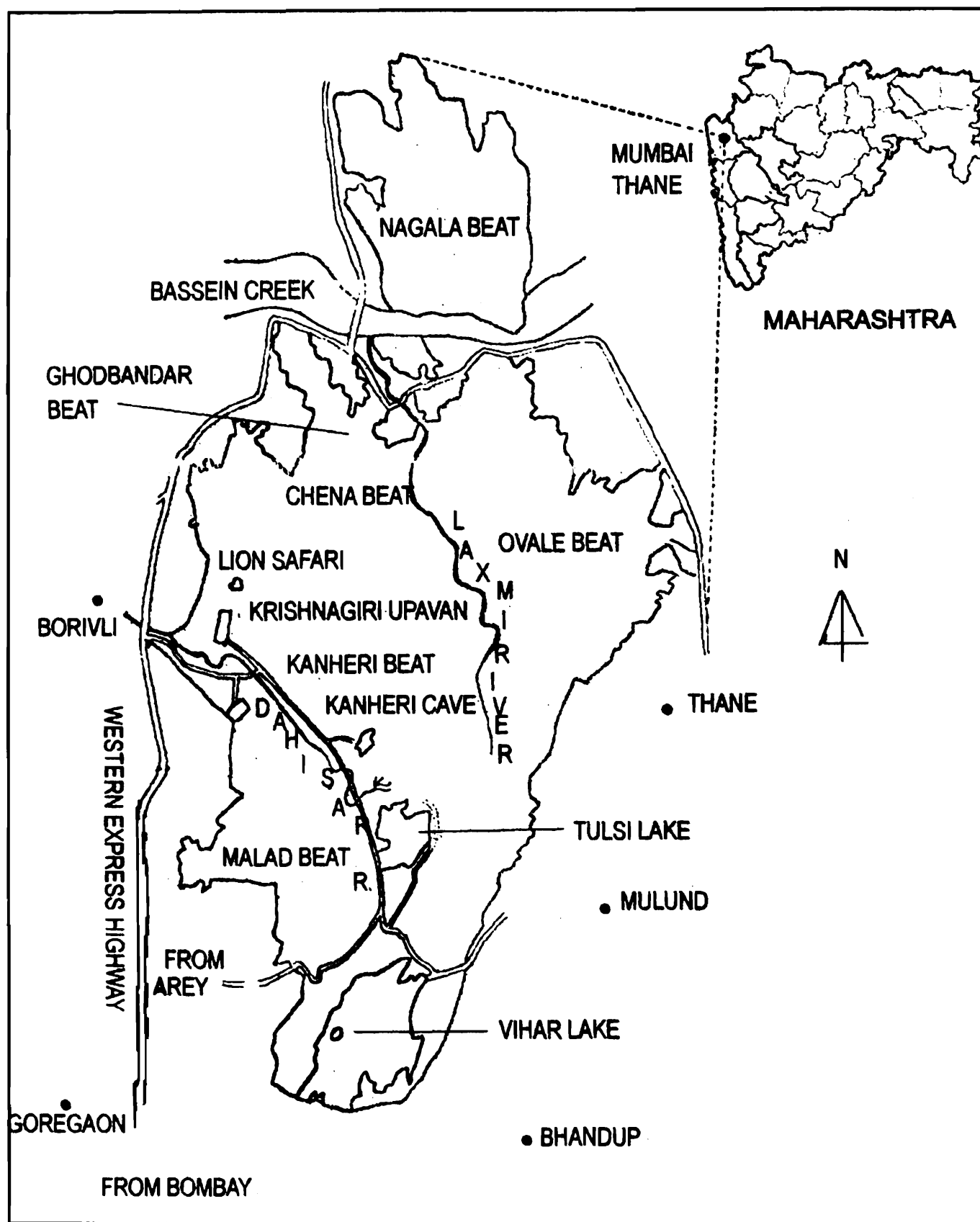


Fig. 1. Map of Sanjay Gandhi National Park, Borivali

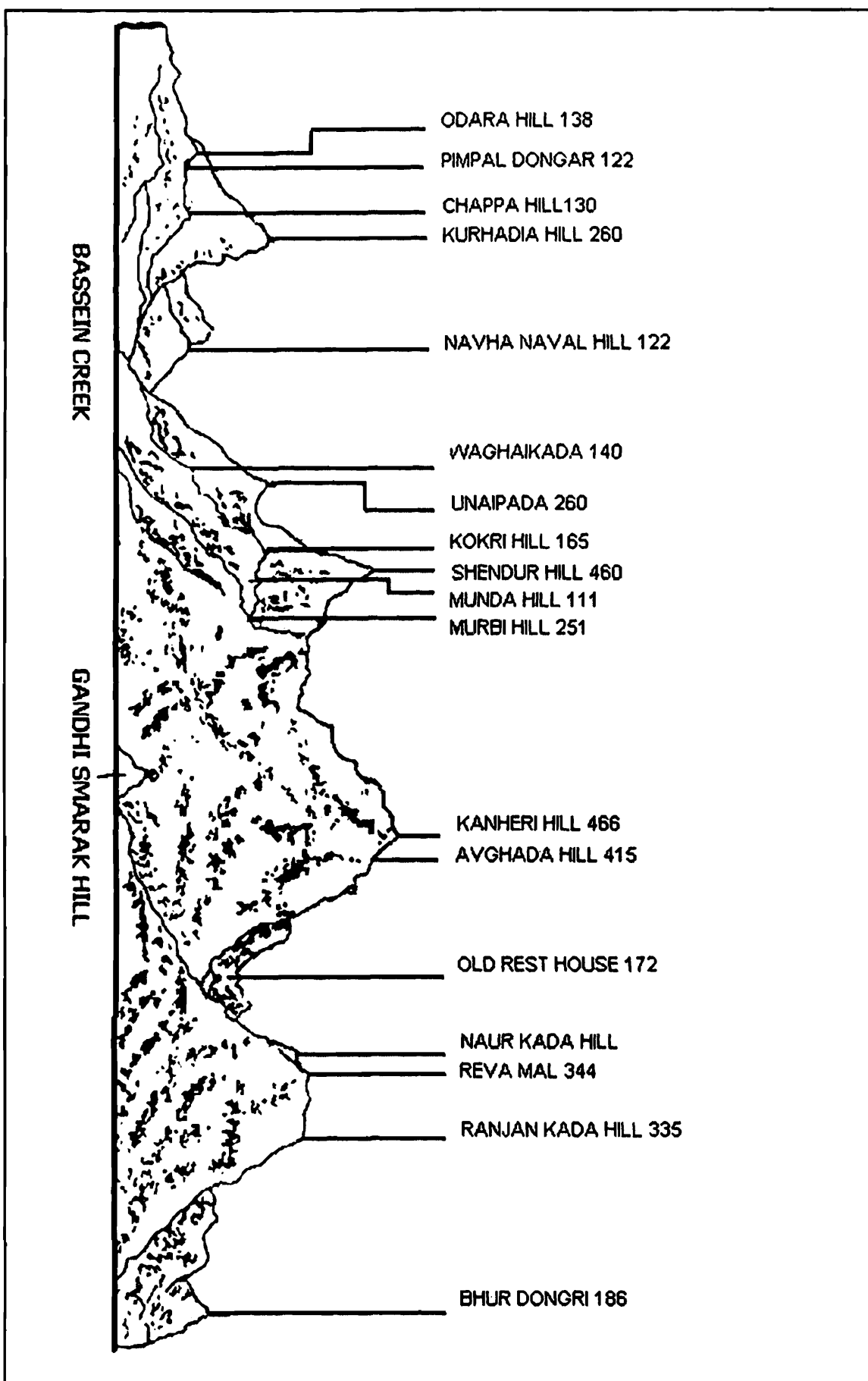
7. Total Area : a) Mumbai suburban Dist. : 44.45 sq. km
b) Thane Dist. : 58.64 sq. km
C) Total Area : 103.09 sq. km
8. No. of compartments : 38 compartments
9. Ranges with area : a) Krishnagiri Upwan, 5.88 sq. km
Borivali Range
(Recreational Sector)
b) SGNP Range 38.59 sq. km
c) Yeur Range 58.62 sq. km
10. Gazette Notification : (A) Maharashtra State Revenue and Forest Dept.
Notification : G.R. No. PGS/1072/73915/F-1, dt. 31.1.1976 for declaration of about 68.977 sq.km. area in Borivali National Park.

(B) Subsequent amendments and change in name : WLP 1094 or 177/F-1, dt. 16.1.1995. Present area : 103.09 sq km. Current Name : Sanjay Gandhi National Park.
11. Boundaries : The Southernmost boundary of the SGNP is formed by the Shores of Vihar lake, the Eastern by the township of Bhandup, Mulund and Thane and the Western boundary by Goregaon, Malad, Kandivali and Borivali suburbs of Mumbai. The Northern boundary extends beyond Bassein Creek and it includes Nagla forest block.
12. Biogeographic zones (as described by Wildlife Institute of India) :
SGNP falls in three provinces of two biogeographic zones of India :
- I. Zone 5 : (A) : Malabar Coast
(B) : Western Ghat Mountains
- II. Zone 10 (A) : Western Coast
13. Rivers and Drainage : Dahisar, Rewat and Laxmi rivers forms the major sources of the drainage for the entire park area. The heavy precipitation received during rains is released gradually through springs, streams and nallahs in these

rivers, two lakes and the creek. Bassein creek divides SGNP into two unequal parts (1) smaller Nagla Block in North and (2) Larger : Main Borivali Block in South (Fig.1).

14. Topography : The terrain of SGNP is mostly hilly in nature culminating into a series of peaks dispersed through the park (Fig.2). These terrains are the outspurs of Sahyadri mountain ranges (Northern Western Ghats). The area forms a part of Deccan Trap Basalt. Kanheri caves have been carved on a huge rock of black mountain known geologically as Volcanic Breccia.
15. Altitudinal Range : From 30–500 m above mean sea level.
16. Climate : Sultry weather in summer is a characteristic climate of this region with moderate rainy and winter seasons. The temperature ranges between 3.9°C (Winter) to 47.8°C (Summer).
17. Rainfall : Approx. 1000 to 1100 mm. Per Annum.
18. People : A tribal community named “Warlis” resides in this region. The population is distributed in well-separated small hamlets. However, the park is under heavy and serious pressure of deterioration by the urban population encroachments and huge masses of visitors particularly in the recreation sector and Kanheri Caves Zone. This results in exceeding of the tourist carrying capacity of the Park ecosystem leaving behind the deleterious effects.
19. Administration : SGNP is under the administrative control of Dy. Conservator of Forests, SGNP, Borivali (East), Mumbai-400066. Different types of Rest Houses are available within the Park area. Office of Dy. Cons. of Forests, SGNP, Mumbai can be approached well in advance for reservations.
20. Forest Types : The Principal vegetation corresponds to the Southern Indian Moist Deciduous type of forest interspersed with pockets of semi-evergreen in places like Jambulmal and Pavamal on Kaheri Hills and in some portions of Nagla block forests. The mangrove type vegetation along the tidal Bassein Creek can also be seen. Five types of forests have been recorded : (1)

Fig. 2. Series of peaks dispersed through the peak



Tropical Moist Deciduous Mixed Fores, (2) Southern Indian Moist Deciduous Forest, (3) Pockets of Semievergreen Forests, (4) Western Tropical Hill Forest and (5) Mangrove scrub Forest. The flora of SGNP chiefly consists of 88 species of lignous trees, 38 of moderate tree types, 24 of various types of grasses and number of species of herbs, shrubs and climbers.

21. Fauna

: Earlier studies have revealed that SGNP is very rich in faunistic composition. The isolated past reports (Abdulali, 1981; Monga, 1986; Deoras, 1987; Singh and Yazdani, 1988; Yazdani, Pradhan and Singh, 1992 and Pradhan, 2002) and studies carried out for preparation of the Management Plan for SGNP (Punetha, 1992) and Environmental Assessment Report by ECONET, Pune (Paranjape, 1997) record 59 species of mammals, 299 of birds, 52 of reptiles, 14 of amphibians and 60 species of fishes. Besides, it is also necessary to mention here that considerable work has been done on butterflies species from SGNP by Bombay Natural History Society.

Table 1. : Faunal Diversity reported from S.G.N.P., Mumbai (Invertebrate)

Group	Order	Family	Subfamily	Genus	Species
Mollusca	1	7	5	9	15
Arachnida					
Phalangida	1	2	2	2	2
Scorpionida	1	3	2	4	5
Araneae	1	18	—	40	61
Amblypygi	1	1	—	1	13
Chilopoda					
Scolopendromorpha	1	1	2	5	8
Insecta					
Odonata	1	7	11	19	27
Homoptera	1	2	2	9	14
Diptera	1	2	—	—	8
Lepidoptera	1	8	—	91	138
Mantodea	1	4	8	11	16

Though vertebrate and butterflies species from SGNP have been well-documented, no precise attempt has been made in past to explore the invertebrate fauna of this region. Taking note of the results achieved so far from the observations made on the chordate and butterflies components, it was decided by Zoological Survey of India to initiate studies in SGNP to prepare invertebrate inventories also. A Project on Invertebrate Fauna of SGNP, Mumbai, was assigned to Zoological Survey of India, WRS, Pune. The Project was initiated in April 2000 and was completed by April 2003 after conducting nine faunistic surveys of the region.

The taxonomic studies carried out so far resulted in the systematic account on eleven invertebrate groups. The present document includes some of the groups like Mollusca, Arachnida, Scolopendromorpha, Odonata, Diptera, Homoptera, Lepidoptera, Mantodea etc. (Table 1).

The document will be worthwhile for those who are keen to learn about the lesser charismatic but ecologically important invertebrate species from SGNP. This important account in addition to the valuable information published in past on vertebrate species will definitely help in improving the image of Sanjay Gandhi National Park more as a Wildlife Protected Area (National Park) rather than as a centre of tourist attraction.

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PRADHAN : *An Overview*



A view from Tulsi Lake, SGNP, Borivali, Mumbai



A view of deciduous forest patch in SGNP, Borivali, Mumbai



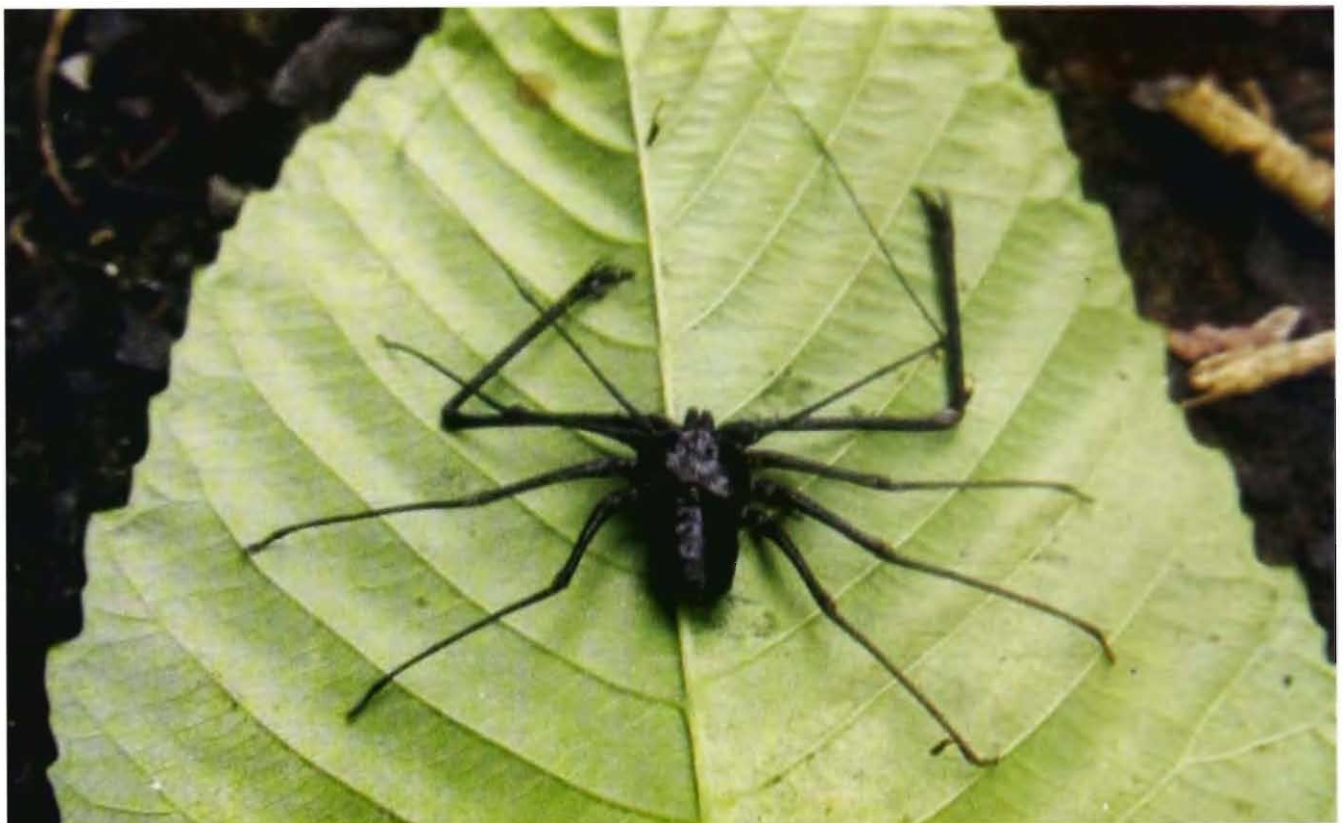
A view Vasal creek showing thick growth of coastal Mangrove forest



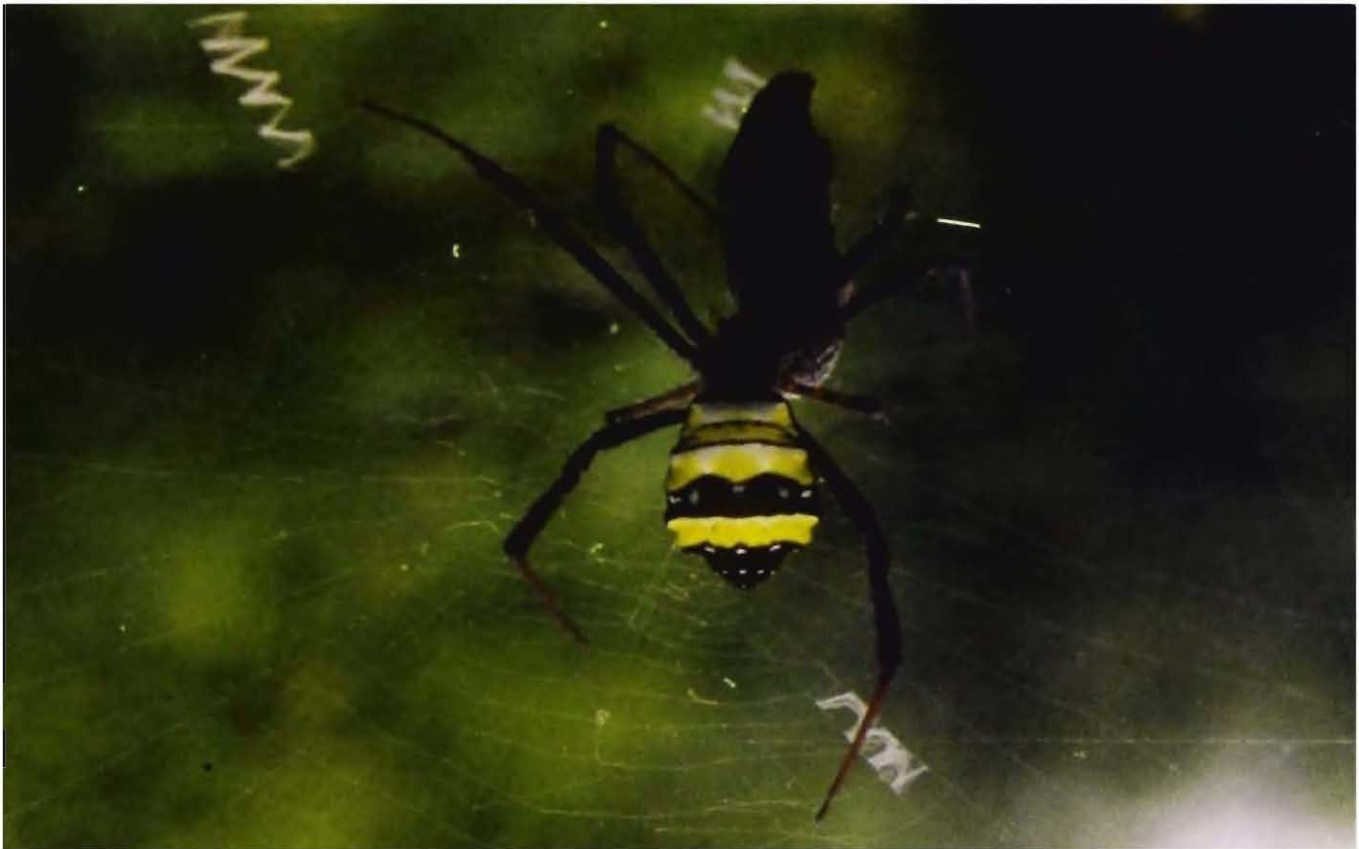
A front close up view of a land species of Crab, camouflaging with littoral substratum



A Lithophilous rock dwelling Scorpion *Neoscorpiops tenuicauda* (Pocock), (Scorpionida : Scorpiopsidae), reported for the first time



A freshly collected Amblypygid female of *Phrynichus phipsoni* (Pocock), (Amblypygi : Phrynichidae), a common species through Western Ghats



A close up view female spider *Argiope aemula* Walkenaer (Araneae : Araneidae) on its insect catch on the web, feeding



An Eresid spider of species *Stegodyphus sarsinorum* (Karsch), a gravid female about to start its separate web from the rolling of leaf



An arboreal spider species *Poecilotheria regalis* Pocock, (Araneae : Theraphosidae) preferably choose to stay in the hole/pit on the teak plant trunks, common in Western Ghats



A ground dwelling lycosid spider seen at the entrance of the tube tunnel, the web spread out side is covered with dew drops in the early morning hours



A clubionid spider species *Cheracanthium daneli* Tikader inhabiting through the tall grasses of the park area exclusively chooses the broad grass blade to prepare brooding pouches, lays eggs and stays in the pouch until young are hatched out.



An Oxyopid spider females of *Paucetia viridana* (Stoliczka) prefers to inhabit the Ghost plants of the park area and changes body colors as the changes in the plant leaves as per season

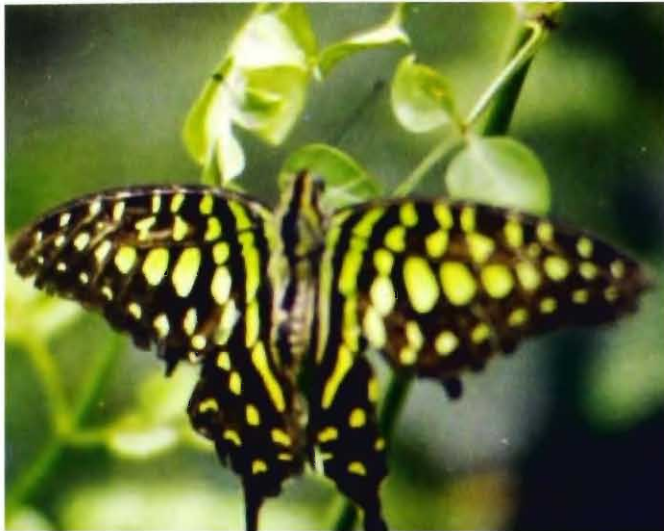
PRADHAN : *An Overview*



A huge gathering of Palpatore Phalangids species on road side cuttings near Tulsi Lake



A pair of male and female of an Orthopteran species found on the stick of tall grass on the way to Tulsi Lake



A Tailed Jay *Graphium agamemnon* Linn.
Butterfly, resting on a wild plant



A Tawny Coster *Acraea terpsicore* (Linn.)
Butterfly resting on a Jasmin flower for honey



A group of Pyrrochorid bugs (Hemiptera :
Insecta) probably feeding on dead insect



A Hemipteran bug resting on stick of wild
plant for laying eggs in a cocoon (white)

MOLLUSCS

S.G. PATIL

Zoological Survey of India, Western Regional Station, Rawet Road, Pune-411044

INTRODUCTION

Freshwater and few land Mollusca have been studied from the Sanjay Gandhi National Park, Borivili, Mumbai. Out of the four National parks in Maharashtra State; this park is preserved within an urban industrial area of Mumbai. This park is situated in the limits i.e. Thane and partly in Bombay Suburban district 25 kms north from heart of Bombay city. The total area of the park is 103.09 sq. kms with rich and diverse vegetation. The vertebrate fauna of park includes fishes, mammals, birds, reptiles and amphibians. The Tulsi and Vihar lakes catchment areas also adds to the beauty of this National park which are in the lower westerly reaches of Krishnagari Upwan. Two rivers viz. Dahisar and Laxmi flow in the Park.

In the present study mainly freshwater and few land mollusca have been studied. In all 15 species have been reported from this region on the basis of present collection. Perusal of literature reveals that many workers attempted to study the non marine Molluscan fauna of Maharashtra. Mentioned must be made of Preston (1915), Annandale and Prashad (1919), Hora (1926), Tonapi and Mulherkar (1963), Tonapi (1971), Subba Rao (1989), Subba Rao and Mitra (1975, 79), Surya Rao *et al.* (2002) and recently Patil (2003) Patil & Talmale (2003), Patil and Ramakrishna (2005) & Patil *et al.* (2006).

SYSTEMATIC LIST

Phylum MOLLUSCA

Class GASTROPODA

Subclass PROSOBRANCHIA

Order MESOGASTROPODA

Family VIVIPARIDAE

Subfamily BELLAMYINAE

1. *Bellamya bengalensis f. typica* (Lamarck)

2. *B. bengalensis f. doliaris* (Gould)

3. *B. bengalensis f. annandalai* (Kobelt)

Family PILIDAE

4. *Pila globosa* (Swainson)

5. *Turbinicola saxea* (Reeve)

Family THIARIDAE

Subfamily THIARINAE

6. *Thiara (Thiara) scabra* (Mueller)

7. *Thiara (Tarebia) lineata* (Gray)

8. *T. (Melanoides) tuberculata* (Mueller)

Order BASOMMATOPHORA

Family LYMNAEIDAE

9. *Lymnaea (Pseudosuccinea) acuminata f. typica* (Lamarck)

10. *L. (P) luteola f. typica* (Lamarck)

Family PLANORBIDAE

Subfamily PLANORBINAE

11. *Gyraulus convexisculus* (Hutton)

Land Mollusca

Class GASTROPODA

Order MESOGASTROPODA

Family CYCLOPHORIDAE

12. *Cyclophorus indicus* (Deshayes)

13. *C. (Litostylus) involvus* (Mueller)

Family ARIOPHANTIDAE

Subfamily ARIOPHANTINAE

14. *Cryptozona bistrialis* (Beck)

Subfamily MACROCHLAMYDINAE

15. *Macrochlamys (M) tenuicula* H. Adam

SYSTEMATIC ACCOUNT

Class GASTROPODA

Order MESOGASTROPODA

Family VIVIPARIDAE

Genus *Bellamya* Jousseaume 18861. *Bellamya bengalensis f. typica* (Lamarck)**Banded pond snail**1822. *Paludina bengalensis* Lamarck. *Hist. nat. Anim. Sans. Vert.*, 6, 2 : 1741921. *Vivipara bengalensis* Annandale. *Rec. Indian. Mus.*, 22 : 2671980. *Vivipara bengalensis* form *typica* (Lamarck) Subba Rao, Das and Mitra. *Rec. zool. Surv. India*, 77 : 225, p. 1, fig. 5.

Material examined : 20 exs., Sanjay Gandhi National Park, Mumbai, 31.xii.1995, Coll. S.G. Patil; 2 exs., Kanheri Cave Sanjay Gandhi National Park, Borivili, Mumbai, 19.viii.1995, Coll. R.H. Kamble.

Distribution : India : Maharashtra, Sanjay Gandhi National Park, Mumbai. Common throughout rest of India.

Elsewhere : Bangladesh, Myanmar, Sri Lanka.

Status : Most common throughout.

Remarks : Annandale (1921) recognized 11 forms under this species on difference in shell of which 3 forms found in Maharashtra, Pune. This species is used as food in some part of Eastern India.

2. *Bellamya bengalensis f. doliaris* (Gould)1843. *Paludina doliaris* Gould. *Proc. Bost. Soc. Nat. Hist.*, 1 : 144.1989. *Vivipara bengalensis* (Lamarck) Race *doliaris*, (Gould) Subba Rao. *Handbook Freshwater Mollusca of India* : 47. Pp 289.

Material examined : 2 exs., Tulsi lake, Sanjay Gandhi National Park, Mumbai, 19.iii.2001, Coll. R.M. Sharma.

Distribution : India : Maharashtra : Sanjay Gandhi National Park, Borivili, Madhya Pradesh, Orissa.

Elsewhere : Myanmar.

Remarks : It differs from *typica* being smaller in size more conical also biangulate at body whorl. It was reported to choke water supply system in Calcutta and Nagpur (Subba Rao, 1993).

3. *Bellamya bengalensis f. annandalai* (Kobelt)

Vivipara annandalai Kobelt. *Malak. Ges.*, Frankfurt, **60** : 161–162.

1921. *Vivipara bengalensis* Phase *annandalai*, Annandale & Sewell. *Rec. Indian Museum*; Calcutta, **22** : 276, pl. 2, figs. 5-8.

Material examined : 2 exs., Sanjay Gandhi National Park, Mumbai, date 31.xii.1995, Coll. S.G. Patil; 2 exs., Kanheri Cave, Sanjay Gandhi National Park, Mumbai 19.viii.1995, Coll. R.H. Kamble.

Distribution : India : Maharashtra, Sanjay Gandhi National Park, Borivili, Andhra Pradesh Bihar, Orissa, Rajasthan, Tamil Nadu and West Bengal.

Remark : Shell usually thinner, translucent with steadily increasing whorls which are less rounded and straight sided.

Family PILIDAE

Genus *Pila* ROEDING, 1798

4. *Pila globosa* (Swainson)

1822. *Ampullaria globosa* Swainson. *Zool. Illustrations* vol. 2 pl. CXIX. *Type locality* : Rivers of India.

Material examined : 2 exs., Tulsi Lake, Sanjay Gandhi National Park, Borivili, date 27.ii.1997, Coll. D.B. Bastawade.

Distribution : India : Maharashtra : Sanjay Gandhi National Park, Borivili, Assam, Bihar, Madhya Pradesh, Orissa, Uttar Pradesh & West Bengal.

Remarks : Many larval trematodes were recorded from this species. These appear to have little less inflated whorl, more conical spine and sub canaloculate sutures.

Genus *Turbinicola* Annandale & Prashad, 1921

5. *Turbinicola saxea* (Reeve)

1856. *Ampullaria saxea* Reeve. *Conch. Icon.*, 10, *Ampullaria*, pl. XXII, fig. 108. *Type Locality* : Stream near Khandala (Prashad, 1925)

1925. *Turbinicola saxea* Prashad. *Mem. Indian Mus.*, **8** : 87, pl. XIV, figs. 10–12. *Type* : B.M. (NH).

Material examined : 3 exs., Rest House, Sanjay Gandhi National Park, 23.viii.1995, Coll. R.H. Kamble.

Distribution : India : Maharastra : Sanjay Gandhi National Park, Borivili, Bombay-Pune highway road at altitude between 2500 to 3000 feet Khandala, Igatpuri, Western Ghats.

Family THIARIDAE
Subfamily THIARINAE
Genus *Thiara* Roeding, 1786

6. *Thiara (Thiara) scabra* (Mueller)

1774. *Buccinum scabrum* Muller. *Hist. Verm. Ten Fluv.*, 2 : 136. *Type locality* : Tranquebar.

1850. *Melanta acanthica* Lea. *Proc. Zool. Soc. Lond.*, P. 194.

1973. *Thiara (Thiara) scabra* Pace. *Malac. Review suppl.*, 1 : 52, pl. 12, figs. 1,2 pl. 13, fig. 3.

Material examined : 2 exs., Tulsi lake, Sanjay Gandhi National Park, Mumbai, 31.xii.95, Coll. S.G. Patil.

Status : Common throughout India except Kashmir.

Distribution : India : Maharashtra : Sanjay Gandhi National Park, Borivili Common throughout except Kashmir.

Elsewhere : Coasts of Indo-Pacific, from Zanzibar to New Hebrides, North to the Philippines, various Pacific Islands.

7. *Thiara (Tarebia) lineata* Gray

1828. *Helix lineata* Gray. In Wood's Index Test Supp., p. 24, fig. 68. *Type locality* : Ganges.

1915. *Tiara (Tarebia) lineata* Preston. *Fauna British India, Mollusca* (Freshwater Gastropoda and Pelecypoda), p. 34.

Material Examined : 2 exs., Tulsi lake, Sanjay Gandhi National Park, Borivili, Mumbai date 12.iii.2001, Coll. R.M. Sharma.

Distribution : India : Maharastra, Sanjay Gandhi National Park, Borivili. Assam, Bihar, Madhya Pradesh, Uttar Pradesh, West Bengal.

Elsewhere : Bhutan, Myanmar and Sri Lanka.

Remarks : The species is often confused with *T. granifera* Lamarck but easily distinguished from the former by the absence of rows of nodules and presence of distinct dark spiral lines.

8. *Thiara (Melanoides) tuberculata* Mueller

1974. *Nerita tuberculata* Mueller. *Hist. Verm. Torr. Fluv.*, **2** : 191. Type locality : Coromandel coast.

1976. *Melanoides (Melanoides) tuberculata* Starmuehler. *Ann. Natur. Hist. Mus. Wien.*, **80** : 591.

Material Examined : 2 exs. Tulsi lake, Sanjay Gandhi National Park, Borivili, Mumbai,, 19.iii.2001, Coll. R.M. Sharma.

Distribution : India : Maharashtra : Sanjay Gandhi National Park, Borivili, throughout India except Kashmir.

Elsewhere : North and South Africa, Eastern Mediterranean countries, South east Asia, Southern China, Malaysia, Malay Archipelago, North Australia, various Pacific Islands and North to Ryukyu Islands of Japan, New Hebrides.

Remarks : Shells are typically narrowly elongate and distinctly sculptured with vertical ribs and spiral striae and also with dark brown dots or streaks here and there.

Family LYMNAEIDAE

Genus *Lymnaea* Lamarck, 1799

9. *Lymnaea (Pseudosuccinea) acuminata f. typica* Lamarck

1822. *Lymnaea acuminata* Lamarck. *Hist. Nat. Anim. Sans. Vert.*, **6** Pl., **2** : 160

1925. *Lymnaea (Pseudosuccinea) acuminata* Annandale & Rao. *Rec. Indian Mus.*, **27** : 177.

Material Examined : 2 exs., Sanjay Gandhi National Park, 19.iii.2001, Coll. R.M. Sharma; 2 exs., Tulsi lake, 31.xii.1995, Coll. S.G. Patil.

Distribution : India : Maharashtra : Sanjay Gandhi National Park, Borivili. Common throughout rest of India.

10. *Lymnaea (Pseudosuccinea) luteola f. typica* Lamarck

Freshwater snail

1822. *Lymnaea luteola* Lamarck. *Hist. nat. Anim. Sans. Vert.* **6** : Pt 2, 160

1925. *Lymnaea (Pseudosuccinea) luteola* Annandale & Rao. *Rec. Indian Mus.*, **27** : 183.

Material examined : 2 exs., Sanjay Gandhi National Park, Borivili, Mumbai, 16.vi.2001, Coll. A.S. Mahabal.

Status : Common throughout India.

Distribution : India : Maharashtra : Sanjay Gandhi National Park, Borivili.

Elsewhere : Sri Lanka and Myanmar.

Remarks : This species is reported to be very particular about its habitat and is often found in temporary water bodies. They burry themselves in dormant conditions. It is reported to be a pest to paddy and Azole, Intermediate host for many parasites of live stocks. Producers of biofertilizer in some part of West Bengal (Subba Rao 1989). This species can be distinguished from its mere ovate shell with narrower aperture and less pointed spire.

Family PLANORBIDAE
Subfamily PLANORBINAE
Genus *Gyraulus* Carpentier, 1837

11. *Gyraulus convexisculus* (Hutton)

1849. *Planorbis convexisculus* Hutton. *J. Asiat. Soc. Beng.*, 18(2) : 657.

1849. *Planorbis convexisculus* Hutton. *J. Asiat. Soc. Beng.*, 18(2) : 657.

1956. *Gyraulus convexiseulus* Benthem Jutting. *Trenbia*, 23(2) : 463.

Material examined : 2 exs., Kanheri caves, Sanjay Gandhi National Park, 29.ix.2001, Coll. R.M. Sharma.

Distribution : India : Maharashtra : Sanjay Gandhi National Park, Borivili, Pench National Park, Widely distributed in rest of the Country.

Elsewhere : Existing from Iran to Philippines.

Land Molluscs

Class GASTROPODA
Order MESOGASTROPODA
Family CYCLOPHORIDAE

Genus *Cyclophorus* Montfort, 1810

12. *Cyclophorus indicus* (Deshayes)

1832. *Cyclostoma indicus* Deshayes. In Balanger, *Voy. Ind. Orient. Zool.*, 415, pl. 1, figs. 4,5.

1921. *Cyclophorus indicus* Gude. *Fauna of British India, Mollusca*, III : 63.

Material Examined : 2 exs., Kanheri cave Sanjay Gandhi National Park, Mumbai, 19.viii.1995, Coll. R.H. Kamble

Distribution : India : Maharastra : Sanjay Gandhi National Park, Borivili, Mumbai. It is restricted to Western Ghats.

13. *Cyclophorus (Litostylus) involvus* (Mueller)

1825. *Helix involvus* Mueller. *Hist. Verm.* Part 2 P. 84 *Wood index Text* Pl. 25, fig. 8.

1899. *Cyclophorus (Litostylus) involvus* Kobelt. *Mollenderff Nachr. Deuts. Malali. Ges XXIX* P. 105 id cat. *Paneum* P., 17 : 7, Kobelt.

Material Examined : 2 exs., Tulsi lake Sanjay Gandhi National Park, Mumbai, 12.xii.2001, Coll. P.P. Kulkarni, 2 exs., Tulsi lake date 16.6.2001, Coll. A.S. Mahabai.

Distribution : India : Maharashtra : Sanjay Gandhi National Park, Borivili, Mumbai.

Order STYLOMMATOPHORA

Family ARIOPHANTIDAE

Subfamily ARIOPHANTINAE

Genus *Cryptozona* Moersch, 1872

14. *Cryptozona bistrialis* (Beck)

1837. *Nanina bistrialis* Beck. *Index Moll*; 1 : 2.

1961. *Cryptozona (Xestina) bistrialis* Ray. *Treubia*, 25(3) : 278.

Material examined : 2 exs., Sanjay Gandhi National Park, Borivili, Mumbai, 20.viii.1995, Coll. R.H. Kamble

Distribution : India : Maharashtra : Sanjay Gandhi National Park, Borivili, Mumbai. It is common in south India.

Elsewhere : Sri Lanka.

Subfamily MACROCHLAMYDINAE

Genus *Macrochlamys* Benson, 1832

15. *Macrochlamys (Macrochlamys) tenuicula* H. Adams

1868. *Macrochlamys tenuicula* H. Adams. *Proc. Zool. Soc. Lond.*, : 14, Pl. 4. fig. 9. (*Type locality* : Satara Maharashtra).

1908. *Macrochlamys tenuicula* Blanford & Godwin Austin. *Fauna British India, Moll.*, : 130.

Material Examined : 2 exs. Lion Safari Park, Sanjay Gandhi National Park, Borivili, Mumbai date 20.viii.1995, Coll. R.H. Kamble.

Distribution : India : Maharashtra : Bombay and Western Ghats, Khandala, Satara and Surat, Rajpipla Hills at Dholgaon.

SUMMARY

A total of 15 species with 9 genera, 7 families are recorded from Sanjay Gandhi National Park, Borivili, Mumbai, Maharashtra. Out of these 15 species 11 species were recorded from fresh water habitat whereas 4 species were land Mollusca. Among them Genera *Turbinicola*, *Cyclophorus* and *Thiara* were found most common. More detail study will reveal the existence of more species than what is recorded now.

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INSECTA : ODONATA

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INTRODUCTION

Odonates are prominent insects while on flight as well as at rest. Being active, while on flight, this group attracted attention of workers since long and the first record of Indian Odonata dates back to more than 250 years. Fraser (1933-36) published 3 volumes on Fauna of British India : Odonata which are still regarded as most authentic consolidated taxonomic work. Recently (Prasad and Varshney, 1995) published checklist of Indian Odonata which includes 499 species.

Prasad (1996) published an account of Odonata from Maharashtra state, based on the collections present in National Zoological Collection of Zoological survey of India, Kolkata and Pune. 46 species and subspecies recorded in his work raised the number to 83 species known from the state. Later Kulkarni *et al.*, 2002 and 2004 added three species to the list.

Faunistic Surveys of Sanjay Gandhi National Park, Borivali, Mumbai, were undertaken by Western Regional Station, Zoological Survey of India, Pune during the years 1996-2000. A total of 147 (approx.) specimens were collected. All these were identified and recorded. There is no earlier record of Odonata species from this area, thus all the 27 species are recorded for the first time from there, which contains new record of *Vestalis gracilis gracilis* (Rambur) and *Vestalis apicalis apicalis* Selys for Maharashtra State. Thus now a total of 88 species of Odonata are known from the state.

Order ODONATA
Suborder ZYGOPTERA
Superfamily COENAGRIONOIDEA
Family COENAGRIONIDAE
Subfamily PSEUDAGRIONINAE
Genus *Ceriagrion* Selys, 1876

1. *Ceriagrion coromandelianum* (Fabr.)

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Genus *Pseudagrion* Selys, 1876

2. *Pseudagrion decorum* (Rambur)

Genus *Ischnura* Charp, 1840

3. *Ischnura aurora aurora* (Brauer)

4. *Ischnura senegalensis* (Rambur)

Subfamily AGRIOCNEMIDINAE

Genus *Agriocnemis* Selys, 1877

5. *Agriocnemis pygmaea* (Rambur)

Family PLATYCNEMIDIDAE

Subfamily PLATYCNEMIDINAE

Genus *Copera* Kirby, 1890

6. *Copera marginipes* (Rambur)

7. *Copera vittata deccanensis* Laidlaw

8. *Copera ciliata* (Selys)

Family PROTONEURIDAE

Subfamily DISPARONEURINAE

Genus *Disparoneura* Selys, 1860

9. *Disparoneura quadrimaculata* (Ramb.)

Superfamily CALOPTERYGOIDEA

Family AMPHIPTERYGIDAE

Subfamily CALOPTERYGINAE

Genus *Vestalis* Selys, 1853

10. *Vestalis apicalis apicalis* Selys

11. *Vestalis gracilis gracilis* (Rambur)

Suborder ANISOPTERA

Super Family AESHNOIDEA

Family GOMPHIDAE

Subfamily LINDENIINAE

Genus *Ictinogomphus* Cowley, 1934

12. *Ictinogomphus rapax* (Rambur)

Family AESHNIDAE

Subfamily AESHNINAE

Genus *Anax* Leach, 1815

13. *Anax immaculifrons* (Rambur)

Superfamily LIBELLULOIDEA

Family LIBELLULIDAE

Subfamily LIBELLULINAE

Genus *Lathrecista* Kirby, 1889

14. *Lathrecista asiatica asiatica* (Fabr.)

Genus *Orthetrum* New Man, 1833

15. *Orthetrum pruinsum neglectum* (Rambur)

16. *Orthetrum sabina sabina* (Drury)

17. *Orthetrum taeniolatum* (Schn.)

18. *Orthetrum glaucum* (Brauer)

Genus *Potamarcha* Karsch, 1890

19. *Potamarcha congener* (Rambur)

Subfamily SYMPETRINAE

Genus *Brachythemis* Brauer, 1868

20. *Brachythemis contaminata* (Fabr.)

Genus *Bradinopyga* Kirby, 1893

21. *Bradinopyga geminata* (Rambur)

Genus *Crocothemis* Brauer, 1868

22. *Crocothemis servilia servilia* (Drury)

Genus *Diplacodes* Kirby, 1889

23. *Diplacodes trivialis* (Rambur)

Subfamily TRITHEMISTINAE

Genus *Trithemis* Brauer, 1861

24. *Trithemis aurora* (Burmeister)

25. *Trithemis festiva* (Rambur)

Subfamily TRAMEINAE

Genus *Pantala* Hagen, 1861

26. *Pantala flavescens* (Fabr.)

Genus *Tholymis* Hagen, 1867

27. *Tholymis tillarga* (Fab.)

SYSTEMATIC ACCOUNT

Order	ODONATA
Suborder	ZYGOPTERA
Superfamily	COENAGRIONOIDEA
Family	COENAGRIONIDAE
Subfamily	PSEUDAGRIONINAE

Genus *Ceriagrion* Selys, 1876

1. *Ceriagrion coromandelianum* (Fabr.)

1798. *Agrion coromandalium* Fabricius. *Entr. Syst. Suppl.*, : 287.

1933. *Ceriagrion coromandelianum*, Fraser. *Fauna Brit. India, Odonata*, 1 : 315–316.

Diagnostic characters : Head : Labium pale yellow; labrum, clypeus, genae, bases of mandibles and frons bright citron yellow; vertex olivaceous; occiput and postocular area ochreous, devoid of spots; basal three joints of antennae pale yellow. Prothorax and thorax uniformly olive green. Legs citron yellow. Wings hyaline, arc situated at the level of the distal antenodal nervure, pterostigma golden yellow. Abdomen uniformly citron yellow, segment 10 deeply emerginate on dorsum. Anal appendages citron yellow. Female more robust and dull coloured.

Material examined : Between Kanheri Phata to Borivali Park, 29.xii.1995, 2 M, Coll. S.G. Patil; Tulsi Lake behind Nursery, 26.ix.2001, 1 F; Sasupada Nature trail, Yewoor range, 27.ix.2001, 1 M, 1 F, Coll. R.M. Sharma; On the way to Sasupada Nature Trail, 27.ix.2002, 1 M, 1 F, Coll. D.B. Bastawade.

Distribution : Throughout India (Maharashtra, Pune, Khandala, Tadoba National Park, Chandrapur).

Elsewhere : Sri Lanka, Myanmar, Malaysia, Indochina and South China.

Remarks : Recorded as a very common species from Estuarine areas of Eastern India (Prasad and Ghosh, 1988).

Genus *Pseudagrion* Selys

2. *Pseudagrion decorum* (Rambur)

1842. *Agrion decorum* Rambur. *Ins. Neurop.*, : 258.

1933. *Pseudagrion decorum* Fraser. *Fauna Brit India, Odon.*, 1 : 286–289.

Diagnostic characters : This species has white labrum with rest of the head up to posterior ocelli pale bluish green. Light blue ground colour, thorax pale blue, pterostigma

diamond shaped; with distal and proximal sides very oblique with fine black lines; 10 to 12 post nodal nervures in forewings. Mid dorsal carinal ridge and a thick black humeral stripe. Beautifully bluish green colour distinguishes this species from other species of the genus. Anal appendages narrowly bifid at the apex. Inferior anal appendages short and half of the length of superior.

Material examined : Sasupada Nature Trail, Yeoor Range, 27.ix.2001, 1 F, Coll. R.M. Sharma.

Distribution : Throughout continental India.

Elsewhere : Myanmar, Nepal and Sri Lanka.

Remarks : Common species in India, found on permanent and temporary water bodies. Rare in hill streams.

Subfamily ISCHNURINAE

Genus *Ischnura* Charp, 1840

3. *Ischnura aurora aurora* (Brauer)

1858. *Agriion delicatum* Hagen. *Verh. Zool-bot. Ges. Wien.*, 8 : 479.

1865. *Ischnura aurora* Brauer. *Verh. Zool. bot. Ges. Wein.*, 15 : 509.

1954. *Ischnura aurora* Lieftinck. *Treubia*, 22 : 74.

1995. *Ischnura aurora aurora* Prasad and Varshney. *Oriental Ins.*, 29 : 390.

Diagnostic characters : Head : Labium white; Labrum citron yellow; vertex bronzed black; eyes beautifully olive green, with semi lunar spot bordering it. Prothorax bronzed black on dorsum, sides and anterior lobe blue. Thorax black on dorsum. Legs pale citron-yellow. Wings : pterostigma differs in fore F hind wings, in fore wings kite shaped, broader than long rose red for proximal half; in the hind wing much smaller about half the size. Abdomen citron yellow except segments 8 to 10 which are azure blue. Inferior anal appendages shorter than superiors and segment 10.

Material examined : Near Upavan, Yeour, 01.i.1996, 1 M, Coll. S.G. Patil.

Remarks : Widely distributed, found in grasses & marshy places around water bodies.

4. *Ischnura senegalensis* (Rambur)

1842. *Agriion senegalensis* Rambur. *Ins. Neurop.*, 276.

1933. *Ischnura senegalensis* Fraser. *Fauna Brit. India*, 1 : 348–351.

1988. *Ischnura senegalensis* Prasad and Ghosh. *Rec. zool. Surv. India*, 85(2) : 202.

Diagnostic characters : Head : Labium pale yellow, labrum pale blue, narrowly black along the base. Prothorax black, the anterior collar pale blue, sides pale green; thorax bronzed black on dorsum. Legs black, exterior surfaces of tibiae and tarsi yellow. Wings hyaline, pterostigma of fore-wings very oblique, diamond shaped, black. Abdomen black 2nd abdominal segment marked with yellow and blue, steely metallic blue on dorsum. Anal appendages black and yellow. Female : Fraser (1933) described three forms of females with difference in colouration of head, prothorax, thorax and abdomen. All forms having similar wings and pterostigma.

Material examined : Tulsi lake, Nursery Road, 26.ix.2001, 1 F, Coll. R.M. Sharma; On the way Sasupada Nature Trail, 27.ix.2002, 1 ?, Coll. D.B. Bastawade.

Distribution : India : Himachal Pradesh, Maharashtra, Manipur, South India, Uttar Pradesh.

Elsewhere : Australia, New Gunia, Philippines, Samoa and Sondi Archipelago.

Subfamily AGRIOCNEMIDINAE

Genus *Agrionemis* Selys

5. *Agriocnemis pygmaea* (Rambur)

1842. *Agrion pygmaea* Rambur. *Ins. Neurop.*, : 278.

1933. *Agriocnemis pygmaea* Fraser. *Fauna Brit. India*, 1 : 398–401.

1988. *Agriocnemis pygmaea* Prasad and Ghosh. *Rec. zool. Surv. India*, 85(2) : 203.

Diagnostic characters : Head : Labium palest yellow, labrum metallic blue, anteclypeus, bases of mandibles, genae and frons pale apple green. Prothorax black on dorsum, anterior lobe and extreme edge of posterior lobe apple green. Thorax black on dorsum, marked with narrow antehumeral apple green stripes. Legs yellow, extensor surface of femora black. Wings hyaline, pterostigma pale yellow. Abdomen segments 1 to 6 pale greenish yellow, terminal segments brick red. Superior anal appendages longer than the inferior ones, brick red in colour. Female more robust than male and is known to exhibit polymorphic forms.

Material examined : Lion Safari, 14.x.1995, 1 F, Coll. P.P. Kulkarni; Sasupada Nature Trail, Yewoor Range, 1 M, 4 F, Coll. R.M. Sharma; Kanheri Caves, 26.ix.2002, Coll. D.B. Bastawade.

Distribution : India : Assam, Himachal Pradesh, Chennai, Maharashtra, Malabar, Manipur, Nicobar, Punjab, Rajasthan, Uttar Pradesh, West Bengal.

Elsewhere : Australia, Myanmar, Sri Lanka, China, Formosa, Java, Malaysia, Manila, North Gunia, Philippines, Singapore and Seychelles.

Family PLATYCNEMIDIDAE
Subfamily PLATYCNEMIDINAE

Genus *Copera* Kirby, 1890

6. *Copera marginipes* (Rambur)

1842. *Platycnemis marginipes* Rambur. *Ins. Neurop.*, : 240.

1993. *Copera marginipes* Fraser. *Fauna Brit, India. Odon.*, 1 : 192-197.

Diagnostic characters : Head : Labium pale brownish white, labrum pale greenish yellow, frons and vertex bronzed black, eyes bordered with white stripes. Prothorax and thorax bronzed black on dorsum, legs variably bright orange to dull reddish. Wings, pterostigma brown. Abdomen bronzed black upto middle of segment 8, from which to the end pale bluish white to creamy white. Superior anal appendages only one fourth the length of interiors. Females with posterior lobe of prothorax without spines. Fraser (1933) has described Ceylon, Coorg, Westcoast, Deccan, Assam and Bengal forms with variation in colour patterns.

Material examined : Tulsi lake, 19.iii.2001, 4 M, 2 F; Tulsi lake nursery, 7 M, 2 F, 26.ix.2001, Coll. R.M. Sharma; Tulsi lake, 11.xii.2001, 2 F, Coll. P.P. Kulkarni; On way to Tulsi lake and nursery, 24.9.2002, 4 M, 1 F; Goregaon, Hattigate, on way to nursery, 25.ix.2002, 1 M, 2 F, Coll. D.B. Bastawade.

Distribution : India : (Assam, Bihar, Chandigarh, Madhya Pradesh, Maharashtra (Lone, Pune, Khandala, Hingoli, Wardha, Gondhonkher, Buldhana, Melghat Tiger Reserve (Amravati), Rajasthan, South Andaman Islands, West Bengal, Western Ghats F Western Himalaya.

Elsewhere : Indonesia; Malaysia; Myanmar; Nepal; Sri Lanka and Thailand.

7. *Copera vittata deccanensis* Laidlaw

1917. *Copera vittata deccanensis* Laidlaw, F.F. *Rec. Indian Mus.*, 13 : 342.

2000. *Copera vittata deccanensis* Prasad, M. *Bionotes*, 2(3) : 50.

2004. *Copera vittata deccanensis* Kulkarni *et al.*, *Insecta : Odonata in Fauna of Pench Nat. Park. Conservation Area Series*, 20 : 184-185. Ed. Director Zool. Surv. India.

Diagnostic characters : Head : Upper lip, genae and anteclypeus greenish white, frons, occiput black, with a broad creamy white transverse band covering ocelli. A pair of linear post ocular lines present. Prothorax black above, with lateral yellow marks, bright lemon yellow below. Thorax black dorsally; creamy white, ante humeral bands present, sides yellow, mottled with black. Legs short, tibia slightly dilated, citron yellow or brick red. Posterior lobe of prothorax with a pair of divergent slender, forwardly directed spines. Abdomen black, segment 2 with fine longitudinal yellow line dorsally, 9 white above 10 entirely white. Legs lemon yellow. The females resemble male, but dull in color.

Material examined : Tulsi lake, 19.iii.2001, 1 M; Tulsi lake behind nursery, 1 F, Coll. R.M. Sharma; on way to Tulsi lake to nursery, 24.ix.2002, 1 F, Coll. D.B. Bastawade.

Distribution : India : Karnataka, Kerala, Maharashtra, Tadoba Tiger Reserve, and Tamil Nadu.

8. *Copera ciliata* (Selys)

1863. *Psilocnemis annulata* Selys. *Bull. Acad. Belg.*, (2)16 : 172

1890. *Copera annulata* Kirby. *Cat. Odon.*, 129.

1933. *Copera annulata* Fraser. *Fauna Brit. India, Odonata*, 1 : 203–206.

1995. *Copera ciliata* Prasad and Varshney. *Oriental Ins.*, 29 : 392.

Diagnostic characters.: Head : Labium white, labrum, genae, bases of mandibles and clypeus pale blue. Frons and vertex in front and laterally pale blue, with a broad bronzed black triangular area, touching the eyes only at a point in line with the posterior ocelli. Thorax dark bronze blackish green on dorsum. Legs very long, pure white, the distal ends of all femora and extreme proximal ends of tibiae black. Wings hyaline, 13–16 post nodal nervures in fore wings, 12–14 in the hind. Abdomen bronzed black on dorsum except at the segments 9 and 10 which are pale blue. Anal appendages strongly arched, black at apices. Females with long legs, tibiae not dilated. Anal appendages very short, pale blue, conical.

Material examined : Lion safari, 14.x.1995, 1 M, Coll. P.P. Kulkarni; on way to Tulsi lake to nursery, 24.ix.2002, 1 M, Coll. D.B. Bastawade.

Distribution : India : Assam, West Bengal, Maharashtra.

Elsewhere : Malyasia; China; Japan; Malacca.

Family PROTONEURIDAE

Subfamily DISPARONEURINAE

Genus *Disparoneura* Selys, 1860

9. *Disparoneura quadrimaculata* (Rambur)

1842. *Argia quadrimaculata* Ramb. *Ins. Neurop.*, : 255.

1859. *Disparoneura quadrimaculata* Selys. *Bull. Acad. Belg.*, (2)x : 446.

1931. *Chloroneura quadrimaculata* Fraser. *Fauna Brit. India, Odonata*, 1 : 246–248.

1955. *Platylestes orientalis* Baijal and Agarwal. *Agra. Univ. J. Res. (Sci)*, 4(2) : 469.

1995. *Disparoneura quadrimaculata* Prasad and Varshney. *Oriental Ins.*, 29 : 494.

Diagnostic Characters : Head : Labium pale whitish brown; labrum, clypeus, vertex and occiput dull brick red, labrum with a small median black spot, prothorax dull brick red, thorax bright brick red on dorsum, paler at sides, marked with black. Legs pale brown, femora speckled out word with black. Wings hyaline, the fore pair traversed by a broad blackish brown fascia, wings of male broadly barred with blackish brown across middle. Wings in females without any black markings. Abdomen brick red, marked with white brown and black (Fraser, 1933). Female differs considerably from male and more robust in build. Black markings on head better defined and more extensive.

Material Examined : Lion safari, 14.x.1995, 6 M, Coll. P.P. Kulkarni; Tulsi lake nursery Road, 26.ix.2001, 3 M, Coll. R.M. Sharma; On way to Tulsi lake to nursery, 24.ix.2002, 8 M, 5 F; Kanheri caves, 26.ix.2002, 1 M, 2 F, Coll. D.B. Bastadwade.

Distribution : India : Central India, Delhi, Uttar Pradesh, Maharashtra, Western Ghats, Tadoba Tiger Reserve, Chandrapur.

Remarks : Found in submontane areas. Mostly recorded up to 1,500 elevation.

Super Family CALOPTERYGOIDEA

Family AMPHIPTERYGIDAE

Sub Family CALOPTERYGINAE

Genus *Vestalis* Selys, 1853

10. *Vestalis apicalis apicalis* Selys

1873. *Vestalis apicalis* Selys. *Bull. Acad. Belg.*, (2)36 : 612.

1921. *Vestalis apicalis* Fraser. *J. Siam. Soc.*, 4 : 164.

1934. *Vestalis apicalis apicalis* Fraser. *Fauna Brit. India : Odonata*, 2 : 128–130.

1995. *Vestalis apicalis apicalis* Prasad and Varshney. *Oriental Ins.*, 29 : 397.

Diagnostic characters : Head : Labium, labrum, cheeks, bases of mandibles and basal joints of antennae bright yellow, rest of head metallic emerald green. Posterior lobe of prothorax more conspicuously bordered with yellow. Wings hyaline, apices of all wings broadly tipped with blackish brown for about distal 5 mm. Abdomen as in *Vestalis gracilis gracilis* (Rambur). Anal appendages black. Females closely similar to males, abdomen more coppery and less metallic. Apical markings on the wings usually paler and less sharply defined.

Material examined : Sasupada nature trail, Yewoor Range, 27.ix.2001, 1 M, Coll. R.M. Sharma.

Distribution : India : Western and Eastern Ghats, West Bengal, Assam.

Elsewhere : Myanmar, Thailand.

Remarks : This species is recorded for the first time from Maharashtra State.

11. *Vestalis gracilis gracilis* (Rambur)

1842. *Calopteryx gracilis* Rambur. *Ins. Neorop.*, : 224

1934. *Vestalis gracilis gracilis* Fraser. *Fauna Brit. India*, 2 : 126–128.

1988. *Vestalis gracilis gracilis* Prasad and Varshney. *Rec. zool. Surv. India, Occ. Paper No.*, 110 : 13–14.

Diagnostic characters : Head : labium, labrum, bases of mandibles, cheeks, basal segments of antennae bright yellow. Eyes : upper two thirds portion dark brown, the rest greenish yellow. Thorax brilliant metallic emerald green. Legs pale to dark brown. Wings hyaline, iridescent with colour of mother of pearl or blue in some, light uniformly so. Abdomen metallic green or blue. Anal appendages black. Females exactly similar to males in colour, but abdomen usually more dully metallic and segments 8 to 10 yellow laterally.

Material examined : 1 M, Hattigate, Goregaon, 29.ix.2001, Coll. R.M. Sharma.

Distribution : India : Western and Eastern Ghats, West Bengal.

Elsewhere : Myanmar, Thailand.

Remarks : Collection of this species forms a new record for Maharashtra State.

Suborder	ANISOPTERA
Superfamily	AESHNOIDEA
Family	GOMPHIDAE
Subfamily	LINDENIINAE

Genus *Ictinogomphus* Cowley, 1934

12. *Ictinogomphus rapax* (Rambur)

1842. *Diastatomma rapax* Rambur. *Ins. Neurop.*, : 169.

1935. *Ictinus rapax* Feaser. *Fauna Brit. India*, 2 : 373–376.

1988. *Ictinogomphus rapax* Prasad and Ghosh. *Rec. zool. Surv. India*, 85(2) : 204.

1995. *Ictinogomphus rapax* Prasad and Varshney. *Oriental Ins.*, 29 : 403.

Diagnostic characters : Head : Labium yellow, bordered with brownish; labrum yellow, with heavy black border, face and frons greenish-yellow, ante clypeus yellow, post clypeus black. Thorax black, marked with yellow or greenish yellow, laterally yellowish green. Wings clear, slightly enfumed in the mature specimens. Pterostigma long, covering 5–6 cells, black. Legs black, coxae and trochanter yellow and a yellow stripe on the flexar surface of anterior femora. Abdomen black, marked with bright yellow. Segments with broad yellow rings. Anal appendages black. Female very similar to male.

Material examined : Hattigata, Goregaon, 20.iii.2001, 1 M, Coll. R.M. Sharma.

Distribution : Throughout India.

Elsewhere : Mynamar, Sri Lanka and Malaysia except in desert area.

Remarks : Prasad (1995) recorded this species from Pune and Prasad and Kulkarni (2000) record this species from Ujani Wetland Dist. Solapur, Maharashtra. Predation of this species by a roberfly (Diptera) was also recorded (Shama and Talmale, 2003).

Family AESHNIDAE

Subfamily AESHNINAE

Genus *Anax* Leach, 1815

13. *Anax immaculifrons* (Rambur)

1842. *Anax immaculifrons* Rambur. *Ins. Neurop.*, : 189.

1936. *Anax immaculifrons* Fraser. *Fauna Brit. India, Odon.*, 3 : 145–146.

1995. *Anax immaculifrons* Prasad and Varshney. *Oriental Ins.*, 29 : 403.

Diagnostic characters : Labium dirty or pale ochareous; labrum greenish yellow heavily bordered with blackish brown. Face and frons uniform pale brownish-green, with a very narrow black border at the base of frons above. Occiput palest blue. Prothorax dark reddish brown, paler laterally, posterior lobe with heavy fringe of long hairs. Thorax pale bluish-green on dorsum, turquoise-blue on sides broadly barred with jet black. Legs black. Wings hyaline, tinted with amber yellow from apex to base of discoidal cell, paler at apex, rather deeply towards the base of wing. Pterostigma orcheous to reddish brown, covering about 3 cells. Discoidal cell of forewing with 5-6 cells, 4-5 in the hind; 5-6 cubital nervures in fore wings, 4 in the hind; 12 cells in the anal loop. Abdomen, segment 1 entirely jet black, segment 2 turquoise-blue with black sutures.

Material examined : Lion Safari and around, 14.x.1995, 1 M, Coll. P.P. Kulkarni.

Distribution : India, Maharashtra : Bombay, Pench National Park, Nagpur, Pune; Bihar, Chandigarh, Eastern Ghats, Sikkim, West Bengal and Western Himalaya.

Elsewhere : Sri Lanka.

Superfamily LIBELLULOIDEA

Family LIBELLULIDAE

Subfamily LIBELLULINAE

Genus *Lathrecista* Kirby, 1889

14. *Lathrecista asiatica asiatica* (Fabr.)

1798. *Lathrecista asiatica asiatica* Fabricius. *Ent. Syst. Suppl.*, : 283

1867. *Libellula pectoralis* Brauer. *Verh. zoo. bot., Ges. Wien*, 17 : 19.

1878. *Agrionoptera pectoralis* Selys. *Mitt. Mus. Dresden.*, : 294.

1909. *Lathrecista asiatica asiatica* Ris. *Cat. Coll. Selys, fasc.*, 9 : 129–132.

1995. *Lathrecista asiatica asiatica* Prasad and Varshney. *Oriental Ins.*, 29 : 408.

Diagnostic characters : Head : Labrum pale ochreous, with borders narrowly black, face, lower border of frons and sides broadly creamy yellow, upper surface of frons, vesicle and occiput black. Prothorax blackish brown with anterior lobe yellowish, Thorax dark coppery brown, two yellow spots on the antealar sinus. Laterally two black Y shaped markings with a narrow black stripe between, the anterior Y forming the posterior border of humeral yellow stripe, the posterior Y situated on the lateral suture and metepimeron. Legs dark reddish brown to black. Wings hyaline with apices usually more or less enfumed, arc situated between the 2nd and 3rd antenodal nervure. Only one row of cells between IR iii and R spl. Abdomen, segments 1 and 2 with a broad lateral stripe and a fine mid-dorsal one which, apical to jugal suture is bisected by the black mid dorsal carina. All sutures on segment 2 finely black. Segments 3–8 bright crimson red, with apical sutures finely black. Segments 9 and 10 black. Anal appendages black. Female resembles male except the sexual details.

Material examined : Kanheri caves, 29.ix.2001, 1 M, Coll. R.M. Sharma.

Distribution : South Andaman Is., Maharashtra, (Tadoba Tiger reserve, Chandrapur), West Bengal, Eastern and Western India.

Elsewhere : Borneo, New Guinea, Malabar, Philippines, Somoa and Sondaic Archipelago.

Genus *Orthetrum* Newman, 1833

15. *Orthetrum pruinsum neglectum* (Rambur)

1842. *Libellula neglecta* Rambur. *Ins. Neurop.*, : 86.

1936. *Orthetrum pruinsum neglectum* Fraser. *Fauna Brit. India*, 3 : 311–313.

Diagnostic Characters : Head, with reddish brown colour progressively dark from labium to frons and up to vesicle and occiput; eyes blue black above, bluish-gray below during life. Prothorax and thorax reddish brown, legs black, wings hyaline with enfumed pale brown towards apices and with a reddish-brown basal marking in hind wing. Antenodal nervures always more than 12 in forewings. Abdomen bright vermilion red in sub adults, purplish red in adults. Anal appendages red. Females differ from males in frons similar to rest of face in colour, eyes yellowish capped with brown. Thorax reddish brown, abdomen dull ocherus with sutures and borders all finely black, anal appendages dark ocherus and basal markings in wings pale and almost obsolete.

Material examined : Film city, Hattigate, 12.xii.2001, 1 M, 2 F, Coll. P.P. Kulkarni; Kanheri caves, 26.ix.2002, 1 F, Coll. D.B. Bastawade.

Distribution : India : Himachal Pradesh, Bilaspur, Kangra, Kinnaur, Kulu, Maharashtra (Tadoba Tiger Reserve), Srimaur, Solan, Uttar Pradesh Chamoli, Dehradun, Nainital, Pauri and Tehri Garhwal, Uttarkashi; Bihar F Dhanbad.

Elsewhere : Nepal; Myanmar; Sri Lanka; Hong Kong; Thailand and Malaya.

Remarks : Breeds in small tanks; recorded from altitude of 7,250 from Ooty, Nilgiris. Variation in nodal index is recorded in this species.

16. *Ortherum sabina sabina* (Drury)

1770. *Libellula sabina* Drury. *Ill. Exot. Int.*, 1 : 114.

1936. *Orthetrum sabina* Fraser. *Fauna Brit. India*, 3 : 300–302.

1995. *Orthetrum sabina sabina* Prasad and Varshney. *Oriental Ins.*, 409.

Diagnostic characters : Head : Labium yellow, middle lobe brownish to black; labrum face and frons yellowish, variably marked on anterior surface with black; frons very deeply notched so as to form two triangular facets in front. Prothorax bright yellow, thorax greenish yellow, legs black. Abdomen greenish yellow with very broad apical black rings on segments 4 to 5, narrow ring on segments 6; segments 7 to 9 and base of 10 black. Segments 1 and 3 enormously swollen dorso ventrally as well as laterally; 4 to 6 narrow, cylindrical, 7 to 9 dilated but compressed laterally; 10th very small. Anal appendages as long as segment 9. Females exactly like males.

Material examined : Lion safari, 14.x.1995, 3 M, 1 F, Coll. P.P. Kulkarni; Gandhi smarak, 25.ix.2001, 1 F, Coll. R.M. Sharma; Kanheri caves, 15.xii.2001, 1 M, Coll. P.P. Kulkarni; On way to Tulsi lake to nursery, 24.iv.2002, 1 M; Kanheri caves, 26.ix.2002, 2 M, On way to Sasupada Nature Trail, 27.ix.2002, 1 M, Yeour, 28.ix.2002, 2 M, Coll. D.B. Bastawade.

Distribution : India : Bilaspur, Kangra, Sirmaur, Solan, Una, Dehra Dun, Nainital, Pauri Garhwal; Bihar, Singhbhum, Dhanbad; Maharashtra Melghat Tiger Reserve, Amravati, Tadoba Tiger Reserve, Amravati.

Elsewhere : Somalia (Somali Land); Iraq; Iran; Nepal; Sri Lanka; Myanmar; Thailand; Micronesia (Ocenia); Samoa Island (Pacific Ocean) Indonesia (Java, Sumba, Timor); Papua (New Guinea); Australia; Egypt; Angola and most of African continent.

Remarks : Found in all parts of India, up to 7000 (Nilgiri's), most predaceous; cannibalism is also recorded and preys on other dragonflies also.

17. *Orthetrum taeniolatum* (Schn.)

1845. *Libellula taeniolata* Schneider, *Stett. Ent. Zeit.*, vi : iii.

1936. *Orthetrum taeniolatum* Fraser. *Fauna Brit. India*, 3 : 296-298.

Diagnostic characters : Head : Labium, labrum, face, frons and vesicle palest brown; occiput dark brown, prothorax and thorax pulverulent blue; legs black, hinder surface yellow, wings hyaline not enfumed, pterostigma orchrous, between thick black nervures covering two and half cells. Abdomen pulverulent blue throughout. Anal appendages black. Female : differs widely from males, never purverulent. Face very pale, nearly white in many specimens. Prothorax dark brown, thorax pale brown. Abdomen olivaceous yellow. Anal appendages brown, shortly conical.

Material examined : Kanheri caves, 28.xii.1995, 1 F, Coll. S.G. Patil; Kanheri caves, 29.ix.2001, 1 M, Coll. R.M. Sharma; Kanheri caves, 26.ix.2002, 1 M, Coll. D.B. Bastawade.

Distribution : Throughout India.

Elsewhere : Nepal and countries bordering Mediterranean Sea.

18. *Orthetrum glaucum* (Brauer)

1865. *Libellula glauca* Brauer. *Varh, zool. bot. Ges. Wien*, 15 : 1012.

1890. *Orthetrum glaucum* Kirby. *Cat. Odon.*, 39.

1936. *Orthetrum glaucum* Fraser. *Fauna Brit. India*, : 3 : 307-309.

Diagnostic characters : Medium sized dragonfly with face black, eyes, dark green during life. Prothorax bright yellow to dark brown, marked with yellow; thorax in old adults pruinosed dark dull blue or black. Legs black, wings hyaline, with extreme base tinted with dark amber-yellow upto the cubital nervure and up to anal triangle in hind wing; discoidal cell of hind wing entire. In female abdomen reddish brown with a broad greenish yellow stripe on mid dorsum extending up to segment 7 as against in males, pale dirty blue up to apical end of segment 8 and black for the remainder.

Material examined : Lion safari, 14.x.1995, 1 M, Coll. P.P. Kulkarni.

Distribution : Throughout India.

Elsewhere : Sri Lanka, Nepal, Philippines, Java; Indonesia, Malaya Archipelago, Papua and South China.

Genus *Potamarcha* Karsch, 1890

19. *Potamarcha congener* (Rambur)

1842. *Libellula obscura* Rambur. *Ins. Neurop.*, : 64.

1842. *Libellula congener* Rambur. *Ins. Neurop.*, : 70.

1890. *Potamarcha obscura* Karsch. *Ent. Zeit* : 33 : 371.

1891. *Potamarcha congener* Selys. *Ann. Soc. Espan.*, 20 : 221.

1936. *Potamarcha obscura* Fraser. *Fauna Brit. India*, 3 : 289-291.

1995. *Potamarcha congener* Prasad F Varshney. *Oriental Ins.*, **29** : 410.

Diagnostic characters : The only species of the genus. Can be distinguished by arc situated between the first and second antenodal nervures; 2 rows of cells between 1 R iii and Rspl. and anal field of hind wing rather broad with cells arranged in straight rows. Wings hyaline, with extreme apices tipped with brown. They are dragonflies of moderate size, coloured black brown, marked with yellow but never of metallic colour. Anal appendages black.

Material examined and Locality : Kanheri caves, 10.x.1995, 1 M, Coll. P.P. Kulkarni; Sasupada Nature Trail, Yewoor range, 27.ix.2001, 1 M, Coll. R.M. Sharma.

Remarks : Common Species in India.

Subfamily SYMPETRINAE

Genus *Brachythemis* Brauer, 1868

20. *Brachythemis contaminata* (Fabr.)

1793. *Libellula contaminata* Fabricius. *Ent. Syst.*, **2** : 382.

1936. *Brachythemis contaminata* Fraser. *Fauna Brit. India*, **3** : 365–366.

Diagnostic characters : Head : Labium pale ochraceous; labrum reddish; face frons and vesicle olivaceous or pale green yellow, eyes broadly contiguous; prothorax with dark reddish brown stripes traversing anterior and posterior borders of middle lobe, thorax with obscure brownish stripes, wings hyaline, reticulation reddish, with a broad bright orange fascia extending from base within 2-3 cells of pterostigma in fore wing and as far as that organ in the hind; pterostigma rust red. Only $6\frac{1}{2}$ to $7\frac{1}{2}$ antenodal nervures in forewings. Abdomen reddish-ochraceous, marked with obscure dorsal and sub dorsal brown stripes. Females differ in colour, with hind wings very palely tinted with yellow at extreme base without orange fascia seen in the males, pterostigma bright ochraceous. Abdomen pale olivaceous brown, with narrow black stripe on mid dorsal carina from segment 2 to end. Anal appendages yellow.

Material examined : Tulsi lake, 30.xii.1995, 1 M, Coll. S.G. Patil; Tulsi lake, 19.iii.2001, 3 F, Coll. R.M. Sharma; Tulsi lake, 17.vi.2001, 1 F, Kanheri caves, 1 M, 1 F, Coll. D.B. Bastawade.

Distribution : India : Himachal Pradesh : Bilaspur, Kangra, Sirmour, Una, Uttar Pradesh : Dehradun, Nainital, Parui, Garhwal; Madhya Pradesh; Bihar : Dhanbad; West Bengal and East Himalaya, Maharashtra : Melghat Tiger Reserve, Amravati, Tadoba Tiger Reserve, Chandrapur, Osmanabad, Pune (Khandala, Khed and Lonavala), Tadoba Tiger Reserve, Chandrapur.

Elsewhere : China; Indonesia; Malaysia; Myanmar; Nepal; Philippines; Singapore; Sri Lanka Taiwan and Thailand.

Remarks : It is common species in India and found in large numbers. Seen flying over water surface throughout year and recorded to undergo three generations annually.

Genus *Bradinopyga* Kirby, 1893

21. *Bradinopyga geminata* (Rambur)

1842. *Libellula geminata* Rambur. *Ins. Neurop.*, : 90.

1936. *Bradinopyga geminata* Fraser. *Fauna Brit. India*, 3 : 349-350.

Diagnostic characters : Head : Labium, labrum pale yellow or dark brown; rest of face and frons olivaceous, vesicle and occiput brown, prothorax and thorax cinereous or dirty pale yellow marbled with black. Wings hyaline, pterostigma black at center, pure white at distal and proximal ends, discoidal cell in forewing traversed only once, but in hind wing entire. Two rows of cells between IR iii and R spl. Anal triangle 3 celled, abdomen coloured very similar to thorax. Anal appendages pale-creamy white. Female exactly similar to males.

Material examined : Kanheri caves, 10.x.1995, 1 F, Coll. P.P. Kulkarni; Kanheri caves, 29.ix.2001, 2 F, Coll. R.M. Sharma.

Distribution : India : Uttar Pradesh, Dehradun, Nainital, Delhi, Madhya Pradesh, Bihar, Dhanbad, West Bengal, Eastern Himalaya, Maharashtra, Melghat Tiger Reserve, Amravati, Satara (Ambenali), Tadoba Tiger Reserve, Chandrapur; Peninsular India.

Elsewhere : Sri Lanka.

Remarks : This species is found in open and cultivated areas, near wells, small and cemented walls, and exhibits protective, cryptic colours. It is common in tanks, plastered March to October. In one female specimen collected on 29.ix.2001, unicolour pterostigma and discoidal cell of hind wing traversed once was observed.

Genus *Crocothemis* Brauer, 1868

22. *Crocothemis servilia servilia* (Drury)

1770. *Libellula servilia* Drury. *Ill. Ex. Ins.*, 1 : 16.

1936. *Crocothemis servilia servilia*, Fraser, *Fauna Brit. India*, 3 : 345-347.

Diagnostic characters : Head : Labium ferruginous; labrum blood red, anteclypeus pale red, rest of face and frons bright blood red; eyes during life blood red above, purple laterally. Prothorax and thorax ferruginous, often blood red on dorsum during life, legs

ochreous, Wings, hyaline bases of all wings marked with rich amber yellow up to cubital nervure in forewing and to first antenodal nervure nearly to arc; apices of wings lined narrowly with pale brown in old specimens. Abdomen blood red. Anal appendages blood red.

Females differ widely in colouration from the males. Labium pale yellow; labrum, face, frons and vesicle olivaceous; prothorax and thorax olivaceous brown. Wings similar to males but markings paler, abdomen ochreous, segments 8 and 9 blackish along mid dorsal carina. Anal appendages ochreous.

Material examined : Kanheri caves, 10.x.1995, 1 M, Coll. P.P. Kulkarni; Between Kanheri Phata to Borivali Park, 29.xii.1995, 1 M; Kanheri caves, 29.ix.2001, 1 M, 1 F, Coll. R.M. Sharma; On the way from Tulsi lake to nursery, 24.ix.2002, 1 F; Kanheri caves, 26.ix.2002, 2 M, 1 F, Coll. D.B. Bastawade.

Distribution : India : Himachal Pradesh : Kangra, Uttar Pradesh : Chamoli, Dehra Dun, Nainital, Pauri Garhwal, Madhya Pradesh, Bihar : Singhbhum, Dhanbad, West Bengal; Maharashtra : Buldana (Gondhonkher), Colaba (Matheran), Osmanabad (Upla), Pune (Khed and Lone), Melghat Tiger Reserve, Amravati, Tadoba Tiger Reserve, Chandrapur, Satara (Lingmal Falls) and Tadoba Tiger Reserve, Amravati.

Elsewhere : Iraq; Nepal; Myanmar, Sri Lanka, Philippines; Indonesia (Sumba); Australia, Sundaic Archipelago and Japan.

Remarks : Common species in India. Adults are seen throughout the year on wing. Teneral males and females are similar in colour, pale straw-yellow, differ from mature males, may confuse identity of the species.

Genus *Diplacodes* Kirby, 1889

23. *Diplacodes trivialis* (Rambur)

1842. *Libellula trivialis* Rambur. *Ins. Neurop.* : 115.

1936. *Diplacodes trivialis* Fraser. *Fauna Brit. India*, 3 : 336–338.

Diagnostic characters : Head : Labium, labrum and bases of mandibles creamy yellow; face, frons, and vesicle palest azure blue with fine black line at the base of frons. Eyes contiguous over a short space. Prothorax pale brown to black; thorax greenish yellow with sutures finely black; the area between mid dorsal carina and humeral sutures olivaceous brown speckled with minute dots, colouration darkens with age. Legs greenish yellow, marked with black in subadults; wings hyaline with a minute yellow point in cubital space of hind wings, discoidal cell in hind wings entire. Abdomen with segments 1 to 3 greenish yellow; remaining segments black with sub dorsal yellow stripes on segments 4-7. Females : Similar to subadult males, abdominal markings broader on segments 8 to 10.

Material examined : Kanheri caves, 10.x.1995, 1 F; Yewoor, 14.x.1995, 1 M, 1 F, Coll. P.P. Kulkarni; Between Kanheri phata to Borivali Park, 29.xii.1995, 1 M, 1 F, Coll. S.G.

Patil; Tulsi lake, 1 M, 2 F; Vasai, 1 F, 19.vi.2001, Coll. A.S. Mahabal; Sasupada Nature trail, 27.ix.2001; 1 M, Kanheri caves, 29.vi.2001, 3 M, Coll. R.M. Sharma; Tulsi lake, 11.xii.2001, 1 M; Yewoor, 13.xii.2001, 2 M, Coll. P.P. Kulkarni; Kanheri caves, 26.ix.2002, 1 M; On the way, Sasupada nature Trail, 27.ix.2002, 1 M, 1 F, Coll. D.B. Bastawade.

Distribution : Throughout India.

Elsewhere : Nepal; Myanmar; Sri Lanka; Thailand; W. Malaysia (Malacca) and Indonesia (Sumatra).

Remarks : Common species found throughout the year near water bodies. Also found in grassy vegetation and agricultural fields.

Subfamily TRITHEMISTINAE

Genus *Trithemis* Brauer, 1868

24. *Trithemis aurora* (Burmeister)

1839. *Libellula aurora* Burmeister. *Handb Ent.*, 2 : 859.

1936. *Trithemis aurora* Fraser. *Fauna Brit. India*, 3 : 383–385.

Diagnostic characters : Head : Labium dark ochreous, labrum dark brown, face and front of frons ochreous, changing to reddish above; eyes crimson above, brown laterally changing to lilaceous beneath. Prothorax reddish brown; thorax dull purple with obscure superior humeral brown stripe and narrow black stripe on postero-lateral suture; a short lower black line at the levels of spiracle; beneath olivaceous, marked with a black square with an angular black line crossing it. Legs black; wings hyaline with crimson reticulation and a broad amber-yellow fascia at base of wings with darker brown rays in subcostal and cubital spaces. Abdomen swollen dorso-ventrally at base; then constricted at segment 3 and again dilated fusiformly depressed and broad. Anal appendages red. Female : Differs from male in colour and shape, with wings often broadly tipped with brown up to pterostigma; reticulation bright yellow to brown, basal markings similar to males. Abdomen subcylindrical and anal appendages black

Material examined : Between Kanheri Phata to Borivali Park, 29.xii.1995, 1 F, Coll. S.G. Patil.

Distribution : Throughout India.

Elsewhere : Pakistan; Nepal; Sri Lanka; Myanmar; West Malaysia : (Penang); Indonesia : (Borneo, Sulawesi, Java, Moluccas, Sumba, Sumatra, Timor) and Philippines.

Remarks : It is common species near hill streams, also recorded from plains in Maharashtra (Buldana, Osmanabad, Satara, Melghat Tiger reserve, Amravati, Tadoba Tiger Reserve, Chandrapur and Wardha).

25. *Triathemis festiva* (Rambur)

1842. *Libellula festiva* Rambur. *Ins. Neurop.*, 92.

1936. *Triathemis festiva* Fraser. *Fauna Bri. India*, 3 : 387–389.

Diagnostic characters : Head : Labium blackish brown, labrum, dark olivaceous; frons, dark brown in front; metallic violet above; prothorax dark blue; thorax black; legs black; wings hyaline with a dark brown mark at base of hind wings; abdomen black and appendages black. Females differ from adult males in labium face and frons dirty yellow, thorax greenish yellow, wings similar to males but in adults broadly drak reddish brown at apices, abdomen with a narrow mid dorsal stripe.

Material examined : Yewoor, 14.x.1995, 2 M, Coll. P.P. Kulkarni; Kanheri caves, 26.ix.2002, 2 M, Coll. D.B. Bastawade.

Distribution : India : Himachal Pradesh : Hamirpur, Kangra, Sirmaur, Solan; Uttar Pradesh : Chamoli, Dehradun, Nainital, Pauri and Tehri Garhwal, Uttar Kashi; West Bengal; Assam; Maharashtra : Khed, Pune, Matheran, Colaba, Poladpur, Lingmal falls, Mahabaleshwar, Bordharan, Tadoba Tiger Reserve, Chandrapur and Wanarvira Wardha, Rajpur, Gondhonkher, Buldhana and Melghat Tiger Reserve, Amravati.

Elsewhere : Nepal; Sri Lanka; Myanmar; West Malaysia : (Penang); Singapore; Indonesia : (Sulawesi, Java, Lesser Sunda, Sumatra); Philippines : Taiwan and Papua (new Guinea).

Remarks : It is a common species near hill streams. Adults breed in still waters or streams with sluggish current.

Subfamily TRAMEINAE

Genus *Pantala* Hagen, 1861

26. *Pantala flavescens* (Fabr.)

1798. *Libellula flavescens* Fabricius. *Ent. Syst. Suppl.*, 285.

1861. *Pantala flavescens* Hagen. *Syn. Neur N. Amer.*, : 142.

1936. *Pantala flavescens* Fraser. *Fauna Brit. India*, 3 : 414–416.

Diagnostic characters : Rather large sized and robust built dragonfly coloured ochreous or reddish and with uncoloured wings. Head large; eyes broadly contiguous; labium pale brown with borders dark brown, anteclypeus pale brown, post clypeus and frons bright golden yellow; eyes reddish brown above, lilaceous or bluish laterally and beneath; prothorax rich ochreous, bluish laterally a beneath; thorax olivaceous, coated thickly with yellowish downy hairs; legs black, bases and exterior of femora yellowish; wings hyaline, with base of hind wing pale golden yellow upto anal loop and with narrow apical brown spot limited to posterior border of wing. Abdomen bright ochreous, sides of segments 1-4 pale yellow,

8-10 with sharply defined black mid dorsal pyriform spots with narrow end of them at bases of segments. Anal appendages ochreous, changing black towards apex. Females similar to males, with eyes olivaceous brown above; face vivid cream yellow; wings often evenly and deputy enfumed and always without the brown spot. Abdomen more stout and robust.

Material examined : Kanheri caves, 10.x.1995, 1 M, 1 F, Coll. P.P. Kulkarni; Rest house No. 4 (At light), 26.ix.2001, 1 M, Coll. R.M. Sharma.

Distribution : Circumtropical and subtropical in distribution (Throughout India)

Elsewhere : China, Indonesia, Malaysia, Micronesia, Morocco, Myanmar, Sri Lanka and Thailand.

Remarks : Common species, breeds in marshes in foot hills, streams in agricultural fields. Large number of specimens emerge out and take to swarming from September to November/ December.

Genus *Tholymis* Hagen, 1867

27. *Tholymis tillarga* (Fab.)

1798. *Libellula tillarga* Fabricius. *Ent. Syst. Suppl.* : 285.

1936. *Tholymis tillarga* Fraser. *Fauna Brit. India*, 3 : 411-413.

1988. *Tholymis tillarga* Prasad and Ghosh. *Rec. zool. Surv. India*, 85(2) : 210.

1995. *Tholymis tillarga* Prasad and Varshney. *Oriental Ins.*, 29 : 413.

Diagnostic characters : Head : Labium, labrum and face oilvaceous or pale yellowish-brown; frons and vesicle ochreous, eyes brown, capped with reddish, olivaceous below. Prothorax and thorax golden yellow, with a bright reddish suffusion on dorsum. Legs ochareous. Wings hyaline, with a broad smoky fan shaped golden brown fascia extending from node to base of hind wing. Deep in colour at node and somewhat longitudinally striated. This fascia bordered distally by a broad oval opalescent white spot, 4 cells deep. Pterostigma reddish brown, between dark nervures, membrane blackish brown. Abdomen bright rust red, specially on dorsum, paler at sides. Anal appendages reddish. Female, similar to male, with wings without opalescent spot and the golden brown fascia very pale and obscure.

Material examined : Gandhi smarak, 25.ix.2001, 1 F, Coll. R.M. Sharma; On way to nursery to Hattigate, Goregaon Film City, 25.ix.2002, 1 M, Coll. D.B. Bastawade.

Distribution : India : Himachal Pradesh, Madhya Pradesh, Maharashtra, Punjab, Uttar Pradesh, West Bengal; Australia, Myanmar, Sri Lanka, Madagascar and Tropical Africa.

Remarks : Dragonflies of rather large size and robust built, appearing on wing before dusk. The brown fascia and opalescent white spot of hind wings distinguish this species easily.

SUMMARY

During the faunistic surveys of Sanjay Gandhi National Park, Borivali, Mumbai conducted by Western Regional Station of Zoological Survey of India, approximately 147 specimens of Odonata were collected and identified. Those comprise 27 species distributed in 7 families and two suborders. Two species viz. *Vestalis gracilis gracilis* (Rambur) and *Vestalis apicalis apicalis* Selys are recorded for the first time from Maharashtra State.

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INSECTA : MANTODEA

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INTRODUCTION

Mantids (Mantodea : Insecta) are a predominant group of insects that occur in all types of habitats and play an important role in the natural control of insect pests by virtue of their predatory habits. Mantid fauna of the state of Maharashtra is fairly well documented (Ghate & Ranade, 2002). Recently, Chaturvedi & Hegde (2000) and Sureshan *et al.* (2004, 2006) made some efforts to inventorise the mantid species from some conservation areas in the state. Here an attempt has been made to consolidate the information on the mantid fauna of Sanjay Gandhi National Park (SGNP), Mumbai, Maharashtra, which is one the few conservation areas in the country that lie simultaneously in biologically rich areas like Western Ghats and amidst metropolis like Mumbai. Chaturvedi & Hegde (opp. citation) have reported 11 species of mantids under 7 genera and 4 families from Sanjay Gandhi National Park and environs. The present communication is based on a study of mantids from the area conducted by Zoological Survey of India, Western Regional Station, Pune and the information already provided by Chaturvedi & Hegde (2000). Altogether 16 species of mantids are now known to occur in Sanjay Gandhi National Park. Diagnostic characters distribution of all the species are provided based on the study of species actually collected and after Mukherjee *et al.* (1995). The following abbreviations are used in the text :

BL - Body length (from anterior margin of head to tip of abdomen).

FW - Forewing.

PN - Pronotum.

SGNP- Sanjay Gandhi National Park.

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SYSTEMATIC ACCOUNT

Order MANTODEA
Family AMORPHOSCELIDAE
Subfamily AMORPHOSCELINAE

1. *Amorphoscelis annulicornis* Stal

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

Diagnostic characters : Body deep brownish, ventral side black; head with large rounded tubercles; fore coxa internally with 3 black bands; pronotum with 2 tubercles at anterior and posterior borders; distal segment of cerci racket shaped, as long as other segments together.

Distribution : India : Maharashtra, Assam, Bihar, Daman & Diu, Himachal Pradesh, Kerala, Meghalaya, Tamil Nadu, West Bengal.

Elsewhere : Sri Lanka.

Remarks : This is a common species occurring on tree trunks in almost all the warmer parts of India. Reported from Maharashtra at Goregaon (E), adjacent to SGNP by Chaturvedi & Hegde (2000).

Family HYMENOPODIDAE
Subfamily ACROMANTINAE

2. *Hestiasula brunneriana* Saussure

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

Diagnostic characters : Frontal sclerite with the superior margin produced into a blunt angle; fore femora foliaceous, superior edge arched, outer face brown with few black spots, inner face presents 3 vertical stripes or bands along superior edge, another black spot in the middle a little above the spines; hind femora with short ventral lobe; costal area of forewing greenish opaque, rest hyaline.

Distribution : India : Andhra Pradesh, Maharashtra, Meghalaya, West Bengal.

Elsewhere : Sri Lanka.

Remarks : Reported from SGNP (Chaturvedi & Hegde, 2000).

3. *Ephestiasula pictipes* (Wood-Mason) (Fig. 1)

1879. *Hestias pictipes* Wood-Mason. *Proc. Asiatic Soc. Bengal.* : 258.

Diagnostic characters : Vertex with a small tubercle above ocelli, marked with black spots, lateral lobes pointed; pronotum dorso-medially black; outer margin of fore coxa with very minute spines; internal spines of fore femora black at tips, inferior internal lobes contain three pale yellow spots encased by black patches, black patch absent at upper border; tarsi internally black; forewing with costal area green.

Measurements (in mm) : BL Male 21, PN 4, FW 19.

Material examined : 1 Male, Kanheri caves, 26.ix.2002. *Coll. D.B. Bastawade* (Reg. No. E/4904).

Remarks : First record of the species from SGNP.

Subfamily HYMENOPODINAE

4. *Creobroter gemmatus* (Stoll)

1813. *Mantis gemmata* Stoll. *Represent. Spectres.*, : 71.

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

Diagnostic characters : Body smaller; prozona of pronotum dentate in female, smooth in male; forewing in male long, with a round small yellow spot near base, 2nd anal vein 3 branched and anal membrane hyaline. hind wing pinkish at base, smoky patch in middle, occupying a little portion of discoidal area in female, in male the patch occupying lesser area and less dark.

Distribution : India : Arunachal Pradesh, Himachal Pradesh, Sikkim, Uttar Pradesh, Maharashtra.

Elsewhere : Myanmar; China; Indonesia : Java.

Remarks : The hyaline membrane of the forewing and the larger smoky patch in the female hindwing are important diagnostic characters of this species. Recorded from SGNP (Chaturvedi & Hegde, 2000).

Family MANTIDAE

Subfamily LITTURGUSINAE

5. *Humbertiella affinis* Giglio-Tos

1917. *Humbertiella affinis* Giglio-Tos. *Bull. Soc. Entomol. Ital.*, 48 : 83.

Diagnostic characters : Body brown. Frontal sclerite with narrow blackish stripe, superior edge more arched in the middle; larger interal spines of fore femora black only at apices; forewing with a less blackish oblique band; second anal vein 3-branched; hindwings less blackish.

Distribution : India : Karnataka, Orissa, Maharashtra.

Remarks : Recorded from SGNP (Chaturvedi & Hegde, 2000).

6. *Humbertiella indica* Saussure

1869. *Humbertiella indica* Saussure. *Mitt. Schweiz. Entomol. Ges.*, 3 : 62.

Diagnostic characters : Body pale brown to brown. Frontal sclerite blackish, superior margin almost straight in male and arched in female; fore femur externally brown, internally with a black longitudinal line, often divided into two, black patches present on claw groove and inside of 1st external spine; forewing with parallel transverse veinules in costal area.

Distribution : India : Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh.

Elsewhere : Sri Lanka.

Remarks : Recorded from SGNP (Chaturvedi & Hegde, 2000)

7. *Humbertiella nigrospinosa* Sjostedt

1930. *Humbertiella nigrospinosa* Sjostedt. *Ark. Zool. Stockholm*, 21A(32) : 18.

Diagnostic characters : Frontal sclerite with a whitish mark in median curvature. Longer internal spines of fore femora completely black; anal vein of forewing 2 branched in female 3 branched in male; stigma whitish with 2 black patches on either ends; costal area with less regular parallel veinules in male, almost parallel near middle in female.

Distribution : India : Orissa, Uttar Pradesh, Maharashtra.

Remarks : Chaturvedi & Hegde (2000) reported the species from SGNP.

Subfamily AMELINAE

Tribe Amelini

8. *Amantis biroi* Giglio-Tos (Fig. 2)

1892. *Gonypeta irina* Brunner. *Ann. Mus. Genova.*, 33 : 66. Preoccupied by *irina* Saussure, 1870.

1915. *Amantis biroi* Giglio-Tos. *Bull. Soc. Entomol. Ital.*, 46 : 153.

Diagnostic characters : Body brown. Pronotum almost entirely blackish, often with discontinuous median blackish stripe; frontal sclerite with a black spot at upper middle part; fore legs brown, 1st segment of tarsi black, the remaining segments partly or completely brown; forewing blackish hyaline, veins blackish.

Measurements (in mm) : BL : Male 12-16.5; PN : 3-4; FW : 12-16.

Material examined : 1 Male, Hattigate, Goregaon, 28.ix.2001, 1 Male, Krishnagiri, 11.x.1996, 1 Male, BNHS information block, 22.iii.2001. coll. R.M. Sharma (Reg. Nos. E/4732, 34843, 4560); 1 Male, Vasai & around, 19.vi.2001, coll. A.S. Mahabal (Reg. No. E/4600); 2 Male, Borivalli Rest House, 20.vi.2001, coll. A.S. Mahabal (Reg. No. E/4614).

Distribution : India : Andhra Pradesh, West Bengal, Maharashtra.

Remarks : The black spot on the frontal sclerite, the colouration of pronotum and the first tarsal segment of fore legs show remarkable variation and need further study. The specimens with entirely black pronotum have the spot on frontal sclerite distinct and first tarsal segment and others black. However in specimens with a lighter pronotum, tarsal segments are not much blackish, and sometimes blackish on tips only. This forms the first record of the species from SGNP and Maharashtra.

Subfamily MANTINAE

Tribe Miomantini

9. *Deiphobe incisa* Werner

1933. *Deiphobe incisa* Werner. *Proc. Zool. Soc. London*, 1933 : 900.

Diagnostic characters : Metazona longer than fore coxa, prominently carinate in female and without carina in male; forewing long, not exceeding abdomen; costal area whitish opaque, anal membrane colorless; supra anal plate in female triangular and incised, in male a little trapezoid, carinae and incised.

Distribution : India : Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Uttar Pradesh.

Remarks : Reported from Goregaon, adjacent to SGNP (Chaturvedi & Hegde (2000)).

10. *Deiphobe infuscata* (Saussure)

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

1927. *Deiphobe infuscata* Giglio-Tos. *Das Tierreich*, 50 : 488.

Diagnostic characters : Metazona of pronotum shorter than fore coxa; metazona of prosternum with 2 blackish bands, prominent in female, less distinct in male; fore legs coxae with dentate margins, externally with few blackish dots and internally with 2 blackish bands; femora with 3-4 blackish bands externally; forewing in male reaches 8th abdominal segment, in female shorter than pronotum; supra-anal plate feebly excised.

Distribution : India : Bihar, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Tamil Nadu, Uttar Pradesh, Maharashtra.

Remarks : Chaturvedi & Hegde (2000) reported this species from SGNP.

Tribe **Mantini**11. *Hierodula (Hierodula) saussurei* Kirby

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

1927. *Hierodula (Hierodula) saussurei* Giglio-Tos. *Das Tierreich.*, 50 : 447.

Diagnostic characters : Body large, greenish, prosternum without blackish bands at base and mesosternum with a pair of whitish round spots; fore coxae with 4-5 obtuse, tubercular spines originating from premarginal groove, with few spinules among them.

Distribution : India : Arunachal Pradesh, Maharashtra; Bhutan.

Elsewhere : China; Indonesia : Java.

Remarks : Chaturvedi & Hegde (2000) reported the species from SGNP. According to Ehrmann (2002), this species is now synonymised under *H. patellifera patellifera* (Serville).

12. *Hierodula (Rhombodera) butleri* Wood-Mason.

1878. *Hierodula butleri* Wood-Mason. *Proc. Zool. Soc. London*, 38 : 580.

1927. *Hierodula (Rhombodera) butleri* Giglio-Tos. *Das Tierreich.*, 50 : 453.

Diagnostic characters : Metazona shorter, metazon of prosternum with two black dots and a blackish band behind them; frontal sclerite without spine. Fore femora internally with 3 brown bands; stigma of forewing bounded on either side by large black patch.

Distribution : India : Assam, Meghalaya, Sikkim, West Bengal.

Remarks : Chaturvedi & Hegde (2000) reported the species from SGNP. Ehrmann (2002) mentions this species as *Rhombodera butleri* Wood-Mason, treating the subgenus *Rhombodera* Burmeister as a separate genus.

13. *Hierodula (Hierodula)* sp.

Material examined : 1 nymph. Male, Vasai & around, 19.vi.2001, coll. A.S. Mahabal (Reg. No. E/4600).

14. *Statilia maculata* (Thunberg)
(Fig.3)

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

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

Diagnostic characters : Vertex with a black cross-band and spots on dorsal surface; prosternum with black patch near coxal joint; fore coxa with 6 triangular spines and few spinules and with internal black patch; tarsi internally black; both wings longer than abdomen.

Measurements (in mm) : BL : female 45, PN : 15, FW : 27.

Material examined : 1 female, Yevoor (on grass near creek), 13.xii.2001, coll. P.P. Kulkarni (Reg. No. E/4770).

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Meghalaya, Madhya Pradesh, Sikkim, Uttar Pradesh, West Bengal, Maharashtra, Andaman and Nicobar Islands.

Remarks : First record from SGNP.

Subfamily TOXODERINAE

Tribe Toxoderini

15. *Cheddikulama* sp.
(Figs. 4,5)

Material examined : 1 nymph female, on the way to Tulsi lake, 24.ix.2002, coll. D.B. Bastawade (Reg. No. E/4903).

Remarks : The genus is known only from the species *viz. C. straminea* from India. The nymph almost fully tallies with the characters of *C. straminea* given in Mukherjee *et al.*, (1995) except for the wing characters. However adult specimens are to be examined from the area for the species confirmation. This forms the first record of the genus from SGNP and Maharashtra and probably the further record of the species from India other than Uttaranchal (formerly part of Uttar Pradesh).

Family EMPUSIDAE

Subfamily EMPUSINAE

16. *Gongylus gongylodes* (Linnaeus)

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

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

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

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

Diagnostic characters : Dilation of pronotum rhomboidal, width about one third the length of pronotum, lateral angles sharp; fore femora dilated oval to elongate; mid abdominal segments laterally foliaceous; forewing extending beyond abdomen in male and a little shorter than abdomen in female.

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

Elsewhere : Indonesia; Sri Lanka.

Remarks : Chaturvedi & Hegde (2000) reported the species from SGNP.

SUMMARY

The present study includes taxonomic account of 16 species of mantids belonging to 11 genera and 6 families from the Sanjay Gandhi National Park, Mumbai, Maharashtra. Three species viz. *Statilia maculata* (Thunberg), *Ephestiasula pictipes* (Wood-Mason) and *Amantis biroi* Giglio-Tos and the genus *Cheddikulama* Henry are reported for the first time from the Sanjay Gandhi National Park based on specimens actually collected from the area. The genus *Cheddikulama* and species *Amantis biroi* are new additions to Maharashtra. With the present report, a total of 54 species of mantids are now known to occur in Maharashtra. Though the classification followed here is that of Mukherjee *et al.* (1995), in a recent book on Mantids of the World, Ehrmann (2002) has also modified classification to some extent. For example, the subfamily Toxoderinae under Mantidae is treated as a separate family, namely, Toxoderidae. The tribe Miomantinae is treated as subfamily Miomantinae. Similarly, Liturgusidae is treated as a family and not as subfamily Liturgusinae under Mantidae. While we have given distribution of species with reference to India only, for information on the world distribution of the species, complete species synonymies, as well as location of type specimen, Ehrmann (2002) may be referred to.

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Fig. 1. *Ephestiasula pictipes* (Wood-Mason)



Fig. 2. *Amantis biroi* Giglio-Tos



Fig. 3. *Statilia maculata* (Thunberg)

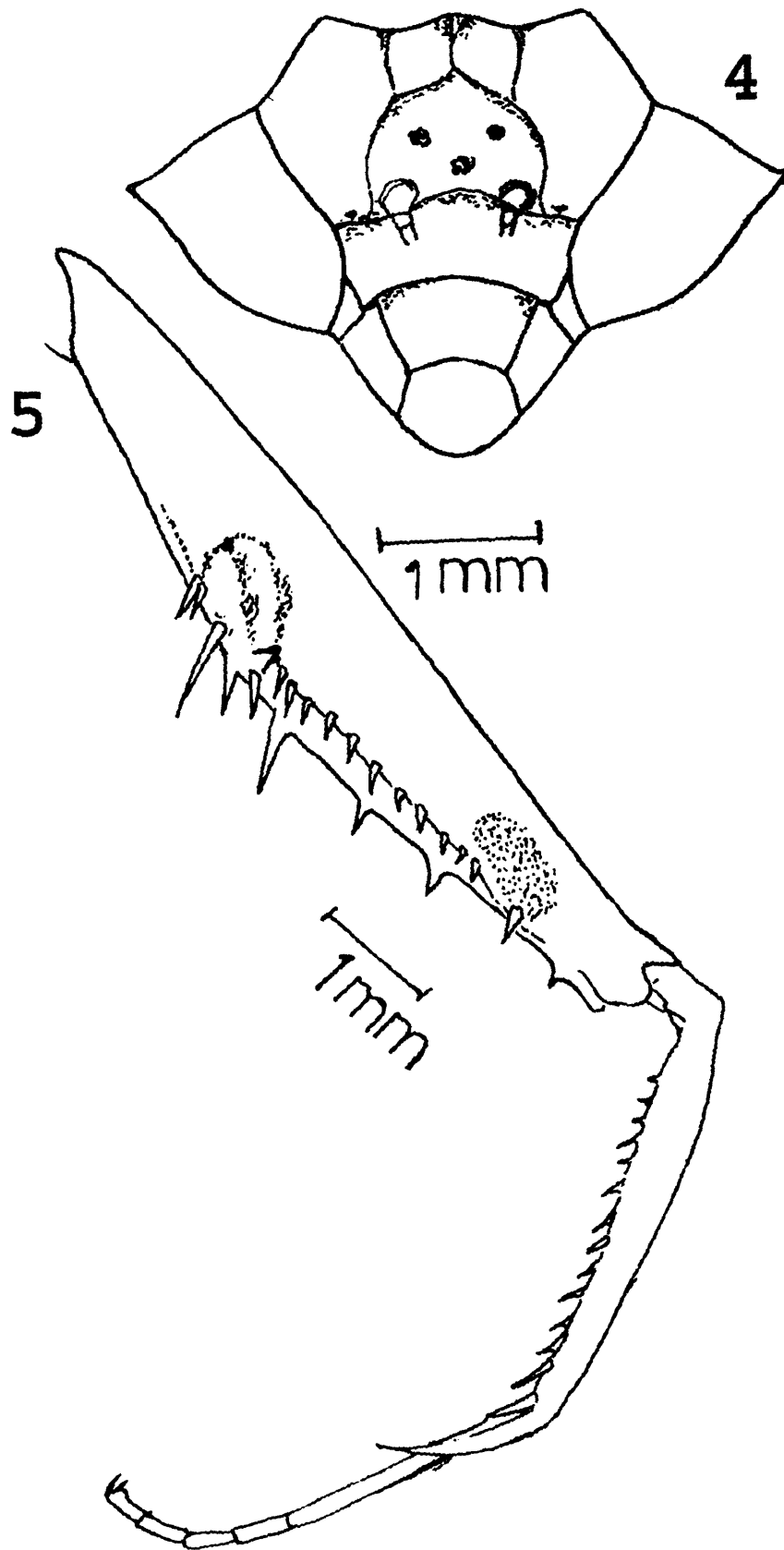


Fig. 4 and 5. *Cheddikulama* sp. female nymph : 4. head front view; 5. fore leg except coxa ventral view.

INSECTA : APHIDOIDEA : APHIDIDAE

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INTRODUCTION

Aphids are small, soft-bodied, polyphagous and polymorphic homopterous insects, ranked high amongst agricultural pests. They are commonly known as plant lice and “Mava Kitak” in local language, Marathi. Aphids act as vectors of plant viruses and thus assume more economic importance. Aphids act as transmitters of plant viruses like citrus tristazia (Kulkarni and Chavan, 1997) and bunchy top in banana. Aphids are known to infest roots of plants also.

The sugary secretion voided by them through anus, accumulates on plants and attracts ants promoting fungal growth (Behura, 1977). The sooty mould develops on plant parts and leaves suffer in photosynthesis.

Biology of aphids shows polymorphism. Winged (Alate) and Wingless (Apterous) morphs are usually found. Apterous and alate viviparous females are very common. Sexual males and females also occur (Raychaudhuri, 1980).

More than 790 species of aphids are known to occur in India (Ghosh, L.K. 1990). Sexual morphs of about 102 species are recorded so far (Behura, 1994, 1997; Basu, 1980). Most of the sexual morphs are recorded from the hilly region in North East India; however apterous oviparous female of *Coloradoa rufomaculata* (Wilson) was found in Nanded in Maharashtra State (Rao & Kulkarni, 1977).

About 22 species are known to occur in Maharashtra State (Deshpande, 1939; Kulkarni, H.L., 1950; Patel and Kulkarni, 1953; Rao and Kulkarni, 1971, 1975, 1977 a,b; Kulkarni and Rao, 1978; Deshpande *et al.*, 1981; Kulkarni and Chavan, 1997; Kulkarni and Sharma, 1998). There has been no record of aphids from Sanjay Gandhi National Park, Borivali, Mumbai earlier. During the faunistic surveys of this area by Zoological Survey of India, Western Regional Station, Pune, 11 species of aphids were collected. Those belong to 9 genera as enlisted here.

SYSTEMATIC LIST

Superfamily APHIDOIDEA

Family APHIDIDAE

Subfamily APHIDINAE

Tribe Aphidini

Subtribe Aphidina

Genus *Aphis* Linnaeus, 17581. *Aphis craccivora* Koch.2. *Aphis gossypii* Glover3. *Aphis nerii* B.d.F.Genus *Toxoptera* Koch., 18544. *Toxoptera aurantii* B.d.F.

Subtribe Rhopalosiphina

Genus *Rhopalosiphum* Koch., 18545. *Rhopalosiphum maidis* (Fitch.)

Tribe Macrosiphini

Genus *Brevicoryne* Van der Goot., 19156. *Brevicoryne brassicae* (Linnaeus)Genus *Macrosiphum* Passerini, 1860.7. *Macrosiphum rosae* (Linnaeus)Genus *Myzus* Passerini, 18608. *Myzus (Nectarosiphon) persicae* (Sulzer)Genus *Pentalonia* Coquerel, 18599. *Pentalonia nigronervosa* CoquerelGenus *Uroleucon* Mordvilko, 1914Subgenus *Uromelan* Mordvilko, 191410. *Uroleucon (Uromelan) compositae* (Theobald).

Subfamily GREENIDEINAE

Tribe Greenideini

Genus *Greenidea* Schouteden, 1905Subgenus *Greenidea* 190511. *Greenidea (Greenidea) ficicola* Tak

SYSTEMATIC ACCOUNT

Superfamily APHIDOIDEA

Family APHIDIDAE

Subfamily APHIDINAE

Tribe **Aphidini**Subtribe **Aphidina**Genus *Aphis* Linneaus 1758**1. *Aphis craccivora* Koch., 1854**1854. *Aphis craccivora* Koch. *Die pflanzenlause, Aphiden, Nnnburg...*, 1 : 124.1909. *Aphis craccivora* Lefroy and Howlett. *Indian Insect Life*, 1 : 786.1972. *Aphis craccivora* Rao and Kulkarni, *Marath. Univ. J. (Nat. Sci.)*, 11 : 287–288.1990. *Aphis craccivora* Ghosh, *Mem. zool. Surv. India*, 17(3) : 22–28.

Common name : All aphids are known as “Mava kitak” or Mavyache kide” in local language, ‘Marathi’ in Maharashtra State.

Diagnostic characters : Apterous viviparous female : Body blackish to black, oval, about 1.6–2.8 mm long with 1.2–1.6 mm at its maximum width. Head smooth, with small antennal tubercles. Antennae six-segmented, 0.5–0.8 times as long as body, progressively more distinctly imbricated from base towards apex. Processus terminalis about 2.1–2.8 times as long as base of antennal segment VI. Rostrum reaching upto hind coxae, ultimate rostral segment about 0.85–1.0 times as long as hind tarsus II. Abdominal dorsum black, with a dark continuous median patch, with polygonal reticulations. This area appears shining black in life. Hairs on dorsum with acuminate apices, longest hair on anterior tergites about 0.5–0.8 times as long as basal diameter of antennal segment III. Siphunculi dark brown to black; imbricated, cylindrical about 0.14–0.20 times as long as body and 1.5–2.0 times as long as cauda. Cauda elongate, black, little constricted at basal 0.3 to 0.5 portion, bearing 5 to 9 hairs of moderate length. First tarsal chaetotaxy 3 : 3 : 2.

Material examined and locality : Apterous viviparous M, ex Grass, 12.xii.2001, Near Nursery area, Hatti gate, Sanjay Gandhi National Park, S.N.G.P. Coll. P.P. Kulkarni.

Distribution : Cosmopolitan.

2. *Aphis gossypii* Glover 18771877. *Aphis gossypii* Glover. *Rep. Comm Agric. USA.*, for 1816 : 36.1938. *Aphis gossypii* Deshpande. *J. Bombay nat. Hist. Soc.*, 39 : 740–744.1972. *Aphis gossypii* Rao and Kulkarni. *Marath. Univ. J. (Nat. Sci.)*, 11 : 287–288.

1990. *Aphis gossypii* Ghosh. *Mem. zool. Surv. India*, 17(3) : 35–41.

Diagnostic characters : Apterous viviparous female : Body pale, about 1.3–1.7 mm long with 0.7–1.1 mm at its maximum width. Antennae 0.5–0.7 times as long as body, segments IV + V shorter than VI, processus terminalis 2.0–3.5 times as long as base of antennal segment VI, flagellum very weakly imbricated, often pale. Rostrum reaching beyond mid coxae, ultimate rostral segment 1.0–1.3 times as long as hind tarsus II. Abdominal dorsum pale to light brown, with or without scattered brown sclerites. Siphunculi light to dark brown, imbricated, cylindrical, tapering to apex; about 0.1–0.19 times as long as body. Cauda spinose, dusky and slightly constricted near the middle, bearing 5–6 hairs. First tarsal chaetotaxy 3 : 3 : 2.

Alate viviparous female : Body pale brownish, 0.9–1.8 mm long with 0.5–0.9 mm at its maximum width. Head brownish. Antennae about 0.6–0.8 times as long as body, processus terminalis 2.1–3.6 times as long as base of antennal segment VI. Antennal segment III with 5–7 secondary rhinaria distributed over entire length. Ultimate rostral segment 1.0–1.2 times as long as hind tarsus II. Abdominal dorsum pale, smooth, with pattern of sclerites from tergites 6–8. Some sclerotic patches on abdomen and a distinct pale to dark post-siphuncular sclerite often present. Siphunculi brownish about 0.1–0.14 times as long as body and 1.5–1.9 times as long as cauda. Cauda bearing 4–7 hairs, wing venation normal. The species exhibits various shades of colour in life from pale yellow to dark yellow to greenish blue mainly depending upon the host plants and season.

Material examined : Apterous and alate viviparous M, 12.xii.2001, Tourism area, S.G.N.P., Mumbai, Coll. P.P. Kulkarni.

Distribution : Cosmopolitan.

3. *Apis nerii* Boyer de Fonscolombe, 1841

1841. *Apis nerii* Boyer de Fonscolombe. *Ann. Soc. Ent. Fr.*, 10 : 179.

1918. *Aphis nerii* Das. *Mem. Indian Mus.*, 6(4) : 220–222.

1980. *Aphis nerii* Kulkarni and Kacker. *Bull. zool. Surv. India*, 3 : 103–105.

1980. *Aphis nerii* Raychaudhuri (ed.). Aphids of North East India and Bhutan, *The Zoological Soc. Calcutta*, 56.

1990. *Aphis nerii* Ghosh. *Mem. zool. Surv. India*, 17(3) : 48–51.

Diagnostic Characters : Apterous viviparous female : Body pale brownish 1.75–2.7 mm long, with 0.9–1.7 mm at its maximum width. Head broader than long. Antennae six segmented, 1.0 to 1.8 times as long as body; Processus terminalis 3.8–4.3 times as long as base of antennal segment VI. Rostrum reaching upto or beyond hind coxae. Ultimate rostral segment 1.2–1.6 times as long as hind tarsus II. Abdominal dorsum pale, with polygonal reticulations. Longest hair on anterior abdominal tergites about 0.9–1.2 times as long as basal diameter of antennal segment III, 8th tergite with 2 hairs. Siphunculi stout broad,

black to dark brown, cylindrical tapering towards apex, about 0.2–0.23 times as long as body. Cauda spinose, rather broad, thumb shaped, bearing about 10 hairs. First tarsal chaetotaxy 3 : 3 : 3. This species is bright orange coloured and feeds mainly on ventral surface of leaves of *Calotropis gignentia*. The population is seen congrigating along the ribs on leaf blade, while feeding.

Alate viviparous female : Body pale, 1.6–2.4 mm long with 0.6–1.0 mm at its maximum width. Head brownish, broader than long. Antennae 6 segmented, about 0.7–0.9 times as long as body; antennal segment III with 6–14 small or large, more or less circular secondary rhinaria distributed over entire length; antennal segment IV with 0-2 secondary rhinaria. Ultimate rostral segment 1.20 to 1.25 times as long as hind tarsus II. Abdominal dorsum pale, smooth, with well developed post siphuncular selerite and scattered pale brownish patches. Siphunculi stubby, cylindrical, dark brown, tapering, imbricated and 0.10–0.20 times as long as body. Cauda dark, somewhat conical, strongly spinose bearing about 10 to 11 hairs. Wing venation normal.

Material Examined : Apterous and alate viviparous M, ex. *Calotropis* sp. 20.i.2005, Coll. received from Nitin Satarkar, Matunga, Mumbai.

Distribution : Throughout India.

Elsewhere : Africa, America; Australia; Bhutan; British Guyinea; China; Europe, Fiji; Formosa; Japan; Java; Korea; Malaya; Middle East; Nepal; Newzealand; Siam; Soloman Is; Spain; Sri Lanka; Somali Land; Transvaal; U.S.A.

Remarks : This species is normally found on Asclepiadaceae and Apocynaceae. In Melghat Tiger Reserve it was reported from *Nerium* sp. and *Calotropis* sp. (Kulkarni 2005). Specimens are orange coloured in life, with dark siphunculi.

Genus *Toxoptera* Koch., 1857

4. *Toxoptera aurantii* B.d.F., 1841

1841. *Aphis aurantii* Boyer de Fonoscolomb. *Annl. Soc. Ent. Fr.*, 10 : 178.

1936. *Toxoptera aurantii* Koch. *Die Pflanzen Aphiden*, 254.

1968. *Toxoptera aurantii* Sharma. *Nep. J. Agric.*, 3 : 129.

1977. *Toxoptera aurantii* Rao and Kulkarni. *Marath. Univ. J. (Nat. Sci.)*; 15(9) : 142-144.

1983. *Toxoptera aurantii* Das & Raychaudhuri. *Rec. zool. Surv. India, Misc. Pub.*, 51 : 17-18.

Diagnostic Characters : Apterous viviparous female : Body pale brownish, about 1.50–1.68 mm long and 1.00–1.02 mm at its maximum width. Head smooth, without lateral frontal tubercles. Antennae six segmented. Shorter or slightly longer than body. Flagellum gradually more distinctly imbricated from base to apex. Processus terminalis about 4.0–4.75 times as long as base of antennal segment VI. Rostrum extend upto hind coxae.

Ultimate rostral segment slightly longer than hind tarsus II. Abdomen pale, with polygonal reticulations, with stridulatory ridges posteriorlaterally on venter, with some dark patches marginally. Hind tibiae with some peg like structure. Postsiphuncular sclerite distinct. Siphunculi dark brown to black, weakly imbricated, about 1.0–1.2 times as long as cauda. Cauda bearing 10 to 20 hairs. First tarsal chaetotaxy 3 : 3 : 3.

Alate viviparous female : Antennal segment III with secondary rhinaria. Head smooth, body 1.70–2.0 mm long and 1.03–1.20 mm at its maximum width. Post siphuncular sclerite more pronounced with stridulatory ridges. Wing venation normal.

Material examined : Apterous and alate viviparous M, ex. *Citrus* sp. 12.xii.2001, S. G. N. P. Borivali, Mumbai, Coll. P.P. Kulkarni.

Distribution : Cosmopolitan.

Subtribe Rhopalosiphina

Genus *Rhopalosiphum* Koch., 1854

5. *Rhopalosiphum maidis* (Fitch.) 1856

1855. *Aphis maidis* Fitch. *Trans. N.Y. agric. Soc.*, 15 : 531.

1953. *Rhopalosiphum maidis* Cottier. *N.Z. Dept. Sci. Ind. Res. Bull.*, 106 : 162–165.

1963. *Rhopalosiphum maidis* Behura. *Proc. 1st Summer School, Zool. Simla*, (1961) : 55.

1977. *Rhopalosiphum maidis* Kulkarni. *Marath. Univ. J. (Nat. Sci.)*, 15(9) : 145–146.

1980. *Rhopalosiphum maidis* Roychaudhuri (ed.). *Aphids of North East India and Bhutan, The Zoological Society, Calcutta*, 67–69.

Diagnostic Characters : Apterous viviparous female : Body 1.55–2.1 mm long with 0.8–0.97 mm at its maximum width. Head smooth, with weakly developed lateral frontal tubercles having rhopalosiphine projections. Antennae six-segmented, 0.5–0.65 times as long as body, processus terminalis 2.0–2.3 times as long as the base of antennal segment VI. Ultimate rostral segment about 1.8–2.3 times as long as hind tarsus II. Mid thoracic furca sessile. Dorsum of abdomen pale, abdominal hairs with blunt or fine apices. Siphunculi about 0.80–0.10 times as long as body, dark, cylindrical, slightly swollen, with well developed flange. Cauda short, pale, 0.6–0.9 times as long as siphunculi and with 5 to 9 hairs. First tarsal chaetotaxy 3 : 3 : 3.

Alate viviparous female : Head smooth, with antennal tubercles weakly developed. Antennae six segmented, about 0.48–0.5 times as long as body, segment II with 11 to 25; IV with 1 to 10 and V with 5 secondary rhinaria. Processus terminalis about 2.0–2.8 times as long as base of antennal segment VI; flangellum progressively imbricated from base to apex. Ultimate rostral segment 0.7–0.8 times as long as hind tarsus II. Abdomen

with well developed marginal sclerites on each segment with inconspicuous median sclerotic patches, with dusky band on segment 7 and 8. Siphunculi slightly swollen on distal half, with well developed flange. Cauda dark, spiunose, about 0.5–0.6 times as long as siphunculi, with 5 to 6 hairs.

Material examined and locality : Apterous and alate viviparous M, 12.xii.2001, Ex. Grass, Near nursery area, Hatti Gate, S.G.N.P., Mumbai, Coll. P.P. Kulkarni.

Distribution : Cosmopolitan.

Tribe Macrosiphini

Genus *Brevicoryne* v.d. Goot 1915

6. *Brevicoryne brassicae* (Linnaeus), 1758

1758. *Apis brassicae* Linnaeus. *Syst. Nat.* (10th ed.) : 1 : 452.

1915. *Brevicoryne brassicae* van der. Goot. *Beitr. Kennt. Holland. Blattlause*, 245.

1980. *Brevicoryne brassicae* Raychaudhuri (ed.). *Aphids of North East India and Bhutan*, Zool. Soc., Calcutta, 111.

1984. *Brevicoryne brassicae* Kulkarni. *Bull. zool. Surv. India*, 6(1-3) : 267–270.

Diagnostic characters : Apterous viviparous female : Head smooth, lateral frontal tubercles very low, median frontal elevation almost as high as lateral frontal tubercles. Body 1.9–2.4 mm long with 1.30–1.50 mm at its maximum width. Antennae six segmented, apterae without secondary rhinaria, processus terminalis about 3.0–3.5 times as long as the base of antennal segment VI. Ultimate rostral segment reaching upto mid coxae, much shorter than hind tarsus II. Abdominal dorsum with pleural pigmented irregular shaped wrinkled patches, with a spinopleural band on segments. Siphunculi about 0.06–0.08 times as long as body and 0.6–0.7 times as long as cauda. Cauda dark, triangular. First tarsal chaetotaxy 3 : 3 : 3.

Alate viviparous female : Antenna six segmented, segment III with numerous distinctly protuberrent rhinaria scattered all over the segment III, dorsal hairs on abdomen thick, with acuminate apices, siphunculi with basal portion constricted and wrinkled. Wing venation normal, all veins slightly bordered brown.

Material examined : Apterous and alate viviparous females, ex. *Brassica* sp., 11.xii.2001 around Residential quarters, S.G.N.P., Borivali, Mumbai, Coll. P.P. Kulkarni.

Distribution : Cosmopolitan.

Genus *Macrosiphum* Passerini, 1860.7. *Macrosiphum rosae* Linnaeus, 1758.

1758. *Aphis rosae* Linnaeus. *Syst. Nat.* (10 ed), 1 : 452.

1860. *Macrosiphum rosae* Passerini. *Gli, A fidi*, 27.

1980. *Macrosiphum (Macrosiphum) rosae* Raychaudhuri (ed.). *Aphids of North East India and Bhutan*, Zool. Society, Calcutta, 181–182.

1983. *Macrosiphum rosae* Das & Raychaudhuri. *Rec. zool. Surv. India, Occ. Paper*, 51 : 30.

1984. *Macrosiphum rosae* Kulkarni. *Bull. zool. Surv. India*, 6(1-3) : 267–270.

1985. *Macrosiphum rosae* Agarwal and Ghosh. *Mem. zool. Surv. India*, 16(3) : 46.

Diagnostic characters : Body 2.50–2.70 mm long with 1.10–1.20 mm at its maximum width. Head smooth, with diverging smooth lateral frontal tubercles and slightly distinct median frontal prominence. Dorsal cephalic hairs small. Antennae six segmented, 1.21–1.25 times as long as body, slender, pale with segment III having few secondary rhinaria on basal 0.5 portion. Ultimate rostral segment 1.0–1.20 times as long as hind tarsus II. Abdomen pale, without sclerotic pattern. Anterior siphuncular sclerite weakly developed. Siphunculi dark with distinct flang, with distinct polygonal reticulated area on apical 0.25–0.30 portion. Cauda elongate, pale, with slight basal constriction. First tarsal chaetotaxy 4 : 4 : 4.

Alate viviparous female : Antennal III with numerous secondary rhinaria throughout, segment IV with 7–10 such rhinaria almost on entire length. Abdomen pale, with slightly developed post siphuncular sclerite, legs long, femora smooth, siphunculi dark, Cauda pale, with slight basal constriction, tapering and with 13 to 15 hairs.

Material examined : Apterous and alate viviparous M, ex. *Rosa* sp., 20.i.2005, tourism zone. S.G.N.P., Borivali, Mumbai. Coll received from Nitin Satarkar, Matunga, Mumbai.

Distribution : Cosmopolitan.

Genus *Myzus* Passerini, 18608. *Myzus (Necterosiphon) persicae* (Sulzer), 1776

1776. *Aphis persicae* Sulzer. *Abgekurtzte Gesch l'nskten*, : 105

1913. *Aphis persicae* Sasaki. *Agr. Expt. St. Formosa, spec. Rept.*, 8 : 114.

1929. *Myzus persicae* Hori. *Rept. Hokkaido Agr. Exp. S.*, 23 : 99 (In Japanese).

1976. *Myzus persicae* Basu & Raychaudhuri. *Oriental Ins.*, 10(1) : 10.

1980. *Myzus persicae* Kulkarni. *Marath. Univ. J. (Nat. Sci.)*, 19 : 29–30.

1980. *Myzus persicae* Raychaudhuri (ed.). *Aphids of North East India and Bhutan*, Zool. Soc. Calcutta, 217.

1985. *Myzus (Necterasiphon) persicae* Agarwala & Ghosh. *Mem. zool. Surv. India*, 16(3) : 49.

Diagnostic characters : Apterous viviparous female : Body 1.6–1.9 mm long, with 1.0–1.2 mm at its maximum width. Head spinose dorsally and ventrally, with weakly developed median frontal tubercle. Lateral tubercles well developed, diverging and with inner margins converging, dorsal cephalic hairs short, with acuminate apices. Antennae six segmented, about 0.9–1.0 times as long as body. Processus terminalis 3.0–3.3 times base of antennal segment VI. Ultimate rostral segment almost equal to the length of hind tarsus II. Dorsum of abdomen pale, without sclerotic patches. Siphunculi cylindrical, distinctly clavate, with flang, 0.23–0.25 times as long as body. Cauda slightly constricted at middle. First tarsal chaetotaxy 3 : 3 : 3. Nymphs with spinulose tibiae.

Alate viviparous female : Head pigmented as in apterae, dorsum of abdomen with a large dark central patch, sclerotic marginal patches on dorsum of abdomen also present. Hairs on dorsum with blunt apices. Siphunculi cylindrical, dark to pale brown, with strongly clavate shape than in apterae. Wing venation normal.

Material examined : Apterous and alate viviparous M, near Tulsi talav, ex. Grass; 12.xii.2001, near Nursery, Hatti gate, S.G.N.P., Borivali, Mumbai, Coll. P.P. Kulkarni.

Distribution : Cosmopolitan.

Genus *Pentalonia* Coquerel 1859

9. *Pentalonia nigronervosa* Coquerel, 1859

1859. *Pentalonia nigronervosa* Coquerel. *Ann. Soc. Ent. Fr.*, 3 : 260.

1949. *Pentalonia nigronervosa* Hille Ris Lamburs. *Contrib to monograph on Aphididae of Europe, Temminckia*, IV, 8 : 182–323.

1971. *Pentalonia nigronervosa* Miyazaki. *Insecta Mats.*, 34(1) : 137.

1980. *Pentalonia nigronervosa* Raychaudhuri (ed.). *Aphids of North East India and Bhutan*, Zool. Soc. Calcutta, : 234–236.

1984. *Pentalonia nigronervosa* Agarwala and Ghosh. *Mem. zool. Surv. India*, 16(3) : 51.

Diagnostic characters : Apterous viviparous female : Body 1.78–1.80 mm long with 1.5 mm at its maximum width. Head pigmented, spinulose, lateral frontal tubercles distinct, scabrous; median frontal prominence lower in height. Antenna six segmented, processus terminalis longer than base of antennal segment VI; Rostrum extends little beyond hind coxae. Thoracic tergum with irregular striations. Abdominal dorsum with polygonal reticulations. Siphunculi about 0.13–0.23 times as long as body, with spinulose inibrications all over. Cauda short, dusky about 0.35–0.42 times as long as siphunculi. First tarsal chaetotaxy 3 : 3 : 2.

Alate viviparous female : Wing venation characteristic with RS fusing with anterior branch of M in forewing. Veins with strongly bordered brown. Hind wing with one oblique vein.

Material examined : Many apterous and alate viviparous M, ex. *Musa* plants in the kitchen garden of staff quarters, 11.xii.2001, S. G. N.P., Borivali, Mumbai, Coll. P.P. Kulkarni.

Distribution : India and virtually cosmopolitan.

Genus *Uroleucon* Mordvilko 1914

Subgenus *Uromelan* Mordvilko 1914

10. *Uroleucon (Uromelan) compositae* (Theobald), 1915

1914. *Dactynotus (Uromelan) compositae* Mordvilko. Fauna de la Russie, *Insecta : Hemiptera*, : 64.

1915. *Dactynotus (Uromelan) compositae* Theobald. *Bull. Ent. Res.*, 6 : 123.

1958. *Dactynotus (Uromelan) compositae* Eastop. *The Aphididae of East Africa*, : 37.

1980. *Dactynotus (Uromelan) compositae* Raychaudhuri (ed.). *Aphids of North East India and Bhutan*, *Zool. Soc. Calcutta*, : 131–132.

1986. *Uroleucon (Uromelan) compositae* Agarwala and Ghosh. *Mem. zool. Surv. India*, 16(3) : 53.

Diagnostic characters : Apterous viviparous female : Large aphids, with body 2.8 - 3.09 mm long, with 1.2–1.35 mm at its maximum width. Head smooth, dark brown, with lateral frontal tubercles very well developed, diverging and smooth. Median frontal prominence very weak, dorsal cephalic hairs short, thick. Antennae six segmented, almost equal to subequal to body length. Flagellum dark, brown, tapering towards apex; segment III with many secondary rhinaria distributed throughout its length. Processus terminalis long, about 6.0–6.5 times as long as base of antennal segment VI. Ultimate rostral segment with about 8 secondary hairs. Siphunculi dark, imbricated, with polygonal reticulations on apical 0.4 portion, about 0.26–0.30 times as long as body. Abdomen pale, smooth, with well developed post-siphuncular sclerite. Cauda elongate, tapering, dark brown, about 0.5–0.54 times as long as siphunculi and with 14 to 16 hairs.

Alate viviparous female : Dark brown to black in life, large aphids with body 2.6–2.8 mm long and 0.8–0.9 mm at its maximum width. Head, thorax and abdomen as in apterous viviparous female. Antennae six segmented, antennal III with about 80 secondary rhinaria distributed throughout its length. Processus terminalis about 5.8–6.0 times as long as base of antennal segment VI. Abdomen pale with well developed post siphuncular sclerite and small sclerotic patches laterally. Siphunculi and cauda as in apterae.

Material examined and locality : Apterous and alate viviparous M, Ex. *Zinnia* and other ornamental flowers of compositae 12.xii.2001, Tourism zone, S. G. N. P., Borivali, Mumbai, Coll. P.P. Kulkarni.

Distribution : India : Himachal Pradesh, Maharashtra, Manipur, Meghalaya, Sikkim, South India, Uttar Pradesh, West Bengal.

Elsewhere : Africa; Australia; Egypt; Europe and South America.

Subfamily GREENIDEINAE

Tribe Greenideini

Genus *Greenidea* Schouteden 1905

Subgenus *Greenidea* Raychaudhuri & Chatterjee 1980

11. *Greenidea (Greenidea) ficicola* Tak., 1916

1916. *Trichosiphum formosanum* Maki. M., *Essay for Nawa*, Gifu, P. 13 (Partim).

1917. *Greenidea artocarpi* Goot. *Contrib. Faune Indes Neerl.*, 1 : 131. (Partim).

1921. *Greenidea ficicola* Takahashi. R. *Aph. of Formosa*, 1 : 66.

1956. *Greenidea ficicola* Raychaudhuri. D.N., *Zool. Verch. Leiden*, 31 : 35.

1980. *Greenidea (Greenidea) ficicola* Raychaudhuri. D.N. (ed.) *Aphids of North East India and Bhutan The Zoological Soc. Calcutta*, : 341.

1993. *Greenidea (Greenidea) ficicola*, Ghosh and Agarwala. *Fauna of India and the Adjacent Countries Homoptera : Aphidoidea pt.*, 6 : 181–186.

Diagnostic characters : Apterous viviparous female : Body brown, pear shaped, 1.70–2.81 mm long and 0.89–1.51 mm at its maximum width. Head brown, dorsum smooth, with large thick hairs. Antennae six segmented, gradually slightly darker and imbricated towards apex, 0.71–1.03 times as long as body. Rostrum reaching upto middle of body, ultimate rostral segment very long and acute, about 1.80–2.42 times as long as hind tarsus II. Dorsum of abdomen scleritized, brown or brownish black, with circular well defined paler zones round the base of each of the large hairs; smooth, dorsal hairs large, thick, stiff with branched or multifid apices; largest hairs on anterior tergites 0.06–0.12 mm long. Siphunculi with the base brown and rest towards apex gradually darker; 0.63–1.03 mm long, about 0.31–0.41 times as long as body, curved outwards. Hairs on siphunculi numerous. Cauda with a distinct median conical process, with 8 very fine long hairs.

Alate viviparous female : Body elongated, brown, 1.66–2.32 mm long and 0.60–1.19 mm at its maximum width. Antennae dark except at basal segments, 1.55–2.60 mm long, flagellum distally imbricated, segment III with 10 to 23 circular, transversely oval secondary rhinaria spread over almost its entire length, nearly in a row. Processus terminalis about 2.26–2.64 times as long as the base of antennal segment VI. Ultimate rostral segment 1.92–2.74 times as long as second segment of hind tarsus II. Dorsal hairs of two types, long and short with acute apices. Dorsum of abdomen smooth, brown, sclerotized. Siphunculi blackish brown, compressed, cylindrical, slightly curved

outwards, about 0.33–0.05 times as long as body. Hairs on siphunculi with acute apices. Wing venation : media twice branched, pterostigma extending upto 0.33 portion of the radial sector. Hind wings with two oblique veins.

Material examined : Apterous and alate viviparous females ex. *Ficus* sp. and *Psidium guajava*; Near staff quarters, 11.xii.2001, S.G.N.P., Borivali, Mumbai. Coll. P.P. Kulkarni.

Distribution : India: Delhi, Himachal Pradesh, Maharashtra, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Australia; Bangla Desh; East China; Indonesia; Malaysia; Nepal; Russia and Taiwan.

SUMMARY

During the faunistic surveys of Sanjay Gandhi National Park, Borivali, Mumbai conducted by Western Regional Station of Zoological Survey of India, specimens of Aphids (Homoptera : Aphididae) were collected and identified. Those belongs to 11 species under two subfamilies.

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ZOOCECIDIA (PLANT GALLS)

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INTRODUCTION

Plant galls (Zooecidia) are structural abnormalities, which arise mostly by overgrowth of tissues in response to the feeding activity of a parasite on the host plant. Galls may arise on any part of a plant and differ widely in size, shape and structure specific to the gall maker. They exhibit very high degree of specificity not only with reference to host plants but also to plant organs and plant tissues.

Among gall makers, perhaps the eriophid mites are one of the most prolific. Approximately 15,000 gall inducing insects have been recorded from the world, of which, majority belong to Thysanoptera, Homoptera (psyllids, aphids & coccids), Coleoptera (curculionidae), Hymenoptera (cynipids, chalcids), Lepidoptera (moths), and Diptera (cecidomyiids, tephritids & agromyzids) (Rohfritsch & Shorthouse, 1982).

Recently, Sharma (2003a & 2003b) presented a comprehensive checklist of Plant galls from Maharashtra State. During the course of faunistic surveys conducted by author in the National Park, altogether 20 kinds of Zooecidia were collected on 15 different plants caused by mites and insects. The gall bearing plants are listed alphabetically according to plant genera followed by their respective Natural order, name/ group of the gall maker, brief description of the gall and distribution.

1. *Abutilon indicum* (L.) Sweet (Malvaceae) caused by *Hexomyza abutilonicaulis* Spencer (Diptera : Agromyzidae). Stem gall. Fusiform, solitary, rugose, unilocular, indehiscent tumescence of tender branches with elongate axial larval cavity containing single maggot inside. Size 5-10 mm long and 3-4 mm thick. Coll. Sanjay Gandhi N.P., August/September 2001, R.M. Sharma.

Distribution : New Delhi, Maharashtra : Aurangabad, Mumbai.

2. *Achyranthes aspera* L. (Amaranthaceae) caused by *Lasioptera achyranthesae* Sharma (Diptera : Cecidomyiidae). Leaf gall. Mostly hypophyllous, subglobose, ovoid or fusiform, solitary, glabrous, pale green when young, indehiscent, persistent swellings of the midrib or of the larger lateral veins; at times on apical part of the petiole which extends beyond

the midrib. 1-4 galls may arise on a single leaf. *Stem gall* : Elongated, cylindrical, solitary, solid, woody, costate, indehiscent, persistent gall. Gall cavity unilocular containing single larva inside. Coll. S.G.N.P. September, 2001, R.M. Sharma.

Distribution : Coromandal Coast, Karnataka, Maharashtra and Punjab.

3. *Avicennia marina* (Forssk.) Vierh. (Avicenniaceae) caused by Unknown Cecidomyiid (Diptera : Cecidomyiidae). Leaf gall. Epi-hypophyllous, non-localized, discoid, compressed, glabrous, solitary or in pairs but never agglomerate, indehiscent, persistent gall. Gall cavity unilocular. Ostiole hypophyllous. Size 4-5 mm in diameter. Coll. Yevoor Forest Range, Vasai creek, S.G.N.P. 27.ix.2001, R.M. Sharma.

Distribution : Andaman Islands, Mumbai (West Coast).

4. *Avicennia marina* (Forssk.) Vierh. (Avicenniaceae) caused by Unknown Hymenoptera Stem gall. Irregularly globose or subglobose, verrucose, solid, hard, woody, indehiscent, cortical gall. Size 10-20 mm. 1-3 galls may be seen on a small tender branch. Several exit holes seen on a mature gall indicating number of larvae inside each gall. Coll. Yevoor Forest Range, Vasai creek, S.G.N.P. 27.ix. 2001, R.M. Sharma.

Distribution : Andaman Islands, Mumbai (West Coast).

5. *Carissa congesta* Wt. (Apocynaceae) caused by Unknown Cecidomyiid (Diptera : Cecidomyiidae). Leaf gall. Epiphyllous, spherical, sessile, unilocular, fleshy galls. Stem gall. Ovoid or fusiform, solid, woody tumescence of tender branches. Coll. S.G.N.P. 29.ix. 2001, R.M. Sharma.

Distribution : Maharashtra : Bhimashankar (Pune dist.), Borivali (Mumbai) and Raigad dist.

6. *Ficus recemosa* L. (Moraceae) caused by *Pauropsylla depressa* Crawford. (Homoptera : Psyllidae). Leaf gall. Epiphyllous, globose or obpyriform, perfoliate, unilocular pouch-gall. Usually in large fleshy, multilocular agglomerate masses, yellowish, orange, reddish or reddish-brown. Size 5-10 mm in diameter and the agglomerate masses may measure up to 30mm in diameter. This is one of the most common galls, occurring every where throughout the year. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : Throughout India including Andaman Islands.

7. *Ficus recemosa* L. (Moraceae) caused by *Horidiplosis mathuri* Mani (Diptera : Cecidomyiidae). Leaf gall. Circular, biconvex, depressed lenticular gall. Smooth, solid, indehiscent with small circular exit holes. A few to many galls may appear on a single leaf. This is also one of the most common galls found everywhere. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : Throughout India including Andaman Islands.

8. ***Garuga pinnata*** Roxb. (Burseraceae) caused by *Phacopteron lentiginosum* Buckton (Homoptera : Psyllidae). Leaf gall. Epiphyllous, simple, free, often densely clustered, subglobose or ovoid, unilocular galls, strongly constricted basally in to a short, neck-like stalk, inserted in a cup-like tumescence of leaf blade near midrib or one of the larger side veins. A single leaf may have number of galls. The gall cavity spacious and contains 1-2 nymphs or adults of the psyllid. Size 20 mm long and 10 mm thick. This too is a common gall. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : Throughout India, up to the tropical forests of the Himalaya.

9. ***Mangifera indica*** L. (Anacardiaceae) caused by *Procontarinia matteina* K & C (Diptera : Cecidomyiidae). Leaf gall. Circular, discoid, depressed, equally developed on both sides of the leaf blade, solid, smooth, indehiscent, unilocular, lenticular gall. Hundreds of galls may be seen on a single leaf. Size 2-3 mm in diameter. This is a most cosmopolitan gall. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : Throughout India including Andaman Islands.

10. ***Momordica dioica*** Roxb. ex. Willd. (Cucurbitaceae) caused by *Lasioptera* sp. (Diptera : Cecidomyiidae). Stem gall. Fusiform, elongate, irregular, solid, fleshy, hirsute, costate, light yellowish-green swellings of tender branches; gall cavity uni or multichambered containing a few to many orange coloured larvae inside. Size : 25-30 mm long and 10-15 mm thick. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : Coromandal Coast, Himachal Pradesh and Maharashtra.

11. ***Pongamia pinnata*** (L.) Pierre (Fabaceae) caused by *Myricomyia pongamiae* Mani (Diptera : Cecidomyiidae). Stem gall, leaf vein-gall. Extensive swellings of the terminal branches, petioles or the midrib and larger side veins; solid, indehiscent, persistent, hard and woody. Size varies from 10-25mm in length. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : South India and Maharashtra.

12. ***Pongamia pinnata*** (L.) Pierre (Fabaceae) caused by *Aceria cheriani* (Masse) (Acarina : Eriophyidae). Leaf gall. Mostly epiphyllous, sometimes hypophyllous, sub cylindrical, clavately-cylindrical or obliquely obpyriform, pedicellate cephaloneon pouch-gall. Lopsided, simple, and free, glabrous, green indehiscent, gall cavity unilocular filled with white erineal hairs. Sometimes entire leaflets are turned in to dense clusters of galls, without a trace of free blade. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : This is one of the most commonly distributed galls in the Orient and extends from Java, Sumatra, Sebesi, Slajar, Celebes through Myanmar, Andaman & Nicobar Islands to mainland India.

13. *Salvadora persica* L. var. *wightiana* (Planch ex. Thw.) Verde (Salvadoraceae) caused by *Resseliella salvadorae* (Rao) (Diptera : Cecidomyiidae). Leaf gall. Mostly epiphyllous, sometimes hypophyllous, globose pouch gall. Stem gall. Subglobose, ovoid or fusiform, moniliform, glabrous, solid, hard, woody, indehiscent, persistent, swellings on tender branches. Size varies from 25-30 mm long and 10-15 mm thick. Coll. Yevoor Forest Range, Vasai creek, S.G.N.P. 27.ix. 2001, R.M. Sharma.

Distribution : Rajasthan, Western Uttar Pradesh and Maharashtra.

14. *Salvadora persica* L. var. *wightiana* (Planch ex. Thw.) Verde (Salvadoraceae) caused by *Eriphytes* sp. (Acarina : Eriophyidae). Leaf gall. Epiphyllous, globose/subglobose or irregular and agglomerated, smooth pouch gall. Gall cavity lined by fine dense erinium. Size 5-15 mm in diameter. Coll. Yevoor Forest Range, Vasai creek, S.G.N.P. 27.ix.2001, R.M. Sharma.

Distribution : Rajasthan, Western Uttar Pradesh and Maharashtra.

15. *Sonneratia apetala* Buch-Ham (Sonneratiaceae) caused by Undetermined Microlepidoptera. Leaf fold galls. Hypophyllous, apical portion of the leaf margin gets folded downwards. Solitary, simple, solid, glabrous, indehiscent, persistent gall. One gall per leaf. Size 5-10 mm in length and 5-8 mm in diameter. Coll. Yevoor Forest Range, Vasai creek, S.G.N.P. 27.ix.2001, R.M. Sharma.

Distribution : Maharashtra.

16. *Tectona grandis* L.f. (Verbenaceae) caused by *Asphondylia tectonae* Mani (Diptera : Cecidomyiidae). Stem gall. Irregularly globose, solid, hard, woody, indehiscent, persistent, unilateral, rindengall. Size 100-150 mm long and 20-40mm thick. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : Throughout India wherever host plant occurs.

17. *Tectona grandis* L.f. (Verbenaceae) caused by Unknown Cecidomyiid (Diptera : Cecidomyiidae). Leaf gall. Hypophyllous, depressed, circular, discoid, lenticular pouch gall; conspicuously clothed with dense cottony white, villous hairs. The galls are crowded, often over 200 per leaf. Size 2-4 mm in diameter. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : Throughout India wherever host plant occurs.

18. *Terminalia paniculata* Roth (Combretaceae) caused by *Trioza hirsuta* (Crawf.) (Homoptera : Psyllidae). Leaf gall. Irregularly subglobose or lenticular pouch gall, simple,

solitary or agglomerated, smooth or verrucose, solid, fleshy, occur in large numbers on the leaf. Size 2-8mm thick. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : Throughout India wherever host plant occurs.

19. *Terminalia* sp. (Combretaceae) caused by *Trioza* sp. (Homoptera : Psyllidae). Leaf roll-gall. Epiphyllous in rolling of the leaf margin, massive irregularly swollen, solid glabrous, pale green, sometimes pinkish with hollow gall cavity containing nymphs inside. Size 5-8mm in length. Coll. S.G.N.P. September 2001, R.M. Sharma.

Distribution : Throughout the plains and the low hills of India.

20. Undetermined Plant caused by Unknown insect. Leaf gall. Epiphyllous, more or less circular, discoid, depressed, glabrous, simple, indehiscent, persistent gall. Ostiole hypophyllous. Size 2-4 mm in diameter. A few to many galls seen on a single leaf. Coll. Yevoor Forest Range, Vasai creek, S.G.N.P. 27.ix.2001, R.M. Sharma. This plant is called 'Wehala' in vernacular language.

Distribution : Maharashtra.

SUMMARY

A total of 20 kinds of Zoological (plant galls) on 15 different plants caused by mites and insecta from the National Park are recorded.

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INSECTA : LEPIDOPTERA : RHOPALOCERA and GRYPOCERA

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INTRODUCTION

The Indian Subcontinent harbours more than 1439 species of butterflies Evans (1932) and Haribal (1992) representing 11.1% of the total world species Vane-Wright (1978). Butterflies are considered to be beneficial insects and they are no exception to the adverse effects of man-made changes to their natural environment. They are important natural resources as they help in pollination, an essential process in natural propagation. As they are intimately associated with plants as adults and as larvae, they are ecological indicators. They not only enhance the aesthetic value of the environment by their fabulous wing colours but also play very important role in the food chain. Therefore, of late, there is an increasing global interest in conserving butterflies. The interest in butterfly studies has shown that at least 26 species are "globally threatened" today IUCN (1990).

Fortunately conservation areas provide much needed protection and desired environment for butterflies to thrive. Their baseline data from such areas are of immense value as they provide the foundation for a meaningful approach in diversity analyses and conservation strategies. Sanjay Gandhi National Park spread over 103.09 Sq. km area has tropical forest including (i) Tropical moist deciduous, (ii) South Indian moist deciduous, (iii) Patches of Evergreen, (iv) Western Tropical Hill Forest and (v) Mangrove Scrub Forest. Besides, the Park has areas where the system transits from coastal to the estuarine, the hilly mountain and lakes. All these support the varieties of lepidopterous insects including butterflies.

The present account of butterflies and skippers is intended to provide comprehensive list based on collections made by Zoological Survey of India, Western Regional Station, Pune and Bombay Natural History Society, Mumbai over the period of time plus the earlier records by previous workers like Best (1952-1956), Chaturvedi and Satheesan (1981-1985) and Andheria (2001) from Bombay and Selsette Island covering Sanjay Gandhi National Park, Borivali, Mumbai, referable to 138 species in 91 genera spread over eight families. This works out to 84.14% of total butterfly species richness of Bombay-Deccan (Pune) area (164 species) and 43.80% of Peninsular India (315 species) Singh & Pandey (2004). Descriptions depicting the diagnostic features of the species dealt here are excluded from

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this account as access to such details can be had from the works of Evans (1932), Talbot (1939, 1947) Wynter-Blyth (1957), Chaturvedi & Satheesan (1981-1985), Gay *et al.* (1992) and Haribal (1992).

The nomenclature followed here is after Varshney (1993, 1994 & 1997) for families other than Hesperidae. Larsen (1987 & 1988) is followed in case of family Hesperidae. Under the systematic account, the original reference to the species and the subsequent important ones are cited, for most of the species dealt with, except for a few for which the original references could not be traced out. The material examined is given only for those species that were collected by the parties of Z.S.I. Pune. The species marked with (*) were identified by one of us (NC) from the collections of BNHS, Mumbai, accumulated over the years, which may run in pages therefore avoided to include here.

SYSTEMATIC ARRANGEMENT OF BUTTERFLIES RECORDED FROM SANJAY GANDHI NATIONAL PARK

(* Indicates inputs from N.Chaturvedi, Bombay Natural History Society, Mumbai)

Order LEPIDOPTERA

Suborder RHOPALOCERA

Family PAPILIONIDAE (Swallow tails)

Subfamily PAPILIONINAE

Tribe Leptocircini

- | | |
|--|--------------------|
| 1. <i>Graphium agamemnon</i> Linn. | Tailed Jay |
| 2. <i>Graphium sarpedon</i> Linn. | Common Blue Bottle |
| *3. <i>Graphium doson</i> C & R Felder | Common Jay |
| *4. <i>Pathysa nomius</i> Esper | Spot Swordtail |

Tribe Papilionini

- | | |
|---|-------------------|
| 5. <i>Papilio polytes</i> Linn. | Common Mormon |
| 6. <i>Papilio polymenstor</i> Cramer | Blue Mormon |
| 7. <i>Papilio demoleus</i> Linn. | Lime Butterfly |
| *8. <i>Chilasa clytia</i> Linn. | Common Mime |
| 9. <i>Pachliopta aristolochiae</i> Fab. | Common Rose |
| 10. <i>Pachliopta hector</i> Linn. | Crimson Rose |
| *11. <i>Troides helena</i> Linn. | Southern Birdwing |

II. Family PIERIDAE (Whites & Yellows)

Subfamily PIERINAE

Tribe Pierini

- | | |
|----------------------------------|---------|
| *12. <i>Belenois aurota</i> Fab. | Pioneer |
|----------------------------------|---------|

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|-------------------------------------|---------------------|
| 13. <i>Cepora nerissa</i> Fab. | Common Gull |
| 14. <i>Cepora nadina</i> Lucas | The Lesser Gull |
| 15. <i>Delias eucharis</i> | Common Jezebel |
| *16. <i>Appias libythea</i> Fab. | Striped Albatross |
| 17. <i>Appias lyncida</i> Cramer | Chocolate Albatross |
| *18. <i>Appias albina</i> Boisduval | Common Albatross |
| 19. <i>Appias indra</i> (Moore) | Plain Puffin |
| 20. <i>Leptosia nina</i> (Fab.) | Psyche |

Tribe **Colotini**

- | | |
|--------------------------------------|-------------------|
| 21. <i>Ixias marianne</i> (Cramer) | White Orange Tip |
| 22. <i>Ixias pyrene</i> Linn. | Yellow Orange Tip |
| 23. <i>Hebomoia glaucippe</i> Linn. | Great Orange Tip |
| *24. <i>Colotis amata</i> (Fab.) | Small Salmon Arab |
| *25. <i>Colotis etrida</i> Boisduval | Small Orange Tip |
| *26. <i>Colotis eucharis</i> (Fab.) | Plain Branded Tip |
| 27. <i>Pareronia valeria</i> Cramer | Common Wanderer |

Subfamily **COLIADINAE**

- | | |
|--|--------------------------|
| 28. <i>Catopsilia pomona</i> (Fab.) | Lemon or Common Emigrant |
| 29. <i>Catopsilia pyranthe</i> (Linn.) | Mottled Emigrant |
| 30. <i>Terias hecabe</i> (Linn.) | Common Grass Yellow |
| 31. <i>Terias laeta</i> Boisduval | Spotless Grass Yellow |
| *32. <i>Terias brigitta</i> Stoll | Small Grass Yellow |
| 33. <i>Terias blanda</i> (Boisduval) | Three spot Grass Yellow |

III. Family **SATYRIDAE** (Browns)Subfamily **SATYRINAE**Tribe **Melanitini**

- | | |
|---------------------------------|----------------------|
| 34. <i>Melanitis leda</i> Linn. | Common Evening Brown |
|---------------------------------|----------------------|

Tribe **Lethini**

- | | |
|---------------------------------|-------------------|
| 35. <i>Lethe europa</i> (Fab.) | Bamboo Tree Brown |
| *36. <i>Lethe rohria</i> (Fab.) | Common Tree Brown |

Tribe **Mycalesini**

- | | |
|-------------------------------------|-----------------------|
| 37. <i>Mycalesis mineus</i> (Linn.) | Dark Brand Bush Brown |
| 38. <i>Mycalesis perseus</i> Fab. | Common Bush Brown |

Tribe **Ypthimini**

39. *Ypthima huebneri* Kirby Common Four ring
 40. *Ypthima baldus* Fab. Common Five ring

IV. Family NYMPHALIDAE (Brush footed Butterflies)

Subfamily BIBLIDINAE

41. *Ariadne ariadne* Linn. Angled Castor
 *42. *Ariadne merione* Cramer Common Castor

Tribe **Argynnini**

43. *Phalanta phalantha* Drury Common Leopard

Subfamily NYMPHALINAE

Tribe **Vanessidi**

- *44. *Cynthia cardui* Linn. Painted Lady
 45. *Precis iphita* Cramer Chocolate Pansy
 46. *Junonia hierta* Fab. Yellow Pansy
 47. *Junonia orithya* Linn. Blue Pansy
 48. *Junonia almana* Linn. Peacock Pansy
 49. *Junonia atlites* Linn. Grey Pansy
 50. *Junonia lemonias* Linn. Lemon Pansy

Tribe **Hypolimini**

51. *Kallima philarchus* (Westwood) Blue Oak leaf
 52. *Hypolimnias bolina* Linn. Great Eggfly
 53. *Hypolimnias misippus* Linn. Danaid Eggfly

Subfamily LIMENITIDINAE

Tribe **Neptini**

54. *Neptis hylas* Linn. Common Sailor
 *55. *Neptis jumbah* Moore Chestnut Streaked Sailor
 *56. *Phaedyma columella* Cramer Short-Banded Sailor

Tribe **Limenitidini**

- *57. *Athyma perius* Linn. Common Sergeant
 58. *Moduza procris* (Cramer) Commander

Tribe **Parthenini**

59. *Symphaedra nais* Forester Baronet
 60. *Euthalia aconthea* Cramer Common Baron

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|------|----------------------------------|---------------------------------|
| *61. | <i>Euthalia lubentina</i> Cramer | Gaudy Baron |
| | Subfamily | APATURINAE |
| *62. | <i>Apatura ambica</i> Kollar | Indian Purple Emperor |
| | Subfamily | CHARAXINAE |
| | Tribe | Charaxini |
| *63. | <i>Polyura athamas</i> Drury | Common Nawab |
| *64. | <i>Charaxes bernardus</i> Fab. | Tawny Rajah |
| *65. | <i>Charaxes solon</i> Fab. | Black Rajah |
| | Subfamily | ACRAEINAE |
| 66. | <i>Acraea terpsicore</i> (Linn.) | Tawny Costar |
| | V. Family | RIODINIDAE |
| | Subfamily | RIODININAE |
| *67. | <i>Abisara echerius</i> Stoll | Plum Judy |
| | VI. Family | DANAIDAE (Milkweed Butterflies) |
| | Subfamily | DANAINAE |
| 68. | <i>Danaus chrysippus</i> Linn. | Common Tiger |
| 69. | <i>Danaus genutia</i> Cramer | Striped Tiger |
| 70. | <i>Parantica aglea</i> Stoll | Glassy Tiger |
| 71. | <i>Tirumala limniace</i> Cramer | Blue Tiger |
| | Subfamily | EUPLOEINAE |
| 72. | <i>Euploea core</i> Cramer | Common Crow |
| *73. | <i>Euploea sylvester</i> (Fab.) | Double Branded Crow |
| *74. | <i>Euploea klugii</i> (Hors.) | Brown King Crow |
| | VII. Family | LYCAENIDAE (Blues) |
| | Subfamily | MILETINAE |
| | Tribe | Spalgini |
| *75. | <i>Spalgis epeus</i> Westwood | Apefly |
| | Subfamily | CURETINAE |
| *76. | <i>Curetis thetis</i> Drury | Indian Sunbeam |
| | Subfamily | POLYOMMATINAE |
| | Tribe | Polyommagini |
| *77. | <i>Nacaduba kurava</i> Moore | Transparent 6-Line Blue |

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|---|---------------------|
| *78. <i>Nacaduba beroe</i> Felder | Opaque 6-Line Blue |
| 79. <i>Prosotas nora</i> Felder | Common Lineblue |
| *80. <i>Prosotas dubiosa</i> Semper | Tail less Line Blue |
| 81. <i>Caleta decidia</i> Hewitson | Angled Pierrot |
| 82. <i>Jamides bochus</i> Stoll | Dark Cerulean |
| 83. <i>Jamides celeno</i> (Cramer) | Common Cerulean |
| 84. <i>Catochrysops strabo</i> (Fab.) | Forget-Me-not |
| 85. <i>Lampides boeticus</i> (Linn.) | Pea Blue |
| 86. <i>Leptotes plinius</i> (Fab.) | Zebra Blue |
| 87. <i>Castalius rosimon</i> (Fab.) | Common Pierrot |
| *88. <i>Tarucus nara</i> Kollar | Rounded Pierrot |
| *89. <i>Zizeeria karsandra</i> Moore | Dark Grass Blue |
| 90. <i>Zizina otis</i> Fab. | Lesser Grass Blue |
| *91. <i>Pseudozizeeria maha</i> Kollar | Pale Grass Blue |
| *92. <i>Talicauda nyseus</i> Guerin Meneville | Red Pierrot |
| 93. <i>Celastrina lavendularis</i> (Moore) | Plain Hedge Blue |
| *94. <i>Acytolepis puspa</i> Horsfield | Common Hedge Blue |
| 95. <i>Euchrysops cnejus</i> (Fab.) | Gram Blue |
| 96. <i>Chilades laius</i> Stoll | Lime Blue |
| *97. <i>Freyeria trochylus</i> Freyer | Grass Jewel |

Subfamily APHNAEINAE

- | | |
|---------------------------------------|-------------------|
| *98. <i>Spindasis vulcanus</i> (Fab.) | Common Silverline |
| *99. <i>Spindasis ictis</i> Hewitson | Shot Silverline |

Subfamily THECLINAE

Tribe Arhopalini

- | | |
|--|--------------------------|
| *100. <i>Narathura amantes</i> Hewitson | Large Oak Blue |
| *101. <i>Narathura pseudocentaurus</i> Doubleday | Western Centaur Oak Blue |

Tribe Zesiini

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| *102. <i>Zesius chrysomallus</i> Huebner | Red Spot |
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Tribe Amblypodini

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|--|--------------------|
| *103. <i>Amblypodia anita</i> Hewitson | Leaf Blue |
| *104. <i>Iraota timoleon</i> Stoll | Silver Streak Blue |

Tribe Loxurini

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|-----------------------------------|--------|
| *105. <i>Loxura atymnus</i> Stoll | Yamfly |
|-----------------------------------|--------|

Tribe **Horagini**

- *106. *Rathinda amor* Fab. Monkey Puzzle

Tribe **Iolaini**

- *107. *Pratapa deva* Moore White Royal
 *108. *Tajuria jehana* Moore Plains Royal

Tribe **Hypolycaenini**

- *109. *Chilaria othona* Hewitson Orchid Tit

Tribe **Deudorigini**

- *110. *Virachola isocrates* Fab. Common Guava Blue
 *111. *Virachola perse* Hewitson Large Guava Blue
 112. *Rapala iarbus* Fabricius Indian Red Flash
 *113. *Rapala manea* Hewitson Slate Flash
 *114. *Rapala varuna* Horsfield Indigo Flash

Suborder **GRYPOCERA**VIII. Family **HESPERIIDAE** (Skippers)Subfamily **COELIADINAE**

- *115. *Hasora chromus* Cramer Common Banded Awl
 *116. *Badamia exclamationis* (Fab.) Brown Awl
 *117. *Bibasis sena* (Moore) Orange Tail Awl

Subfamily **PYRGINAE**

118. *Celaenorrhinus leucocera* Kollar Common Spotted Flat
 119. *Celaenorrhinus ambareesa* Moore Malabar Spotted Flat
 120. *Sarangesa dasahara* (Moore) Common Small Flat
 *121. *Pseudocolodinia indrani* (Moore) Tri-Colour Pied Flat
 *122. *Pseudocolodinia dan* (Fab.) Fulvous Pied Flat
 *123. *Capronia ransonetti* (Felder) Golden Angle
 *124. *Tapena thwaitesi* Moore Black Angle

Subfamily **HESPERIINAE**

- *125. *Udaspes folus* (Cramer) Grass Demon
 126. *Telicota ancilla* Mabille Dark Palm Dart
 *127. *Telicota colon* Fab. Pale Palm Dart
 128. *Pelopidas mathias* (Fab.) Small Branded Swift
 129. *Pelopidas conjuncta* H. Schaeffer Conjoined Swift

*130. <i>Caltoris kumara</i> Moore	Blank Swift
131. <i>Suastus gremius</i> (Fab.)	Indian Palm Bob
*132. <i>Gangara thyrsis</i> (Fab.)	Giant Redeye
*133. <i>Taractrocera ceramas</i> (Hewitson)	Tamil Grass Dart
*134. <i>Taractrocera maevius</i> (Fab.)	Common Grass Dart
*135. <i>Potanthus dara</i> Koll.	Dart
*136. <i>Potanthus pseudomaesa</i> Moore	Common Dart
*137. <i>Borbo cinnara</i> Walker	Rice Swift
*138. <i>Borbo bevani</i> Moore	Bevan's Swift

SYSTEMATIC ACCOUNT

1. *Graphium agamemnon* (Linn.) The Tailed Jay

1758. *Papilio agamemnon* Linn. *Syst. Nat. ed.*, 10 : 462.

1939. *Graphium agamemnon* Talbot. *Fauna Brit. India, Butterflies*, 1 : 230.

1987. *Graphium agamemnon* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 45.

1993. *Graphium agamemnon* Varshney. *Oriental Insects*, 27 : 350.

Material examined : 1 ex Yeoor, 14.x.1995, P.P. Kulkarni & Party.

Distribution : South India to Saurashtra. Kumaon to Assam.

Elsewhere : Myanmar, Sri Lanka.

2. *Graphium sarpedon* (Linn.) The Common Bluebottle

1758. *Papilio sarpedon* Linn. *Syst. Nat. ed.*, 10 : 461.

1939. *Graphium sarpedon* Talbot. *Fauna Brit. India, Butterflies*, 1 : 219.

1987. *Graphium sarpedon* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 45.

1993. *Graphium sarpedon* Varshney. *Oriental Insects*, 27 : 350.

Material examined : 2 exs Film City, Hatigate, 12.xii.2001, P.P. Kulkarni & Party.

Distribution : South India. Kashmir to Assam.

Elsewhere : Myanmar, Sri Lanka.

*3. *Graphium doson* C. & R. Felder The Common Jay

1864. *Papilio doson* C. & R. Felder. *Species Lepidopterorum, Verh. Zool. bot. Ges. Wien*, : 305.

1923. *Zetides doson* Evans. *J. Bombay Nat. Hist., Soc.*, **29** : 240
 1939. *Graphium doson* Talbot. *Fauna Brit. India, Butterflies*, **1** : 221
 1957. *Zetides doson* Wynter-Blyth. *Butterflies of the Indian Region*, : 402
 1987. *Graphium doson* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 45.
 1993. *Graphium doson* Varshney. *Oriental Insects*, **27** : 350.
 2005. *Graphium doson* Chaturvedi *et al.* *J. Bombay nat. Hist. Soc.*, **102(2)** : 240.

Distribution : South India to Bengal. Kumaon to Assam.

Elsewhere : Myanmar, Sri Lanka.

***4. *Pathysa nomius* (Esper.)**

The Spot Swordtail

1801. *Papilio nomius* Esper. *Die Ausländische Schmetterlinge*, : 210
 1932. *Pathysa nomius* Evans. *Identification of Indian Butterflies*, : 54
 1939. *Graphium nomius* Talbot. *Fauna Brit. India, Butterflies*, **1** : 207
 1987. *Pathysa nomius* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 46
 1993. *Pathysa nomius* Varshney. *Oriental Insects*, **27** : 351.

Distribution : Peninsular India to South Bihar. M.P. Saurashtra, U.P. H.P. to Sikkim, Assam.

Elsewhere : Myanmar and Sri Lanka.

5. *Papilio polytes* Linn.

The Common Mormon

1758. *Papilio polytes* Linnaeus. *Syst. Nat. ed.*, **10** : 460.
 1939. *Papilio polytes* Talbot. *Fauna Brit. India, Butterflies*, **1** : 176.
 1987. *Papilio polytes* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 43.
 1993. *Papilio polytes* Varshney. *Oriental Insects*, **27** : 352.

Material examined : 1 ex Lion Safari, 12.x.1996, R.M. Sharma & Party.

Distribution : India.

Elsewhere : Myanmar and Sri Lanka.

6. *Papilio polymenstor* Cramer

The Blue Mormon

1775. *Papilio polymenstor* Cramer. *Pap. Exot.*, **i** : 83.

1939. *Papilio polymenstor* Talbot. *Fauna Brit. India, Butterflies*, 1 : 126.

1987. *Papilio polymenstor* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 43

1993. *Papilio polymenstor* Varshney. *Oriental Insects*, 27 : 352

Material examined : 1 ex Lion Safari, 27.xi.2000, D.B. Bastawade & Party.

Distribution : South India, M.P. South Bihar, Bengal, Western Ghats to Mumbai, Sikkim.

7. *Papilio demoleus* Linn. The Lime Butterfly

1758. *Papilio demoleus* Linnaeus. *Syst. Nat. ed.*, 10 : 464.

1895. *Papilio demoleus* Rothschild. *Nov. Zool.*, 2 : 279.

1907. *Papilio demoleus* Bingham. *Fauna Brit. India Butterflies*, 2 : 39.

1939. *Papilio demoleus* Talbot. *Fauna Brit. India Butterflies*, 1 : 187.

1993. *Papilio demoleus* Varshney. *Oriental Insects*, 27 : 352.

Material examined : 1 ex Lion Safari, 27.xi.2000, D.B. Bastawade & Party; 1 ex. Gandhi Smarak, 17.iii.2001; R.M. Sharma & Party.

Distribution : India.

Elsewhere : Myanmar and Sri Lanka.

*8. *Chilasa clytia* (Linn.). The Common Mime

1758. *Papilio clytia* Linnaeus. *Syst. Nat. ed.*, 10 : 479.

1889. *Chilasa clytia* Hampson. *J. Asiatic Soc. Bengal*, lvii : 363.

1987. *Chilasa clytia* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 41.

1993. *Chilasa clytia* Varshney. *Oriental Insects*, 27 : 353.

Distribution : South India, Himachal Pradesh to Sikkim, Assam, M.P. Maharashtra.

Elsewhere : Myanmar and Sri Lanka.

9. *Pachliopta aristolochiae* (Fab.) The Common Rose

1775. *Papilio aristolochiae* Fabricius. *Syst. Ent.*, : 443.

1932. *Tros aristolochiae* Evans. *Identification of Indian Butterflies*, : 44

1939. *Polydorus aristolochiae* Talbot. *Fauna Brit. India Butterflies*, 1 : 86.

1987. *Pachliopta aristolochiae* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 40.

1993. *Pachliopta aristolochiae* Varshney. *Oriental Insects*, 27 : 354.

Material examined : 1ex. Gandhi Smarak, 17.iii.2001; R.M. Sharma & Party.

Distribution : India.

Elsewhere : Myanmar and Sri Lanka.

**10. *Pachliopta hector* (Linn.)
Crimson Rose**

1758. *Papilio hector* Linnaeus. *Syst. Nat. ed.*, 10 : 459.

1939. *Polydorus hector* Talbot. *Fauna Brit. India Butterflies*, 1 : 83.

1987. *Pachliopta hector* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 40.

1993. *Pachliopta hector* Varshney. *Oriental Insects*, 27 : 354.

Material examined : 1ex. Gandhi Smarak, 17.iii.2001; R.M. Sharma & Party.

Distribution : Bengal, South Bihar, South India, Maharashtra, Orissa.

***11. *Troides helena* Linn.
The Southern Birdwing**

1932. *Troides helena* Evans. *Identification of Indian Butterflies*, : 42.

1939. *Troides helena* Talbot. *Fauna Brit. India Butterflies*, 1 : 62.

1957. *Troides helena* Wynter-Blyth. *Butterflies of the Indian Region*, : 372.

1993. *Troides helena* Varshney. *Oriental Insects*, 27 : 354.

Remarks : Very few sight records are available for this species in Mumbai region.

Distribution : South India (Mumbai to Travancore), Orissa, Assam, Sikkim.

Elsewhere : Myanmar and Sri Lanka.

***12. *Belenois aurota* (Fab.)
The Pioneer or Caper White**

1793. *Papilio aurota* Fabricius. *Syst. Ent.*, : 197

1904. *Anapheis mesentina* Moore, : 158

1932. *Anapheis aurota* Hemming, : 283

1932. *Belenois mesentina* Evans. *Identification of Indian Butterflies*, : 71

1987. *Anapheis aurota* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 48.

1993. *Belenois aurota* Varshney. *Oriental Insects*, 27 : 358.

Distribution : India (except N.E. India).

Elsewhere : Nepal, Pakistan and Sri Lanka.

13. *Cepora nerissa* (Fab.) The Common Gull

1775. *Papilio nerissa* Fabricius. *Syst. Ent.*, : 471.

1932. *Huphina nerissa* Evans. *Identification of Indian Butterflies*, : 72.

1939. *Cepora nerissa* Talbot. *Fauna Brit. India Butterflies*, 1 : 362

1957. *Huphina nerissa* Wynter-Blyth. *Butterflies of the Indian Region*, : 421

1987. *Cepora nerissa* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 47.

1993. *Cepora nerissa* Varshney. *Oriental Insects*, 27 : 358.

Material examined : 1 ex Kanheri Caves, 10.x.1995; 1 ex Lion Safari, 14.x.1995; P.P. Kulkarni & Party; 1 ex. Navapada, 8.x.1996; 1 ex Tulsi Lake, 9.x.1996; 2 exs. Tulsi Lake and around Forest Nursery, 28.xi.2000, D.B. Bastawade & Party; 3 exs. Tulsi Lake, 19.iii.2001; 1 ex Hatigate, Goregaon, 20.iii.2001; 1 ex Vasai Creek–Nagla, Yeoor, 21.iii.2001; R. M. Sharma & party; 1 ex Film City, Hatigate, 12.xii.2001; P.P. Kulkarni & Party; 2 exs. Forest Nursery–Hatigate–Goregaon, 25.ix.2002, D.B. Bastawade & Party.

Distribution : India (including Andaman & Nicobar Islands).¹

Elsewhere : Bhutan, Nepal, Sri Lanka & Myanmar.

14. *Cepora nadina* (Lucas) The Lesser Gull

1852. *Pieris nadina* Lucas. *Rev. Mag., Zool., ser.*, 2 : 333.

1939. *Cepora nadina* Talbot. *Fauna Brit. India Butterflies*, 1 : 369.

1957. *Huphina nadina* Wynter-Blyth. *Butterflies of the Indian Region*, : 422.

1987. *Cepora nadina*: Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 47.

1993. *Cepora nadina* Varshney. *Oriental Insects*, 27 : 358.

Material examined : 1 ex Silondha, 13.x.1999, P.P. Kulkarni & Party.

Distribution : India : Western Ghats, Sikkim to Assam.

Elsewhere : Myanmar.

**15. *Delias eucharis* (Drury)
The Common Jezebel**

1773. *Papilio eucharis* Drury. *Illustr. Nat. Hist.*, Pl x, figs. 5,6
1939. *Delias eucharis* Talbot. *Fauna Brit. India Butterflies*, 1 : 352.
1957. *Delias eucharis* Wynter-Blyth. *Butterflies of the Indian Region*, : 420.
1987. *Delias eucharis* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 46.
1993. *Delias eucharis* Varshney. *Oriental Insects*, 27 : 359.

Material examined : 1 ex Vasai Creek–Nagla, Yeoor, 21.iii.2001; R. M. Sharma & party.

Distribution : India (except the desert tracts).

Elsewhere : Sri Lanka, North Myanmar.

***16. *Appias libythea* Fab.
The Striped Albatross**

1775. *Papilio libythea* Fabricius. *Syst. Ent.*, : 471.
1939. *Appias libythea* Talbot. *Fauna Brit. India Butterflies*, 1 : 394.
1957. *Appias libythea* Wynter-Blyth. *Butterflies of the Indian Region*, : 427.
1987. *Appias libythea* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 48.
1993. *Appias libythea* Varshney. *Oriental Insects*, 27 : 359.

Distribution : North of India.

Elsewhere : Myanmar & Sri Lanka.

**17. *Appias lyncida* Cramer
The Chocolate Albatross**

1777. *Appias lyncida* Cramer. *Pap. Exot.*, ii :
1939. *Appias lyncida* Talbot. *Fauna Brit. India Butterflies*, 1 : 396.
1957. *Appias lyncida* Wynter-Blyth. *Butterflies of the Indian Region*, : 428.
1987. *Appias lyncida* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 48.
1993. *Appias lyncida* Varshney. *Oriental Insects*, 27 : 359.

Material examined : 1 ex Film City, Hatigate, 12.xii.2001, P.P. Kulkarni & Party.

Distribution : South India, Sikkim to Assam. U.P. Orissa.

Elsewhere : Myanmar, Sri Lanka.

***18. *Appias albina* Boisduval**
The Common Albatross

1939. *Appias albina* Talbot. *Fauna Brit. India Butterflies*, 1 : 400.
 1957. *Appias albina* Wynter-Blyth. *Butterflies of the Indian Region*, : 429.
 1987. *Appias albina* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 49.
 1993. *Appias albina* Varshney. *Oriental Insects*, 27 : 359.

Distribution : South India to Sikkim.

Elsewhere : Myanmar, Sri Lanka.

19. *Appias indra* (Moore)
The Plain Puffin

1857. *Pieris indra* Moore. *Cat. Lep. Mus. E.C.I.*, 1 : 74.
 1939. *Appias indra* Talbot. *Fauna Brit. India Butterflies*, 1 : 391.
 1957. *Appias indra* Wynter-Blyth. *Butterflies of the Indian Region*, : 427.
 1987. *Appias indra* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 48.
 1993. *Appias indra* Varshney. *Oriental Insects*, 27 : 359.

Material examined : 1 ex Jambhul Mal, 11.x.1995, P.P. Kulkarni & Party.

Distribution : South India, N.E. India.

Elsewhere : Myanmar and Nepal.

20. *Leptosia nina* (Fab.)
The Psyche

1793. *Papilio nina* Fabricius. *Ent. Syst.*, 3 : 194.
 1939. *Leptosia nina* Talbot. *Fauna Brit. India Butterflies*, 1 : 305.
 1987. *Leptosia nina* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 46.
 1993. *Leptosia nina* Varshney. *Oriental Insects*, 27 : 360.

Material examined : 1 ex Kanheri Caves, 10.x.1995; 3 exs. Jambhul Mal, 11.x.1995; P.P. Kulkarni & Party; 3 exs. Kanheri Caves, 28.xii.1995; 1 ex Tulsi Lake, 30.xii.1995; 4 exs. Yeour, 31.xii.1995; all S.G. Patil & Party; 5 exs. Navapada, 8.x.1996; 1 ex Tulsi Lake, 9.x.1996; 1 ex Krishnagiri, 11.x.1996; 4 exs. Tulsi Lake and around Forest Nursery, 28.xi.2000; 4 exs. Hatigate near Film city, 29.xi.2000; 1 ex Kanheri Caves, 30.xi.2000, D.B. Bastawade & Party; 4 exs. Kanheri Caves, 18.iii.2001; 1 ex Tulsi Lake, 19.iii.2001; R.M. Sharma & Party; 4 exs. Tulsi Lake, 11.xii.2001; 1 ex Jambhul Mal, 14.xii.2001; P.P.

Kulkarni & Party; 1 ex Tulsi Lake-Forest Nursery, 24.ix.2002, 1 ex Forest Nursery-Hatigate-Goregaon, 25.ix.2002, D.B. Bastawade & Party.

Distribution : India (including A & N Islands).

Elsewhere : Sri Lanka.

21. *Ixias marianne* (Cramer)

The White Orange Tip

1779. *Papilio marianne* Cramer. *Pap. Exot.*, iii : 41.

1871. *Ixias marianne* Butler. *Proc. Zool. Soc.*, 250.

1939. *Ixias marianne* Talbot. *Fauna Brit. India Butterflies*, 1 : 440.

1957. *Ixias marianne* Wynter-Blyth. *Butterflies of the Indian Region*, : 436.

1987. *Ixias marianne* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 51.

1993. *Ixias marianne* Varshney. *Oriental Insects*, 27 : 361.

Material examined : 1 ex Hatigate, Goregaon, 20.iii.2001; R.M. Sharma & Party.

Distribution : Peninsular India to Saurashtra, Punjab, Bengal.

Elsewhere : Sri Lanka.

22. *Ixias pyrene* Linn.

The Yellow Orange Tip

1939. *Ixias pyrene* Talbot. *Fauna Brit. India Butterflies*, 1 : 443.

1957. *Ixias pyrene* Wynter-Blyth. *Butterflies of the Indian Region*, : 437.

1987. *Ixias pyrene* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 51.

1993. *Ixias pyrene* Varshney. *Oriental Insects*, 27 : 361.

Material examined : 1 ex Kanheri Caves, 10.x.1995, P.P. Kulkarni & Party; 2 exs. Navapada, 8.x.1996; 2exs. Hatigate, Goregaon, 20.iii.2001, R.M. Sharma & Party; 1 ex Tulsi Lake, 11.xii.2001, P.P. Kulkarni & Party; 2 exs Tulsi Lake-Forest Nursery, 24.ix.2002; 1 ex Forest Nursery-Hatigate-Goregaon, 25.ix.2002, D.B. Bastawade & Party.

Distribution : Peninsular India to Saurashtra and Bengal, N.W. Himalayas to Assam.

Elsewhere : Baluchistan, Myanmar.

23. *Hebomoia glaucippe* Linn.

The Great Orange Tip

1758. *Papilio glaucippe* Linnaeus. *Syst. Nat. ed.*, 10 : 469.

1939. *Hebomoia glaucippe* Talbot. *Fauna Brit. India Butterflies*, 1 : 476.

1957. *Hebomoia glaucippe* Wynter-Blyth. *Butterflies of the Indian Region*, : 442.

1987. *Hebomoia glaucippe* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 51.

1993. *Hebomoia glaucippe* Varshney. *Oriental Insects*, 27 : 361.

Material examined : 1 ex Yeoor, 14.x.1995, P.P. Kulkarni & Party; 1 ex Kanheri Caves, 10.x.1996; 1 ex Krishnagiri, 11.x.1996; R.M. Sharma & Party; 1 ex Hatigate, nr, Film City, 29.xi.2000; 3 exs. Tulsi Lake, 11.xii.2001; 1 ex Film City, Hatigate, 12.xii.2001; 1 ex Kanheri Caves, 15.xii.2001; P.P. Kulkarni & Party; 1 ex Forest Nursery-Hatigate-Goregaon, 25.ix.2002, D.B. Bastawade & Party.

Distribution : Peninsular India, Assam.

Elsewhere : Myanmar, Nepal and Sri Lanka.

***24. *Colotis amata* (Fab.)
The Small Salmon Arab**

1775. *Papilio amata* Fabricius. *Syst. Ent.*, : 476.

1939. *Colotis amata* Talbot. *Fauna Brit. India Butterflies*, 1 : 454.

1957. *Colotis amata* Wynter-Blyth. *Butterflies of the Indian Region*, : 438.

1987. *Colotis amata* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 49.

1993. *Colotis amata* Varshney. *Oriental Insects*, 27 : 362.

Distribution : India (except N.E. India).

Elsewhere : Sri Lanka.

***25. *Colotis etrida* Boisduval
The Small Orange Tip**

1836. *Anthocharis etrida* Boisduval. *Spec. Gen, Lep.*, i : 576.

1932. *Colotis etrida* Evans. *Identification of Indian Butterflies*, : 83.

1939. *Colotis etrida* Talbot. *Fauna Brit. India Butterflies*, 1 : 464.

1957. *Colotis etrida* Wynter-Blyth. *Butterflies of the Indian Region*, : 440.

1987. *Colotis etrida* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 50.

1993. *Colotis etrida* Varshney. *Oriental Insects*, 27 : 362.

Distribution : All over the plains of India except Bengal and Assam, Delhi.

Elsewhere : Sri Lanka.

26. *Colotis eucharis* (Fab.)*The Plain Branded Tip**

1775. *Papilio eucharis* Fabricius. *Syst. Ent.*, : 472.
1939. *Colotis eucharis* Talbot. *Fauna Brit. India Butterflies*, 1 : 467.
1957. *Colotis eucharis* Wynter-Blyth. *Butterflies of the Indian Region*, : 441.
1987. *Colotis eucharis* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 50.
1993. *Colotis eucharis* Varshney. *Oriental Insects*, 27 : 362.

Distribution : Sri Lanka to Central India.

27. *Pareronia valeria* Cramer**The Common Wanderer**

1776. *Papilio valeria* Cramer. *Pap. Exot.*, : 133-56.
1939. *Valeria valeria* Talbot. *Fauna Brit. India Butterflies*, 1 : 485.
1987. *Pareronia valeria* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 51.
1993. *Pareronia valeria* Varshney. *Oriental Insects*, 27 : 362.

Material examined : 1 ex Kanheri Caves, 10.x.1995; 2 exs. Silondha, 13.x.1995, 2 exs. Lion Safari, 14.x.1995; P.P. Kulkarni & Party; 1 ex Near Upavan, Yeour, 1.i.1996, S.G. Patil & Party; 1 ex Kanheri Caves, 10.x.1996, R.M. Sharma & Party; 1 ex Hatigate, nr. Film City, 29.xi.2000; 3 exs. Tulsi Lake, 11.xii.2001, 1 ex Yeoor, Sasupada, 13.xii.2001; 1 ex Kanheri Caves, 15.xii.2001; P.P. Kulkarni & Party; 1 ex Forest Nursery-Hatigate-Goregaon, 25.ix.2002; 1 ex Sasupada Nature Trail, 27.ix.2002; D.B. Bastawade & Party.

Distribution : India.

Elsewhere : Myanmar.

28. *Catopsilia pomona* (Fab.)**The Lemon or Common Emigrant**

1775. *Papilio pomona* Fabricius. *Syst. Ent.*, : 479.
1932. *Catopsilia pomona* Evans. *Identification of Indian Butterflies*, : 75.
1939. *Catopsilia pomona* Talbot. *Fauna Brit. India Butterflies*, 1 : 493.
1987. *Catopsilia pomona* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 52.
1993. *Catopsilia pomona* Varshney. *Oriental Insects*, 27 : 362.

Material examined : 2 exs. Navapada, 8.x.1996; 2 exs. Tulsi Lake, 9.x.1996; 3 exs. Krishnagiri, 11.x.1996; 3 exs. Lion Safari, 12.x.1996; R.M. Sharma & Party; 1 ex Vasai

Creek, 19.vi.2001, A.S. Mahabal & Party; 1 ex Film City, Hatigate, 12.xii.2001, P.P. Kulkarni & Party; 2 exs Tulsi Lake-Forest Nursery, 24.ix.2002, D.B. Bastawade & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

29. *Catopsilia pyranthe* (Linn.) The Mottled Emigrant

1758. *Papilio pyranthe* Linnaeus. *Syst. Nat. ed.*, 10 : 469.

1881. *Catopsilia pyranthe*. *Lep. Ceylon*, 1 : 124.

1939. *Catopsilia pyranthe* Talbot. *Fauna Brit. India Butterflies*, 1 : 497.

1987. *Catopsilia pyranthe* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 52.

1993. *Catopsilia pyranthe* Varshney. *Oriental Insects*, 27 : 362.

Material examined : 1 ex Navapada, 8.x.1996; 1 ex Krishnagiri, 11.x.1996; R.M. Sharma & Party; 1 ex Lion Safari, 27.xi.2000, D.B. Bastawade & Party; 1 ex Film City, Hatigate, 12.xii.2001; P.P. Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

30. *Terias hecabe* (Linn.) The Common Grass Yellow

1758. *Papilio hecabe* Linnaeus. *Syst. Nat. ed.*, 10 : 470.

1932. *Terias hecabe* Evans. *Identification of Indian Butterflies*, : 78.

1939. *Eurema hecabe* Talbot. *Fauna Brit. India Butterflies*, 1 : 526.

1993. *Terias hecabe* Varshney. *Oriental Insects*, 27 : 364.

Material examined : 2 exs Kanheri Caves, 10.x.1995; 3 exs. Jambhul Mal, 11.x.1995; 1 ex Yeoor, & Lion Safari, 14.x.1995; P.P. Kulkarni & Party; 1 ex Kanheri Phata, 29.xii.1995, S.G. Patil & Party; 1 ex Navapada, 8.x.1996; 1 ex Krishnagiri, 11.x.1996; R.M. Sharma & Party; 4 exs. Tulsi Lake and around Forest Nursery, 28.xi.2000; 1 ex Hatigate, nr. Film City, 29.xi.2000, 1 ex Vasai Creek Information Centre, 1.xii.2000, D.B. Bastawade & Party; 1 ex Tulsi Lake, 19.iii.2001, R.M. Sharma & Party; 1 ex Tulsi Lake, 11.xii.2001, P.P. Kulkarni & Party; 1 ex Tulsi Lake-Forest Nursery, 24.ix.2002, D.B. Bastawade & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

31. *Terias laeta* Boisduval
The Spotless Grass Yellow

1836. *Terias laeta* Boisduval. *Sp. Gen. Lep.*, 1 : 674.

1939. *Eurema laeta* Talbot. *Fauna Brit. India Butterflies*, 1 : 517.

1987. *Eurema laeta* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 53.

1993. *Terias laeta* Varshney. *Oriental Insects*, 27 : 363.

Material examined : 1 ex. Kanheri Caves, 15.xii.2001; P.P. Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***32. *Terias brigitta* (Stoll)**
The Small Grass Yellow

1780. *Papilio brigitta* Stoll. In Cramer, *Uitl. Kapellen*, 4 : 82.

1867. *Terias brigitta* Wallace. *Trans. Ent. Soc. Lond.*, 4 : 323.

1939. *Eurema brigitta* Talbot. *Fauna Brit. India Butterflies*, 1 : 515.

1987. *Eurema brigitta* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 53.

1993. *Terias brigitta* Varshney. *Oriental Insects*, 27 : 363.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

33. *Terias blanda* (Boisduval)
The Three spot Grass Yellow

1836. *Eurema blanda* Boisduval. *Spec. Gen. Lep.*, 1 : 577.

1939. *Eurema blanda* Talbot. *Fauna Brit. India Butterflies*, 1 : 522.

1987. *Eurema blanda* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 53.

1993. *Terias blanda* Varshney. *Oriental Insects*, 27 : 364.

Material examined : 1 ex Navapada, 8.x.1996, R.M. Sharma & Party.

Distribution : Peninsular India.

34. *Melanitis leda* (Linn.)
The Common Evening Brown

1758. *Papilio leda* Linnaeus. *Syst. Nat.* (ed x), 1 : 773.

1883. *Melanitis leda* de Niceville. *Butterflies of India Burma & Ceylon*, 1 : 152.

1947. *Melanitis leda* Talbot. *Fauna Brit. India Butterflies*, 2 : 366.

1987. *Melanitis leda* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 560.

1994. *Melanitis leda* Varshney. *Oriental Insects*, 28 : 152.

Material examined : 3 exs. Navapada, 8.x.1996, R.M. Sharma & Party; 1 ex Tulsi Lake and around Forest Nursery, 28.xi.2000, D.B. Bastawade & Party.

Distribution : Throughout India except the extreme N.W.

Elsewhere : Sri Lanka and Myanmar.

35. *Lethe europa* (Fab.) The Bamboo Tree Brown

1775. *Papilio europa* Fabricius. *Syst. Ent.*, no., 247 : 500.

1883. *Lethe europa* de Niceville. *Butterflies of India Burma & Ceylon*, 1 : 149.

1947. *Lethe europa* Talbot. *Fauna Brit. India Butterflies*, 2 : 197.

1987. *Lethe europa* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 561.

1994. *Lethe europa* Varshney. *Oriental Insects*, 28 : 153.

Material examined : 1 ex Tulsi Lake, Loghut, 12.x.1995; 1 ex Lion Safari, 14.x.1995; P.P. Kulkarni & Party; 3 exs. Krishnagiri, 10.x.1996, R.M. Sharma & Party.

Distribution : South India, M.P., Dehra Dun to Assam, North India very common.

Elsewhere : Myanmar.

*36. *Lethe rohria* (Fab.) The Common Tree Brown

1787. *Papilio rohria* Fabricius. *Mant. Ins.*, ii : 45.

1883. *Lethe rohria* de Niceville. *Butterflies of India Burma & Ceylon*, 1 : 156.

1932. *Lethe rohria* Evans. *Identification of Indian Butterflies*, : 105.

1947. *Lethe rohria* Talbot. *Fauna Brit. India Butterflies*, 2 : 200.

1987. *Lethe rohria* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 562.

1994. *Lethe rohria* Varshney. *Oriental Insects*, 28 : 153.

Distribution : South India to Pachmari (M.P.), Kashmir to Assam.

Elsewhere : Myanmar.

37. *Mycalesis mineus* (Linn.)
The Dark Brand Bush Brown

1767. *Papilio mineus* Linnaeus. *Syst. Nat.*, 1 : 768.

1883. *Mycalesis mineus* de Niceville. *The Butterflies of India, Burma & Ceylon*, 1 : 117.

1947. *Mycalesis mineus* Talbot. *Fauna Brit. India Butterflies*, 2 : 134.

1987. *Mycalesis mineus* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 563.

1994. *Mycalesis mineus* Varshney. *Oriental Insects*, 28 : 157.

Material examined : 2 exs Kanheri Caves, 10.x.1995, P.P. Kulkarni & Party; 1 ex Navapada, 8.x.1996; 1 ex Kanheri Caves, 10.x.1996; 3 exs. Krishnagiri, 11.x.1996; R.M. Sharma & Party.

Distribution : Peninsular India South of Mumbai, M.P., Bengal, H.P. to Assam.

Elsewhere : Myanmar.

38. *Mycalesis perseus* Fabricius
The Common Bush Brown

1775. *Papilio perseus* Fabricius. *Syst. Ent.*, : 488.

1883. *Mycalesis perseus* de Niceville. *Butterflies of India Burma & Ceylon*, 1 : 120.

1947. *Mycalesis perseus* Talbot. *Fauna Brit. India Butterflies*, 2 : 130.

1987. *Mycalesis perseus* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 562

1994. *Mycalesis perseus* Varshney. *Oriental Insects*, 28 : 157.

Material examined : 3 exs. Jambhul Mal, 11.x.1995; P.P. Kulkarni & Party; 3 exs. Navapada, 8.x.1996; 1 ex Tulsi Lake, 9.x.1996; 1 ex Kanheri Caves, 10.x.1996; 5 exs. Krishnagiri, 11.x.1996; 1 ex Lion Safari, 12.x.1996; R.M. Sharma & Party; 1 ex Tulsi Lake-Forest Nursery, 24.ix.2002; 1 ex Forest Nursery-Hatigate-Goregaon, 25.ix.2002, D.B. Bastawade & Party.

Distribution : South India to Bengal, Konkan, U.P., H.P. to Assam.

Elsewhere : Myanmar.

39. *Ypthima huebneri* Kirby
The Common Four ring

1871. *Ypthima huebneri* Kirby. *Cat. Diurn. Lep.*, : 95.

1883. *Ypthima huebneri* de Niceville. *The Butterflies of India, Burma & Ceylon*, 1 : 226.

1947. *Ypthima huebneri* Talbot. *Fauna Brit. India Butterflies*, 2 : 329.

1987. *Ypthima huebneri* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 565.

1994. *Ypthima huebneri* Varshney. *Oriental Insects*, **28** : 159.

Material examined : 3 exs Navapada, 8.x.1996; R.M. Sharma & Party; 1 ex Forest Nursery-Hatigate-Goregaon, 25.ix.2002, D.B. Bastawade & Party.

Distribution : India.

Elsewhere : Myanmar.

40. *Ypthima baldus* Fabricius The Common Fivering

1775. *Ypthima baldus* Fabricius. *Syst. Ent.*, : 829.

1947. *Ypthima baldus* Talbot. *Fauna Brit. India Butterflies*, **2** : 337.

1987. *Ypthima baldus* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 566.

1994. *Ypthima baldus* Varshney. *Oriental Insects*, **28** : 159.

Material examined : 1 ex. Lion Safari, 12.x.1996, R.M. Sharma & Party.

Distribution : Central, Western and Southern India, H.P., Assam.

Elsewhere : Myanmar.

41. *Ariadne ariadne* (Linn.) The Angled Castor

1767. *Papilio ariadne* Linnaeus. *Syst. Nat.*, **1** : 778

1886. *Ergolis ariadne* de Niceville. *The Butterflies of India, Burma & Ceylon*, **2** : 10.

1957. *Ergolis ariadne* Wynter-Blyth. *Butterflies of the Indian Region*, : 231.

1987. *Ariadne ariadne* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 567.

1994. *Ariadne ariadne* Varshney. *Oriental Insects*, **28** : 167.

Material examined : 2 exs. Tulsi Lake, Loghut, 12.x.1995; 1 ex Yoor, 14.x.1995; P.P. Kulkarni & Party; 2 exs Navapada, 8.x.1996; 1 ex Tulsi Lake, 9.x.1996; 1 ex Krishnagiri, 11.x.1996; 1 ex Kanheri Caves, 18.iii.2001; R.M. Sharma & Party; 2 exs Tulsi Lake, 11.xii.2001; 1 ex Film City, Hatigate, 12.xii.2001; 1 ex Yoor, Sasupada, 13.xii.2001; P.P. Kulkarni & Party; P.P. Kulkarni & Party; 1 ex Sasupada Nature Trail, 27.ix.2002, D.B. Bastawade & Party.

Distribution : India except arid North and N.W. region.

Elsewhere : Sri Lanka and Myanmar.

42. *Ariadne merione* Cramer*The Common Castor**

1777. *Papilio merione* Cramer. *Pap. Ex.*, 2.

1886. *Ergolis merione* de Niceville. *The Butterflies of India, Burma & Ceylon*, 2 : 8.

1957. *Ergolis merione* Wynter-Blyth. *Butterflies of the Indian Region*, : 232.

1987. *Ariadne merione* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 567.

1994. *Ariadne merione* Varshney. *Oriental Insects*, 28 : 167.

Distribution : India except arid North & N.W. region.

Elsewhere : Sri Lanka and Myanmar.

43. *Phalanta phalantha* (Drury)**The Common Leopard**

1770. *Papilio phalantha* Drury. *Exot. Inst.*, 1 : 41.

1932. *Atella phalantha* Evans. *Identification of Indian Butterflies* : 187.

1980. *Phalanta phalantha* Varshney et al *Rec. Zool. Surv. India, Occ. Paper No.*, 31 : 18.

1987. *Phalanta phalantha* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 568.

1994. *Phalanta phalantha* Varshney. *Oriental Insects*, 28 : 171.

Material examined : 1 ex Near Upavan, Yeour, 1.i.1996, S.G. Patil & Party; 1 ex Navapada, 8.x.1996, R.M. Sharma & Party; 2 exs Tulsi Lake, 11.xii.2001, P.P. Kulkarni & Party; 1 ex Tulsi Lake-Forest Nursery, 24.ix.2002; 1 ex Kanheri Caves, 26.ix.2002; D.B. Bastawade & Party.

Distribution : India.

Elsewhere : Sri Lanka, Myanmar.

44. *Cynthia cardui* Linn.*The Painted Lady**

1758. *Papilio cardui* Linnaeus. *Syst. Nat. Ins., ed.*, 10 : 475.

1957. *Vanessa cardui* Wynter-Blyth. *Butterflies of the Indian Region*, : 210.

1994. *Cynthia cardui* Varshney. *Oriental Insects*, 28 : 175.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

45. *Precis iphita* (Cramer)**The Chocolate Pansy**

1779. *Papilio iphita* Cramer. *Pap. Exot.* 3 : 209.

1886. *Precis iphita* de Niceville. *The Butterflies of India, Burma & Ceylon*, 2 : 63.

1932. *Precis iphita* Evans. *Identification of Indian Butterflies*, : 177.

1987. *Precis iphita* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 570.

1994. *Precis iphita* Varshney. *Oriental Insects*, 28 : 176.

Material examined : 1 ex Navapada, 8.x.1996; 1 ex Kanheri Caves, 10.x.1996; 1 ex Lion Safari, 12.x.1996, R.M. Sharma & Party; 1 ex Tulsi Lake, 11.xii.2001; 1 ex Jambhul Mal, 14.xii.2001; P.P. Kulkarni & Party.

Distribution : South and Central India, Himalayas as far west as Kashmir, N.E. India.

Elsewhere : Myanmar.

46. *Junonia hierta* (Fab.)**The Yellow Pansy**

1798. *Papilio hierta* Fabricius. *Ent. Syst. Suppl.*, : 424.

1932. *Precis hierta* Evans. *Identification of Indian Butterflies*, : 176.

1987. *Junonia hierta* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 569.

1994. *Junonia hierta* Varshney. *Oriental Insects*, 28 : 176.

Material examined : 2 exs. Lion Safari, 12.x.1996, R.M. Sharma & party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

47. *Junonia orithya* (Linn.)**The Blue Pansy**

1758. *Papilio orithya* Linnaeus. *Syst. Nat. ed.*, 10 : 473.

1905. *Junonia orithya* Bingham. *Fauna Brit. India Butterflies*, 1 : 358.

1987. *Junonia orithya* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 569.

1994. *Junonia orithya* Varshney. *Oriental Insects*, 28 : 176.

Material examined : 2 exs. Lion Safari, 12.x.1996, R.M. Sharma & party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

**48. *Junonia almana* (Linn.)
The Peacock Pansy**

1758. *Papilio almana* Linnaeus. *Syst. Nat. ed.*, 10 : 472.
1905. *Junonia almana* Bingham. *Fauna Brit. India Butterflies*, 1 : 361.
1987. *Junonia almana* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 570.
1994. *Junonia almana* Varshney. *Oriental Insects*, 28 : 176.

Material examined : 5 exs. Lion Safari, 12.x.1996, R.M. Sharma & party; 1 ex Hatigate nr. Film City, 29.xi.2000, D.B. Bastawade & Party; 1 ex Vasai Creek-Nagla, (Yeer), 21.iii.2001; R.M. Sharma & party; 1 ex Tulsi Lake, 11.xii.2001, P.P. Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

**49. *Junonia atlites* (Linn.)
The Grey Pansy**

1763. *Papilio atlites* Linnaeus. *Centur. Ins.*, : 24.
1886. *Junonia atlites* de Niceville. *Butterflies of India Burma & Ceylon*, 2 : 69.
1987. *Junonia atlites* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 570.
1994. *Junonia atlites* Varshney. *Oriental Insects*, 28 : 176.

Material examined : 1 ex Yeoor, 14.x.1995; P.P. Kulkarni & Party; 2 exs. Lion Safari, 12.x.1996, R.M. Sharma & Party; 2 exs. Tulsi Lake, 11.xii.2001, P.P. Kulkarni & Party.

Distribution : Wetter regions of Peninsular India, Along the foot of Himalayas.

Elsewhere : Sri Lanka and Myanmar.

**50. *Junonia lemonias* (Linn.)
The Lemon Pansy**

1758. *Papilio lemonias* Linnaeus. *Syst. Nat. ed.*, 10 : 473.
1905. *Junonia lemonias* Bingham. *Fauna Brit. India Butterflies*, 1 : 357.
1987. *Junonia lemonias* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 570.
1994. *Junonia lemonias* Varshney. *Oriental Insects*, 28 : 176.

Material examined : 1 ex Tulsi Lake, Loghut, 12.x.1995; P.P. Kulkarni & Party; 1 ex. Near Upavan, 1.i.1996, S.G. Patil & Party; 1 ex Tulsi Lake, 11.xii.2001; 1 ex Film City, Hatigate, 12.xii.2001; P.P. Kulkarni & Party; 1 ex Kanheri Caves, 26.ix.2002, D.B. Bastawade & Party.

Distribution : South and Central India, Saurashtra, Himalayas as far west as Kashmir, Assam, Bengal.

Elsewhere : Myanmar.

51. *Kallima philarchus* (Westwood)

The Blue Oak leaf

1848. *Amathusia philarchus* Westwood. *Cab. Or. Ent.*, : 56.

1886. *Kallima philarchus* de Niceville. *The Butterflies of India, Burma & Ceylon*, 2 : 265.

1957. *Kallima philarchus* Wynter-Blyth. *Butterflies of the Indian Region* : 204.

1987. *Kallima philarchus* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 572.

1994. *Kallima philarchus* Varshney. *Oriental Insects*, 28 : 176.

Material examined : 1 ex Hattigate-Goregaon, 28.ix.2001, R.M. Sharma & Party.

A few examples were sighted in this area in the month of August 2001 by the first author.

Distribution : South India.

Elsewhere : Sri Lanka.

52. *Hypolimnas bolina* (Linn.)

The Great Eggfly

1758. *Papilio bolina* Linnaeus. *Syst. Nat. ed.*, 10 : 479.

1886. *Hypolimnas bolina* de Niceville. *The Butterflies of India, Burma & Ceylon*, 2 : 122.

1905. *Hypolimnas bolina* Bingham. *Fauna Brit. India Butterflies*, 1 : 386.

1987. *Hypolimnas bolina* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 572.

1994. *Hypolimnas bolina* Varshney. *Oriental Insects*, 28 : 177.

Material examined : 1ex. Film City, Hatigate, 12.xii.2001, P.P. Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

53. *Hypolimnas misippus* (Linn.).

The Danaid Eggfly

1764. *Papilio misippus* Linnaeus. *Mus. Ulr.*, : 264

1886. *Hypolimnas misippus* de Niceville. *The Butterflies of India, Burma & Ceylon*, 2 : 126.

1905. *Hypolimnias misippus* Bingham. *Fauna Brit. India Butterflies*, 1 : 388.

1987. *Hypolimnias misippus* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 571.

1994. *Hypolimnias misippus* Varshney. *Oriental Insects*, 28 : 177.

Material examined : 1 ex Jambhul Mal, 11.x.1995; 1 ex Tulsi Lake, Loghut, 12.x.1995; P.P. Kulkarni & Party; 3 exs. Lion Safari, 12.x.1996, R.M. Sharma & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

54. *Neptis hylas* (Linn.)

The Common Sailor

1758. *Papilio hylas* Linnaeus. *Sys. Nat.*, ed., 10 : 486.

1927. *Neptis hylas* Fruhstorfer. In Seitz, *The Macrolepidoptera of the World, The Indo-Australian Rhopalocera*, 9 : 101.

1987. *Neptis hylas* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 573.

1994. *Neptis hylas* Varshney. *Oriental Insects*, 28 : 178.

Material examined : 1 ex Navapada, 8.x.1996; 1 ex Kanheri Caves, 10.x.1996; 1 ex Lion Safari, 12.x.1996, R.M.Sharma & Party; 3 exs. Tulsi Lake, 11.xii.2001; 1 ex Yeoor, Sasupada, 13.xii.2001; 1 ex Kanheri Caves, 15.xii.2001; P.P. Kulkarni & Party; 1 ex Vasai Creek Information Centre, 30.xi.2000; 1 ex Yeoor, 28.ix.2002, D.B. Bastawade & Party.

Distribution : Throughout India.

Elsewhere : Sri Lanka and Myanmar.

*55. *Neptis jumbah* Moore

The Chestnut Streaked Sailor

1857. *Neptis jumbah* Moore. *Cat. Lep., Mus., E.I.C.*, 1 : 167.

1886. *Neptis jumbah* de Niceville. *The Butterflies of India, Burma & Ceylon*, 2 : 106.

1957. *Neptis jumbah* Wynter-Blyth. *Bombay nat. Hist. Soc.*, : 190.

1987. *Neptis jumbah* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 573.

1994. *Neptis jumbah* Varshney. *Oriental Insects*, 28 : 178.

Distribution : South India and Bengal.

Elsewhere : Sri Lanka and Myanmar.

***56. *Phaedyma columella* Cramer**
The Short-Banded Sailor

1994. *Phaedyma columella* Varshney. *Oriental Insects*, **28** : 179.

Distribution : South India, N.E. India.

Elsewhere : Bhutan, Nepal and Myanmar.

***57. *Athyma perius* Linn.**
The Common Sergeant

1758. *Papilio perius* Linnaeus. *Sys. Nat., ed., 10* : 471.

1886. *Athyma perius* De Niceville. *The Butterflies of India, Burma & Ceylon*, **2** : 166.

1987. *Athyma perius* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 575.

1994. *Athyma perius* Varshney. *Oriental Insects*, **28** : 180.

Distribution : India (including Andaman Islands).

Elsewhere : Bhutan, Nepal and Myanmar.

58. *Moduza procris* (Cramer)
The Commander

1777. *Papilio procris* Cramer. *Pap. Exot.*, **2** : 106.

1886. *Limenitis procris* De Niceville. *The Butterflies of India, Burma & Ceylon*, **2** : 163.

1905. *Moduza procris* Bingham. *Fauna Brit. India Butterflies*, **1** : 291

1932. *Limenitis procris* Evans. *Identification of Indian Butterflies*, : 161

1987. *Moduza procris* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 575.

1994. *Moduza procris* Varshney. *Oriental Insects*, **28** : 181.

Material examined : 1 ex Tulsi Lake, 11.xii.2001; 1 ex Film City, Hatigate, 12.xii.2001, P.P. Kulkarni & Party; 1 ex. Forest Nursery-Hatigate-Goregaon, 25.ix.2002, D.B. Bastawade & Party.

Distribution : Peninsular India, south of M.P., Dun to Bengal, Assam.

Elsewhere : Myanmar and Sri Lanka.

59. *Symphaedra nais* (Forster)
The Baronet

1771. *Papilio nais* Forster. *Nov. Spec. Ins. Cent.*, **1** : 73.

1886. *Symphaedra nais* De Niceville. *The Butterflies of India, Burma & Ceylon*, **2** : 186.

1932. *Euthalia nais* Evans. *Identification of Indian Butterflies*, : 157.

1987. *Symphaedra nais* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 577.

1994. *Symphaedra nais* Varshney. *Oriental Insects*, **28** : 184.

Material examined : 2 exs. Yoor, 14.x.1995; P.P. Kulkarni & Party; 2 exs. Vasai Creek, 19.vi.2001; A.S. Mahabal & Party; 1 ex Jambhul Mal, 14.xii.2001, P.P. Kulkarni & Party.

Distribution : Wide spread in India, S. India to Duns and Sikkim.

Elsewhere : Sri Lanka.

60. *Euthalia aconthea* Cramer The Common Baron

1857. *Adolias garuda* Moore. *Cat. Lep. Mus. E.I.C.*, **1** : 186.

1886. *Euthalia garuda* de Niceville. *Butterflies of India Burma & Ceylon*, **2** : 216.

1957. *Euthalia garuda* Wynter-Blyth. *Butterflies of the Indian Region*, : 167.

1987. *Euthalia garuda* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 577.

1994. *Euthalia aconthea* Varshney. *Oriental Insects*, **28** : 184.

Material examined : 1 ex Tulsi Lake, Loghut, 12.x.1995; 1 ex Silondha, 13.x.1995; P.P. Kulkarni & Party; 3 exs. Krishnagiri, 11.x.1996, R.M. Sharma & Party; 1 ex Yoor, Sasupada, 13.xii.2001; P.P. Kulkarni & Party.

Remarks : It is an endangered species.

Distribution : India.

Elsewhere : Sri Lanka, Myanmar.

*61. *Euthalia lubentina* Cramer The Gaudy Baron

1777. *Papilio lubentina* Cramer. *Pap. Exot.*, **2** : pl. clv.

1886. *Euthalia lubentina* de Niceville. *Butterflies of India Burma & Ceylon*, **2** : 220.

1957. *Euthalia lubentina* Wynter-Blyth. *Butterflies of the Indian Region*, : 168.

1987. *Euthalia lubentina* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 577.

1994. *Euthalia lubentina* Varshney. *Oriental Insects*, **28** : 186.

Remarks : It is an endangered species.

Distribution : Peninsular India, Mumbai, Bengal, Oudh, N.E. India, Himalayas from Kangra eastwards.

Elsewhere : Sri Lanka and Myanmar.

***62. *Apatura ambica* Kollar**
The Indian Purple Emperor

1932. *Apatura ambica* Evans. *Identification of Indian Butterflies*, : 146.
1957. *Apatura ambica* Wynter-Blyth. *Butterflies of the Indian Region*, : 154.
1994. *Apatura ambica* Varshney. *Oriental Insects*, 28 : 184.

Distribution : Chitral to Assam.

Elsewhere : Myanmar.

***63. *Polyura athamas* Drury**
The Common Nawab

1720. *Papilio athamas* Drury. *Ill. Ex. Ent.*, 1 : 5.
1886. *Charaxes athamas* de Niceville. *Butterflies of India Burma & Ceylon*, 2 : 275.
1982. *Polyura athamas* Smiles. *Bull. Br. Mus., Hist., Ent.*, 44 : 115–237.
1987. *Polyura athamas* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 578.
1994. *Polyura athamas* Varshney. *Oriental Insects*, 28 : 190.

Distribution : India (Including Andaman Islands).

Elsewhere : Nepal, Sri Lanka and Myanmar.

***64. *Charaxes bernardus* Fabricius**
The Tawny Rajah

1932. *Charaxes polyxena* Evans. *Identification of Indian Butterflies*, : 141.
1957. *Charaxes polyxena* Wynter-Blyth. *Butterflies of the Indian Region*, : 144.
1987. *Charaxes bernardus* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 579.
1994. *Charaxes bernardus* Varshney. *Oriental Insects*, 28 : 190.

Distribution : Peninsular India, Mussoorie to Assam.

Elsewhere : Sri Lanka and Myanmar.

***65. *Charaxes solon* (Fab.)**
The Black Rajah

1793. *Papilio solon* Fabricius. *Ent. Syst.*, 3 : 69
1886. *Charaxes solon* de Niceville. *Butterflies of India Burma & Ceylon*, 2 : 280.

1957. *Charaxes fabius* Wynter-Blyth. *Butterflies of the Indian Region*, : 146.

1987. *Charaxes solon* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 580.

1994. *Charaxes solon* Varshney. *Oriental Insects*, **28** : 190.

Distribution : India except extreme N.W..

Elsewhere : Sri Lanka, Myanmar.

66. *Acraea terpsicore* (Linn.)

The Tawny Coaster

1775. *Papilio violae* Fabricius. *Syst. Ent.*, n., **74** : 460.

1883. *Telchinia violae* De Niceville. *The Butterflies of India, Burma & Ceylon*, **1** : 320.

1905. *Telchinia violae* Bingham. *Fauna Brit. India Butterflies*, **1** : 471.

1947. *Acraea violae* Talbot. *Fauna Brit. India Butterflies*, **2** : 467.

1987. *Acraea terpsicore* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 580.

1994. *Acraea terpsicore* Varshney. *Oriental Insects*, **28** : 191.

Material examined : 1 ex Near Upavan, Yeour, 1.i.1996, S.G. Patil & Party; 2 exs. Tulsi Lake, 9.x.1996; R.M. Sharma & Party.

Distribution : Peninsular India (Indo-gangetic plains upto the lower hills of Himalaya and including Lakshadweep Is.).

Elsewhere : Nepal and possibly Myanmar.

*67. *Abisara echerius* Stoll

The Plum Judy

1790. *Papilio echerius* Stoll. In Cramer, *Pap. Exot.*, **5** : 31.

1905. *Abisara echerius* Bingham. *Fauna Brit. India Butterflies*, **1** : 492

1987. *Abisara echerius* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 312.

1994. *Abisara echerius* Varshney. *Oriental Insects*, **28** : 193.

Distribution : India.

Elsewhere : Sri Lanka, Nepal, Bhutan and Myanmar.

68. *Danaus chrysippus* (Linn.)

The Plain or Common Tiger

1758. *Papilio chrysippus* Linnaeus. *Syst. Nat. ed.*, **10** : 471.

1932. *Danaus chrysippus* Evans. *Identification of Indian Butterflies*, : 88.

1947. *Danaus chrysippus* Talbot. *Fauna Brit. India Butterflies*, 2 : 20.

1987. *Danaus chrysippus* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 313.

1993. *Danaus chrysippus* Varshney. *Oriental Insects*, 27 : 365.

Material examined : 1 ex Yeoor, 14.x.1995; P.P. Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka, Myanmar.

69. *Danaus genutia* (Cramer) The Striped Tiger

1779. *Papilio genutia* Cramer, *Pap. Exot.*, 3 : 23.

1882. *Danais genutia* Distant. *Rhopalocera Malayana* : 18.

1947. *Danaus plexippus* Talbot. *Fauna Brit. India Butterflies*, 2 : 25.

1987. *Danaus genutia* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 314.

1993. *Danaus genutia* Varshney. *Oriental Insects*, 27 : 365.

Material examined : 1 ex Kanheri Caves, 10.x.1995, 2 exs Jambhul Mal, 11.x.1995; 1 ex Yeoor, 14.x.1995; P.P. Kulkarni & Party; 1 ex. Tulsi Lake, 19.iii.2001; R.M. Sharma & Party; 5 exs. Film City, Hatigate, 12.xii.2001; 1 ex Yeoor, Sasupada, 13.xii.2001; P.P. Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka, Myanmar.

70. *Parantica aglea* (Stoll) The Glassy Tiger

1781. *Papilio aglea* Stoll. *Pap. Ex.*, 4 : 29-252, pl 305-400

1883. *Danais (Parantica) aglea* de Niceville. *Butterflies of India Burma & Ceylon*, 1 : 38.

1987. *Parantica aglea* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 314

1993. *Parantica aglea* Varshney. *Oriental Insects*, 27 : 366.

Material examined : 1 ex Jambhul Mal, 11.x.1995; 1 ex Lion Safari, 14.x.1995; P.P. Kulkarni & Party; 1 ex. Navapada, 8.x.1996; R.M. Sharma & Party; 1 ex Hatigate, nr. Film City, 29.xi.2000, D.B. Bastawade & Party; 1 ex Tulsi Lake, 11.xii.2001, P.P. Kulkarni & Party.

Distribution : Peninsular India, Himalayas east from Kashmir, Assam, Bengal.

Elsewhere : Sri Lanka, Myanmar.

**71. *Tirumala limniace* (Cramer)
The Blue Tiger**

1775. *Papilio limniace* Cramer. *Pap. Exot.*, **1** : 92.
 1883. *Danais limniace* de Niceville. *Butterflies of India Burma & Ceylon*, **1** : 47.
 1932. *Danais limniace* Evans. *Identification of Indian Butterflies*, : 87.
 1947. *Danaus limniace* Talbot. *Fauna Brit. India Butterflies*, **2** : 31.
 1987. *Tirumala limniace* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 314.
 1993. *Tirumala limniace* Varshney. *Oriental Insects*, **27** : 366.

Material examined : 5 exs. Jambhul Mal, 11.x.1995; 1 ex Yeoor, 14.x.1995; P.P. Kulkarni & Party; 1 ex Near Upavan, Yeoor, 1.i.1996, S.G. Patil & Party; 1 ex Tulsi Lake and around Forest Nursery, 28.xi.2000, D.B. Bastawade & party; 2 exs. Tulsi Lake, 19.iii.2001, R.M. Sharma & Party; 1 ex Film City, Hatigate, 12.xii.2001; 1 ex Yeoor, Sasupada, 13.xii.2001; P.P. Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

**72. *Euploea core* (Cramer)
The Common Crow**

1780. *Papilio core* Cramer. *Pap. Exot.*, **3** : 133.
 1883. *Euploea core* de Niceville. *Butterflies of India Burma & Ceylon*, **1** : 80.
 1932. *Euploea core* Evans. *Identification of Indian Butterflies*, : 90.
 1947. *Euploea core* Talbot. *Fauna Brit. India Butterflies*, **2** : 67.
 1987. *Euploea core* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 315.
 1993. *Euploea core* Varshney. *Oriental Insects*, **27** : 367.

Material examined : 10 exs. Jambhul Mal, 11.x.1995; 1 ex Silondha, 13.x.1995; 4 exs. Lion Safari, 14.x.1995; P.P. Kulkarni & Party; 1 ex Kanheri Caves, 28.xii.1995, S.G. Patil & Party; 1 ex Navapada, 8.x.1996; 1 ex Tulsi Lake, 9.x.1996; 1 ex Krishnagiri, 11.x.1996; 1 ex Tulsi Lake and around Forest Nursery, 28.xi.2000, D.B. Bastawade & Party; 1 ex Tulsi Lake, 19.iii.2001; R.M. Sharma & Party; 1 ex Tulsi Lake, 11.xii.2001, P.P. Kulkarni & Party; 1 ex Forest Nursery-Hatigate-Goregaon, 25.ix.2002, D.B. Bastawade & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***73. *Euploea sylvester* (Fab.)
The Double Branded Crow**

1793. *Papilio sylvester* Fab., *Entomologica Systematica*, **3**(1) : iv+ 487.

1977. *Euploea sylvester* Morishta. *Acta Rhopalocerologica Fukuoka*, 3(3) : 28.
 1987. *Euploea sylvester* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 316.
 1993. *Euploea sylvester* Varshney. *Oriental Insects*, 27 : 367.

Distribution : Sikkim to Assam.

Elsewhere : Myanmar.

***74. *Euploea klugii* (Hors.)**
The Brown King Crow

1857. *Euploea klugii* Horsfield & Moore. *Cat. Lep. E.I.C. n.*, 258,1 : 130.
 1883. *Euploea klugii* de Niceville. *Butterflies of India Burma & Ceylon*, 1 : 38.
 1987. *Euploea klugii* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 316.
 1993. *Euploea klugii* Varshney. *Oriental Insects*, 27 : 367.

Distribution : Sikkim and N.E. Himalaya, Assam.

***75. *Spalgis epeus* Westwood**
The Apefly

1852. *Lucia epeus* Westwood. *Gen., Diurn. Lep.*, 2 : 502.
 1890. *Spalgis epeus* de Niceville. *Butterflies of India Burma & Ceylon*, 3 : 157.
 1987. *Spalgis epeus* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 291.
 1997. *Spalgis epeus* Varshney. *Oriental Insects*, 31 : 89.

Distribution : South India, Bengal, Kumaon to Assam.

Elsewhere : Sri Lanka and Myanmar.

***76. *Curetis thetis* Drury**
The Indian Sunbeam

1773. *Papilio thetis* Drury. *Ill. Ex. Ent.*, 2 : 16.
 1890. *Curetis thetis* de Niceville. *Butterflies of India Burma & Ceylon*, 3 : 287.
 1987. *Curetis thetis* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 312.
 1997. *Curetis thetis* Varshney. *Oriental Insects*, 31 : 89.

Distribution : Peninsular India, Saurashtra, Bengal.

Elsewhere : Sri Lanka, Sylhet to Myanmar.

***77. *Nacaduba kurava* Moore**
The Transparent 6-line Blue

1987. *Nacaduba kurava* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 299.

1997. *Nacaduba kurava* Varshney. *Oriental Insects*, 31 : 91.

Distribution : South India, Sikkim to Assam.

Elsewhere : Sri Lanka and Myanmar.

***78. *Nacaduba beroe* Felder
The Opaque 6-Line Blue**

1987. *Nacaduba beroe* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 300.

1997. *Nacaduba beroe* Varshney. *Oriental Insects*, 31 : 91.

Distribution : South India, Sikkim to Assam.

Elsewhere : Sri Lanka and Myanmar.

**79. *Prosotas nora* Felder
The Common Lineblue**

1860. *Lycaena nora* Felder. *Sitz. Ak. Wiss. Wien, Math. Nat.Cl.*, 40 : 458.

1890. *Nacaduba nora* de Niceville. *Butterflies of India Burma & Ceylon*, 3 : 147.

1957. *Nacaduba nora* Wynter-Blyth. *Butterflies of the Indian Region*, : 298.

1987. *Prosotas nora* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 301.

1997. *Prosotas nora* Varshney. *Oriental Insects*, 31 : 91.

Material examined : 1 ex Tulsi Lake, 19.iii.2001, R.M. Sharma & Party.

Distribution : India.

Elsewhere : Sri Lanka, Myanmar.

***80. *Prosotas dubiosa* Semper
Tail less Lineblue**

1997. *Prosotas dubiosa* Varshney. *Oriental Insects*, 31 : 91.

Distribution : India.

Elsewhere : Sri Lanka, Myanmar.

**81. *Caleta decidia* Hewitson
The Angled Pierrot**

1876. *Lycaena decidia* Hewitson. *Ex. Butt.*, 4

1890. *Castalius decidia* de Niceville. *Butterflies of India Burma & Ceylon*, 3 : 201.

1987. *Caleta decidia* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 291.

1997. *Caleta decidia* Varshney. *Oriental Insects*, **31** : 92.

Material examined : 2 exs. Sasupada Nature Trail, 27.ix.2002, D.B. Bastawade & Party.

Distribution : Peninsular India, M.P., S. Bihar, Orissa, Sikkim to Assam.

Elsewhere : Sri Lanka and Myanmar.

82. *Jamides bochus* Stoll

The Dark Cerulean

1782. *Papilio bochus* Cramer. *Pap. Exot.*, **4** : 210.

1819. *Jamides bochus* Hubner. *Verz. Bekannt.Schmet.*, **5** : 71.

1890. *Jamides bochus* de Niceville. *Butterflies of India Burma & Ceylon*, **3** : 157.

1987. *Jamides bochus* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 298.

1997. *Jamides bochus* Varshney. *Oriental Insects*, **31** : 93.

Material examined : 1 ex Kanheri Phata, 29.xii.1995, S.G.Patil & Party; 1 ex Tulsi Lake, 11.xii.2001, P.P. Kulkarni & Party; 1 ex Tulsi Lake-Forest Nursery, 24.ix.2002, D.B. Bastawade & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

83. *Jamides celeno* (Cramer)

The Common Cerulean

1932. *Jamides celeno* Evans. *Identification of Indian Butterflies*, : 237.

1957. *Jamides celeno* Wynter-Blyth. *Butterflies of the Indian Region*, : 292.

1987. *Jamides celeno* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 298.

1997. *Jamides celeno* Varshney. *Oriental Insects*, **31** : 93.

Material examined : 1 ex Jambhul Mal, 11.x.1995, P.P. Kulkarni & Party; 1 ex Navapada, 8.x.1996; 1 ex. Tulsi Lake, 9.x.1996; R.M. Sharma & Party; 1 ex Kanheri Caves, 30.xi.2000, D.B. Bastawade & Party.

Distribution : India.

Elsewhere : Sri Lanka, Myanmar.

84. *Catochrysops strabo* (Fab.)

The Forget-Me-not

1793. *Hesperia strabo* Fabricius. *Ent. Syst.*, **3** : 287.

1890. *Catochrysops strabo* deNiceville. *Butterflies of India, Burma & Ceylon*, **3** : 177.

1907. *Catochrysops strabo* Bingham. *Fauna Brit. India Butterflies*, 2 : 411.

1987. *Catochrysops strabo* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 297.

1997. *Catochrysops strabo* Varshney. *Oriental Insects*, 31 : 93.

Material examined : 1 ex BNHS Interpretation Centre, 22.iii.2001, R.M. Sharma & Party; 1 ex Film City, Hatigate, 12.xii.2001, P.P. Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

85. *Lampides boeticus* (Linn.) The Pea Blue

1767. *Papilio boeticus* Linnaeus. *Syst. Nat. ed.*, 12 : 789.

1907. *Polyommatus boeticus* Bingham. *Fauna Brit. India Butterflies*, 2 : 432.

1890. *Polyommatus boeticus* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 204.

1962. *Lampides boeticus* Cantlie. *The Lycaenidae portion of Brigadier Evans. The Identification of Indian Butterflies*, 1932 : 69.

1987. *Lampides boeticus* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 297.

1997. *Lampides boeticus* Varshney. *Oriental Insects*, 31 : 94.

Material examined : 1 ex Kanheri Caves, 10.x.1995; P.P. Kulkarni & Party; 2 exs Hatigate, Goregaon, 20.iii.2001; 1 ex BNHS Interpretation Centre-Hatigate, 22.iii.2001; R.M. Sharma & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

86. *Leptotes plinius* (Fab.) The Zebra Blue

1793. *Hesperia plinius* Fabricius. *Ent. Syst.*, 3 : 284.

1890. *Tarucus plinius* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 194.

1932. *Syntarucus plinius* Evans. *Identification of Indian Butterflies* : 217.

1957. *Syntarucus plinius* Wynter-Blyth. *Butterflies of the Indian Region*, : 266.

1997. *Leptotes plinius* Varshney. *Oriental Insects*, 31 : 94.

Material examined : 1 ex Tulsi Lake, 19.iii.2001; R.M. Sharma & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

**87. *Castalius rosimon* (Fab.)
The Common Pierrot**

1775. *Papilio rosimon* Fabricius. *Syst. Ent.*, : 523.

1890. *Castalius rosimon* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 197.

1957. *Castalius rosimon* Wynter-Blyth. *Butterflies of the Indian Region*, : 259.

1987. *Castalius rosimon* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 291.

1997. *Castalius rosimon* Varshney. *Oriental Insects*, 31 : 94.

Material examined : 1 ex Kanheri Caves, 10.x.1995; 2 exs. Tulsi Lake, 9.x.1996; 1 ex Kanheri Caves, 10.x. 1996, 1 ex Tulsi Lake, 19.iii.2001; 1 ex Hatigate, Goregaon, 20.iii.2001, R.M. Sharma & Party; 1 ex Kanheri Caves, 15.xii.2001, P.P. Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***88. *Tarucus nara* Kollar
The Rounded Pierrot**

1848. *Lycaena nara* Kollar. *Hugel's Kaschmir*, 4 : 421.

1890. *Tarucus nara* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 190.

1957. *Tarucus nara* Wynter-Blyth. *Butterflies of the Indian Region*, : 264.

1987. *Tarucus nara* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 292.

1997. *Tarucus nara* Varshney. *Oriental Insects*, 31 : 95.

Distribution : Mumbai, Saurashtra, Rajasthan, Punjab.

Elsewhere : N.W. Frontier Province, Sind.

***89. *Zizeeria karsandra* Moore
The Dark Grass Blue**

1865. *Polyommatus karsandra* Moore. *Proc. Zool. Soc. Lond.*, : 505.

1890. *Zizeeria karsandra* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 117.

1997. *Zizeeria karsandra* Varshney. *Oriental Insects*, 31 : 95.

Distribution : India.

Elsewhere : Sri Lanka, Myanmar.

**90. *Zizina otis* Fab.
The Lesser Grass Blue**

1787. *Papilio otis* Fabricius. *Mant. Ins.*, 2 : 73.

1890. *Zizeeria otis* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 119.

1957. *Zizeeria otis* Wynter-Blyth. *Butterflies of the Indian Region*, : 285.

1997. *Zizina otis* Varshney. *Oriental Insects*, 31 : 95.

Material examined : 1 ex Kanheri Caves, 18.iii.2001, R.M. Sharma & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***91. *Pseudozizeeria maha* (Kollar)
The Pale Grass Blue**

1848. *Lycaena maha* Kollar. In Huegel's *Kaschmir und das Reich der Siek*, 4(2) : 422.

1907. *Zizeeria maha* Bingham. *Fauna Brit. India Butterflies*, 2 : 355.

1957. *Zizeeria maha* Wynter-Blyth. *Butterflies of the Indian Region* : 284.

1987. *Zizeeria maha* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 295.

1997. *Pseudozizeeria maha* Varshney. *Oriental Insects*, 31 : 96.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***92. *Talicauda nyseus* Guerin Meneville
The Red Pierrot**

1843. *Polyommatus nyseus* Guerin. *Dellessert's Souv. D'us Voy. Dans l'Inde*, : 78.

1890. *Talicauda nyseus* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 135.

1957. *Talicauda nyseus* Wynter-Blyth. *Butterflies of the Indian Region*, : 257.

1987. *Talicauda nyseus* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 302.

1997. *Talicauda nyseus* Varshney. *Oriental Insects*, 31 : 97.

Distribution : India, Khasi and Naga Hills.

Elsewhere : Sri Lanka and Myanmar.

**93. *Celastrina lavendularis* (Moore)
The Plain Hedge Blue**

1877. *Polyommatus lavendularis* Moore. *Ann. Mag. Nat. Hist.*, series, 4, 11 : 341.

1890. *Cyaniris lavendularis* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 100.

1957. *Lycaenopsis lavendularis* Wynter-Blyth. *Butterflies of the Indian Region*, : 278.

1987. *Celastrina lavendularis* Larsen. *J. Bombay nat. Hist. Soc.*, 84 : 295.

1997. *Celastrina lavendularis* Varshney. *Oriental Insects*, 31 : 99.

Material examined : 1 ex. Vasai Creek-Nagla (Yeoor), 21.iii.2001, R.M. Sharma & Party.

Distribution : South India, Bengal, Dehra Dun to Assam.

Elsewhere : Sri Lanka, Myanmar.

***94. *Acytolepis puspa* Horsfield
The Common Hedge Blue**

1828. *Polyommatus puspa* Horsfield. *Cat. Lep. E.I.Co. n.*, 3 : 67.

1890. *Cyaniris puspa* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 135.

1957. *Lycaenopsis puspa* Wynter-Blyth. *Butterflies of the Indian Region*, : 274.

1987. *Acytolepis puspa* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 294.

1997. *Acytolepis puspa* Varshney. *Oriental Insects*, 31 : 100.

Distribution : Peninsular India, Himalayas, Assam.

Elsewhere : Sri Lanka and Myanmar.

**95. *Euchrysops cnejus* (Fab.)
The Gram Blue**

1798. *Hesperia cnejus* Fabricius. *Ent. Syst. Suppl.* : 430.

1890. *Catochrysops cnejus* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 178.

1962. *Euchrysops cnejus* Cantlie. *The Lycaenidae portion (except the Arhopala group) of Brigadier Evans, The Identification of Indian Butterflies*, 1932 : 65.

1987. *Euchrysops cnejus* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 297.

1997. *Euchrysops cnejus* Varshney. *Oriental Insects*, 31 : 104.

Material examined : 2 exs. Navapada, 8.x.1996, 2 exs. Gandhi Smarak, 17.iii.2001; 2 exs Kanheri Caves, 18.iii.2001; R.M.Sharma & Party; 1 ex Kanheri Caves, 15.xii.2001, P.P.Kulkarni & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

**96. *Chilades laius* Stoll
The Lime Blue**

1780. *Papilio laius* Stoll. *Pap. Ex.*, 4 : 62.

1890. *Chilades laius* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 89.

1957. *Chilades laius* Wynter-Blyth. *Butterflies of the Indian Region*, : 284.

1987. *Chilades laius* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 296.

1997. *Chilades laius* Varshney. *Oriental Insects*, **31** : 107.

Material examined : 1 ex Navapada, 8.x.1996; 1 ex Tulsi Lake, 9.x.1996; 1 ex Lion Safari, 12.x.1996, R.M. Sharma & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***97. *Freyeria trochylus* (Freyer)
The Grass Jewel**

1844. *Lycaena trochylus* Freyer. *Neuere Beeitrage Schmett*, **5** : 98.

1890. *Chilades trochylus* deNiceville. *Butterflies of India Burma & Ceylon*, **3** : 91.

1957. *Zizeeria trochylus* Wynter-Blyth. *Butterflies of the Indian Region*, : 284.

1987. *Freyeria trochylus* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 297.

1997. *Freyeria trochylus* Varshney. *Oriental Insects*, **31** : 107.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***98. *Spindasis vulcanus* (Fab.)
The Common Silverline**

1775. *Papilio vulcanus* Fabricius. *Syst. Ent.* : 519.

1890. *Aphnaeus vulcanus* deNiceville. *Butterflies of India Burma & Ceylon*, **3** : 349.

1957. *Spindasis vulcanus* Wynter-Blyth. *Butterflies of the Indian Region*, : 332.

1987. *Spindasis vulcanus* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 305.

1997. *Spindasis vulcanus* Varshney. *Oriental Insects*, **31** : 110.

Distribution : India.

Elsewhere : Sri Lanka.

***99. *Spindasis ictis* Hewitson
The Shot Silverline**

1855. *Aphnaeus ictis* Hewitson. *Ill., Diurn., Lep. n.*, **5** : 61.

1890. *Aphnaeus ictis* deNiceville. *Butterflies of India Burma & Ceylon*, **3** : 361.

1957. *Spindasis ictis* Wynter-Blyth. *Butterflies of the Indian Region* : 332.

1987. *Spindasis ictis* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 305.

1997. *Spindasis ictis* Varshney. *Oriental Insects*, **31** : 110.

Distribution : India.

Elsewhere : Sri Lanka.

***100. *Narathura amantes* Hewitson
The Large Oak Blue**

1862. *Amblypodia amantes* Hewitson. *Cat. Lycaenidae B.M.No.*, 17 : 4.
1890. *Arhopala amantes* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 239.
1987. *Arhopala amantes* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 303.
1997. *Narathura amantes* Varshney. *Oriental Insects*, 31 : 113.

Distribution : South India to M.P., South Bihar, Dehra Dun to Assam.

Elsewhere : Sri Lanka and Myanmar.

***101. *Narathura pseudocentaurus* Doubleday
The Western Centaur Oak Blue**

1997. *Narathura pseudocentaurus* Varshney. *Oriental Insects*, 31 : 113.

Distribution : India.

Elsewhere : Sri Lanka.

***102. *Zesius chrysomallus* Huebner
The Red Spot**

1823. *Zesius chrysomallus* Huebner. *Zutr. Ex. Schemett.*
1890. *Zesius chrysomallus* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 334.
1957. *Zesius chrysomallus* Wynter-Blyth. *Butterflies of the Indian Region*, : 335.
1987. *Zesius chrysomallus* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 308.
1997. *Zesius chrysomallus* Varshney. *Oriental Insects*, 31 : 117.

Distribution : Peninsular India, S. Bihar, Orissa, Bengal.

Elsewhere : Sri Lanka.

***103. *Amblypodia anita* Hewitson
The Leaf Blue**

1862. *Amblypodia anita* Hewitson. *Cat. Lycaenidae B.M.No.* : 14.
1890. *Amblypodia anita* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 211.
1987. *Amblypodia anita* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 305.
1997. *Amblypodia anita* Varshney. *Oriental Insects*, 31 : 117.

Distribution : Peninsular India, M.P., Orissa, Bihar, West Bengal, Sikkim, N.E. India & Andaman.

Elsewhere : Sri Lanka and Myanmar.

***104. *Iraota timoleon* Stoll**
The Silver Streak Blue

1790. *Papilio timoleon* Stoll. *Suppl. Cramer, Pap. Ex.*, 5 :
1890. *Iraota timoleon* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 215.
1957. *Iraota timoleon* Wynter-Blyth. *Butterflies of the Indian Region*, : 316.
1987. *Iraota timoleon* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 304.
1997. *Iraota timoleon* Varshney. *Oriental Insects*, 31 : 117.

Distribution : South India, Konkan, M.P., Bengal, U.P., H.P. to Assam.

Elsewhere : Sri Lanka and Myanmar.

***105. *Loxura atymnus* Stoll**
The Yamfly

1780. *Papilio atymnus* Stoll. *Pap. Ex.*, 4 : 82.
1890. *Loxura atymnus* de Niceville. *Butterflies of India Burma & Ceylon*, 3 : 436.
1957. *Loxura atymnus* Wynter-Blyth. *Butterflies of the Indian Region*, : 329.
1997. *Loxura atymnus* Varshney. *Oriental Insects*, 31 : 118.

Distribution : South India, S. Bihar, Orissa, M.P., Bengal, Mussoorie to Assam.

Elsewhere : Sri Lanka and Myanmar.

***106. *Rathinda amor* Fab.**
The Monkey Puzzle

1775. *Rathinda amor* Fabricius. *Syst. Ent., n.*, 321 : 518.
1890. *Rathinda amor* de Niceville. *Butterflies of India Burma & Ceylon*, 3 : 414.
1957. *Rathinda amor* Wynter-Blyth. *Butterflies of the Indian Region*, : 349.
1987. *Rathinda amor* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 307.
1997. *Rathinda amor* Varshney. *Oriental Insects*, 31 : 120.

Distribution : South India, Maharashtra, Orissa, Bengal, Assam.

Elsewhere : Sri Lanka.

***107. *Pratapa deva* Moore**
The White Royal

1932. *Pratapa deva* Evans. *Identification of Indian Butterflies*, : 280.

1987. Pratapa deva Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 308.

1997. Pratapa deva Varshney. *Oriental Insects*, **31** : 122.

Distribution : Peninsular India, U.P. Hills, M.P., Sikkim, W. Bengal, N.E. India.

Elsewhere : Sri Lanka.

***108. *Tajuria jehana* Moore**
The Plains Royal

1883. *Tajuria jehana* Moore. *Proc. Zool. Soc. Lond.*, : 529.

1890. *Tajuria jehana* de Niceville. *Butterflies of India Burma & Ceylon*, **3** : 377.

1957. *Tajuria jehana* Wynter-Blyth. *Butterflies of the Indian Region*, : 343.

1987. *Tajuria jehana* Larsen. *J. Bombay Nat. Hist. Soc.*, **84** : 309.

1997. *Tajuria jehana* Varshney. *Oriental Insects*, **31** : 122.

Distribution : South India, H.P. to Bengal.

Elsewhere : Sri Lanka.

***109. *Chliaria othona* Hewitson**
The Orchid Tit

1865. *Hypolycaena othona* Hewitson. *Ill. Diurn. Lep. n.*, **7** : 50.

1890. *Chliaria othona* de Niceville. *Butterflies of India Burma & Ceylon*, **3** : 395.

1957. *Chliaria othona* Wynter-Blyth. *Butterflies of the Indian Region*, : 353.

1997. *Chliaria othona* Varshney. *Oriental Insects*, **31** : 127.

Distribution : Western Ghats, Dehra Dun to Assam, Bengal.

Elsewhere : Myanmar.

***110. *Virachola isocrates* Fab.**
The Common Guava Blue

1793. *Hesperia isocrates* Fabricius. *Syst. Ent.*, **3** : 266.

1890. *Virachola isocrates* de Niceville. *Butterflies of India Burma & Ceylon*, **3** : 477.

1957. *Virachola isocrates* Wynter-Blyth. *Butterflies of the Indian Region*, : 357.

1997. *Virachola isocrates* Varshney. *Oriental Insects*, **31** : 129.

Distribution : India.

Elsewhere : Sri Lanka.

***111. *Virachola perse* Hewitson**
The Large Guava Blue

1853. *Deudorix perse* Hewitson. *Ill. Diurn. Lep.*, : 18
1890. *Virachola perse* de Niceville. *Butterflies of India Burma & Ceylon*, 3 : 481.
1957. *Virachola perse* Wynter-Blyth. *Butterflies of the Indian Region*, : 359.
1997. *Virachola perse* Varshney. *Oriental Insects*, 31 : 129.

Distribution : South India, Kangra to Assam, Orissa.

Elsewhere : Sri Lanka and Myanmar.

112. *Rapala iarbus* Fabricius
The Indian Red Flash

1787. *Papilio iarbus* Fabricius. *Mant. Ins.*, 2 : 68
1890. *Rapala iarbus* deNiceville. *Butterflies of India Burma & Ceylon*, 3 : 468.
1932. *Rapala iarbus* Evans. *Identification of Indian Butterflies*, : 299.
1957. *Rapala melampus* Wynter-Blyth. *Butterflies of the Indian Region*, : 362.
1987. *Rapala iarbus* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 311.
1997. *Rapala iarbus* Varshney. *Oriental Insects*, 31 : 130.

Material examined : 1 ex Near Upavan, Yeour, 1.i.1996, S.G. Patil & Party; 1 ex Tulsi Lake, 11.xii.2001, P.P. Kulkarni & Party.

Distribution : South India, Mumbai, M.P., S. Bihar, Orissa, Saurashtra, Kutch, Kumaon.

Elsewhere : Sri Lanka.

***113. *Rapala manea* Hewitson**
The Slate Flash

1987. *Rapala manea* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 311.
1997. *Rapala manea* Varshney. *Oriental Insects*, 31 : 130.

Distribution : Throughout Oriental Region.

Elsewhere : Beyond Sumatra, Borneo to Australia.

***114. *Rapala varuna* Horsfield**
The Indigo Flash

1987. *Rapala varuna* Larsen. *J. Bombay Nat. Hist. Soc.*, 84 : 311.

1997. *Rapala varuna* Varshney. *Oriental Insects*, **31** : 130.

Distribution : Throughout Oriental Region.

***115. *Hasora chromus* (Fab.)
The Common Banded Awl**

1782. *Papilio chromus* Cramer. *Lepidoptera indica*.

1932. *Hasora chromus* Evans. *The Identification of Indian Butterflies*, : 316.

1957. *Hasora chromus* Wynter-Blyth. *Butterflies of the Indian Region*, : 467.

1987. *Hasora chromus* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 581.

Distribution : India.

Elsewhere : Sri Lanka, Baluchistan, Myanmar.

***116. *Badamia exclamationis* (Fab.)
The Brown Awl**

1775. *Papilio exclamationis* Fabricius. *Syst. Ent.*, 530.

1932. *Badamia exclamationis* Evans. *The Identification of Indian Butterflies*, : 321.

1957. *Badamia exclamationis* Wynter-Blyth. *Butterflies of the Indian Region*, : 470.

1987. *Badamia exclamationis* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 582.

Distribution : India.

Elsewhere : Sri Lanka, Myanmar.

***117. *Bibasis sena* (Moore)
The Orange Tail Awl**

1932. *Bibasis sena* Evans. *The Identification of Indian Butterflies* : 320

1957. *Bibasis sena* Wynter-Blyth. *Butterflies of the Indian Region* : 469.

1987. *Bibasis sena* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 581.

Distribution : South India, H.P. to Assam.

Elsewhere : Sri Lanka, Myanmar.

**118. *Celaenorrhinus leucocera* Kollar
The Common Spotted Flat**

1932. *Celaenorrhinus leucocera* Evans. *The Identification of Indian Butterflies* : 326.

1957. *Celaenorrhinus leucocera* Wynter-Blyth. *Butterflies of the Indian Region*, : 459.

1987. *Celaenorrhinus leucocera* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 583.

Material examined : 1 ex Gandhi Hill, 28.ii.1997, D.B. Bastawade & Party.

Distribution : South India, Mumbai to Bengal, Himalayas from Kashmir to Assam.

Elsewhere : Myanmar.

119. *Celaenorrhinus ambareesa* Moore

The Malabar Spotted Flat

1932. *Celaenorrhinus ambareesa* Evans. *The Identification of Indian Butterflies*, : 324.

1957. *Celaenorrhinus ambareesa* Wynter-Blyth. *Butterflies of the Indian Region*, : 460.

1987. *Celaenorrhinus ambareesa* Larsen. *J. Bombay nat. Hist. Soc.*, **84** : 583.

Material examined : 1 ex Kanheri Caves, 10.x.1995, P.P. Kulkarni & Party.

Distribution : South India, Western Maharashtra, M.P. and Bengal.

120. *Sarangesa dasahara* (Moore)

The Common Small Flat

1932. *Sarangesa dasahara* Evans. *The Identification of Indian Butterflies*, : 342

1957. *Sarangesa dasahara* Wynter-Blyth. *Butterflies of the Indian Region*, : 464

1988. *Sarangesa dasahara* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 27.

Material examined : 2 exs Tulsi Lake, 9.x.1996, R.M. Sharma & Party.

Distribution : South India, Mumbai, M.P., Kangra to Assam, U.P..

Elsewhere : Sri Lanka and Myanmar.

*121. *Pseudocolodinia indrani* (Moore)

The Tri-Colour Pied Flat

1865. *Coladenia indrani* Moore.

1932. *Coladenia indrani* Evans. *The Identification of Indian Butterflies* : 341.

1988. *Pseudocolodinia indrani* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 26.

2000. *Telicota ancilla* Kunte. *Butterflies of Peninsular India*, : 201.

Distribution : Peninsular India, Bengal, Mussoorie to Sikkim.

Elsewhere : Myanmar.

***122. *Pseudocoladenia dan* (Fab.)**

The Fulvous Pied Flat

1787. *Coladenia dan* Fabricius.

1988. *Pseudocolodinia dan* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 26.

Distribution : Peninsular India, Kullu to Assam.

Elsewhere : Myanmar.

***123. *Caprona ransonetti* (Felder)**

The Golden Angle

1957. *Caprona ransonetti* Wynter-Blyth. *Bombay Nat. Hist. Soc.*, : 465.

1988. *Caprona ransonetti* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 27.

Distribution : Peninsular India, Kalka and Assam.

Elsewhere : Sri Lanka and Myanmar.

***124. *Tapena thwaitesi* Moore**

The Black Angle

1881. *Tapena thwaitesi* Moore. *Lepidoptera of Ceylon*.

1932. *Tapena thwaitesi* Evans. *The Identification of Indian Butterflies*, : 342.

1988. *Tapena thwaitesi* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 27.

Distribution : Peninsular India.

Elsewhere : Sri Lanka and Myanmar.

***125. *Udaspes folus* Cramer**

The Grass Demon

1779. *Papilio folus* Cramer. *Pap. Exot.*, **1** : 74.

1932. *Udaspes folus* Evans. *The Identification of Indian Butterflies*, : 370.

1957. *Udaspes folus* Wynter-Blyth. *Butterflies of the Indian Region*, : 490.

1988. *Udaspes folus* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 34.

Distribution : South India, Mumbai, Gujrat, M.P., U.P., Bengal, Kangra to Assam.

Elsewhere : Sri Lanka and Myanmar.

126. *Telicota ancilla* Mabille
The Dark Palm Dart

1949. *Telicota ancilla* Evans. *A catalogue of Hesperiidae from Europe*.

1981. *Telicota ancilla* Varshney et al. *Rec. zool. Surv. India, Occ. Paper No.*, **31** : 12.

1988. *Telicota ancilla* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 36.

2000. *Telicota ancilla* Kunte. *Butterflies of Peninsular India*, : 217.

Material examined : 1 ex Krishnagiri, 11.x.1996, R.M. Sharma & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***127. *Telicota colon* Fab.**
The Pale Palm Dart

1775. *Telicota colon* Fabricius. Corbet, 1942, *Proc. R. Ent. Soc. London*, B, **11** : 94.

1988. *Telicota colon* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 35.

Distribution : India.

Elsewhere : Sri Lanka.

128. *Pelopidas mathias* Fab.
The Small Branded Swift

1798. *Hesperia mathias* Fabricius. *Ent. Syst., Suppl.*, : 438

1957. *Pelopidas mathias* Wynter-Blyth. *Butterflies of the Indian Region*, : 486

1988. *Pelopidas mathias* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 37.

Material examined : 2 exs Krishnagiri, 11.x.1996, R.M. Sharma & Party; 1 ex Nursery-Hatigate, Goregaon, 23.ix.2002, D.B. Bastawade & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

129. *Pelopidas conjuncta* H. Schaeffer
The Conjoined Swift

1869. *Pelopidas conjuncta* H. Schaeffer.

1957. *Pelopidas conjuncta* Wynter-Blyth. *Butterflies of the Indian Region*, : 485.

1988. *Pelopidas conjuncta* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 37.

Material examined : 1 ex Krishnagiri, 11.x.1996, R.M. Sharma & Party; 1 ex Tulsi Lake-Nursery, 24.ix.2002, D.B. Bastawade & Party.

Distribution : Peninsular India, Bengal, Dun to Assam.

Elsewhere : Sri Lanka, Myanmar.

***130. *Caltoris kumara* Moore**

The Blank Swift

1878. *Caltoris kumara* Moore.

1957. *Caltoris kumara* Wynter-Blyth. *Butterflies of the Indian Region*, : 484.

1988. *Caltoris kumara* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 38.

Distribution : Western Ghats to N. Kanara, Bengal, Sikkim to Assam.

Elsewhere : Sri Lanka and Myanmar.

131. *Suastus gremius* (Fab.)

The Indian Palm Bob

1798. *Suastus gremius* Fabricius. Butler, 1869, Catalogue of the Lepidoptera in the British Museum described by Fabricius.

1932. *Suastus gremius* Evans. *The Identification of Indian Butterflies*, : 365.

1957. *Suastus gremius* Wynter-Blyth. *Butterflies of the Indian Region*, : 471.

1988. *Suastus gremius* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 31.

Material examined : 1 ex Tulsi Lake, 9.x.1996, R.M. Sharma & Party.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***132. *Gangara thyrsis* (Fab.)**

The Giant Redeye

1775. *Gangara thyrsis* Fabricius. Syn *G. pandia*, Moore, 1857.

1932. *Gangara thyrsis* Evans. *The Identification of Indian Butterflies*, : 372.

1957. *Gangara thyrsis* Wynter-Blyth. *Butterflies of the Indian Region*, : 473.

1988. *Gangara thyrsis* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 33.

Distribution : South India, Mumbai, Bengal, Sikkim to Assam.

Elsewhere : Sri Lanka and Myanmar.

133. *Taractrocera ceramas* (Hewitson)*The Tamil Grass Dart**

1868. *Taractrocera ceramas* Hewitson.

1932 *Taractrocera ceramas* Evans. *The Identification of Indian Butterflies*, : 397.

1957. *Taractrocera ceramas* Wynter-Blyth. *Butterflies of the Indian Region*, : 475.

1988. *Taractrocera ceramas* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 33.

Distribution : Western Ghats, Mumbai.

Elsewhere : N. Myanmar.

134. *Taractrocera maevius* (Fab.)*The Common Grass Dart**

1793. *Taractrocera maevius* Fabricius.

1957. *Taractrocera maevius* Wynter-Blyth. *Butterflies of the Indian Region*, : 475.

1988. *Taractrocera maevius* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 33.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

135. *Potanthus dara* Koll.*The Dart**

1848. *Potanthus dara* Kollar.

1865. *Potanthus dara maesa* Moore.

1957. *Potanthus dara* Wynter-Blyth. *Butterflies of the Indian Region* : 480.

Distribution : Plains of India, Himalayas.

136. *Potanthus pseudomaesa* Moore*The Common Dart**

1881. *Potanthus pseudomaesa* Moore.

1957. *Potanthus pseudomaesa* Wynter-Blyth. *Butterflies of the Indian Region*, : 479.

1988. *Potanthus pseudomaesa* Larsen. *J. Bombay nat. Hist. Soc.* **85** : 35.

Distribution : Plains of India, Lower Himalayas

Elsewhere : Sri Lanka.

***137. *Borbo cinnara* Walker
The Rice Swift**

1866. *Borbo cinnara* Wallace. Waterhouse, G.A. What butterfly is that? : A handbook of known Australian species.
1957. *Borbo cinnara* Wynter-Blyth. *Butterflies of the Indian Region*, : 486.
1988. *Borbo cinnara* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 36.

Distribution : India.

Elsewhere : Sri Lanka and Myanmar.

***138. *Borbo bevani* Moore
The Bevan's Swift**

1878. *Borbo bevani* Moore Seitz, A. 1909, Macrolepidoptera of the World.
1957. *Borbo bevani* Wynter-Blyth. *Butterflies of the Indian Region*, : 486.
1988. *Borbo bevani* Larsen. *J. Bombay nat. Hist. Soc.*, **85** : 36.

Distribution : South India to M.P., U.P., Bengal, Assam.

Elsewhere : Myanmar.

SUMMARY

The paper embodies the systematic account of butterflies and skippers collected during different surveys conducted by Western Regional Station, Pune, Bombay Natural History Society, Mumbai and earlier records from Bombay and Selsette Island covering Sanjay Gandhi National Park, Borivali, Mumbai, Maharashtra State.

The study resulted in the enumeration of 138 species belonging to 91 genera spread over eight families, viz. Papilionidae 11 spp, Pieridae 22 spp, Satyridae 7 spp, Nymphalidae 26 spp, Riodinidae 1 sp., Danaidae 7 spp, Lycaenidae 40 spp. and Hesperidae 24 spp. The analysis of the species richness shows that the family Lycaenidae is predominant followed by Nymphalidae, Hesperidae and Pieridae.

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CHILOPODA : SCOLOPENDROMORPHA

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INTRODUCTION

Centipedes (Chilopoda : Scolopendromorpha) represent an economically important group of arthropods, playing a vital role in the terrestrial ecosystems. A perusal of the checklist of Indian centipedes by Khanna (2001) revealed that the country has a representation of 102 species belonging to 11 genera and two families. Centipede fauna of Maharashtra is fairly well known by the studies undertaken by Jangi & Dass (1984), Yadav (1993 a,b), Yadav (2004, 5, 6) which also include species diversity from some of the important conservation areas like Melghat Tiger Reserve, Pench National Park and Tadoba Andhari Tiger Reserve. An attempt has been made here to inventorise the centipede fauna of Sanjay Gandhi National Park, Borivalli, Mumbai based upon the collections made from the area by the scientists of Zoological Survey of India, Western Regional Station, Pune during the years 1995-96 and 2000-2002. This forms the first detailed account on the centipede fauna of Sanjay Gandhi National Park, which is an important conservation area located in the Northern Western Ghats of Maharashtra. Altogether 8 species comprising 5 genera, 2 sub-families and 3 tribes have been reported to occur in Sanjay Gandhi National Park.

SYSTEMATIC ACCOUNT

Class CHILOPODA

Order SCOLOPENDROMORPHA

Family SCOLOPENDRIDAE

Subfamily SCOLOPENDRINAE

Tribe Scolopendrini

1. *Scolopendra amazonica* (Bucherl)

1946. *Scolopendra morsitans amazonica* Bucherl. W. Mem. Inst. Butantan, 19 : 135-137.

1984. *Scolopendra amazonica* Jangi & Dass. J. Scient. Indl. Res., 43(2) : 29.

Diagnostic characters : 20th pair of legs without tarsal spur. Prefemur of anal legs ventrally with 3 rows of 3 spines in each.

Material examined : 4 exs, Gandhi Mandir, 21-vi-2001, A.S. Mahabal; 1ex, Gomukh. Goraksh nath, 21-xii-2000, D.B. Bastawade; 1ex, Kanheri caves, 18-vi-2001, A.S. Mahabal, 1 ex, Kanheri caves, 26-ix-2002, D.B. Bastawade, 4 exs. at Film city, Hattigate, 12-xii-2001, P.P. Kulkarni; 1 ex, Kanheri caves, 15-xii-2001, P.P. Kulkarni; 1 ex., on way to Tulsi lake to Nursary, 24-ix-2002, D.B. Bastawade; 1 ex; Tulsi lake, 17-vi-2001, A.S. Mahabal.

Distribution : Cosmopolitan.

Status : Common.

Remarks : Cave specimens are black in colour.

2. *Scolopendra morsitans* Linnaeus.

1758. *Scolopendra morsitans* Linnaeus. *Syst. Nat.*, 10 : 638.

1984. *Scolopendra morsitans* Jangi & Dass. *J. Scient. Indl. Res.*, 43(2) : 27–54.

2001. *Scolopendra morsitans* Khanna. *Ann. For.*, 9(2) : 199–219.

Diagnostic characters : 20th pair of legs with tarsal spur, anal leg prefemur with 3 rows of 3 spines on ventral side.

Material examined : 1 ex, Film city, Hattigate, 12-xii-2001, P.P. Kulkarni.

Distribution : Cosmopolitan.

Status : Common.

3. *Cormocephalus dentipes* Pocock

1891. *Cormocephalus dentipes* Pocock. *Ann. Nat. Hist. Ser.*, 6, 7 : 66.

1984. *Cormocephalus dentipes* Jangi & Dass. *J. Scient. Indl. Res.*, 43(2) : 27–54.

2001. *Cormocephalus dentipes* Khanna. *Ann. For.*, 9(2) : 199–219.

Diagnostic characters : Lateral tergital margination present anterior to tergite 21. 21st tergite without longitudinal median sulcus. Anal legs tuberculate in males.

Material examined : 1 ex, Kanheri caves, 18-vi-2001, A.S. Mahabal; 1 ex, Kanheri caves, 15-xii-2001, P.P. Kulkarni; 1 ex, Tulsi lake, 17-vi-2001, A.S. Mahabal.

Distribution : India : Andaman Nicobar Islands, Delhi, Himachal Pradesh, Meghalaya, Mizoram, Madhya Pradesh, Orissa, West Bengal, Uttar Pradesh, Uttaranchal, Maharashtra.

Status : Uncommon in Maharashtra.

Tribe **Asanadini**4. *Asanada sukhensis* Jangi & Dass.

1984. *Asanada sukhensis* Jangi & Dass. *J. Scient. Indl. Res.*, **43**(2) : 27–54.

2001. *Asanada sukhensis* Khanna. *Ann. For.*, **9**(2) : 199–219.

Diagnostic characters : Anal legs short, thick, paired longitudinal median suture complete on 20th tergite, 21st tergite more than twice as broad as long, anal leg claw dorsally without a dent, longitudinal median suture confined to posterior half of anal leg femur.

Distribution : India : Kerala, Madhya Pradesh, Orissa.

Status : Uncommon.

Remarks : It is a new record from Maharashtra.

5. *Asanada* sp.

1886. *Asanada* Meinert. *P. Amer. Phil. Soc.*, **23**.

2001. *Asanada* Khanna. *Ann. For.*, **9**(2) : 199–219.

Diagnostic characters : Antennae short composed of 17 segments, 6 glabrous. Tarsal spur absent on all legs, 2 claw spurs present on legs 1-20, absent on 21st pair. Anal leg claw serrate. Anal leg segment unspined, dorsally grooved, coxopleura without pores, processes and spines.

Material examined : 1 ex., Tulsi lake, 17-vi-2001, A.S. Mahabal.

Status : Uncommon.

Distribution : Throughout India.

Remarks : The specimen was damaged beyond its identification to species level.

Subfamily OTOSTIGMINAE

Tribe **Otostigmini**6. *Rhysida nuda* (Newport)

1845. *Branchiostoma nudum* Newport. *Trans. Linn. Soc.*, **19** : 412.

1984. *Rhysida nuda* Jangi & Dass. *J. Scient. Indl. Res.*, **43**(2) : 27–54.

2001. *Rhysida nuda* Khanna. *Ann. For.*, **9**(2) : 199–219.

Diagnostic characters : Tergites except anterior one with para median sutures and tergites preceding endtergite not marginate.

Material examined : 1 ex., Upavan Yeur, 1-i-1996, S.G. Patil; 1 ex., Hattigate Goregaon E. 20-vi-2001, A.S. Mahabal; 1 ex., Vasai & around, 19-vi-2001, A.S. Mahabal.

Status : Common.

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

Remarks : Damaged specimens.

7. *Rhysida nuda immarginata* (Porath)

1876. *Branchiostoma immarginatum* Porath. *Bih. Svenska Ak.*, 4(7) : 24.

2001. *Rhysida nuda immarginata* Khanna. *Ann. For.*, 9(2) : 199–219.

Diagnostic characters : 20th pair of walking legs without tarsal spur.

Material examined : 1 ex., near Upavan, Yeur, 1-i-1996, S.G. Patil; 1 ex., Tulsi lake, 3-xii-1995, S.G. Patil; 1 ex., Film city, Hattigate, 12-xii-2001, P.P. Kulkarni; 1 ex., between Kanheri phata and Borivalli, 29-xii-1995, S.G. Patil; 1 ex., Silondha, 13-x-1995, P.P. Kulkarni; 1 ex., on way to Tulsi lake, 28-xi-2000, D.B. Bastawade.

Distribution : India : Assam, Andaman and Nicobar Islands, Delhi, Gujarat, M.P., Maharashtra, Rajasthan, Uttaranchal, U.P. and West Bengal.

Status : Common.

8. *Digitipes* sp.

1930. *Digitipes* Attems. *Das Tier.*, *Scolopendromorpha*, 54(2) : 167–168.

2001. *Digitipes* Khanna. *Ann. For.*, 9(2) : 199–219.

Diagnostic characters : Femur of anal leg in male with a posteriomedial process, claw of 2nd maxilla without spur.

Material examined : 1 ex., Kanheri caves, 18-vi-2001, A.S. Mahabal.

Distribution : Ethiopian (Congo only) and Oriental (India only).

Status : Uncommon.

Remarks : Damaged specimen.

SUMMARY

The centipede fauna of Sanjay Gandhi National Park represents 8 species comprising 5 genera, 2 subfamilies and 3 tribes under the family Scolopendridae. The cave dwelling specimens were found darker in colour. Two genera *Scolopendra* and *Rhysida* are commonly occurring in this area. *Asanada sukhensis* Jangi & Dass is a new record from Maharashtra.

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ARACHNIDA : SCORPIONIDA and AMBLYPYGI

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INTRODUCTION

The faunal studies of class Arachnid of conservation areas in India are scarce and limited to certain orders of this class. The most studied order under this class is none other than the popularly known as Araneae *i.e.* Spiders. Remaining orders are generally neglected on account of their poisonous nature, rare occurrences, secretive nocturnal habits and the most important difficulties in collections. The scorpions being one of them are potently poisonous and dangerous due to their venomous bites, are being reported for the first time. The present studies are made on the basis of about 60 specimens belonging to 3 families, 4 genera and 5 species. The order Amblypygi has been represented by only 1 species on the basis of collection of 1 female specimen from this conservation area for the first time.

SYSTEMATIC LIST

Order SCORPIONIDA

Family BUTHIDAE

1. *Mesobuthus tamulus concanensis* Pocock
2. *Lychas (Endotrichus) kharpadi* Bastawade

Family SCORPIOPSIDAE

3. *Neoscorpiops tenuicauda* (Pocock)

Family SCORPIONIDAE

4. *Heterometrus (Chersonesometrus) phipsoni* (Pocock)
5. *Heterometrus (Heterometrus) keralensis* Tikader & Bastawade

Order AMBLYPYGI

Family PHRYNICHIDAE

6. *Phrynichus phipsoni* Pocock

SYSTEMATIC ACCOUNT

Order SCORPIONIDA

Family BUTHIDAE

Subfamily BUTHINAE

Genus *Mesobuthus* Vachon1. *Mesobuthus tamulus concanensis* Pocock1900. *Buthus tamulus concansis* Pocock. *Fauna Brit. India, Arachn.*, : 25.1983. *Mesobuthus tamulus indicus* : Tikader & Bastawade. *Faun. of India, Scorpions*, 3 : 188–194. (erroneous)*Common Name* : Yellow Scorpion. *Local Name* : Tambada Vinchu (Marathi), Chol (Karnataka), Bichhi (Bengali).

Diagnostic characters : Medium size body ranges from 65–75 mm in length, body color yellowish to reddish brown, blackish-green on tergites, entire body surface less granular, posterior median carinae on carapace forming lyre-form structure with central medians, median ocular tubercles smooth and black, provided with a pair of median eyes, situated anteriorly in the ratio 1 : 1.5, male slender with robust pedipalp manus, length of under hand more than half the length of carapace in male but as long as half in female, outer row of movable finger of pedipalp with fifteen teeth in male and fourteen teeth in female, trichobothrial pattern of A type with μ configuration on femora, pectines well developed with 34/35 teeth in male and 29/30 in female, last mesosomal sternite with two pairs of smooth carinae, inferior carinae on I, II and III caudal segments smooth, cauda almost five times as long as carapace, telson longer than V caudal segment but vesicle shorter and granular on ventral surface.

Habits and habitats : Normally found under medium to larger stones and boulders, occasionally under bricks and logs, common intruder of houses through coastal areas on Konkan stripe. Reports of bite deaths used to occur before Dr. Bhavalkar's useful treatment in recent years, which has brought death rate from 40 % to nil.

Material examined : 2 M, 1 M imm., 3ys, 2 F; *Coll. D.B. Bastawade*, Loc. : Base of Kanheri caves, Dt. 26.ix.2002, Reg. No. I/3324, Lion Gate, Dt. 25.ii.1997, Reg. No. I/2740, Near Tulsi Lake, Dt. 27.ii.1997, Reg. No. I/2739; *Coll. R. H. Kamble*, Loc. : Kanheri Caves and around, Dt. 19.viii.1995, Reg. No. I/2356.

Distribution : India : Sindhudurg, Ratnagiri, Raigad and Thane Dist., Maharashtra.

Genus *Lychus* C. Koch2. *Lychas (Alterotrichus) kharjadi* Bastawade1986. *Lychas (Alterotrichus) kharjadi* : Bastawade. *J. Bombay nat. Hist. Soc.*, 83(3) : 634–637.

1997. *Lychas kharpadi* : Kovarik. *Acta Soc. Zool. Bohem*, **61** : 311–371.

Common Name : Yellow scorpion. **Local Name** : Pivala Vinchu (Marathi), Chol (Kanada), Bichhi (Bangali).

Diagnostic characters : Small to medium body size, ranging from 35.00-40.00(%) and 40.00-45.00(&) mm in length, carapace with out carinae but entirely weakly and sparsely granular, ocular tubercles smooth, median tubercles with a pair of eyes, situated anteriorly in the ratio 1 : 2.25, five pairs of lateral eyes present of smooth lateral tubercles, inter ocular area black and more granular on anterior portion. Chelicerae small, with single minute tooth on ventral side of immovable finger. Pedipalps delicate, carinated and confuscated on femora and patellae, manus smooth, length of underhand half the length of femora, fingers as long as patella, trichobothridial pattern of A type with â configuration on femora, movable finger with 6 paired and 2 unpaired teeth in outer row. Pectines well developed and with 17/17 teeth in male and 18/18 in female. Mesosomal tergites sparsely granular and mono-carinated on tergites I–VI. Cauda almost five times as long as carapace, all segments carinated, segments I & II with eight carinae, segments III & IV with six carinae, lateral developed only on ½ posterior portion of III & IV segments, inter-carinal space sparsely granular, segment V as long as carapace, vesicle as long as II caudal segment with a small sub-aculear nodule provided with a pair of minute teeth.

Habits and habitats : Mostly arboreal in habit, usually found under barks of larger trees, prefers to be at 5-6 feet above the ground level, feeds on smaller insects roam on the tree trunks during night times.

Material examined : 1 M. Coll. D.B. Bastawade, On the way to BNHS information center, Vasai creek, Dt. 01.xii.2000, Reg. No. I/3123.

Distribution : India : Thane and Nasik Dists., Maharashtra.

Family SCORPIOPSIDAE

Genus *Neoscorpiops* Vachon

3. *Neoscorpiops tenuicauda* (Pocock)

1894. *Scorpiops montanus tenuicauda* Pocock. *Ann. Mag. Nat. Hist.*, **16**(6) : 77.

1899. *Scorpiops montanus tenuicauda* Kraepelin. *Tierr. Scorp. Etc.*, : 181.

1900. *Scorpiops montanus tenuicauda* Pocock. *Fauna Brit. India, Arachn.*, : 72

1980. *Scorpiops* (*Neoscorpiops*) *tenuicauda* Vachon. *Bull. Mus. natn. Hist. Nat., Paris*, 4e ser., 2 Sect., A, (1) : 143.

1983. *Scorpiops* (*Neoscorpiops*) *tenuicauda* Tikader & Bastawade. *Fauna of India, Scorpions*, **3** : 396-403.

1998. *Neoscorpiops tenuicauda* Bastawade. *J. Bombay nat. Hist. Soc.*, **94**(1) : 104–114.

Common name : Scorpions.

Local name : Vinchu (Marathi), Bichhu (Hindi).

Diagnostic characters : Body 42–52 mm in length, brownish black but more darker on metasoma and pedipalps, legs paler than body colour, telson clear yellow but darker on aculeus, ventral side of body yellowish, carapace finely and irregularly granular, a pair of median eyes situated in the ratio 1 : 2.25–2.5 three contiguously placed lateral eyes, anterior margin deeply incised medially. Cheliceral movable finger armed with 5–6 minute teeth on inner margin. Pedipalp digits dorso-ventrally flat, carinated, inner surface of patella with a pair of tuberculate spines at the base, dentition on fingers double dentate and scalloped at the base, more prominent in males; trichobothrial pattern 'C' type and typical as in the genus *Neoscorpiops* with more than 5 *est* and 13–14 *V* on patella. Legs normal with spine formula 5/5, 5/5, 6/6, 6/6 in male and 5/5, 5/5, 4/6, 5/6 in female. Cephalothoracic sternum pentagonal and pectinal teeth 7/7 in numbers. Mesosomal tergites III–VI each with a median smooth carina and weakly granular on lateral portion, all sternites smooth. Metasomal segments carinated and dorsal carinae elevated on posterior end and spiniform on III & IV segments, telson longer than V segment, and aculeus 1/3rd of vesicular length.

Habits and habitats : These are the rupicolous scorpions prefer to inhabit through the thinner crevices of hard to soft rocks and the out crops by road cuttings, rarely seen in the root clusters of Bamboo plants and in rainy season often seen under barks of larger tree in the Park area. These scorpion need more humid habitats than those of Buthid scorpions. Very rarely these have been found under stone, bricks and logs unless the habitat remains fully covered under dense forest. These feed on smaller to medium sized insects, scolopendra and some times scutigera and ground dwelling spiders. They normally breed and parturate about 15–20 young ones.

Material examined : 6 M, 2 F, *Coll.* D.B. Bastawade, *Loc.* : Kanheri caves and around, Dts. 26.ii.1997, 30.xi.2000, *Reg.* Nos. I/2727, I/3120 and *Loc.* : Gomukh Road and around, Dt. 02.xii.2000, *Reg.* No. I/3118.

Distribution : India : Raigad, Mumbai and Thane Dists., Maharashtra.

Family SCORPIONIDAE

Genus *Heterometrus* Hemprich & Ehrenberg

4. *Heterometrus (Chersonesometrus) phipsoni* (Pocock)

1893. *Scorpio phipsoni* Pocock. *J. Bombay nat. Hist. Soc.*, 7 : 370.

1900. *Palamnaeus phipsoni* Pocock. *Fauna Brit. India, Arachn.*, : 94.

1983. *Heterometrus (Chersonesometrus) phipsoni* Tikader & Bastawade. *Fauna of India, Scorpions*, 3 : 646-651.

Common Name : Black Scorpion. *Local Name* : Ingali (Marathi), Kakada Bichhi (Bengali).

Diagnostic characters : Large body size ranges from 95.00 to 110 mm in length, entirely black except dark brown on chelicerae, legs and telson; carapace weakly granular on lateral portions, median ocular tubercles smooth with a median suture, provided with a pair of median eyes situated anteriorly in the ratio 1 : 1.1; pedipalps stout, elongated, expanded on manus but manus narrowed distally, femora and patellae longer than carapace and carinated, manus shorter than femora but slightly longer than carapace, trichobothrial pattern C type with 3 ventrals on lpatella eggs smooth, spine formulae on legs I–IV : 5/7 5/7, 5/7 5/7, 5/75/7 & 5/7 5/7.; pectines well developed and with 15/15 teeth; Mesosomal tergites I–VI smooth, with out carina; cauda slightly more than three and a half times as long as carapace, segment V more than twice longer than wide, segments I–IV with crenulated dorsal, dorso-lateral carinae, inferior carinae smooth, inferior lateral and inferior median carinae serrated, telson longer than segment V but shorter than carapace, vesicle longer than segment IV but less as wide and deep as segment V, aculeus less bent and slightly more than half the length of vesicle.

Habits and habitats : Common species found in hill sides of Western Ghat areas of Maharashtra. Inhabits in the self-made tunnels/burrows mostly in support of firmly fixed stone or boulders. Tunnels are generally prepared on the slopes and at an angle of 30–45° to avoid inlet of water into the tunnel. Tunnels are 10–12' deep from the ground level and the support of stone keeps it cooler by 1–2° below the atmospheric temperature. The end of the tunnel seems to be expanded to form a 'living chamber' and lined with a finely granular loamy soil. Many a times it is observed that individuals of more than one generations stay in a same tunnel with mother, indicating parental care and social behavior. They feed around the tunnel up to 10 mts. diameter, mostly feed on smaller invertebrates and occasionally on smaller mammals. At two of the excavated burrows of this species, yielded one specimen each of a tiny frog belonging to the genus *Ramanella*, which were seen seating beneath the mesosoma of this scorpion. However such association in the burrow was confusing. The proper identification of frog species is awaited.

Material examined : 21 M, 11 F, 15 ys; *Coll. D.B. Bastawade*, Loc. : Gandhi Hills and around, Dt. 28.ii.1997, Reg. No. I/2738, Kanheri caves and around, Dt. 30.xi.2002, Reg. No. I/3120, Dt. 26.xi.2002, Reg. No. I/3324, Forest Nursery to Hattigate, Dt. 25.xi.2002, Reg. No. I/3325, Information Center, Vasai creek, Dt. 01.xii.2000, Reg. No. I/3123, Gomukha Road, Reg. No. I/3118; *Coll. P.D. Rane*, Loc. : Kanheri caves and around, Dt. 19.viii.1995, Reg. No. I/2356.

Distribution : India : Kolhapur, Sangli, Satara, Pune, Ahmednagar, Raigad, Thane, Nasik and Dhule Dists., Maharashtra.

5. *Heterometrus (Heterometrus) keralensis* Tikader & Bastawade

1983. *Heterometrus (Heterometrus) keralensis* Tikader & Bastawade. *Fauna of India, Scorpions*, 3 : 528–533.

Common Name : Black Scorpion. **Local Name :** Ingali (Marathi), Kakada Bichi (Bangali).

Diagnostic characters : Large body, ranging 105–115 mm in length, almost entirely black in colour, except reddish brown on manus and yellowish brown on telson; weakly granular on lateral portions of carapace and tergites, ocular tubercles smooth, median eyes situated anteriorly in the ratio 1 : 1.25. Chelicerae normal with normal dentition. Pedipalps exceptionally long, slender and narrow on manus and carinated only on femur, femur longer than carapace, strongly carinated, carinae with denticulate granules, patellae shorter than femur but longer than carapace, anterior or inner surface weakly elevated and armed with few denticulate granules on proximal portion, manus exceptionally elongated, narrow and length of underhand shorter than femur or patellae but longer than carapace, carinated but only exterior carinae distinct and smooth, fingers also slender and long, movable fingers as long as femur, trichobothrial pattern of C type with 3 ventrals. Legs I–IV granular on femur and patella, spine formula 4/5 4/5, 4/6 4/5, 4/6 4/6 and 4/6 4/6. Pectines well developed, 2nd $\frac{1}{2}$ times longer than wide, pectinal teeth 13/13 in number. Mesomal tergites I–VI weakly granular on lateral portions and without carinae, sternite VII entirely smooth; cauda slightly longer than 3 and $\frac{1}{2}$ times as long as carapace, segments I–III carinated, dorsal, dorso-lateral carinae granular but inferior lateral and inferiors smooth, segment IV dorsal carinae distinct and serrated, dorso-laterals granular, inferior laterals and inferiors weakly granular and obsolete, segment V shorter than carapace, inferior laterals and a inferior median sparsely serrated; telson shorter than carapace but longer than patella, vesicle longer than segment IV, aculeus more than half the vesicular length and sharply pointed.

Habits and habitat : Almost same to *Heterometrus (Chersonesometrus) phipsoni* (Pocock). It appears that these two species share the same habitat and show most of the habit same including the feeding habits.

Material examined : 3 M, 5 F, 1% imm., 3 ygs. *Coll. D. B. Bastawade*, Loc. : Hattigate Nr. Film city, Dt. 29.xi.2000, Reg. No. I/3121, 8 Kms. Of Sasupada, Nr. BNHS, Information center, Vasai creek, Dt. 01.xii.2000, Reg. No. I/3123, Tulsi lake and around, Dt. 28.xi.2000, Reg. No. I/3119; *Coll. M.S. Pradhan*, Loc. : SGNP, Thane Area, Dt. 14.iii.1984, Reg. No. I/233.

Distribution : India : Meenamutty, New Amaranbalan Reserve Forest (Type Locality) Kerala and Ratnagiri, Mumbai and Thane Dists., Maharashtra.

Order AMBLYPYGI

Family PHRYNICHIDAE

Genus *Phrynichus* Pocock

6. *Phrynichus phipsoni* Pocock

1900. *Phrynichus phipsoni* Pocock. *Fauna Brit. India, Arachn.*, : 127.

1986. *Phrynichus phipsoni* : Bastawade. *J. Bombay nat. Hist. Soc.*, 92(1) : 132–135.

Common Name : Whip spider.

Local Name : Kashamakadi (Hindi).

Diagnostic characters : Total length of body ranges from 20–25 mm, prominent with pseudo-pedipalp and antenniform 1st pair of legs; cephalothorax truncate on anterior margin, median posterior portion slightly raised and centrally deepened into an elongated notch, entire surface almost entirely smooth or very rarely poorly granular with regular darker radiating stripes, a pair of median eyes on median smooth tubercle placed anterior sub-marginally, a pair of lateral ocular tubercles situated on anterior-lateral corner and each provided with 3 lateral eyes, smaller than median eyes; chelicera primitive, two segment, semichelate, movable finger vertically operative, basal segment compressed laterally, clothed with a fringe short delicate bristles, clustered with many short, group of blunt to sharp teeth on ventral distal portion and a single ventral large tooth, movable finger $\frac{3}{4}$ of the basal segment, sharply pointed distally and armed with 4-5 minute sharp teeth on inner margin; pedipalp prehensile, subchelate, moving in horizontal plane and of six segments, femur twice as long as carapace, slender, armed with many spiniform tubercles on exterior surface, tibia almost as long as femur, ending distally in to two apical spines, tow subapical spines, one as long as apical spine and the other small, anteriorly curved in between the apical and subapical, hand $\frac{1}{3}$ rd of femur or tibia but slightly less than half the carapacial length, armed with two strong spines, one on each lateral surface, finger clawed, spined strongly, sharply pointed, always longer than any of the spines on tibia or hand, the proximal inner margin provided with a fringe of delicate and short bristles at the base; Legs I–IV, 1st pair antenniform whip like long, modified, femur almost 3 times as long as carapace, tibia of 29–30 small segments, tarsi of 24-24 segments ending distally into an elongated bulbous segment, provided apically with a delicate spine, legs II–IV shorter and each provided with pulvilli, shrunk to a dark membranous structure; abdomen oval, superficially segmented into 12 dorsal tergites and 11 ventral sternites, all entirely smooth, last 1 or 2 tergites form a flap on anal aperture.

Habits and habitats : Mainly encountered during wet season in July to October, mostly nocturnal in habits, prevalently hides under larger boulders and deep narrow crevices along the road side cuttings, mostly solitary but occasionally in groups of 5–10 individuals, feeds on smaller invertebrates and smaller vertebrates, rarely noticed scavenging on dead bodies of reptiles and mammals (Reported from Goa, personal communication, unpublished data).

Material examined : 1 M, 1 exuvia; *Coll. D.B. Bastawade*, Loc. : On the way to Tulsi lake, Forest Nursery and around, Dt. 24.ix.2002, Reg. No. I/3314.

Distribution : India : Mumbai, Thane, Kolhapur and Sindhudurg Dists., Maharashtra; Kerala; Goa.

SUMMARY

This communication deals with the report of 5 species of Scorpion fauna belonging to 3 families and 4 genera. The Scorpionid family Scorpionidae has been authentically reported for the first time from near by places of Mumbai metropolitan city. The previous report of this family near to Mumbai was Matheran, in Raigad district. The scorpion species *Lychas* (*Alterotrichus*) *kharpadi* Bastawade has also been reported first time other than its Type locality Kharpadi, District Nasik, Maharashtra. The order Ambypagi has been reported by the only species *Prynichus phipsoni* Pocock.

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ARACHNIDA : ARANEAE (SPIDERS)

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INTRODUCTION

So far there are no reports on Araneae fauna of Sanjay Gandhi National Park, Borivali, Dist. Mumbai and Thane, Maharashtra. The present inventories and the systematic reports are being made to the fauna belonging to Arachnid order Araneae (Spiders). About 225 specimens of order Araneae (Spiders) were studied for their identification and other details. Eventhough the Spider fauna of India has extensively worked out by Pocock (1900), Tikader (1963–1995), Malhotra (1982), Gajbe (1976–2005) Sharma *et al.* (2001) and Bastawade (2002). So far, spider fauna of Sanjay Gandhi National Park is concerned, the published information is indeed scanty. Present studies report 61 species of Araneae (Spiders) belonging to 18 Families. These studies also include the additional collections and photographic observations made by Dharmendra Khandal, NGO, Mumbai (now at Ranthambore Wildlife Sanctuary, Rajasthan). There are some species of Spiders, which have been identified up to family and generic taxa, due to the lack of literature and keys for identifications, also being reported here to note their existence in the reserve area of Sanjay Gandhi National Park, Borivali, Mumbai, Maharashtra.

SYSTEMATIC LIST

Order ARANEAE

Family THERAPHOSIDAE

1. *Chylobrachys fimbriatus* Pocock
2. *Chylobrachys nitelinus* Karsch
3. *Plesiophriectus millardi* Pocock
4. *Poecilotheria regalis* Pocock

Family CTENIDAE

5. *Ctenus indicus* Gravely

*Ranthambore Wildlife Sanctuary, Rajasthan

Family CORINNIDAE

6. *Amaurobius indicus* Bastawade (Transferred from Family : Amourbiidae, Pl. see remarks)

Family ERESIDAE

7. *Stegodyphus sarasinorum* Karsch

8. *Stegodyphus mirandus* Pocock

Family HERSILIDAE

9. *Hersilia savignyi* Lucas

Family PHOLCIDAE

10. *Artema atlanta* (Walck)

11. *Pholcus phalangioides* Fuesslis

Family SALTICIDAE

12. *Telamonia elegans* (Thorell)

13. *Plexippus paykullii* (Savigny & Audoin)

Family THOMISIDAE

14. *Camaricus bipunctatus* Bastawade

15. *Thomisus pooneus* Tikader

16. *Mismenops khandalensis* Tikader

17. *Mismenops kumaoensis* Tikader

18. *Tmarus kotigeharns* Tikader

Family PHILODROMIDAE

19. *Tibellus poonensis* Tikader

20. *Dieta elongata* Tikader

Family OXYOPIDAE

21. *Peucetia viridana* (Stoliczka)

Family PISAURIDAE

22. *Pisaura gitae* Tikader

Family TETRAGNATHIDAE

23. *Tetragnatha mandibulata* (Fabr.)

Family ARANEIDAE

24. *Herennia ornatissima* (Doleschall)

25. *Nephila maculata* (Fabr.)

26. *Nephila malabarensis* (Walckenaer)

27. *Argiope pulchela* Thorell
28. *Argiope aemula* (Walckenaer)
29. *Ordgarius hobsoni* (O. P. Cambridge)
30. *Cyrtarachne raniceps* Pocock
31. *Cyrtarachne biswamoyi* Tikader
32. *Araneus mitifica* (Simon)
33. *Araneus bilunifer* Pocock
34. *Neoscona poonensis* Tikader & Bal
35. *Neoscona elliptica* Tikader & Bal
36. *Neoscona mukerjei* Tikader
37. *Neoscona lugubris* (Walckenaer)
38. *Neoscona laglaizei* (Simon)
39. *Neoscona theis* (Walckenaer)
40. *Leucauge festigata* (Simon)
41. *Leucauge decorata* (Blackwall)
42. *Leucauge dorsotuberculata* Tikader
43. *Leucauge tessellata* (Thorell)
44. *Gastracantha hesaliti* C. L. Koch
45. *Gastracantha remifera* Butler
46. *Gastracantha geminata* (Fabr.)
47. *Gastracantha mammosa* C. L. Koch
48. *Cyrtophora cicatrosa* (Stoliczka)
49. *Cyrtophora citricola* (Foskal)
50. *Parawixia dahaanii* (Doleschall)
51. *Poltys godrejii* sp. n.
52. *Poltys rehmanii* sp. n.

Family LYCOSIDAE

53. *Hippasa lycosina* Pocock
54. *Pardosa birmanica* Simon
55. *Pardosa sumatrana* (Thorell)
56. *Lycosa phipsoni* Pocock

Family CLUBIONIDAE

57. *Cheracanthium daneli* Tikader
58. *Cheracanthium inornatum* Cambridge

Family GNAPHOSIDAE

59. *Gnaphosa harpax* O. P. Cambridge

Family TETRABBLEMIDAE

60. *Tetrablemma deccanensis* Tikader

Family OONOPIDAE

61. *Triaeris poonaensis* Tikader & Malhotra

SYSTEMATIC ACCOUNT

Order ARANEAE

Family THERAPHOSIDAE

Genus *Chilobrachys* Karsch1. *Chilobrachys fimbriatus* Pocock1899. *Chilobrachys fimbriatus* Pocock. *J. Bombay nat. Hist. Soc.*, 12 : 746.1985. *Chilobrachys fimbriatus* : Raven. *Megalomorphae*, : 118.2000. *Chilobrachys fimbriatus* : Smith. *A field guide for Theraphosid spiders of India and Sri Lanka, particularly the genus Poecilotheria*, (Unpublished data).*Common name* : Ornamental/Cat-legged spiders. *Local name* : Koli (Marathi), Makadi (Hindi).*Diagnostic characters* : Large colourful spider, blackish with yellowish hair intermixed with reddish bristles on abdomen and legs, abdomen marked with narrow dark stripes above and dark blackish below; body length 30–45 mm, carapace longer than wide, wider on anterior portion and narrowed on posterior, eyes grouped on anterior median portion, ocular quad longer than wide, chelicerae robust, each with long and strong fang, basal segment with a stridulating organ on outer surface, 3-6 rows of mixed modified setae at basal corner, lower line of tapering medium to long straight setae, mixed with majority of short thorny setae plus prolateral surface of maxillae with 2-3 lines of horizontal bacilliform setae, outer larger setae paddle shaped; abdomen narrowed posteriorly with elongated spinnerets, epigynum much chitinised with twin seminal receptacle spermathecae; male palpal bulb embolus long and stout and tapering with tegular keel.*Habits and habitats* : Species found in forests, live in self made burrows, some times hide in larger crevices of forest lands, feed on larger insects and smaller reptiles and mammals, no authentic informations available.*Material examined* : 2 M, 1 F y; *Coll.* D.B. Bastawade, Loc. On the way to Tulsi Lake and Forest nursery, Dt. 28.i.2000, Reg. No. I/3116; On top of the Kanheri caves and around, Dt. 15.xii.2001, Reg. I/3228.

Distribution : India : Keral, Karnatak, Tamil Nadu, Andhra Pradesh, and Maharashtra.

2. *Chilobrachys nitelinus* Karsch

1892. *Chilobrachys nitelinus* Karsch. *Berl. Ent. Zeits.*, 36 : 270.

2000. *Chilobrachys fimbriatus* : Smith. *A field guide for Theraphosid spiders of India and Sri Lanka, particularly the genus Poecilotheria*, (Unpublished data).

Common name : Cat-legged spiders. **Local name** : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body size ranges from 22 to 30 mm, carapace longer than wide, abdomen elliptical and more narrowed anteriorly, deep brown in colour, covered with yellowish brown hair, stridulating organ on the outer face of chelicerae with 3/6 rows of modified mixed setae at the basal corner and the lower line of tapering, stout median to long straight setae, remaining short and thorny, prolateral surface of maxillae with 2/3 rows of horizontal baciliform flat setae and outer being paddle form; spermathecae with twin seminal receptacles, usually rounded at tip; male palpal bulb embolus stout, long, pointed with inferior tegular keel.

Habits and habitats : Found in forested area through moist litter, when disturbed runs fast for shelter in soil crevices, feeding of smaller to medium sized arthropods inhabiting the litter. Not seen to prepare typical burrows of theraphosids.

Material examined : 2 M, Coll. D.B. Bastawade, Loc. : Kanheri Caves, Dt. 23.ii.1997, Reg. No. I/2743.

Distribution : Wide spread in southern India, collected from Park area.

Genus *Plesiophrictus* Pocock

3. *Plesiophrictus millardi* Pocock

1899. *Plesiophrictus millardi* Pocock. *J. Bombay nat. Hist. Soc.*, 7 : 49.

2000. *Chilobrachys fimbriatus* : Smith. *A field guide for Theraphosid spiders of India and Sri Lanka, particularly the genus Poecilotheria*, (Unpublished data).

Common name : Cat-legged spiders. **Local name** : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Uniform greyish brown except whitish on I protarsi, body 12–15 mm in length, carapace longer than wide, slightly narrowed anteriorly, stridulating organ between chelicerae and maxillae absent, I tarsal scopulae divided and II, III and IV divided by a line of stout setae, all legs heavily spined, female genitalia with two seminal receptacles, male cymbium (tibia) with sigmoid depression, papal bulb with stout tapering embolus with twisted tegular keel, tibiae with 1 or 2 spurs, slightly curved, directed forwards, tuberculate spur accompanied with long black stout spine on inner side and many short spinules present between two.

Habits and habitats : Found in forested area through moist litter, when disturbed runs fast for shelter in soil crevices, feeding of smaller to medium sized arthropods inhabiting the litter. Not seen to prepare typical burrows of theraphosids.

Material examined : 1 M, 2 F, On the way to Hattigate, near tulsi lake area and reported by Mr. Khandal.

Distribution : Matheran, Uran Dist. Raigad; Borivali, Dist. Thane, Hinjawade, Dist. Pune Maharashtra. This species is wide spread in southern India (Smith and Kirk, unpublished data).

Genus *Poecilotheria* Pocock

4. *Poecilotheria regalis* Pocock

1899. *Poecilotheria regalis* Pocock. *Ann. Mus. Nat. Hist.*, 3(7) : 89.

2000. *Chilobrachys fimbriatus* : Smith. *A field guide for Theraphosid spiders of India and Sri Lanka, particularly the genus Poecilotheria*, (Unpublished data).

Common name : Ornamental/Cat-legged spiders. **Local name :** Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Large, beautiful spider, body measuring 45–55 mm in length, dorsum greyish, carapace marked in middle with a pair of longitudinal dark stripes, abdomen with a broad whitish, marginally sinuous band, edged with black, stripes pass laterally on sides, ventrum deep chocolate brown to black with broad transverse reddish-pinkish-yellow band behind the epigastric fold; upper sides of legs and palpi variegated with greyish black, femora black, patellae and tibiae whitish below, lower sides of femora, patellae and tibiae of 1st and 2nd legs bright sulphur yellow, 3rd and 4th legs typically coloured with black and greyish bands; carapace almost equal to patella and tibia of 2nd leg, femora of palp and first 2 legs thickly fringed externally and internally at distal ends. Female genitalia simple with dome shaped single spermathecae. Male slightly smaller than female and much more uniformly coloured above.

Habits and habitats : The habits and habitats of this ornamental spider species are peculiar. All *Poecilotheria* species are arboreal in habits. They prefer to live in small burrows or cavities of large and tall trees. *P. regalis* was observed specifically to select narrow cavities on tall Teak trunks. They are nocturnal and easily be seen on tree trunks feeding during nights. They are common intruders of human settlements in forested area during night either for feeding or in the search of mate. They usually feed on Frogs, Geckoes and rarely on smaller snakes and birds. Female lays eggs in large cocoon and guards the same until young hatch out. This species, including some other Indian Mygalomorphs, can easily be bred in captivity. Due to their simple diatory habits many prefer to keep them as pet animals, they live in cages for long time.

Material examined : 1 M reported from Park area by Mr. Dharmendra Khandal.

Distribution : India : Kerala, Tamil Nadu, Andhra Pradesh and Maharashtra.

Family CTENIDAE

Genus *Ctenus* Walckenaer

5. *Ctenus indicus* Gravely

1931. *Ctenus indicus* Gravely. *Rec. Indian Mus.*, 33(3) : 234.

1981. *Ctenus indicus* Tikader and Malhotra. *Rec. zool. Surv. India*, 79 : 105-124.

Common name : Trap door spiders. **Local name** : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 15–20 mm in length, carapace and legs reddish brown but abdomen greyish brown; cephalothorax longer than wide, both rows of eyes recurved but posterior much more recurved than anterior and posterior medians larger than others; sternum heart shaped and reddish brown; chelicerae chocolate brown, strong and retromargin of fang furrow with 4 teeth; legs long, robust, strong, tibiae III and IV with 3 pairs of ventral spines; abdomen oval greyish brown, dorsum with 2 pairs of sagillae, anterior mid-longitudinal area pale, ventrum dark brown and two rows of paired white spots extending from epigastric furrow to the base of spinnerets, rows narrowing on posterior portion, and irregular white spots present on sides, epigynum with broad central plate and a pair of globular structures on lateral sides of the median plate, internal genitalia with a pair of inverted Y shaped pouched spermathecae with a pair of small circular spots on inner arm of spermathecae darker on lateral portion and continued with minute duct anteriorly.

Habits and habitats : Not known.

Material examined : 1 M, Coll. D.B. Bastawade, Loc. : On the way to Tulsi Lake and around, Dt.24.ix.2002, Reg. No. 1/3320.

Distribution : India : Kerala, Tamil Nadu and Maharashtra.

Family CORINNIDAE

Genus *Amaurobius* C.L. Koch

6. *Amaurobius indicus* Bastawade

2002. *Amaurobius indicus* Bastawade. *J. Bombay nat. Hist. Soc.*, 99(2) : 274–281.

Common name : Spider. **Local name** : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body colour dark blackish brown to yellowish brown, ventral portion lighter; body ranges from 7.00–9.00 mm in length; cephalothorax longer than wide, entire surface rough with fine granulation and without hair, clypeus high, eight eyes placed

in two rows, laterals smaller and close to each other, anterior medians larger than others, ocular quad almost as long as wide; chelicerae robust, bulging anteriorly on basal segment, fang furrow not deep and armed with three teeth on promargin and 8–9 teeth on retromargin, fang long, bent on middle portion and acutely pointed; palp simple and much elongated and modified in male; legs comparatively thin, long, smooth and shining, armed ventrally with 9-9, 8-8, 3-2 and 3-2 spines respectively, leg formula 1432; abdomen longer than wide, dorsum covered with smooth scutum and a weak chitinous collar present on 1/3rd anterior portion, female epigynum with a pair of clear dark spots and internal genitalia with dark dumbbell shaped sacs.

Habits and habitats : Inhabitant of wet litter in forested area and very swift in walk and escapes quickly while collecting. Most of the biological aspects not known.

Material examined : 2 M, Coll. D.B. Bastawade, Loc. On the way to Tulsi lake to Nursery, Dt. 24.ix.2002, Reg. No. 3320.

Distribution : India : Raigad, Thane, Kolhapur and Sindhudurg Dists., Maharashtra.

Remarks : According to the Platnick's Catalogues of World spiders 2005, this species has been transferred to Family : Corinnidae and the species name *indicus* is preoccupied, unless the change is properly published, the present name *Amaurobius indicus* is maintained.

Family ERESIDAE

Genus *Stegodyphus* Simon

7. *Stegodyphus sarasinorum* Karsch

1892. *Stegodyphus sarasinorum* Karsch. Berl. ent. Zeits., 36 : 275.

1987. *Stegodyphus sarasinorum* : Tikader. Handbook of Indian Spiders, : 150–151.

Common name : Social spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic Characters : Medium sized spiders, about 10–12 mm in length, cephalothorax longer than wide, truncated on anterior margin, four median eyes forming quadrangle, narrowed in front, posterior laterals far behind, legs short and strong, abdomen oval, spinnerets with exceptionally large cribellum, they spin labyrinthine tube ending blindly at one end and the other expands in to a broad sheet of web.

Habits and habitats : These are social spiders and gregarious in their habits, they feed on captive alive and all members of a colony share the prey. They are most active in pre and post monsoon and hibernate in the web-tubes in winter. Their webs are too sticky and compactly spun to escape the prey once entangled in the web.

Material examined : 3 F, 2 F Imm., Coll. D.B. Bastawade, Loc. Kanheri Phata, Dt. 29.ii.1995, Reg. No. 1/, Coll. S. G. Patil, Loc. : Between Kanheri Phata to Borivali Park, Dt. 29.xii.1995. Reg. No. 1/2450.

Distribution : Widely distributed in India : Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Goa and Maharashtra.

8. *Stegodyphus mirandus* Pocock

1899. *Stegodyphus mirandus* Pocock. *J. Bombay nat. Hist. Soc.*, **12** : 750.

1987. *Stegodyphus mirandus* : Tikader. *Handbook of Indian spiders*, : 150–151.

Common name : Social spiders. **Local name** : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Male body size 18–22 mm long, robust body, legs short and stout, body colour uniformly greyish black, except bright yellowish red on tibiae, tarsi and metatarsi of legs II–IV; cephalothorax longer than wide, cephalic region raised, eyes placed in two rows, anterior row slightly procurved where as posterior row recurved, lateral eyes placed away from medians, ocular quad almost quarrish. Female larger than male, 25–30 mm long, abdomen bronze-black above and rich golden red on sides, spinnerets black with large cribellum.

Habits and habitats : Social spiders, 10 to 100 individuals leave in a common nest of thickly woven bunch of sticky threads, bundled along with few to many leaves and twigs of various trees, the nest is channeled with many irregular passages through which the individuals move and keep in contact with each other. The main nest is supported time to time with sparsely spread out sheet of web for getting increased chances of prey. Such nest are preferably prepared at the height of 5–10' above the ground level. The mature and gravid females leave the parent nest for proliferation and prepare new nests close or near to the parent nest. There seems to be no division of labor or any ratio maintained for males and females (Bradoo 1969).

Material examined : 2 F, This species has been noted, observed and photographed by Mr. Dharmendra Khandal.

Distribution : India : Thane, Raigad and Pune Dists., Maharashtra.

Family HERSILIDAE

Genus *Hersilia* Audouin

9. *Hersilia savignyi* Lucas

1836. *Hersilia savignyi* Lucas. *Mag. Zool. 6e annee*, **60**(8) : 10.

1869. *Hersilia calcuttensis* (?) : Stoliczka. *Jr. Asiatic Soc. Bengal*, **38** : 216.

1900. *Hersilia savignyi* : Pocock. *Fauna Brit. India, Arachn.*, : 241.

Common name : Hunting spiders. **Local name** : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body ranges from 8–12 mm in length, female larger than male, colour pale to dark black with darker spots and transverse band on abdomen, palps and legs banded, carapace narrowed anteriorly, ocular quad placed on anterior median tubercle with larger lateral eyes, abdomen elliptical with lateral pair of spinnerets very long, female genitalia bilobed and lobes separated by deep emargination; male palp with a distinct sigmoid curvature and patella produced into a prominent conical hairy structure above.

Habits and habitats : Normally solitary, seen moving on large tree trunks, very fast moving, camouflaging with trunk color, rarely seen to produce smaller and irregular snare, feeds on variety of smaller insects inhabiting the tree trunks.

Material examined : 4 M, 1 F; *Coll. D.B. Bastawade*, Loc. On the way to Tulsi Lake and Forest nursery, on tree trunk, Dt. 28.i.2000, Reg. No. I/3116.

Distribution : Through out Indian subcontinent.

Family PHOLCIDAE

Genus *Artema* Walckenaer

10. *Artema atlanta* (Walckenaer)

1837. *Artema atlanta* Walckenaer. *Ins. Apt.*, 1 : 656.

1987. *Artema atlanta* : Tikader. *Handbook of Indian Spiders* : 170.

Common name : Short bodied cellar spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body short, about 8–10 mm long, abdomen very high, globular, more than as wide, sternum posteriorly acuminate, chelicerae with two minute teeth, body colour yellowish brown, carapace with median brown patch and clypeus striped brown, legs yellow with brown on patellae, brown rings on femora and tibiae, abdomen greyish yellow, 3 rows of dusty gray spots, genitalia of brown, thickly horny plate and concave on posterior margin. Male and female alike, except thick on palps and chelicerae with large serrated crest externally.

Habits and habitats : Almost similar to *Crossopriza lyoni* (Blackwall).

Material examined : 1 M, *Coll. D.B. Bastawade*, Loc. Kanheri caves and around, Dt. 30.xi.2000, Reg. No. I/3115.

Distribution : India : Kerala, Andhra Pradesh, Maharashtra and Uttar Pradesh.

Elsewhere : Pakistan : Karachi. Myanmar.

Genus *Pholcus* Walckenaer11. *Pholcus phalangioides* (Fusselin)

1775. *Pholcus phalangioides* Fuesslin. *nebst der Ankdg. Ein. Neu. Inst. Werk.*, : 9

1987. *Pholcus phalangioides* Tikader. *Handbook of Indian Spiders*, : 170–171.

Common name : Long bodied cellar spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body elongated, thin delicate and about 8-12 mm in length, greyish green in colour, abdomen smooth, shining, narrow and elongated, legs very long and thin, delicate as compared to body, these spiders prepare smaller, irregular snares and remain at the center in an inverted position and female typically carries the egg sac in its chelicerae. Their webs are used by gallmidges as resting places.

Habits and habitats : Occupies dark corners of remote vacant houses and buildings, hallow tree trunks, medium to smaller size pits through the side cuttings of rocks and out crops, prepares smaller snares, can easily be pointed out by the presence of numerous tiny whitish gall midges, resting on their web threads (Sharma and Bastawade 2002). Spider usually occupies the center of the snare, vigorously vibrates if disturbed, otherwise difficult to notice the occupant.

Material examined : 7 M, 2 F, *Coll. D.B. Bastawade*, Loc. Kanheri caves and around, Dt. 30.xi.2000, Reg. No. I/3115; Loc. On the way to Tulsi Lake, Dt. 28.xi.2000, Reg. No. I/3116.

Distribution : Almost through out Indian sub-continent.

Elsewhere : Sri Lanka, Myanmar, Bangla Desh and Pakistan.

Family SALTICIDAE

Genus *Telamonia* Thorell12. *Telamonia elegans* (Thorell)

1887. *Viciria elegans* Thorell. *Anns. Mus. civ. Stor. Nat. Geniva*, 25 : 5–417.

1985. *Telamonia elegans* Zabka. *Anns. Zool. Warsz.*, 39 : 197–485.

Common name : Jumping spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 4–6 mm in length (appr.), colour whitish with brownish spots on ocular area of cephalothorax and a pair of narrow sub-median brown bands running from sub-anterior portion to end of abdomen converging on rear portion and almost joining just next to spinnerets, legs whitish and almost look transparent. Cephalothorax longer than wide, with broad cephalic region, ocular quad slightly longer than wide, and

flat on dorsal portion, anterior medians largest. Abdomen longer than wide, narrowed posteriorly, ventrum almost whitish with dark epigynum, genitalia with a pair of bean shaped chitinous plates narrowing posteriorly and provided with T shaped median depression, internal genitalia with a pair of roundish spermathecae from under which an inverted comma like projection present, each spermathecae provided with coiled structure. Male palp with short and stout tibial apophysis, cymbium with a coiled, tubular and pointed paracymbium, and also with bunch of setae on ventral inner margin. (These characters drawn from Illustrations and photograph of *Telamonia elegans* (Thorell) from Proszynski).

Habits and habitats : Mostly seen moving through the broad leaf bushes and trees, characteristically moving its palps during movements and jumping from leaf to leaf and branches, rarely seen on grounds. Preys on smaller insects by catching the prey in direct attack.

Material examined : 3 M, Coll. Dharmendra Khandal, Loc. : SGNP area, Dt. Feb – March 2001 and 2002, Reg. No. nil.

Distribution : India : SGNP, Maharashtra.

Elsewhere : Myanmar, Vietnam and Indonesia.

Genus *Plexippus* C. L. Koch

13. *Plexippus paykulli* (Savigny & Audoin)

1825. *Attus paykullii* Savigny & Audoin. *Deser, Egypte, 2nd Ed.*, 22 : 172.

1940. *Plexippus paykullii* : Comstock. *The Spider Book*, New York, : 701.

1974. *Marpissa mandali* : Tikader. *Proc. Indian Acad. Sci.*, 79(5) : 213.

Common name : Jumping spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Dignostic characters : Body 5–6 mm in length. The most handsome jumping spider, oblong carapace longer than wide, truncated posteriorly, curves gradually just behind the front eyes and then diverges, colour dark brown, broad and dark black on inter ocular area, a typical white band running from front or posterior eyes to rear margin joining equally wide a pair of entire sub-marginal bands. Abdomen elongate oval with hunched shoulders, dark brown in colour with broad white median band up to spinnerets and dorsum bearing two pairs of characteristic circular white spots adjacent to the white median band placed about third from spinnerets and the second pair near to the spinnerets. Male darker than female.

Habits and habitats : Very actively moving through the the foliages of bushes and shrubs with typical dancing pattern of palps, feeds through direct attacks on smaller insects

mainly the Dipterans. Prepares fine silky patch as nest to store off white to pearly eggs on dorsal portion of broad leaf with two entrances on opposite directions. Other biological details not properly understood.

Material examined : 2 M, observed and photographed by Mr. Khandal.

Distribution : India : almost all over the country.

Elsewhere : Africa, Papua New Guinea, Malaysia, Japan, Australai and America.

Family THOMISIDAE

Genus *Camaricus* Thorell

14. *Camaricus bipunctatus* Bastawade

2002. *Camaricus bipunctatus* Bastawade. *J. Bombay nat. Hist. Soc.*, 99(2) : 276–278.

Common name : Crab-spiders.

Local name : Kark koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 6.00 to 8.00 mm in length, colour dark brown to blackish, lighter on abdomen with a pair of conspicuous light yellow to brownish spots on mid-dorsal abdominal portion, legs short and robust, dark brown to blackish-brown; cephalothorax longer than wide, narrowed in front and slightly curved straight anterior border, uniformly dark brown with yellowish stalk of lateral eyes, entire surface finely punctate, sparsely and finely rugose more rugose on posterior portion, ocular quad longer than wide, both rows of eyes recurved; chelicerae compressed, narrowed distally, finely granular on outer portion promargin of fang outstretched and armed with 6 denticulate tubercles/denticles, fangs pointed and short, less than $1/3^{\text{rd}}$ of basal segment, boss small and triangular; legs short and robust but I & II longer than III & IV, finely punctate and rugose on ventral portion. Abdomen almost elliptical, longer than wide, soft, dorsum with specific colour pattern, epigynum with pair of rounded, small median spots, internal genitalia with rounded spermathecae opening by short ducts posteriorly.

Habits and habitats : Unlike other thomisids these inhabit in forest litters mainly under rotten logs in forest area. They are seen slowly moving if disturbed instead of jumping like other thomisids.

Material examined : 5 M, 1 F; *Coll. D.B. Bastawade*, Locality : Tulsi Lake and around, SGNP, Borivali, Mumbai, Maharashtra, Dt. 21.ii.1997, Reg. No. 1/2742.

Distribution : India : Raigad, Thane and Chandrapur, Maharashtra; Srisailum, Andhra Pradesh; Tirap and Changlang, Arunachal Pradesh.

Genus *Thomisus* Walck.15. *Thomisus pooneus* Tikader

1965. *Thomisus pooneus* Tikader. *Proc. Indian Acad. Sci.*, Bangalore, 61(5) : 283.

1980. *Thomisus pooneus* : Tikader. *Fauna of India, Spiders (Thomisidae)*, 1(1) : 35–36.

Common name : Crab spiders. *Local name* : Kark Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 5–8 mm in length, colour light brown on cephalothorax, whitish with regular dark patches on abdomen and greenish on legs; cephalothorax high, almost as long as wide, bearing a pair of lateral longitudinal black bands, eyes black, round and anterior row strongly recurved, anterior medians slightly larger than posterior medians, ocular area chalk-white; legs long and stout, tibiae and metatarsi I two and six pairs of ventral spines respectively; abdomen roundish, anteriorly overlapping the posterior portion of carapace, broadest just behind the middle and a pair of muscular tubercles at the broadest portion from where abdomen slopes down abruptly up to the spinnerets, epigyne small, pointed anteriorly, with a pair of sub-terminal pointed tubercles.

Habits and habitats : Like other thomisid spiders this is seen through foliage of shrubs and flowering plants camouflaging with the colour of host plant, mainly flowers, for hunting. Feeds on dipteran and hymenopteran insects visiting the plants in search of honey. Feeds by direct attacks, never seen to spin any thread cover to overpower the prey.

Material examined : 1 M, Coll. R.M. Sharma, Loc. Hattigate, Goregaon, Dt. 28.ix.2001, Reg. No. I/3216.

Distribution : India : Pune, Raigad and Thane Dists., Maharashtra.

Genus *Misumenops* Cambridge16. *Misumenops khandalensis* Tikader

1965. *Misumenops khandalensis* Tikader. *Proc. Indian Acad. Sci.*, Bangalore, 61(5) : 287.

1980. *Misumenops khandalensis* : Tikader. *Fauna of India, Spiders (Thomisidae)*, 1(1) : 156–157.

Common name : Crab-spiders. *Local name* : Kark Koli, Makadi (Hindi).

Diagnostic characters : Body 7–10 mm in total length, colour light brownish-green on carapace and legs while whitish on abdomen, cephalothorax almost as long as wide, cephalic region a bit high, both rows of eyes recurved, lateral eyes situated on short but prominent tubercles, ocular area with deep brown patch and quad as long as wide; legs long and stout, tibiae and metatarsi I with 6 and 7 pairs of ventral spines; male palp with long coiled conductor sharply pointed distally, cymbium and paracymbium inconspicuous, digits without any apophysis; abdomen round, slightly wider than long, dorsum with conspicuous oval shape brown patch with black outer border, epigynum small, narrowed anteriorly in

the middle with a pair of elongated and obliquely placed spermathecae supplemented with round anterior median patch next to spermathecae.

Habits and habitats : Inhabitant of foliages mainly through flowering portions for feeding on visiting insects.

Material examined : Reported by Dharmendra Khandal, in his personal collections.

Distribution : INDIA : Pune and Raigad Dists., Maharashtra.

17. *Misumenops kumaonensis* Tikader

1980. *Misumenops kumaonensis* Tikader. *Fauna of India, Spiders (Thomisidae)*, 1(1) : 157–158.

Common name : Crab-spiders. *Local name* : Kark Koli, Makadi (Hindi).

Diagnostic characters : Body smaller, ranging 5.50–8.00 mm in length, light brownish green on cephalothorax and legs and dirty chalk-white on abdomen; cephalothorax longer than wide, cephalic region high, both rows of eyes recurved but anteriors strongly recurved and ringed with white tubercles, lateral eyes on prominent tubercles, ocular quad longer than wide; legs long and stout, tibiae and metatarsi I armed with five and four pairs of ventral spines respectively; abdomen almost round, slightly wider than long, posteriorly more wider than on anterior portion, anterior mid-dorsal portion with a light brown cross markings, epigynum small and with a pair of elliptical spermathecae touching each other on median line and situated on elongated transverse plate at the base.

Habits and habitats : Foliage habitant species like other thomisids, mainly feed on insects visiting the flowers and inflorescences of different plants.

Material examined : 2 M, Coll. D.B. Bastawade, Loc. Kanheri Caves, Dt. 30.xi.2000, Reg. No. I/3115.

Distribution : India : Raigad, Maharashtra; Almora, Uttar Pradesh.

Genus *Tmarus* Simon

18. *Tmarus kotigeharus* Tikader

1963. *Tmarus kotigeharus* Tikader. *Proc. India Acad. Sci.*, Bangalore, 58(5) : 250.

1980. *Tmarus kotigeharus* : Tikader. *Fauna of India, Spiders (Thomisidae)* 1(1) : 147–148.

Common name : Crab spiders. *Local name* : Kark Koli, Makadi (Hindi).

Diagnostic characters : Body length ranges from 5.00–7.00 mm, small spider with yellowish brown on cephalothorax, brownish grey on abdomen and pale greenish on legs; cephalothorax longer than wide, cephalic region high, lateral portion with broad, longitudinal dark brown patches, both rows of eyes recurved, posterior row longer than anterior, lateral

eyes larger than others and ringed basially with brown tubercles, ocular quad narrow in front; legs long and strong, tibiae I & II armed with three pairs of ventral spines; abdomen high, pointed and broadest behind, posterior half with two pairs of transverse incomplete bands, epigynum small plate like, inverted 'V' shaped.

Habits and habitats : Forest species lives in foliages of wild plants, arboreal feeder, feeds on insects visiting tender leaves of shrubs.

Material examined : 1 M, Coll. R.M. Sharma, Loc. Sasupada Nature Trail, Yeoor range, Vasai creek, Dt. 27.ix.2001, Reg. No. I/3211.

Distribution : India : Chikmanglur, Karantaka; Raigad and Thane Dists., Maharashtra.

Family PHILODROMIDAE

Genus *Tibellus* Simon

19. *Tibellus poonensis* Tikader

1962. *Tibellus poonensis* Tikader. *J. Univ. Poona Sci. and Tech.*, **22** : 135.

1980. *Tibellus poonensis* : Tikader. *Fauna of India, spiders (Thomisidae)*, **1(1)** : 215–216.

Common name : Crab spiders. *Local name* : Kark Koli, Makadi (Hindi).

Diagnostic characters : Body ranges from 6.00 to 9.00 mm in length, body colour pale yellow, black on eyes and legs light yellowish green; cephalothorax longer than wide, narrowed in front, a median and two lateral longitudinal brown bands extending from ocular area up to base of cephalothorax, both the eye rows recurved, four anterior eyes and two posterior median eyes together form a hexagonal area and the posterior laterals removed and placed more posteriorly and larger in size; legs long and spined, tibiae and metatarsi I & II with three and two ventral spines respectively; abdomen long, cylindrical, narrowed behind, dorsum with a mid-longitudinal lens-shaped light brown band on $\frac{3}{4}$ portion, ventrum with light brown broad longitudinal band from epigastric furrow to the spinnerets, epigyne of a peculiar butterfly shape.

Habits and habitats : Inhabits the shrubs and herbs of endemic as well as exotic plants but detailed information lacking. Feeds on smaller insects sharing the same plants.

Material examined : 2 M, 1F imm., Coll. R.H. Kamble. Loc. Lion Safari and around, Dt. 20.viii.1995, Reg. No. I/2360.

Distribution : India : Raigad, Thane and Pune Dists., Maharashtra.

Genus *Dieta* Simon

20. *Dieta elongata* Tikader

1980. *Dieta elongata* Tikader. *Fauna of India, Spiders (Thomisidae)*, **1(1)** : 234–235.

Common name : Crab spiders. **Local name** : Kark Koli, Makadi (Hindi).

Diagnostic characters : Body length ranges from 7.00 to 10.00 mm, light brown on cephalothorax and legs white dirty chalk-white on abdomen with few pinkish and brown spots on both thoracic region and abdomen respectively; cephalothorax slightly longer than wide, cephalic region abruptly narrowing in front, anterior row of eyes strongly recurved and shorter than posterior, median eyes of both rows smaller than the laterals and ocular quad longer than wide; legs remarkably longer and cylindrical, tibiae and metatarsi I & II each with four pairs of robust ventral spines, a conspicuous brown patch on prolateral distal portion of tibiae I; abdomen long, narrow, tapering behind, dorsum with inconspicuous brown markings, epigynum small and simple with a pair of spherical spermathecae with pointed spine like process on anterior inner portion and minute kidney shape patch on inner postero-middle portion.

Habits and habitats : Body colour light greenish, camouflaged with leaves, seen wandering through tender leaves of different plants, feed mainly on smaller insects moving on trunk and leaves of plants.

Material examined : 1 M, reported by Dharmendra Khandal.

Distribution : India : Raigad, Thane and Pune Dists., Maharashtra.

Family OXYOPIDAE

Genus *Peucetia* Thorell

21. *Peucetia viridana* (Stoliczka)

1869. *Sphasus viridana* Stoliczka. *J. Asit. Soc. Bengal*, 38 : 220.

1884. *Peucetia viridana* : Simon. *Ann. Mus. Genova*, 20 : 365.

Common Name : Lynx-spiders. **Local Name** : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 15–17 mm in length, cephalothorax and abdomen rich grass green, legs yellowish green densely spotted with black, cephalic region raised, eyes grouped together except anterior medians removed and placed in front, clypeus distinct and marked with a pair of black lines running up to base of chelicerae; chelicerae narrowed distally and armed with a minute tooth on inner margin of fang groove, fang short delicate but sharply pointed; legs long and densely covered with long black spines; abdomen longer than wide pointed on posterior portion, dorsum covered with a pair of lateral white mixed with brownish to yellowish bands, lateral pair of spinnerets large and more tubular; epigynum piriform and transversely truncate on posterior portion, internal genitalia.

Habits and habitats : Non orb weaver spider but prefer to be arboreal, moving through large trees, bushes and grasses of forested areas, feeds on smaller to medium size arthropods by direct attacks. No other biological informations available. Most commonly seen on Ghost plant, observed to change body colour seasonally.

Material examined : Few females observed and photographed by Mr. Khandal.

Distribution : India : Kerala, Tamil Nadu, Podicherry, Andhra Pradesh, Maharashtra and West Bengal.

Family PISAURIDAE

Genus *Pisaura*

22. *Pisaura gitae* Tikader

1966. *Pisaura gitae* Tikader. *Rec. zool. Surv. India*, **64**(1-4) : 59-60.

1973. *Pisaura gitae* : Tikader. *Rec. zool. Surv. India*, **72** : 153-212.

Common name : Nursery-web weaver spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 8-12 mm in length, cephalothorax and abdomen light to deep brown but legs greenish; cephalothorax longer than wide, convex, cephalic region slightly high, middle portion and lateral margins with longitudinal brown stripes, both rows of eyes recurved but posterior row much more recurved, ocular quad longer than wide and narrowed in front; chelicerae moderate and inner margin of fang furrow armed with three minute teeth; legs long and strong, clothed with spines; abdomen longer than wide, anterior middle portion of abdomen with a pair of sub-median whitish, double bent in lines and both lateral margins with broad longitudinal whitish lines running through out the length, ventrum pale, epigynum almost triangular in out line with lateral chitinous narrow plates tucked inner words posteriorly.

Habits and habitats : Unknown.

Material examined : 1 M, *Coll. D.B. Bastawade*, Loc. : Tulsi Lake and around, Dt. 29.ix.2002, Reg. No. I/3320.

Distribution : India : Thane, Maharashtra, West Bengal and Andaman Islands.

Family TETRAGNATHIDAE

Genus *Tetragnatha* Latreille

23. *Tetragnatha mandoulata* Walckenaer

1837. *Tetragnatha mandibulata* Walckenaer. *Ins. Apt.*, **2** : 211.

1977. *Tetragnatha mandibulata* : Tikader. *Rec. zool. Surv. India*, **75** : 153-212.

Common name : Long-cylindrical spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body shape narrow, more elongated, about 12-15 mm long,

yellowish to dark yellowish with greenish tinge and one or two pairs of whitish stripes dorsal surface of abdomen, legs exceptionally long as compared to the body; carapace flat and narrowed anteriorly with truncated margin, eyes in two slightly procurved rows; chelicerae large and exceptionally long with large teeth and longer fangs; male palp with exposed round cymbium, female genitalia simple with tubular epigynum.

Habits and habitats : Normally found in the vicinity of water bodies and streams, prepare radially symmetrical delicate mostly horizontal webs, just about 2 to 3' above water surface between available supports, feed on smaller insects visiting the streams or aquatic bodies which entangle in to the webs.

Material examined : 2 M, Coll. D.B. Bastawade, Loc. Kanheri caves, Dt. 30.xi.2000, Reg. No. I/3115, On the way to Tulsi Lake to Forest Nurseri, Dt. 29.ix.2002, Reg. No. I/3320.

Distribution : Almost throughout Indian sub-continent.

Family ARANEIDAE

Genus *Herennia* Thorell

24. *Herennia ornatissima* (Doleschall)

1859. *Epeira ornatissima* Doleschall. *Act. Soc. Ind. Neerl.*, 5 : 32.

1982. *Herennia ornatissima* : Tikader. *Fauna of India, Spiders, Araneae*, 2(1) : 106–108.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Dignostic characters : Body 12–14 mm in length, colour brownish to greyish white, with yellowish white patches on legs, cephalothorax longer than wide, narrowing in front, cephalic region light brown with U-shaped yellowish white patch, thoracic region with dark brown patches and yellowish with transverse grooves on sides, ocular quad as long as wide but more wider behind, anterior medians larger but median sub-equal and placed on prominent tubercles, anterior row procurved while posteriors almost straight; chelicerae strong and stout, light brownish and with moderate boss; abdomen flat, lobate with 4 pairs of lateral lobes on posterior half, numerous greyish specks with distinct centers, few longitudinal darker lines posterior and 5 pairs of distinct sigilla arranged mid-longitudinally on dorsum, ventral side provided with a median broad yellowish patch with a large black spot in the center between epigastric furrow and spinnerets, epigynum with a pair of rounded plates with thin median septum, internal genitalia with a pair of elongated tubular pouches under the plate and opening posteriorly by short tucked in ducts.

Habits and habitats : Prepares delicate web of 1' to 1½' diameter along with wall or tree trunks, feeds on smaller insects entangle in the web, nothing is known about any other biological details.

Material examined : 2 M observed and collected by Mr. Khandal, kept in his personal collections.

Distribution : India : Tamil Nadu, Goa, Maharashtra (first report) and Meghalaya.

Genus *Nephila* Leach

25. *Nephila maculata* (Fabr.)

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

1982. *Nephila maculata* : Tikader. *Fauna of India, Spiders (Araneae)*, 2(1) : 97-99.

Common name : Giant Wood Spiders. *Local name* : Ajasra Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Large spiders, body size of females range from 35 to 45 mm. Males comparatively smaller in body size and also differ in color pattern and never found to spin webs but hang around the female in variable numbers. Female, with elongate abdomen with typical yellowish brown sub-median bands. Two variants seen in this area and differ in having colors on legs, one variety bears dark black legs where as the other has light to dark brown legs.

Habits and habitats : Inhabiting wooded and forest area of Indian subcontinent, females spin enormously large individual webs of much sticky threads and sit at center of the web, normally head positioned towards ground, spins large sticky webs between adjacent large trees and patiently waits for prey, generally feeds on medium to large bodied insects such as Dragon flies and grass hoppers and sometimes smaller bird caught in to the nests. Many males are always noticed on the periphery of the web, are very small and comparatively light orange-red in colour. Their bite is not fatal but portion remains painful and swollen for 6-8 hrs.

Material examined : 4 M, 1 M j, *Coll. D.B. Bastawade*, Loc. : On the way to Tulsi Lake and Forest Nursery, Dt. 28.xi.2000, Reg. No. I/3116, Kanheri Caves, Dt. 30.xi.2000, Reg. No. I/3115; *Coll. P.P. Kulkarni*, Loc. : Filmcity, Hattigate, Borivali, Mumbai, Dt. 12.xii.2001, Reg. No. I/3225.

Distribution : India : Forested areas of Uttaranchal, Uttar Pradesh, Madhya Pradesh, Bihar, Chhatisgarh, West Bengal, Sikkim, Entire North Eastern states, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala and Andaman and Nicobar.

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

26. *Nephila malabarensis* (Walckenaer)

1837. *Epeira malabarensis* Walckenaer. *Hist. Nat. Ins. Apt.*, 1 : 103.

1982. *Nephila malabarensis* : Tikader. *Fauna of India, Spiders (Araneidae)*, 2(1) : 95-97.

Common name : Giant wood spiders. *Local name* : Motha Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Large spider, body ranges from 20.00 to 25.00 mm in length, dark brown on cephalothorax, greyish yellow with brownish patches laterally on abdomen and brownish yellow with brown patches on legs; cephalothorax longer than wide, slightly narrower in front, cephalic region elevated, thoracic fovea shallow, both rows of eyes recurved but posterior row acutely recurved, ocular quad slightly wider behind than long and narrowed in front, anterior medians larger than posterior medians, laterals separated from each other by 3 times of its diameter size; chelicerae strong and stout with prominent boss; legs short and strong; abdomen oval, longer than wide, overlapping the posterior portion of cephalothorax, dorsum with five pairs of sigilla arranged mid-dorsally, epigynum heavily sclerotised with a distinct median septum beaked anteriorly, internal genitalia with a pair of spherical spermathecae each with short and inwardly bent opening tube.

Habits and habitats : Forest inhabitant, prepares large, radially symmetrical webs between adjacent trees by female and wait for prey. Feed mainly on medium to large insects such as grass-hoppers, odonates, butterflies and beetles.

Material examined : 1 M, reported by Dharmendra Khandal.

Distribution : India : Tamil Nadu (Ootacamund), Kerala (Trivendrum), Bihar (Purulia and Chota Nagpur), Maharashtra, Andaman and Nicobar Islands.

Elsewhere : Myanmar; Sri Lanka; Thailand; New Guinea and Australia.

Genus *Argiope* Audouin

27. *Argiope pulchela* Thorell

1881. *Argiope pulchela* Thorell. *Annali. Mus. Civ. Genova*, **18** : 74.

1982. *Argiope pulchela* : Tikader. *Fauna of India, Araneae*, **2(1)** : 129–131.

Common name : Signature spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 10–13 mm in length, body colourful, yellowish white on abdomen while yellowish brown on cephalothorax and legs; cephalothorax slightly longer than wide, narrowing in front, cephalic region less elevated than thoracic region, ocular quad much longer than wide and more wider behind than in front, laterals situated on prominent tubercles, anterior row procurved in front view while posteriors strongly procurved viewed from above; chelicerae with rudimentary boss; abdomen roughly pentagonal, slightly longer than wide, truncated on anterior margin, dorsum white with deep brown transverse patches and stripes, ventral portion dark brown with a pair of chalk white longitudinal band between epigastric groove to spinnerets, epigynum with a pair of weakly bulging lateral lobes and distally narrowing median scape, internal genitalia with a pair of much elongated elliptical spermathecae opening separately on posterior lateral portion.

Habits and habitats : Forest inhabitant, prepares medium, radially symmetrical webs between adjacent shrub twigs or braches. Webs are generally prepared by females with diagonally placed stabilimentum and wait for prey. Feed mainly on medium to large insects such as grass-hoppers, odonates, butterflies and beetles.

Material examined : 2 M, 1 F imm., 1 M j. Coll. : D.B. Bastawade, Loc. : Kanheri Caves, Dt. 30.xi.2000, Reg. No. I/3125.

Distribution : India : Tamil Nadu, 24 Pargana, Kalimpong, Darjeeling, West Bengal, Madhya Pradesh; Orissa; Assam; Pune, Raigad and Thane, Maharashtra; Andaman and Laccadive Islands.

Elsewhere : Myanmar, Malaya Peninsula.

28. *Argiope aemula* (Walckenaer)

1841. *Epeira aemula* Walckenaer. *Hist. Nat. Ins. Apt.*, 2 : 118.

1982. *Argiope aemula* : Tikader. *Fauna of India, Araneae*, 2(1) : 119–121.

Common name : Signature spiders. **Local name** : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Medium size body about 20–25 mm in length, general body colour Yellowish grey, yellowish brown on cephalothorax, deep brown on legs and grayish white with blackish stripes and reticulation on abdomen, cephalothorax narrowing in front, anterior and posterior rows of eyes strongly procurved, legs long, spined and femur bearing yellowish patch ventrally, abdomen oval, truncated in front and partly overlapping cephalothorax, pair of ventral longitudinal yellow stripes between gastric furrow and spinnerets, epigynum roughly triangular, narrowing in front with a pair of basal round bulging, internal genitalia with a pair of unipouched spermathecae.

Habits and habitats : Prefer to inhabit through forested areas, prepare medium sized geometrical webs in vertical plane, typically strengthen the web by preparing X shaped stabilimentum due which are known as “Signature Spiders”, keeps facing towards ground, feeds on smaller to medium sized insects get in to the nest.

Material examined : 1 M, Coll. D. B. Bastawade, Loc. : Goregaon, Hattigate Dt. 25.ix.2002, Reg. No. I/3317, Yeoor, Thane, Dt. 28.ix.2002, Reg. No. I/3319.

Distribution : India : Kerala, Tamil Nadu, Maharashtra, West Bengal, Andaman and Nicobar Islands.

Elsewhere : Sri Lanka; Myanmar; Indo-Austro-Malaysia.

Genus *Ordgarius* Keyserling

29. *Ordgarius hobsoni* (O. P. Cambridge)

1877. *Cyrtarachne hobsoni* O. P. Cambridge. *Proc. Zool. Soc. Lond.* : 562.

1982. *Ordgarius hobsoni* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 137–138.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 7–10 mm in length, colour light to dull brown, cephalothorax slightly wider than long, carapace armed posteriorly with a pair of smaller tubercles and a large median conical tubercle and anterior to it a small median tubercle, ocular quad as long as wide situated on a moderate elevation, lateral eyes subequal and placed close. Legs with dark brown transverse bands; abdomen wider than long, provided with many blunt and rounded tubercle, dorsum with a large anterior median conspicuous yellow patch, epigynum without scape, much wider than long and bulged in to lateral lobes, narrowed anterior-medially.

Habits and habitats : This species inhabits through forest areas of Western Ghats and seen to construct medium sized web and sits on a twig on which the web is supported, not much information is available. Feeds on medium size insects entangled to the web.

Material examined : 2 M, observed and photographed by Dharmendra Khandal in Sanjay Gandhi National Park, Borivali area.

Distribution : India : Thane, Raigad and Pune Dists., Maharashtra.

Elsewhere : Sri Lanka.

Genus *Cyrtarachne* Thorell

30. *Cyrtarachne raniceps* Pocock

1900. *Cyrtarachne raniceps* Pocock. *Fauna Brit. India, Arachn.* : 229.

1982. *Cyrtarachne raniceps* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 145–146.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 8–11 mm in length, colour yellowish to olive green with brownish patches, cephalothorax moderately convex, ocular quad narrowly wider than long but in equal width, median eyes subequal, lateral smaller than medians and not situated on tubercles and both the row recurved; abdomen large, nearly triangular pointed on posterior portion and strongly overlapping on cephalothorax, integument leathery and dorsal portion with a pair of smooth lateral prominences and with olive green and brownish patches, ventral portion with a broad median black patch between epigastric furrow and spinnerets, epigynum with thin narrow median scape and a pair of lateral lobes with curved elongated posterior patch, internal genitalia with a pair of rounded spermatheca connected each with curved dorsal duct opening distally in to funnel shaped tube opening on posterior lateral portion.

Habits and habitats : Forested species, no information available on other biological aspects of this species.

Material examined : Noted and observed by Dharmendra Khandal.

Distribution : India : West Bengal, Karataka and Maharashtra (Raigad and Thane Dists.).

Elsewhere : Sri Lanka.

31. *Cyrtarachne biswamoyi* Tikader

1960. *Cyrtarachne biswamoyi* Tikader. *J. Bombay nat. Hist. Soc.*, **57**(2) : 554.

1982. *Cyrtarachne biswamoyi* : Tikader. *Fauna of India, Araneae : Araneidae*, **2**(1) : 141 –142.

Common name : Orb weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 4–7 mm in length, cephalothorax and legs brownish while greyish brown on abdomen; cephalothorax convex, two darker longitudinal lines behind posterior medians, ocular quad nearly squarish, almost as long as wide and slightly wider in front, medians equal and laterals also sub-equal but smaller than medians and situated on prominent tubercles; chelicerae small but strong and stout, brownish with moderate boss; legs short, moderately strong, femur I tuberculate on prolateral surface while tibiae I and II tuberculate on dorsal surface; abdomen large, convex with small blunt tubercles strongly overlapping on posterior portion of cephalothorax, more than 1 ½ times wider than long, dorsum with large conspicuous sigilla and few mid-longitudinal dark lines, with two pairs of lateral and one pair of large dorsal tubercles present, ventrum with large black patch from epigastric furrow to spinnerets, epigynum with an anterior plate like structure and posterior reduced scape, short, bluntly pointed and bent, internal genitalia with a pair of rounded spermathecae covered with convoluted string like structure originating from a transverse plate, spermathecae opening each posteriorly with a short straight duct on submedian portion.

Habits and habitats : Mostly inhabitant of forested area. No information available on any biological aspects.

Material examined : 1 M observed and photographed by Dharmendra Khandal.

Distribution : India : Madhya Pradesh and Maharashtra (first report).

Genus *Araneus* Clerck

32. *Araneus mitifica* (Simon)

1886. *Epeira mitifica* Simon. *Act. Soc. Linn. Bordeaux*, **40** : 150.

1982. *Araneus mitifica* : Tikader. *Fauna of India, Araneae : Araneidae*, **2**(1) : 233–235.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 7–11 mm in length, colour yellowish white to greenish, cephalothorax longer than wide, narrowing in front, thoracic area with an indistinct groove, ocular quad longer than wide and wider in front, both the rows of eyes recurved, anterior medians larger than posterior laterals closely placed and situated on black tubercles; chelicerae yellowish, strong and moderate boss; abdomen nearly globular but slightly narrowed anteriorly, dorsum with a pair of wing shaped large, median black patch and also two lateral black patches and also an abrupt slopping on 2/3rd posterior portion, epigynum with very short, thick and unwrinkled scape with lateral groove, internal genitalia with a pair of rounded spermathecae having central black patch that continues posteriorly in larger black patch and appears to open on posterior lateral groove.

Habits and habitats : No information available.

Material examined : 2 M, Coll. R.M. Sharma, Loc. : Picnic shade of Kanheri caves, Dt. 30.ix.2001, Reg. No. I/3210.

Distribution : India : Pune, Raigad, Thane, Maharashtra, Karnataka, West Bengal.

Elsewhere : Pakistan; Bangla Desh; Myanmar and Malaysia.

33. *Araneus bilunifer* Pocock

1900. *Araneus bilunifer* Pocock. *Fauna Brit. India, Arachn.* : 227.

1982. *Araneus bilunifer* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 221–222.

Common name : Orb weaving spiders. Local name : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 20–22 mm in length, light brownish to yellowish grey; cephalothorax longer than wide, narrowing in front, thoracic region with conspicuous transverse groove, ocular quad longer than wide and much wider in front, anterior medians larger than posterior medians, lateral eyes placed close and each placed on tubercle, both rows of eyes recurved but anterior strongly recurved; chelicerae strong and stout, brown in colour and with medium size boss; legs long, stout and strong, distal segments with brown bands; abdomen sub-oval, longer than wide, with 2 small low shouldered humps and a pair of conspicuous chalk white large spots on sub-median portion and 3 pairs of sigilla placed mid-longitudinally, ventrum with large brown patch guarded laterally with a pair of chalk white dumble shaped patches in between epigastric groove and spinnerets, epigynum provided with short, broad deeply bent scape, internal genitalia much complicated with numerous dark curved patches under which placed a pair of round spermathecae.

Habits and habitats : Inhabits mostly the forested areas. No proper information available on any biological aspects.

Material examined : 2 M observed and collected by Dharmendra Khandal.

Distribution : India : Tamil Nadu, Maharashtra (First report) and Gujarat.

Genus *Neoscona* Simon34. *Neoscona poonaensis* Tikader & Bal

1981. *Neoscona poonaensis* Tikader & Bal. *Rec. zool. Surv. India, Occ. Pap. No.*, **24** : 29.

1982. *Neoscona poonaensis* : Tikader. *Fauna of India, Araneae : Araneidae*, **2(1)** : 265–267.

Common name : Orb weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 7–10 mm in length, colour yellowish grey; cephalothorax slightly longer than wide narrowing in front, cephalic region with an indistinct groove, ocular quad as long as wide and situated on an elevation, median of same size, laterals place on tubercles, both rows recurved; chelicerae moderately strong, yellowish with medium sized boss; legs long, moderately strong, distal ends of femora with distinct dark brown tranverse bands and tibiae with dark brown patches; abdomen nearly pentagonal, yellowish grey with chalk white patches and dark brown lines, provided with a distinct elongated tail like hump on posterior end and 3 pairs of sigilla on mid-longitudinal portion of dorsum, ventrum with large star shaped black patches inbetween epigastric furrow and spinnerets, epigynum with board based scape narrowing distally and up wardly curved on tip with a pair of dark rounded patches in the middle portion, internal genitalia with a pair of convoluted dark pouched spermathecae.

Habits and habitats : No information available.

Material examined : 1 M, *Coll. D.B. Bastawade*, Loc. : Year, SGNP, Thane, Dt. 28.ix.2002, Reg. No I/3319.

Distribution : India : Pune and Thane (First report) Dists., Maharashtra.

35. *Neoscona elliptica* Tikader & Bal

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

1982. *Neoscona elliptica* : Tikader. *Fauna of India, Araneae : Araneidae*, **2(1)** : 259–261.

Common name : Orb weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 6–9 mm in length, colour light yellow to brown, cephalothorax longer than wide narrowing in front, thoracic region more lighter and with distinct median longitudinal groove, ocular quad longer than wide but more wider in front, except anterior medians all pearly white, anterior medians slightly larger than posterior medians, lateral placed close and subequal in size, both rows recurved; chelicerae strong with distinct boss; legs strong and long, distal end of tarsi with brown bands; abdomen elliptical, roundish on both ends, longer than wide, yellowish brown with few black patches and spots, lateral sides with few brownish inward lines and 4 pairs of sigilla present, ventrum deep brownish with a median broad darker patch guarded by a pair of chalk

white patches between epigastric furrow and spinnerets, epigynum with short, broad, stumpy triangular scape and a pair of lateral lobes, internal genitalia with a pair of round pouched spermathecae, darker in the middle portion, covered dorsally with a pair of elongated tubular structure bifid on posterior end.

Habits and habitats : Spin delicate geometrically radial webs amongst bushes and small trees, and use to attach an elongated rolled leaf to shelter itself, comes out to roll in to the prey if it can be overpowered otherwise drops suddenly to ground in case danger sensed. Feeds on smaller arthropods entangled in to the web threads.

Material examined : 2 M, Coll. R. M. Sharma, Loc. : Kanheri caves and around, Dt. 29.ix.2001, Reg. No. I/3214.

Distribution : India : Pune and Thane Dists. Maharashtra.

36. *Neoscona mukerjei* Tikader

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

1981. *Nephila mukerje* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 248–253.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Small spiders of body size 8–12 mm., carapace longer than wide, narrowed in front, cephalic region with conspicuous 'V' shaped dark brown patch, thoracic with deep longitudinal groove, anterior median eyes slightly larger than posterior medians, lateral eyes placed closer to each other, both rows recurved and ocular quadrangle wider in front; chelicerae strong, yellowish with moderate boss; abdomen sub-triangular, longer than wide, tapering posteriorly, dorsum with a club shaped greyish white patch, arranged longitudinally, 5 pairs of sigilla prominent mid-dorsally, epigynum provided with a moderately long scape with a deep constriction and a pair of indistinct lateral lobes.

Habits and habitats : Mostly observed to spin a thin threaded small sized radial geometric webs through tall grasses and bushes. When disturbed drops down at once to avoid predation. There is tremendous color variation specially the color pattern on dorsal portion of abdomen, 18 colour variations have been reported by Tikader (1982).

Material examined : 2 M, Coll. D.B. Bastawade, Loc. : On the way to Tulsi Lake and Forest Nursery, Dt. 28.i.200, Reg. No. I/3116, Yeoor, Thane, Dt. 28.ix.2002, Reg. No. I/3119.

Distribution : Through out Indian subcontinent.

37. *Neoscona lugubris* Walckenaer

1841. *Epeira lugubris* Walckenaer. *Hist. Nat. Ins. Apl.*, 2 : 34.

1982. *Neoscona lugubris* : Tikader. *Fauna of India, Aranea : Araneidae*, 2(1) : 255–257.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body size about 10mm long, cephalothorax and legs light yellowish brown but chalk white on abdomen, abdomen sub-triangular, tapering behind, with greenish instinct marks, ventral white band between epigastric furrow and spinnerets. Epigynal scape thin, broad, narrowed behind with a deep constriction at the base with lateral lobes, internal genitalia with a pair of double looped spermathecae.

Habits and Habitats : Not much of the information available, spins webs through medium sized bushes and shrubs and keeps itself in a dried and rolled piece of leaf, mostly at the centre of the orb.

Material Examined : 1 M, Noted and observed by Dharmendra Khanda.

Distribution : India : Pune, Maharashtra, Dangs, Gujarat.

Elsewhere : Austro-Malaysia, South New Guinea, Japan and China.

38. *Neoscona laglaizei* Simon

1977. *Epeira laglaizei* Simon. *Annls. Soc. ent. Fr.*, 7(5) : 77.

1981. *Neoscona laglaizei* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 263–265.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic Characters : Body 8–10 mm in length, abdomen tapering and pointed posteriorly with 2 pairs of light coloured bands in middle, body colour yellowish grey, female epigynum with short broad scape directed upwards distally and with a pair of elongated dark spots.

Habits and habitats : Prepares smaller snares along with rolling of small to medium size leaves at centric or eccentric place of the web and hides in rolling of the leaf, web may be at considerable height from ground level. It becomes difficult to notice and collect these spiders from such nest in fields. Preys on smaller insects and other invertebrates entangle in to net. Many times seen along with other species of *Neoscona*.

Material examined : 2 M, Coll. D.B. Bastwade, Loc. : Sasupada trail, Dt. 27.ix.2002, Reg. No. I/3318.

Distribution : India : Tamil Nadu (Ootacamund).

Elsewhere : Sri Lanka : Peradeniya, Trincomali; Myanmar : Tounghnoo. Tharrawaddy, Rangoon, Tenasser; Java; Indo–Austro–Malaysia region and China to Philippines; New Guinea.

39. *Neoscona theis* (Walckenaer)

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

1983. *Neoscona theis* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 269–271.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic Characters : Body size smaller 8–10 mm; carapace longer than wide, narrowing in front, with a pair of lateral and a median longitudinal dark brown bands, thoracic region with a distinct longitudinal median groove, ocular quad longer than wide and wider in front than behind; chelicerae strong, stout, brown and with prominent boss; abdomen sub-oval, longer than wide, abdomen sub-oval, with a conspicuous mid-longitudinal chalk white bar having four pairs of lateral projections and guarded by deep brown or black patches. Epigynum with prominent black rim with a constriction at the middle and a pair of lateral lobes, internal genitalia with a pair of rolled pouched spermathecae distally opening at the constriction.

Habits and habitats : This inhabits through deciduous forest areas and found to prepare web with the support of 2-3 adjacent thin twigs. Prepares smaller snares along with rolling of small to medium size leaves at centric or eccentric place of the web, web may be at considerable height above ground level. It becomes difficult to notice and collect these spiders from such nest in collection fields. Preys on smaller insects and other invertebrates entangle in the web.

Material examined : 1 M, *Coll. D.B. Bastawade*, Loc. : On the way to Tulsi Lake and Forest Nursery, Dt. 24.ix.2002, Reg. No. I/3320.

Distribution : India : Maharashtra (Pune), Gujarat, Orissa and West Bengal.

Elsewhere : South New Guinea and China to Pacific Islands.

Genus *Leucauge* White

40. *Leucauge festigata* (Simon)

1877. *Meta festigata* Simon. *Anns. Soc. Ent. Fr.*, 7(5) : 79.

1982. *Leucauge festigata* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 76–78.

Common name : Orb-weaving spiders. *Local name* : Koli (Marath), Hindi (Makadi).

Diagnostic characters : Body 6–9 mm in length, colour pale yellow to light brownish yellow to silvery white with black and grey patches, carapace longer than wide, cephalic region elevated than thoracic region, ocular quad longer than wide, wider behind than in front, both rows of eyes recurved, lateral place close and on moderate tubercles; chelicerae strong and stout with moderate boss; abdomen longer than wide, broader posteriorly, narrowed on anterior portion and abruptly truncated, overlapping the carapace, dorsum silvery white with blackish patches and ventrum with a pair of bracket shaped patches of silvery white specks between epigastric furrow and spinnerets, epigynum plate like with a thin semicircular rim, a pair of darker patches narrowed anterior medially and separated by

a median plate pointed on anterior portion; internal genitalia a pair of much coiled spermathecae, placed on posterior portion.

Habits and habitat : No information available.

Material examined : 14 M, Coll. D.B. Bastawade, Loc. : Sasupada trail, Dt. 27.ix.2002, Reg. No. I/3318; Hatti gate, Goregaon to Forest Nursery, Dt. 25.ix.2002, Reg. No. I/3317; Coll. R.M. Sharma, Loc. Tourism zone, Dt. 01.x.2001, Reg. No. I/3215, Loc. Picnic shade near Kanheri caves, Dt. 30.ix.2001, Reg. No. I/3210.

Distribution : India : Raigad, Thane, Maharashtra; Kerala; Orissa; Uttar Pradesh.

Elsewhere : Myanmar; Sri Lanka.

41. *Leucauge decorata* (Blackwall)

1864. *Tetragnatha decorata* Blackwall. *Ann. Mag. nat. Hist.*, 14(3) : 44.

1982. *Leucauge decorata* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 79–80.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic Characters : Body 9–12 mm in length; carapace longer than wide, cephalic region slightly higher than thoracic region and provided with deep trifold median groove, ocular quad slightly wider than long, median eyes sub-equal in size and laterals slightly smaller than medians, both rows of eyes recurved; chelicerae large, stout, yellowish with small boss; abdomen elongated and not much pointed posteriorly and bent upwards, with a pair prominent anterior lateral humps, body colour yellowish on cephalothorax and legs with greenish shades, abdomen silvery white with blackish patches and lines of light coloured bands, female epigynum plate like having a thin semilunar rim anteriorly and internal genitalia with pair of obliquely placed roughly rounded spermathecae opening posteriorly with short ducts on posterior portion.

Habits and habitats : These spiders prepare Two tier nests (webs) upper tier remains of very much irregular mesh of web thread, where as the second tier is dome shaped and prepared below the first, where the individual spider remain in an inverted position. Generally females are seen to occupy such nests along with chain of their star shaped flat, dirty grey coloured egg cocoon attached to web tread on one side.

Material examined : 1 M, Coll. D.B. Bastawade, Loc. : Hatti gate, Goregaon to Forest Nursery, Dt. 25.ix.2002, Reg. No. I/3317.

Distribution : India : Kerala (Cochin), Tamil Nadu (Chingleput), Pondicherry, Karnataka (Bangalore), Maharashtra (Pune), Gujarat, Orissa, West Bengal (Darjeeling, Kalimpong), Assam, Meghalaya (Shillong), Bihar, Sikkim, Uttaranchal (Dehra Dun).

Elsewhere : Sri Lanka (Colombo and Peradeniya); Myanmar (Maymyo); Pakistan (Rawalpindi).

42. *Leucauge dorsotuberculata* Tikader

1982. *Leucauge dorsotuberculata* Tikader. *Fauna of India, Araneae : Araneidae*, 2(2) : 74 –76.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 4–6 mm in length, colour pale with greenish and greyish patches; cephalothorax longer than wide and flat, thoracic region with deep trifold groove on posterior median portion, both rows of eyes recurved, ocular quad almost rectangular, longer than wide, median eyes subequal, lateral slightly smaller than medians, closely placed, almost equal and on prominent tubercles; chelicerae strong and stout with smaller boss; abdomen rather roundish with two pairs of large hump like tubercles on anterior portion, dorsum with silvery white, black and greyish patches, ventral side black with one or two large triangular silvery white patches between epigastric groove and spinnerets and four silvery white spots around spinnerets; epigynum plate like with thin semicircular rim anteriorly, internal genitalia with a pair of elongated tube like narrowed posteriorly and opening in to mid posterior margin.

Habits and habitat : Not known.

Material examined : 1 M, Noted and observed by Dharmendra Khandal.

Distribution : India : Satara, Raigad and Thane Dists., Maharashtra.

43. *Leucauge tessellata* (Thorell)

1887. *Leucauge tessellata* Thorell. *Annali. Mus. Civ. Genova*, 25 : 135.

1982. *Leucauge tessellata* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 80–82.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 9–12mm in length, colour light brown to reddish, legs brownish with yellowish patches, abdomen greyish with silvery white and blackish patches; cephalothorax longer than wide, flat, cephalic region slightly raised, thoracic region with posterior median trifold groove, ocular quad longer than wide and slightly narrowed in front, both the rows of eyes recurved but anterior strongly recurved; chelicerae large and very strong with smaller boss; abdomen longer than wide, elongated, anterior portion with a pair of blunt rounded prominences and also a blunt caudal hump on posterior end, dorsum with silvery white and chalk white patches and line, ventrum with a pair of elongated silvery patches between epigastric furrow and spinnerets, epigynum plate like with a thin semilunar rim anteriorly, a pair of median round lighter spots and larger and darker inverted comma like structure on posterior portion, internal genitalia with three pairs of pouches, inner two pairs smaller than outer with incurved tube arising from the junction of inner smaller pouch and opening in the mid-lateral portion.

Habits and habitats : Forested species, commonly seen on medium size webs on bushes and smaller trees, occasionally on Bamboo bunches, feeds on smaller to medium size insects entangled on webs, solitary but seen to prepare webs on adjacent branched in large numbers.

Material examined : 1 M, Noted and observed by Dharmendra Khandal.

Distribution : India : Kerala, Maharashtra, Gujarat, West Bengal, Sikkim.

Elsewhere : Bhutan and Myanmar.

Genus *Gastracantha* Sundevall

44. *Gastracantha hasseltii* C. L. Koch

1838. *Gastracantha hasseltii* C. L. Koch. *Die Arachniden*, 4 : 29.

1982. *Gastracantha hasseltii* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 63–65.

Common name : Orb-weaving spiders. **Local name :** Koli (Marathi), Makadi (Hindi).

Dignostic characters : Body 4–6 mm in length, colour dark brown to blackish brown and yellowish on legs; cephalothorax slightly longer than wide and blunt on anterior margin, cephalic region with a median depression and thoracic region slopping down posteriorly, ocular quad wider than long and more wider on posterior portion, medians subequal; chelicerae very strong, stout with moderate boss; legs short and strong; abdomen octagonal, much wider than long, anteriorly overlapping the cephalothorax, dorsum chalk white, blackish brown outer sides and few pairs of conspicuous sigilla, actually spinned with three pairs, median being largest and much pointed; epigynum with rounded short scape, internal genitalia with a pair of narrow tubularly pouched spermathecae, opening on anterior lateral sides.

Habits and habitat : Species found in forested area, spins small delicate webs on shrub and grass blades preferably horizontal to ground, feeds on smaller to medium size insects.

Material examined : 3 M, Coll. D.B. Bastawade, Loc. : On the way to Tulsi Lake and Forest Nursery, Dt. 24.ix.2002, Reg. No. 1/3320

Distribution : India : Kerala; Raigad, Thane, Maharashtra; West Bengal; Sikkim; and Assam.

Elsewhere : Myanmar.

45. *Gastracantha remifera* Butler

1873. *Gastracantha remifera* Butler. *Trans. Ent. Soc. Lond.*, 2 : 154.

1982. *Gastracantha remifera* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 56–67.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 9–12 mm in length, colour deep brown to blackish brown, cephalothorax slightly longer than wide, blunt on anterior margin, cephalic region elevated with an inconspicuous median groove, thoracic region slopping down posteriorly, ocular quad wider than long and wider posteriorly, median eyes subequal, chelicerae strong and stout with moderate boss; legs short and strong; abdomen with concave dorsum, three pairs of spines and forms an arch between median pair of spines, anterior pair smaller than posterior pair, median spines much thinner in the middle and clavate distally, dorsum with few pairs of definitive large conspicuous sigilla, epigynum with short stout and pointed scape, with darker mark above scape, internal genitalia with a pair of rounded spermathecae each bearing small dot on the anterior middle portion, posteriorly continued with duct opening at the base of scape.

Habits and habitats : In habitant of forested area, preparing small to medium size webs amongst bushes shrubs and tall grasses, usually seen at the center of web, feeds on smaller arthropods entangled in the nest.

Material examined : 1 M, Coll. D.B. Bastawade, Loc. : On the way to Tulsi Lake and Forest Nursery, Dt. 24.ix.2002, Reg. No. I/3320.

Distribution : India : Tamil Nadu, Raigad and Thane Dists., Maharashtra.

46. *Gastracantha geminata* (Fabr.)

1798. *Aranea geminata* Fabricius. *Suppl. Ent. Syst.*, : 292.

1982. *Gastracantha geminata* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 53–55.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 6–9 mm in length, colour dark brown to blackish brown, cephalothorax slightly longer than wide, blunt anteriorly, cephalic region elevated while thoracic region slopping posteriorly ocular quad wider than long and more wider on posteriorly,; chelicerae strong and stout with moderate boss; legs also short and stout, each femora with transverse yellow bands; abdomen hexagonal, much wider than long, overlapped cephalothorax, dorsum with three yellowish white transeverse bands, three pairs of spines, anterior and median of same size while posterior short and smallest, few pairs of sigilla present on dorsum, ventral portion with scattered patches of yellowish white colour and a tubercle present in front of spinnerets, epigynum with short and blunt scape and a pair of median darker spot, internal genitalia provided with a pair of rounded pouched spermathecae with median darker area, each continued posteriorly in to a duct opening posteriorly at the base of median scape.

Habits and habitat : No information available.

Material examined : 1 F, 1 M, Coll. R.M. Sharma, Loc. : BNHS, Study center, Dt. 26.ix.2001, Reg. No. I/3212.

Distribution : India : Tamil Nadu, Karnataka, Raigad, Thane Dists. Maharashtra.

Elsewhere : Sri Lanka

47. *Gastracantha mammosa* C. L. Koch

1845. *Gastracantha mammosa* C. L. Koch. *Die Arachniden*, 11 : 57.

1982. *Gastracantha mammosa* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 55–57.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Ninmdi).

Diagnostic characters : Body 6–9 mm in length, colour reddish to greenish brown, cephalothorax slightly longer than wide and broad in front, cephalic region with a median bulge like conical elevation while thoracic region abruptly down posteriorly, ocular quad wider than long and wider behind than in front, median eyes subequal in size; chelicerae strong and stout, reddish brown with moderate boss; legs short and strong and femora III, IV and tibiae IV yellowish in colour; abdomen roughly octagonal, wider than long, overlapping strongly the cephalothorax, dorsum with lateral pair of yellowish white patches and a dark median patch up to posterior spines, few pairs of conspicuous sigilla present, a conspicuous median tubercle present ventrally in front of spinnerets, epigynum with short, acutely pointed bent downward scape, and a pair of dark smaller round spots on median central portion, internal genitalia with a pair of rounded spermathecae each overlapping a pair of an elliptical secondary pouch opening posteriorly at the base of scape.

Habits and habitat : No information available.

Material examined : 2 M, Noted and observed by Dharmendra Khandal.

Distribution : India : Tamil Nadu, Maharashtra, Orissa, West Bengal, Meghalaya, Sikkim, Uttar Pradesh, Andaman and Nicobar.

Elsewhere : Japan; Myanmar; Malaysia; Bangla Desh; Pakistan and Sri Lanka.

Genus *Cyrtophora* Simon

48. *Cyrtophora cicatrosa* (Stoliczka)

1869. *Epeira (Nephila) cicatrosa* Stoliczka. *J. Asiat. Soc. Beng.*, 33 : 242.

1982. *Cyrtophora cicatrosa* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 178–180.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 6–9 mm in length, colour yellowish to greyish with blackish patches and stripes; cephalothorax longer than wide, narrowing in front, much broad and

rounded on posterior portion, a middle and a pair of lateral longitudinal black patches, thoracic area with deep trifid fovea, ocular quad longer than wide, slightly narrowed in front, anterior median larger than posteriors, laterals subequal placed little away from each other on prominent tubercles, both rows of eyes recurved but anterior strongly recurved; chelicerae moderately strong; legs thin and delicate, femora I & II with longitudinal black stripes and rest with numerous black spots; abdomen highly raised on anterior portion, dorsum with two pairs of anterior small black conical tubercles and a blunt posterior caudal tubercle, black and chalk white patches present, ventral portion with a pair of chalk white longitudinal lines and three pairs of chalk white spots present between epigastric furrow and spinneretes, epigynum covered with a single plate raised on posterior middle portion of operculum, internal genitalia with two pairs of elliptical and round patches placed one above the other, the rounded pouches connected to lateral operculum portion by small duct on each side.

Habits and habitats : Prefer to prepare two tire web, inner median dome shaped and the outer an irregular snare supporting the median dome, the individual spider stays in the center of the dome. Such nets are prepared among the smaller branches of bushes, usually by the female spiders and a chain of 4-6 dirty greyish egg cocoons are normally left hanging on one side of the net. Many female spiders are seen to occupy a single bush constructing their individual web. These spiders feed on smaller to medium size arthropods entangled in the web.

Material examined : 2 M, Coll. D.B. Bastawade, Loc. : Goregaon, Hattigate, Borivali, Mumbai, Dt. 25.ix.2002, Reg. No. I/3317.

Distribution : India : Tamil Nadu, Karnataka, Maharashtra, Gujarat, West Bengal, Uttar Pradesh, Punjab and Andaman and Nicobar.

Elsewhere : Pakistan; Myanmar; New Guinea and Austro-Malaysia.

49. *Cyrtophora citricola* (Foskal)

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

1982. *Cyrtophora citricola* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 180-182.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 10–13 mm in length, colour highly variable, normally with brownish to greyish and yellow patches, cephalothorax longer than wide, narrowing anteriorly and much broader posteriorly, trifid fovea on thoracic region, ocular quad forming trapezium placed on an elevation longer than wide and wider in front than behind, both rows of eyes strongly recurved, anterior medians larger than posterior medians, laterals subequal, away from each other and placed on prominent tubercles; chelicerae strong, distinctly swollen at the base with prominent boss; legs short and stout; abdomen raised high up anteriorly and strongly overlapping the cephalothorax,

dorsum with a pair of shoulder humps, one pair of lateral humps in the middle and a pair of bifid caudal humps, epigynum with small but much broad scape with prominent rim, internal genitalia with a pair of elliptically pouched spermathecae drawn posteriorly in to narrow duct opening in to lateral portion of scape.

Habits and habitats : Almost same as *Cyrtophora cicatrosa* (Stoliczka) and occupying neighboring areas.

Material examined : 1 M, *Coll. D.B. Bastawade*, Loc. : Kanheri Caves and around, Dt. 26.ix.2002, Reg. No. I/3324.

Distribution : India : Tamil Nadu, Karanataka, Maharashtra, Gujarat, West Bengal, Assam, Madhya Pradesh, Rajasthan, Punjab.

Elsewhere : Sri Lanka; Madagaskar; Mayaysia; Australia; Africa; Egypt and Europe.

Genus *Parawixia* F. O. P. Cambridge

50. *Parawixia dahaanii* (Doleschall)

1859. *Epeira dahaanii* Doleschall. *Act. Soc. Ind. Neerl.*, 5(5) : 33.

1982. *Parawixia dahaanii* : Tikader. *Fauna of India, Araneae : Araneidae*, 2(1) : 212–214.

Common name : Orb-weaving spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 18–22 mm in length, many colour variations noted from greyish to yellowish brown, cephalothorax longer than wide, narrowing in front, surface granular, cephalic region much raised in the middle, ocular quad also situated on raised portion, slightly wider in front than behind, anterior row of eyes procurved in front view, posterior row recurved from above, anterior medians larger than posterior medians, laterals of same size, placed close and on the base of horn like tubercles; chelicerae stout and with moderate boss; legs long, strong and darker on tarsi; abdomen triangular, longer than wide, with two pointed spine like shoulder humps and one pointed tail hump at the posterior end, a chalk like white narrow band extending between shoulder humps; epigynum with single plate drawn posteriorly in to stout beak like scape, bent at right angle to the base, internal genitalia with a pair of comparatively large rounded pouched spermathecae each drawn out on inner portion into a 'S' shaped ducts opening at the base of beaked scape.

Habits and habitats : Species found in forested area and commonly encountered in Sanjay Gandhi National Park, Borivali, Mumbai. About 6–8 colour variants have been noticed on different types of trees, preferably at the tip of thin branch along with its small web, the specimen, mostly the female, was never observed to rest on the web but always selects to rest on a smaller twig utilized for supporting the web, mostly feeding on medium to larger insects. The web remains more sticky than other araneids.

Material examined : 7–8 M, Observed and photographed by Dharmendra Khandal, few have been collected and preserved in his personal collection.

Distribution : India : Karanataka, Maharashtra, West Bengal, Sikkim;

Elsewhere : Myanmar; Indo-Austro-Malaysia; Java; Sumatra; Polynesia and Japan.

Genus *Poltys* C. L. Koch

51. *Poltys godrejii* sp. n.

Common name : Orb-weaving spiders. **Local name** : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 11–14 mm in length, colour deep dark brown to blackish, cephalothorax longer than wide, cephalic region prominently elevated conical and anteriorly projecting ocular region, ocular quad longer than wide, anterior row recurved where as posterior slightly procurved; chelicerae moderately strong, with prominent boss; legs strong and little longer; abdomen large, high up anteriorly, overlapping 2/3 portion of carapace, with numerous tubercles of different sizes and nature, anterior median portion with a median large horn like tubercle and a pair of smaller hump shoulders, a pair of distinctly large blunt tubercles also present on posterior portion, dorsum with pairs of sigilla. Ventral surface darker than dorsal, epigynum trilobed with short and blunt scape. Internal genitalia with a pair of bean shaped spermathecae.

Habits and habitats : Arboreal in habits, build 3–4' diameter nests and seats on the corner of one of the supporting thread, usually camouflage with colour of the twig it builds nest.

Material examined : 1 M, 1 M young, *Coll. Dharmendra Khandal*, Loc. : Godrej land, Mumbai, Dt. Aug. 2002, Reg. No. nil; 1 M, *Coll. Dharmendra Khandal*, Loc. : Filmcity, Goregaon, Mumbai, Dt. Set. 2003, Reg. No. nil.

Distribution : Known only from Mumbai, Maharashtra.

52. *Poltys rehmanii* Sp. n.

Common name : Orb-weaving spiders. **Local name** : Koli (Marathi), Makadi (Hindi).

Diagnosti characters : Body 19–24 mm in length, colour deep brown to reddish, yellowish on abdominal dorsum; cephalothorax slightly longer than wide, cephalic region prominent with elevated conical and anteriorly projecting ocular region, ocular quad longer than wide, posterior median eyes slightly oval, laterals widely separated; chelicerae moderately strong with prominent boss; abdomen longer than wide, with a median anterior and a pair of anterior lateral pointed humps and two pairs of lateral rounded short humps and one pair of lateral posterior rounded humps, anterior median hump covers most of the posterior portion of carapace, dorsum with few sigilla, epigynum trilobed with large scape and lateral folds, opening lies in middle groove under neath of scale and internal genitalia with a pair

of roughly kidney shaped spermathecae placed in anterior portion and opening in middle portion with a pair of long inner tubes.

Habits and habitats : Strictly arboreal in habits, prepare large webs with support of thinner twigs in bushes or trees and seats at the end of one of the supporting thread, mostly camouflaging with the colour of bush or tree branches.

Material examined : 2 M, Coll. Dharmendra Khandal, Loc. : Nasik, Dt. July 2002 and SGNP, Mumbai, Aug. 2003, Reg. No. Nil.

Distribution : India : Maharashtra.

Family LYCOSIDAE

Genus *Hippasa* Simon

53. *Hippasa lycosina* Pocock

1900. *Hippasa lycosina* Pocock. *Fauna Brit. India, Arachn.*, : 250.

1980. *Hippasa nilgiriensis* : Tikader and Malhotra. *Fauna of India, Araneae : Lycisidae*, 1(2) : 287–289.

Common name : Wolf–spiders. *Local name* : Landaga Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 15–18 mm in length, cephalothorax and legs yellowish brown, abdomen with greenish brown patches; cephalothorax longer than wide, convex, cephalic region high and narrow, anterior row of eyes procurved and medians slightly larger than laterals, posterior eyes larger, ocular quad wider behind and narrowing in front, middle of cephalothorax with conspicuous fovea; chelicerae strong; legs long and moderately strong; abdomen longer than wide anterior median half of dorsum with longitudinal lens shaped markings, ventrum pale, epigynum with median broad patch with triangular dark markings on lateral portion and median arrow shaped marking directed anterior medially, internal genitalia with pair of spermathecae continued posteriorly with short curved lateral wards and posteriorly expanded in to triangular pouch supported medially with an arrow shaped structure pointed anterior medially.

Habits and habitats : Not known.

Material examined : 1 M, 1 F, 2ys; Coll. P.P. Kulkarni, Loc. : Tulsi Lake and around, Dt. 13.xii.2001, Reg. No. I/3221.

Distribution : India : Pykar, Attakutti, Kerala; Nilgiris, Tamil Nadu; Satara, Pune, Mumbai, Nasik, Maharashtra; Dehra Dun; Mussoorie, Uttaranchal.

Genus *Pardosa* Koch

54. *Pardosa birmanica* Simon

1884. *Pardosa birmanica* Simon. *Ann. Mus. civ. stor. nat. Genova*, 20 : 333.

1980. *Pardosa birmanica* : Tikader & Malhotra. *Fauna of India, Araneae : Lycosidae*, 1(2) : 329–331.

Common name : Wolf spiders. *Local name* : Landaga Koli (Marathi), Makadi (Hindi)

Diagnostic characters : Body size smaller about 5–8 mm in length, colour dark brown to blackish brown, cephalothorax and legs dark brown, abdomen with blackish and pale patches, cephalothorax longer than wide, convex, cephalic region narrowing in front and slightly high, median area light brown with a sharp fovea, legs thin, long, spined and all with transverse greenish dark brown patches, abdomen longer than wide, oval, pointed behind, broadest behind the middle, epigynum roughly pentagonal, notched deeply on posterior margin tucked out medially, marked with a pair of minute elliptical white markings on the posterior median portion, internal genitalia complicated with a median pair of rounded spermathecae continued in to compact 'S' shaped duct laterally turning in side posteriorly and opening in middle and supported medially with 'M' shaped plate.

Habits and habitats : Inhabiting the damp area near streams and pools, feeds on smaller insects by direct attacks, female carry egg cocoons between the hind legs.

Material examined : 1 M, *Coll.* R.M. Sharma, *Loc.* : Gandhi Hill and around, Dt. 25.ix.2001, *Reg. No.* I/3213.

Distribution : India : Tamil Nadu, Andhra Pradesh, Maharashtra, Orissa, West Bengal, Magalia, Bihar, Madhya Pradesh, Gujarat, Uttar Pradesh, Rajas than, Punjab, Himachal Pradesh.

Elsewhere : Pakistan and Myanmar.

55. *Pardosa sumatrana* (Thorell)

1890. *Lycosa sumatrana* Thorell. *Ann. Mus. Stor. nat. Genova*, 30 : 136.

1980. *Pardosa sumatrana* : Tikader & Malhotra. *Fauna of India, Araneae : Lycosidae*, 1(2) : 353–355.

Common name : Wolf spiders. *Local name* : Landaga Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Smaller body ranging from 6–10 mm in length, brownish in colour, cephalothorax brown with a pale median and two lateral pale bands extending from anterior to posterior margins, a distinct fovea at the center of thoracic region, abdomen longer than wide oval pointed behind, anterior mid dorsal with lens shaped longitudinal marks, rest provided with dark brown and pale patches and black spots, epigynum broder almost hexagonal with a median plate of inverted 'T' shape and a pair of round median spots, internal genitalia with a pair of elongated and elliptical pouched spermathecae and 'S' shaped ductile on inner side.

Habits and habitats : No information available.

Material examined : 2 M, *Coll.* A.S. Mahabal, *Loc.* : Tulsi Lake and around, Dt. 17.vi.2001, *Reg. No.* I/3185.

Distribution : India : Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, West Bengal, Meghalaya, Arunachal Pradesh, Bihar, Madhya Pradesh, Gujarat, Rajasthan, Himachal Pradesh and Nicobar Islands.

Elsewhere : Nepal, Bangla Desh, Sumatra and Sri Lanka.

Genus *Lycosa* Latreille

56. *Lycosa phipsoni* Pocock.

1899. *Lycosa phipsoni* Pocock. *J. Bombay nat. Hist. Soc.*, **12** : 751.

1980. *Lycosa phipsoni* : Tikader & Malhotra. *Fauna of India, Araneae : Lycosidae*, **1(2)** : 398–400.

Common name : Wolf-spiders. **Local name :** Langada Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body large 20–25 mm in length, body colour yellowish to pale brown, darker on cephalic region, centre with conspicuous fovea and brown bands extend laterally from it, abdomen almost oval, broadest just behind of middle, pale with few brown spots present, ventral side black patch between epigastric furrow and spinnerets, epigynum almost triangular with lateral notch and black spots at the base, internal genitalia with obliquely placed minute spermathecae.

Habits and habitats : These are expert ground dwelling hunters, generally found near the streams and aquatic bodies in isolated areas. Females are known to carry their young ones on their abdomen and often sacrifice for the want of food for young ones.

Material examined : 1 M, Coll. R.M. Sharma, Loc. : Yeoor Creek and around, Dt. 18.iii.2001, Reg. No. I/3161.

Distribution : India : Maharashtra, Mumbai, Pune, Satara, and Nasik Dists.

Family CLUBONIDAE

Genus *Cheiracanthium* C. L. Koch

57. *Cheiracanthium danieli* Tikader

1975. *Cheiracanthium danieli* Tikader. *J. Bombay nat. Hist. Soc.*, **72(1)** : 43.

1991. *Cheiracanthium danieli* : Majumdar & Tikader. *Rec. zool. Surv. India*, Occ. pap. No. **102** : 69–70.

Common name : Sac spiders. **Local name :** Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 6–9 mm in length, colour light brownish green, cephalothorax longer than wide, wider and darker in front, cephalic region slightly high and moderately convex, fovea normally absent, ocular quad wider than long, anterior row slightly recurved, medians oval, pearly white and larger than laterals, posterior row longer than anterior, procurved, medians larger than laterals, both laterals contiguous; chelicerae strong,

nearly vertical, fang groove margins toothed, inner margin with 2 teeth while outer margin with 1 large tooth and other very small; legs moderately strong, spined, femora I & II dorsally spined, leg formula 1432; male palpal tibiae with long retrolateral apophysis and a curved ventral apophysis, cymbium with long and curved basal spur, tegulum rounded and convex and embolus thin and elongated; abdomen longer than wide, narrowed posteriorly, epigynum covered with round and convex plate, copulatory openings on lateral sides of the plate, internal genitalia with smaller, convoluted spermathecae, copulatory tubes short.

Habits and habitats : Females are seen very common in post monsoon months when tall grasses grow in plenty, these are seen to construct brooding nests with help of one of larger blade of these grass, nicely curved in two tier folding, stuck with the help of sticky web thread (Photo). The mother forms an egg cocoon inside this nest and stays as guard. No details are so far known about the method of such construction and other biological aspects of the developments of young ones in side such nest. The other details of feeding aspects are also unknown.

Material examined : 1 F, Coll. D.B. Bastawade, Loc. : On the way to Sasupada Dt. 27.ix.2002, Reg. No. I/3318; 2 M; Loc. : On the way to Tulsi Lake, Dt. 24.ix.2002, Reg. No. I/3320.

Disrtibution : India : Pune, Raigad and Thane Dists., Maharashtra.

58. *Cheiracanthium inornatum* Cambridge

1874. *Cheiracanthium inornatum* Cambridge. *Proc. Zool. Soc., London*, : 290.

1991. *Cheiracanthium danieli* : Majumdar & Tikader. *Rec. zool. Surv. India*, occ. pap. No. 102 : 83-84.

Common name : Sac spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 5–7 mm in length, yellowish brown in colour, cephalothorax longer than wide, cephalic region slightly convex without fovea, ocular quad longer than wide, anterior row recurved while posterior procurved, medians larger than laterals and placed contiguous. Chelicerae dark brown, both fang groove margins armed with 2 teeth each; legs long slender and leg formula 1423, tibiae and metatarsi I & II with 2-3 pairs of ventral spines; a stout and short retrolateral apophysis present on male palpal tibiae, cymbium with long spur curved outwardly, tegulum oval, embolus long slender and arises from the retrolateral portion of tegular apophysis. Abdomen oval, longer than wide, epigynum with flat and concave plate with conspicuous copulatory opening, internal genitalia with small rounded spermathecae and shorter copulatory tubes.

Habits and habitat : Unknown.

Material examined : 2 M, Coll. D.B. Bastawade, Loc. : Around Forest Nurseri area, Dt. 25.ix.2002, Reg. No. I/3324.

Distribution : India : Pune, Raigad and Thane Dists., Maharashtra.

Family GNAPHOSIDAE

Genus *Gnaphosa* Latreille

59. *Gnaphosa harpax* O. P. Cambridge

1874. *Gnaphosa harpax* O. P. Cambridge. *Proc. Zool. Soc. Lond.*, : 371.

1982. *Gnaphosa harpax* : Tikader. *Fauna of India, Araneae : Gnaphosidae*, 2(2) : 336–338.

Common name : Spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Brownish to yellowish, body ranges from 4.00 to 6.00 mm in length, cephalothorax longer than wide, blunt in front, eyes clubbed on anterior median portion and pearly white, anterior medians smallest but laterals equal, anterior row procurved while posteriors slightly recurved, maxillae bean shaped and narrowed in front, labium longer than wide; chelicerae weak, with a minute serrula at the base of delicate pointed fang, male palp globular with indistinct cymbium and paracymbium and armed with few stout spines. Abdomen barrel shaped with six pairs of closely placed sigilla on dorsal portion.

Habits and habitats : No information available.

Material examined : 2 F, 1 M (imm.) *Coll. D.B. Bastawade*, Loc. Kanheri caves and around, Dt. 30.xi.2000, Reg. No. I/ 3115; Gandhi Hill and around, Dt. 28.ii.1997, Reg. No I/2741.

Distribution : India : Raigad and Thane Dists., Maharashtra.

Family TETRABLEMIDAE

Genus *Tetrablemma* Cambridge

60. *Tetrablemma deccanensis* (Tikader)

1975. *Indonops deccanensis* Tikader, *Bull. Brit. Arach. Soc.*, 3(6) : 174–176.

Common name : Minute red spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body size 1–1.5 mm, tiny spiders with reddish brown on cephalothorax and abdomen and brownish green on legs; cephalothorax longer than wide narrowing in front, anterior end obtuse, middle region raised, conspicuous tranverse mark in the middle of cephalothorax, four elliptical pearly white eyes placed in compact group with median portion dark black, anterior pair slightly larger than posterior, in male eyes shifted posteriorly and placed just next to median mark or susa; chelicera in female simple

and smooth but in male with a prominent horn like projection; pedipalp simple in female but globular with an apical sharply pointed spine in male; legs clothed with minute hair and few spines, leg formula 1423, femur I narrow anteriorly but broader on posterior end and tarsi with strongly curved paired claws bearing four long teeth; abdomen longer than wide nearly elliptical slightly overlapping cephalothorax clothed with fine pubescence, lateral portion with four longitudinal deep brown ridges extending nearly end to end, ventral slightly lighter, epigastric fold behind middle, epigynum simple, procurved with a median arrow shaped structure, internal genitalia simple with two pairs of lateral tubes and a median short tubular structure.

Habits and habitats : Mostly inhabitants under tree barks, very active and run swiftly through narrow channels of loose barks. Some times noticed and collected from forest and farm litters, also seen under stones and pebbles during rainy season. No information about other biological particulars available.

Material examined : 1 M, Coll. D.B. Bastawade, Loc. : Sasupada to Information center, Vasai, Thane Dist. Maharashtra, under bark of wild tree along with *Triaeris poonaensis* Tikader & Malhotra, Dt. 27.ix.2002, Reg. No. I/3318.

Distribution : India : Raigad, Thane, Pune, Sangli Dists., Maharashtra.

Family OONOPIDAE

Genus *Triaeris* Simon

61. *Triaeris poonaensis* Tikader & Malhotra

1974. *Triaeris poonaensis* Tikader & Malhotra. *Oriental Insects*. 8(4) : 495-501.

Common name : Minute red spiders. *Local name* : Koli (Marathi), Makadi (Hindi).

Diagnostic characters : Body 2-3 mm in length, males slightly smaller and slender than female, colour reddish to greenish brown, cephalothorax longer than wide, smooth, clothed with few though hair, males more spiny, cephalic region narrow and slightly high, eyes six pearly white, arranged in two rows, two anteriors and posterior median eyes nearly of same size, posterior row almost straight, ocular area black, male palp simple narrowed distally in to a pair of spine like structure, abdomen longer than wide, elliptical, clothed with short darker hair, dorsal and also ventral portions covered more than 2/3rd anteriorly with scutum, epigynum simple with posteriorly pointed triangular plate with a pair of lateral rod like chitinised structure.

Habits and habitats : Invariably found under variety of tree barks along with other minute Arachnids and arthropods. Most of the life activities are completed under barks and moist soil. They are commonly seen during monsoon season of the year. Feed on minute arthropods but require confirmation.

Material examined : 4 M, 2 F, Coll. D.B. Bastawade, Loc. : Sasupada to Information center, Vasai, Thane Dist. Maharashtra, under bark of wild tree along with *Tetrablemma*

deccanensis (Tikader), Dt. 27.ix.2002, Reg. No. I/3318; Loc. : Tulsi Lake and around, SGNP, Borivali, Mumbai, Maharashtra, Dt. 27.ii.1997, Reg. No. I/2742.

Distribution : India : Pune, Raigad and Thane Dists., Maharashtra.

LIST OF THE SPECIMENS IDENTIFIED UP TO FAMILY AND GENERA

Family CTENIDAE

1. *Ctenus* sp. 1 M, 1 M Imm.

Family SALTICIDAE

2. *Rhene* sp. 1 M, 1 M Imm., 2??.
 3. *Salticus* sp. 2 M, 2 M Imm.
 4. *Phidippus* sp. 2 M Imm., 1 M spoiled.
 5. *Rhene* sp. 1 M, 1 F and 2 M Imm., 1 F Imm.

Family THOMISIDAE

6. *Thomisus* sp. 1 M, 1 F.
 7. *Misumenops* sp. 1 M.
 8. *Tibellus* sp. 1 M.

Family OXYOPIDAE

9. *Oxyopes* sp. 1 M, 1 F, 2 M Imm.
 10. *Peucetia* sp. 1 M Imm.

Family PISAURIDAE

11. *Pisaurina* sp. 2 M Juveniles.
 12. *Dendrolycosa* sp. 2 M.
 13. ? 1 M Imm.

Family ARANEIDAE

14. *Araneus* sp. 1 M.

Family LYCOSIDAE

15. *Lycosa* sp. 1 M.
 16. *Hippasa* sp. 1 M Juv., 1 F.

Family CLUBIONIDAE

17. *Cheiracanthium* sp. 1 F Juv., 1 &, 1 & Imm.

Family GNAPHOSIDAE

18. *Gnaphosa* sp. 1 F.

Family SCYTODAE

19. *Scytodes* sp. 1 M, 1 M imm., 1 M, 2 M, 1 & imm., 2 M and 1 M imm.

Family SPARASSIDAE

20. *Heteropoda* sp. 1 M imm., 2 M imm.,

Family ULOBLRIDAE

21. *Uloborus* sp. 1 M imm.

Family THERIDIIDAE

22. *Theridion* sp. (?) 1 M.

23. ? ? ? ? 1 M.

SUMMARY

This paper deals with 61 species, 35 genera, 18 families and 1 sub-family of Spiders from Sanjay Gandhi National Park, Borivali, Mumbai. These collections were made in 15 faunistic field tours undertaken by different parties of Zoological Survey of India, Western Regional Station, Pune during 1990 to 2002 and lead by different specialized scientists and staff in different field of Animal Taxonomy and Animal Collections respectively. In addition to these surveys some observations and notes made by Dharmendra Khandal, NGO, have also been incorporated and reported hitherto to up date the knowledge about araneae fauna of Sanjay Gandhi National Park. The 2 new species are described on the basis of material collected by Dharmendra Khandal, under the genus *Potyus* of the family Araneidae, the most widely distributed and commonly occurring spider family in the National Park. There are many new reports. Some specimens could not be identified up to specific status due to not having the mature specimens and the concerned literature for studying such specimens, but the list has been endorsed to have on record the authentic existence of such genera in the park area for future reference on such faunal studies to be made in future.

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ARACHNIDA : PHALANGIDA (PALPATOIRES and LANIATOIRES)

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INTRODUCTION

Phalangids or Opiliones are the uncommon arachnids rarely come across to locate and observe, even for scientific studies. They are equally secretive like other groups of arachnids such as scorpions, uropygids, amblypygi, chelonethi (Pseudo-scorpions), schizomids or solifugids. Few naturalist and zoologists have studied them in details but such studies are very old and scarce. The Indian phalangid fauna has fairly been studied by an European naturalist Roewer (1910–1958). More recently one of the major Indian phalangid group Palpatores, has been studied by Deshapande (1987) as revisionary studies of types of known species and few new discoveries. The other main groups of these animals are Laniatores and Onchopodids and Cyphophthalmi are yet to be revised taxonomically from Indian region. The data on protected areas are still unavailable on this major group of arachnids. Recently Bastawade (2002) has studied five known species of Laniatores from India belonging to the family Assamiidae, on the basis of type specimens deposited at National collection, Zoological Survey of India, Kolkata. The present communication deals with the species collected from Sanjay Gandhi National Park, Borivali, Mumbai, Maharashtra.

SYSTEMATIC LIST

Order PHALANGIDA (=Opiliones)

Sub-order PALPATOIRES

Family PHALANGIDAE

1. *Stradia maindroni* (Simon)

Sub-order LANIATOIRES

Family ASSAMIIDAE

2. *Puria dorsalis* (Roewer)

SYSTEMATIC ACCOUNT

Family PHALANGIDAE

Sub-family GAGRELLINAE

Genus *Strandia* Roewer1. *Strandia maindroni* (Simon)1827. *Gagrella maindroni* Simon. *Bull. Mus., Paris*, 3 : 296.1923. *Strandia maindroni* : Roewer. *Weberknechten der Erde.*, : 1009.1929a. *Strandia maindroni* : Roewer. *Rec. Indian Mus., Calcutta*, 31(2) : 133.1954b. *Strandia maindroni* : Roewer. *Sencken. Biol.*, 35(5/6) : 272.1987. *Strandia maindroni* : Deshpande. *Ph. D. Thesis, B. A. M. Univ., Aurangabad*, : 213–217.*Common name* : Daddy-long legs. *Local name* : Zad zankar.

Diagnostic characters : Cephalothorax 4.23 mm long, body color brown with a pair of longitudinal yellow patches, supra-cheliceral lamellae smoother dorsally with a median apical tooth on a pair of short lamellae. Cephalothorax granular and ocularium toothed basally with 9–10 denticular tubercles. Chelicerae yellow, smooth, movable and immovable fingers with carinae of dark brown color. Pedipalp with elongated yellow femur with row of denticulate tubercles on ventral margin but smooth dorsally; patella with smaller tubercles and ventrally smooth; tibia ventrolaterally with few tubercles; legs slender long, coxa granular with distinct marginal humps, femur longer than the body armed with smaller tubercles on both the margins, patella apically with fine, short and sharp tubercles, tibia armed with teeth, tarsal segment smooth and claw simple. Female : ovipositor with long slit sensilla, seminal receptacle with long primary loop above which a long basal loop. Male : penis short and stout, glans very narrow and cylindrical, tip pointed and protruding, stylus medially broader and basally narrow.

Habits and habitats : These were found to inhabit, in the state of clinging in very large numbers, on the roadside out crop rocks near to the Tulsi Lake (pl. see Photo) in the months of Nov. 2000. The rocks were also covered with half dried up short grasses with loose roots. The phalangids thus inhabiting were difficult to locate for observations and collection. Dr. Rane has also collected the same species in huge numbers from under the tree barks near the nalha at film city, Goregaon in the month of May 1996. Nothing is known for their other biological aspects.

Material examined : 1 M and 1 F, *Coll.* D. B. Bastawade, *Loc.* : On the way to Tulsi Lake, near Forest Nursery and around, Date 28.xi.2000, Reg. No. I/3126, were selected and dissected for internal genitalial studies and identification. More than 100 specimens were available from this locality, 1M. *Loc.* : Near by places around Lion Safari Park, Date 27.xi.2000, Reg. No. I/3124; 1 M *Loc.* : Kanheri Caves and around, Date 30.xi.2000, Reg.

No. I/3126. > 70 M and F Coll. P. D. Rane, Loc. : Nalha near Film City, Goregaon, under the tree barks, Date 29.v.1996, Reg. No. Nil.

Distribution : India : Mahabaleswar, Satara Dist., Matheran, Dist. Raigad and Sanjay Gandhi National Park, Borivali, Dist. Mumbai, Maharashtra.

Family ASSAMIIDAE
Sub-family POLYCORIPHINAE

Genus *Puria* Roewer

2. *Puria dorsalis* (Roewer)

1914. *Assamia dorsalis* Roewer. *Arch. Natur.*, 80A(9) : 106–132.

1923. *Puria dorsalis* : Roewer. *Die Weber. Erde.*, : 1116.

2002. *Puria dorsalis* : Bastawade. *J. Bombay nat. Hist. Soc.*, 99(3) : 455–466.

Common name : Daddy-long-legs. *Local name* : Zad-zankar (Hindi).

Diagnostic characters : Cephalothorax 5.17 mm long, body yellowish orange and light yellow on appendages, dorsum finely granular, more granular on anterior portion, anterior margin with 5 spines, one median and a pair on anterior-lateral portion, ocularium wider than long, raised, granular and with a pair of small tuberculate spines, Area II, III and V with a pair of spines, tegites granular and last tergite bears 10–12 small tuberculate spines; ovipositor roughly elliptical shape bearing spines on anterior, lateral and anterior narrowed portion. Male penis expanded on 1/3rd anterior portion and narrowed anteriorly, sub apical expanded portion bears rim of short spines; Chelicera three segmented, first segment bulging on anterior dorsal portion, basal segment with 7+2 ventral 3+3 outer setae at the base of movable finger, 4+4 on outer fontal surface and 3 inner /mesal setae at the base of immovable finger, movable finger armed with a serrula of 8 minute teeth on inner margin, immovable finger armed with 7 broader cutting teeth. Palp slightly longer than cephalothorax, trochanter short, granular and carinated, femur laterally flat, carinated and 13–15 granules denticulate on anterior margin, patella shorter than femur, carinated, inner carinae with 4–6 denticulate tubercles, tibia longer than patella but shorter than femur, almost quadrangular, inner surface flat, marginated with strong but obsolete carinae and outer carinae provided with large pointed apophysis and few spines and tubercles supporting apophysis, metatarsus shorter than tibia, more flat, widened on outer portion with 2 longer, 2 moderate and 4–5 smaller spines in series, tarsus spined, elongated, sharp, curved and shorter than metatarsus. Leg formula 6(4+2), 12(9+3), 7(4+1+2), 7(4+1+2).

Habits and habitats : Inhabitants of forest area of park, normally noticed under stones and some times under tree barks but prefer to live in slightly humid climate. Other biological details not available.

Material examined : 2 M, Coll. D. B. Bastawade, Loc. : Gandhi Smarak and around, SGNP, Borivali, Dist. Mumbai, Maharashtra, Dt. 25.ii.2001, Reg. No. I/3213.

Distribution : India : Ratnagiri, Satara and Mumbai Dists., Maharashtra and Puri Dist., Orissa.

SUMMARY

Two species under two family and two genera are studied and described here from the S.G.N.P.

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