

### **BIOINVENTORY OF THE STUDY AREA**

Surprisingly, scientists have better understanding of how many stars are there in the galaxy than how many species are there on Earth. The problems stemming from the limits of current knowledge of species diversity are compounded by the lack of a central database or list of the world's species.

The present investigation was aimed at understanding the faunal diversity of Shoolpaneshwar Wildlife Sanctuary (SWS), a forest biotope. The area is about 200 km away from Baroda and the exploration of the area was undertaken by arranging regular field trips. Each trip lasted for 6-10 days and was arranged in such a way that it covered the entire area in different seasons i.e. winter, summer and monsoon. The survey was conducted during 1990-1994. All these studies were carried out by camping at Dediapada and Sagai forest guest houses. Sagai guest house, being situated almost in the centre of the sanctuary, was an ideal camp site to have an access to all parts of the SWS.

During each trip, field notes pertaining to the topography, vegetational types and the associated animal lives were prepared. The identification of the plants was mainly done by comparing the collected plant parts with the herbarium prepared from the same area by Pradeepkumar (1993). The identification of various animal groups was done

using standard reference books and published articles (Blanford and Godwin Austen, 1908; Brunetti, 1912; Fowler, 1912; Preston, 1915; Arrow, 1917; Gude, 1921; Baker, 1922-30; Harding and Moore, 1927; Cameron, 1932; Ali, 1956; Daniel and Shull, 1963; Maxwell, 1971; Kalyanam, 1973; Ali, 1979; Patel and Chhaya, 1979; Nayar *et al.*, 1981; Daniel, 1983; Ali and Ripley, 1983a; Jhingran, 1983; Tikader, 1987; Prater, 1989; Ayyar and Ananthakrishnan, 1991; Daniel and Sekar, 1991; Grewal, 1993). The specimens which could be collected especially insects, spiders, fishes, amphibians and some reptiles were confirmed by matching with the authentic specimens of the Zoological Survey of India, Calcutta.

### LOCATION

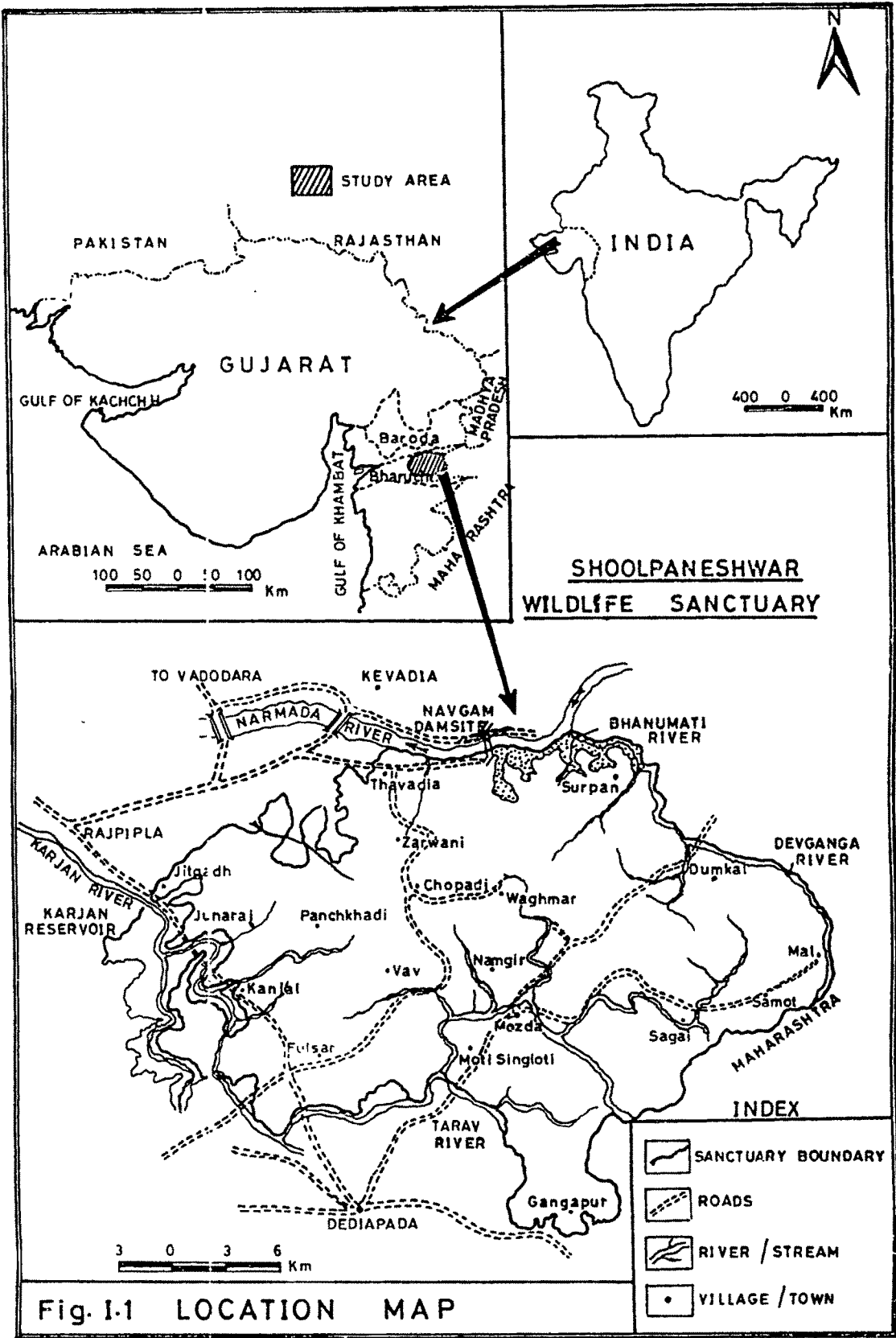
The Shoolpaneshwar Wildlife Sanctuary is located in Dediapada taluka of Bharuch District in Gujarat State. This area, a part of Rajpipla Forests, was earlier known to naturalists as Dumkhal Sloth bear Sanctuary. The sanctuary got the name after the famous Shiva temple—'Surpan' situated on the banks of River Narmada. The SWS is located between 73° 32' and 73° 54' E and 21° 34' and 21° 52' N. The nearest town, Rajpipla is about 110 km away from Dediapada in the northwest direction (Figure.1.1).

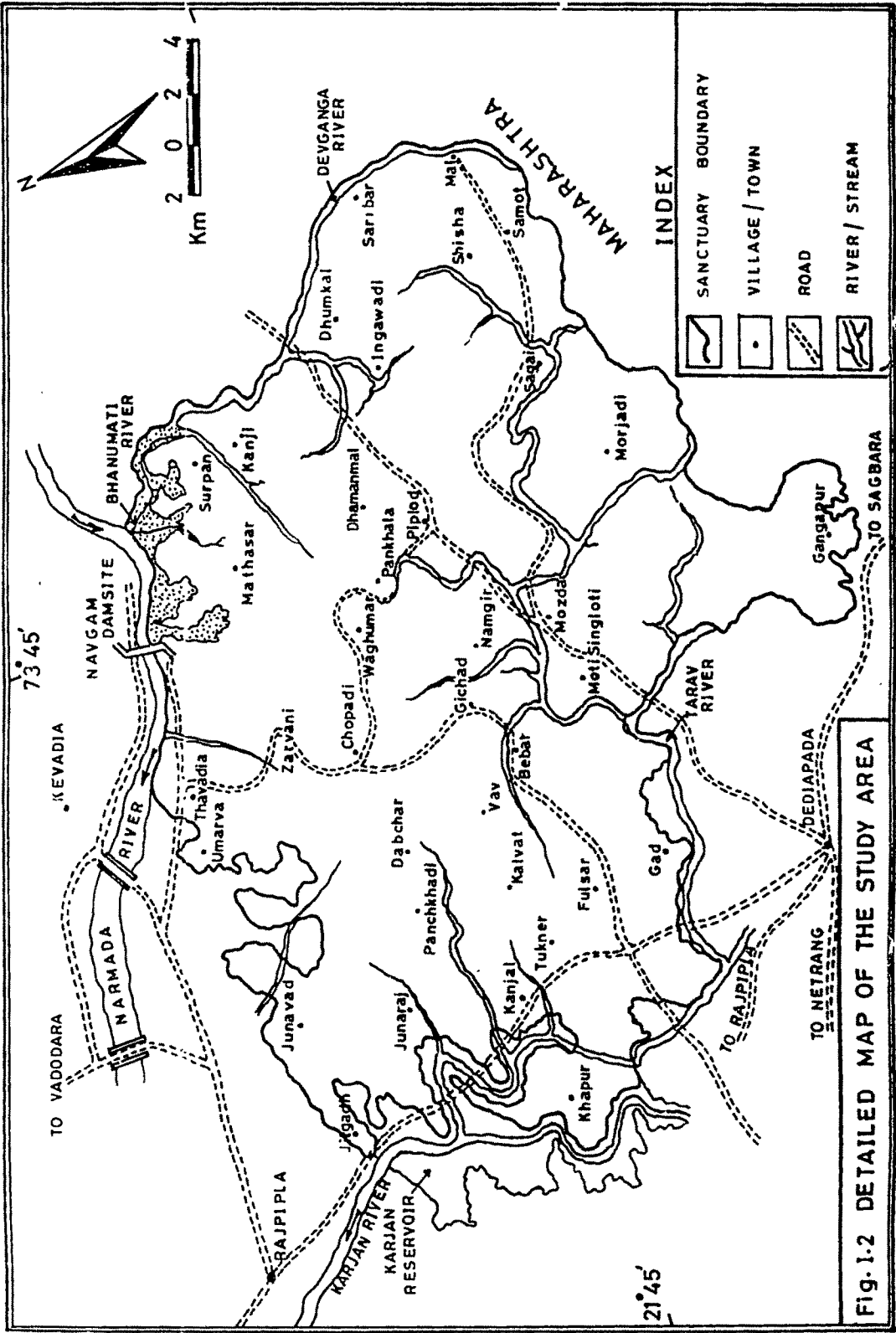
### PHYSIOGRAPHY

The sanctuary is situated at the confluence of the western end of Satpura range with Western Ghats. It is a hilly terrain with large number of valleys and gorges and covers an area of 675 sq. km (this includes 68 sq. km revenue land). The hills range in height between 400 and 882 meters, and the highest hill 'Dhamanmal' is situated in Piplod range. The area is very important because it forms the catchment zone of the Karjan reservoir and the proposed Sardar Sarovar reservoir, coming up on the Narmada river in Gujarat.

On its west, the sanctuary is bordered by Karjan reservoir and its eastern boundary runs along the Devaganga river. On the north and northwestern side, the Sardar Sarovar will come up and a small portion of the sanctuary may get submerged, once the reservoir attains its full capacity. The south, southwestern and southeastern boundaries slowly merge into more populated areas of Sagbara forest division (Figure 1.2).

Numerous small streams arise from the mountain tops which form tributaries of rivers that ultimately run into Karjan and Narmada rivers. The major river Tarav and its





tributaries meander through the area crisscrossing the SWS. Thus, the steep hilly terrain is cut up by small rivers, rivulets and streams.

## **GEOLOGY AND SOILS**

The study area falling within the lower Narmada valley, geologically includes the Precambrian basement made up of metamorphics and granites, cretaceous Bagh Beds and their freshwater equivalents, the Lameta Beds, Deccan Trap and associated intrusives, Tertiary sedimentary deposits and Quaternary alluvium (Deota, 1991). The Deccan Traps are the main geological formations encountered in the lower Narmada valley. The major geological formations in their sequence of deposition, met within the study area, are the Bagh Beds comprising of sandstones and limestones, the Deccan Trap lava flows and alluvial deposits. The Deccan basalts of the area comprise of hard, compact, porphyritic and amygdaloidal varieties in association with andesite and trachyte. The sub-aerial weathering of the basalts have given rise to lateritic rocks in some parts, mostly occurring as a thin cover of lateritic soil. Rich black soil formed from weathered Deccan Trap Bagh Beds occur in some parts of the SWS (near Surpan), where the soil is sandy. The characteristic physiography of this area is the result of the horizontal to sub-horizontal Deccan Trap lava flow basalts, the Bagh limestones and sandstones and the alluvial deposits. The humid and moist soil conditions have created innumerable loose gravels of basaltic material and coarse sand.

## **CLIMATE**

### **RAINFALL**

During monsoon, due to the high rising Satpura peaks, the moisture laden clouds coming from the southwest are trapped, allowing more precipitation in the region around Satpura on the left bank of Narmada, especially the SWS. The average annual rainfall ranges between 777-1590 mm (Table 1).

### **TEMPERATURE**

The data of temperature for the last five years (Table 2) indicate that it ranges from 15-20° C minimum to 30-40° C maximum.

Table 1 Rainfall recorded\* during 1990 to 1994.

October 1990	1049 mm
October 1991	777 mm
October 1992	1181 mm
November 1993	1139 mm
September 1994	1590 mm

\* Source: Taluka Headquarter, Dediapada.

Table 2 Mean maximum and minimum temperature (in ° C) recorded\* during 1990-1994.

Year	Minimum	Maximum
1990	17	36
1991	20	40
1992	18	34
1993	16	33
1994	15	30

\* Source: Taluka Headquarter, Dediapada.

## VEGETATION

According to Champion and Seth's revised system of classification, the forests in this area could be placed in two major types viz. moist mixed deciduous and dry mixed deciduous (Champion and Seth, 1968).

### MOIST MIXED DECIDUOUS FOREST (Plate I a & b)

This type of forest is generally confined to the valleys and plains having good soil moisture. The canopy cover is almost closed and the leafless period begins by the end of the cold season. The floristics mainly include tree species viz. *Terminalia crenulata*, *Adina cordifolia*, *Tectona grandis*, *Mitragyna parvifolia*, *Dalbergia latifolia*, *Hymenodictyon excelsum*, *Lagerstroemia lanceolata*, *Anogeissus latifolia*, *Bridelia retusa* and *Albizia lebbek*. The middlestorey is occupied by *Butea monosperma*, *Holarrhena antidysenterica*, *Meyna laxiflora*, *Randia brandisii*, *Ougeinia oojeinensis* and *Bauhinia racemosa*. The understorey mainly consists of small shrubs, undershrubs and herbs including grasses. It is represented by *Azanza lampas*, *Helicteres isora*, *Desmodium gangeticum*, *Moghinia strobilifera*, *Eranthemum roseum*, *Carvia callosa* and *Pogostemon parviflorus*. The ground cover mainly consists of *Sida cordata*, *Neuracanthus sphaerostachys*, *Haplanthus verticillatus* and *Achyranthes aspera*. This ground cover and understorey are more prominent during the monsoon. *Ventilago denticulata*, *Combretum ovalifolium*, *Phanera integrifolia*, *Pueraria tuberosa*, *Cryptolepis buchanani*, *Cocculus hirsutus*, *Dioscorea bulbifera*, *Abrus precatorius* and *Ampelocissus latifolia* are the major climbers.

### DRY MIXED DECIDUOUS FOREST (Plate II a & b)

It is commonly found in areas with poor soil cover and heavy biotic pressure. Floristics include trees such as *Tectona grandis*, *Anogeissus latifolia*, *Garuga pinnata*, *Lannea coromandelica*, *Mitragyna parvifolia*, *Pterocarpus marsupium* and *Madhuca indica*. The middlestorey consists of *Butea monosperma*, *Holarrhena antidysenterica*, *Aegle marmelos* and *Emblica officinalis*. The understorey consists of *Helicteres isora*, *Azanza lampas*, *Nyctanthes arbotristis* and *Kirganelia reticulata*. Ground cover is occupied by *Sida cordata*, *Triumfetta rhomboidea*, *Borreria stricta*, *Haplanthus verticillatus* and *Indoneesiella echioides*. Climbers mainly include *Combretum ovalifolium*, *Ventilago denticulata*, *Celastrus paniculata* and *Abrus precaritorius*.

Plate I a



Plate I b



Plate I a & b. Moist mixed forest patches of the sanctuary.



Plate II a. Dry mixed deciduous forest near Waghumar.



Plate II b. A view of dry mixed deciduous forest near Bhilvasi.



A few epiphytes and parasites such as *Vanda tessellata*, *Dendrophthoe falcata*, *Viscum articulatum* and *Cuscuta reflexa* are commonly met with. *Aeginetia indica* is also found but rarely.

However, during monsoon and post-monsoon periods (up to October), the undergrowth becomes more prominent and the entire area of the sanctuary gives the impression of a semi-evergreen type of forest. *Tacca leontopetaloides*, *Amorphophallus commutatus*, *Curcuma inodora*, *Euphorbia acaulis*, *Impatiens balsamina*, *Canscora diffusa* and *Curculigo orchioidea* are observed in large numbers during the monsoon.

Some localities in the sanctuary viz. Chopadi, Waghumar, Kanjal, Vav, Kalvat, Tukner and Dabchar represent the least disturbed forests with a 70% dominance of bamboo. *Tectona grandis*, *Anogeissus latifolia*, *Terminalia crenulata*, *Morinda tomentosa*, *Grewia tiliaefolia*, *Dalbergia latifolia* and *Mitragyna parvifolia* are the major associates. These localities form the core of the sanctuary and can support a rich fauna.

The peripheral areas of the sanctuary are under heavy biotic pressure. Areas such as Mal, Samot, Budi, Sakva, Bhilvasi, and Umarva represent severely deteriorated systems where the natural vegetation cover is replaced by agricultural crops and anthropogenic weeds. Some scattered trees of *Tectona grandis*, *Madhuca indica* and *Mangifera indica* are seen growing in these areas. Tree species such as *Mangifera* and *Madhuca* are often planted by local tribal population around their huts and agricultural fields.

#### RIVERINE VEGETATION (Plate III a & b)

A number of streams and rivulets present in the area support a luxuriant vegetation which show clear-cut zonations. Different species found on the banks and slopes are *Derris indica*, *Ficus racemosa*, *Ficus hispida*, *Vitex negundo*, *Syzygium cumini*, *Dendrocalamus strictus* and *Tectona grandis*. On the river bed, plants such as *Tamarix ericoides*, *Hemionia riparia*, *Polygonum glabrum*, *P. plebeium*, *Sphaeranthus indicus*, *Cyperus* spp., *Hygrophyla auriculata*, *Ammannia baccifera* and *Vernascum chinense* are generally present. Plants such as *Physalis longifolia*, *Heliotropium supinum* and *Cochlearia cochlearioides* are found occasionally.

The degradation in the sanctuary has started from the periphery and extends towards the interior. In the interior areas the tribals have cleared the forest lands and practice primitive agriculture. This has led to the shrinkage of the habitat and some plant



Plate III a. Riverine vegetation near Kanjal.



Plate III b. Another example of riverine vegetation near Shisha.



species show restricted distribution. Plants such as *Melia composita*, *Miliusa tomentosa*, *Terminalia arjuna*, *Phanera integrifolia*, *Schrebera swietenoides*, *Impatiens kleinii*, *Securinega virosa*, *Baliospermum montanum*, *Mallotus philippensis*, *Oroxylum indicum*, *Tacca leontopetaloides*, *Careya arborea*, *Begonia crenata*, *Cylista scariosa* and *Colebrookea oppositifolia* are not frequent in their distribution and are limited to some pockets, while plants like *Radermachera xylocarpa* (Kokati and way to Shisha), *Paracaryum coelestinum*, *Aeginetia indica* (Shisha), *Firmiana colorata*, *Buchanania laonzan* (Waghumar), *Butea parviflora*, *Physalis longifolia* (Tukner) and *Dillenia pentagyna* (between Gichad and Chopadi) are very rare in the area.

The presence of plants such as *Dillenia pentagyna* and *Careya arborea* that represent climax vegetation, clearly indicates the existence of good forest in the recent past and also the fact that the area still has the potential to support a good forest if properly managed.

The field studies and floristic analysis clearly suggest that the area supports a good diversity of plant species. The diversity is represented at all levels of plant forms and the area therefore, can serve as a good natural habitat for a wide variety of wildlife.

The forests show a fairly good vegetation cover. Areas in the interiors of the Shoolpaneshwar Wildlife Sanctuary are well preserved because of rough terrain and less of biotic interference, while the northern part of the sanctuary represented by localities viz. Surpan, Shekbar, Thavadia and Zarvani exhibit degraded status. In the earlier works (Singh 1969; Patel 1971), the description of vegetation and the floristic composition of these areas showed presence of a close canopy and a diversity of plant species. The upper storey mainly consisted of *Tectona grandis*, *Anogeissus latifolia*, *Garuga pinnata* and *Boswellia serrata*. The codominants included plants like *Cassia fistula*, *Diospyros melanoxylon*, *Mitragyna parvifolia* along with *Ailanthus excelsa*, *Cochlospermum religiosum*, *Lagerstroemia lanceolata*, *Miliusa tomentosa* and *Sterculia urens*. The middle storey was represented mainly by *Alangium salvifolium*, *Butea monosperma*, *Holarrhena antidysenterica*, *Wrightia tomentosa* and *Nyctanthes arbortristis* and occasionally by *Acacia chundra*, *Bauhinia racemosa* and *Zizyphus xylopyra*. Plant species viz. *Flacourtia indica*, *Gardinia turgida*, *Elaeodendron roxburghii* and *Maytenus emarginata* were reported having restricted distribution. During monsoon and post-monsoon seasons the undergrowth mainly consisted of *Azanza lampas*, *Desmodium*

*gangeticum*, *Leea indica*, *Neuracanthus sphaerostachys*, *Peristrophe bicalyculata*, *Echinochloa colonum*, *Chloris barbata* and *Apluda mutica*.

At present, the above mentioned localities of the sanctuary exhibit progressively deteriorated status as one moves towards the periphery. The hillocks and the surrounding plains have been cleared of its vegetation cover, and only scattered trees of *Tectona grandis* and a few other plant species mentioned above along with coppices of *Butea monosperma* are seen. The slopes of the hillocks that have been cleared off, show the presence of *Nyctanthes* only. Tree species of both the upper and middle stories are more or less absent. The removal of tree cover has resulted in the creation of large opening and the hillocks therefore, do not support the luxuriant undergrowth of shade-loving plants, and the same has been replaced by plant species viz. *Tephrosia*, *Cleome*, *Indigofera*, *Crotalaria*, *Borreria*, *Achyranthes*, *Vicoa*, *Celosia*, *Alysicarpus*, *Triumfetta* and grasses like *Digitaria*, *Eragrostis*, *Cynodon* and *Heteropogon* that also include some anthropogenic ones. Open areas near the foothills that have been cleared are inhabited by tribals. Near the inhabitation *Madhuca*, *Mangifera*, *Borassus*, *Moringa* and *Delonix* are planted and cultivation of rain fed crops is practiced on the surrounding plains. It is feared that similar deterioration may make further inroads into the interior of the sanctuary, if suitable measures are not taken in time.

## FAUNA OF STUDY AREA

### INVERTEBRATE FAUNA

The SWS supports a large number of invertebrates and the major groups include insects and spiders. The richness of invertebrate fauna in the area can be attributed to a fairly good forest cover with large number of flowering plants, moisture availability and less human interference.

#### 1. Annelids

Annelids constitute only one percent of the total invertebrate species recorded. They include three species of earthworms and a species of leech. The earthworms are seen in loose and moist soil. It is well known that the earthworms are economically important since they help in increasing aeration and maintaining the fertility of the soil. They also form the food material for various birds and animals, and thus constitute an important food link in the chain operating in terrestrial environment (Table 3).

Table 3. List of Annelids collected from the study area.

<b>PHYLUM</b>	<b>: ANNELIDA</b>
<b>CLASS</b>	<b>: OLIGOCHAETA</b> (Earthworms)
<b>ORDER</b>	<b>: OPISTHOPORA</b>
<b>FAMILY</b>	<b>: LUMBRICIDAE</b>
1.	<i>: Glyphidrilus tuberosus</i> (Steph.)
<b>FAMILY</b>	<b>: MEGASCOLECIDAE</b>
2.	<i>: Perionyx excavatus</i> (Perr.)
3.	<i>: Megascolex mauritii</i>
<b>CLASS</b>	<b>: HIRUDINEA</b> (Leeches)
<b>ORDER</b>	<b>: RHYNCHOBDELLIDA</b>
<b>FAMILY</b>	<b>: GLOSSIPHONIDAE</b>
4.	<i>: Glossiphonia complanata</i> (Linn.)

## 2. Arthropods

Insects form the predominant group of invertebrates in the SWS area. They include pests, pollinators and predators. The major pollinators are butterflies, moths, a few dipterans and hymenopterans. Spiders are the second largest group of invertebrates recorded in the SWS area. They play an important role in limiting the population of insects. The high population density and diversity of insects and spiders in the SWS indicate the least usage of pesticides in the region. The presence of high number of honey bee colonies indicates the availability of flowers throughout the year in the region. The insect diversity in SWS also indicates the diversity of plants in the area as most of the flowers are adapted to attract specific pollinators. The other members of the phylum arthropoda include two species of millipedes, one species of scorpion, prawns, shrimps and crabs (Table 4).

## 3. Mollusks

The fresh water mollusks belong to two main classes viz. the bivalves of which mussels are the best known and the gastropods to which snails belong. Both these groups are present in the sanctuary area (Table 5). They are filter feeders, phytophagous or detritivorous and occupy second trophic level in the food chain. Aquatic gastropods such as *Limnaea*, *Planorbis* and *Melanides* are the chief source of food for birds such as sandpipers, herons, lapwings.

## VERTEBRATE FAUNA

### 1. Fishes

In SWS there are several streams and rivulets. Apart from these, the sanctuary has large water courses on three sides that support commercial fishery. The streams and rivulets inside the sanctuary have only small sized non commercial varieties of fish. The tribals collect these fishes by using nets made out of cloth or with the help of specially made bamboo traps. The catch is niggardly and fails to supplement the diet of the tribals. Piscivorous birds such as kingfishers, egrets, fishing eagles and barn owls also catch these small fish. In all 17 species of fishes were collected from the area (Table 6).

### 2. Amphibians

The SWS is very rich in amphibians. Total 19 representatives of amphibians were

Table 4 List of Arthropods collected from the study area

<b>PHYLUM</b>	<b>: ARTHROPODA</b>
<b>CLASS</b>	<b>: CRUSTACEA</b>
<b>ORDER</b>	<b>: DECAPODA</b>
1.	: <i>Macrobrachium rosenbergii</i> (De Man.)
<b>FAMILY</b>	<b>: ATYIDAE (Shrimps)</b>
2.	: <i>Caridina nilotica</i> (Roux.)
<b>FAMILY</b>	<b>: POTAMONIDAE (Crabs)</b>
3.	: <i>Paratelphues (Brytelphusa) jaquemonti</i> (Rathbun)
<b>CLASS</b>	<b>: MYRIAPODA</b>
<b>ORDER</b>	<b>: DIPLOPODA</b>
<b>SUB-ORDER</b>	<b>: CHILOGNATHA</b>
4.	: <i>Spirostreptus</i> sp.
5.	: <i>Polydesmus</i> sp.
<b>ORDER</b>	<b>: CHILOPODA</b>
6.	: <i>Scolopendra</i> sp.
<b>CLASS</b>	<b>: INSECTA</b>
<b>SUB-CLASS</b>	<b>: APTERYGOTA</b>
<b>ORDER</b>	<b>: THYSANURA</b>
<b>FAMILY</b>	<b>: LEPISMATIDAE</b>
7.	: <i>Lepisma sacchirina</i>
8.	: <i>Lepisma collaris</i> (Fabr.)
<b>ORDER</b>	<b>: COLLEMBOLA</b>
<b>FAMILY</b>	<b>: PODURIDAE</b>
9.	: <i>Achorutes armatus</i>
<b>SUB-CLASS</b>	<b>: PTERYGOTA</b>
<b>DIVISION</b>	<b>: EXOPTERYGOTA</b>
<b>ORDER</b>	<b>: EPHEMEROPTERA</b>
<b>FAMILY</b>	<b>: EPHEMEROPTERIDAE</b>
10.	: <i>Ephemera</i> sp.
<b>ORDER</b>	<b>: ODONATA</b>
<b>SUB-ORDER</b>	<b>: ANISOPTERA</b>
<b>FAMILY</b>	<b>: LIBELLULIDAE</b>
11.	: <i>Onychothemis testacea</i> (Ris.)
12.	: <i>Orthetrum testaceum testaceum</i> (Brum)
13.	: <i>Orthetrum glecum</i> (Braver)
14.	: <i>Pentala flavensis</i> (Fabr.)
15.	: <i>Trithemis festiva</i> (Ramr)



- FAMILY : COMPHIDAE  
 16. : *Gomphus* sp. (Club tail)  
 17. : *Mesogomphus lindgreni* (Farses.)  
 FAMILY : AESHNIDAE  
 18. : *Aeshna* sp.  
 19. : *Anax* sp.  
 SUB-ORDER : ZYGOPTERA  
 FAMILY : LESTIDAE  
 20. : *Oriestes* sp.  
 FAMILY : COENAGRIIDAE  
 21. : *Argia* sp. (Damers)  
 22. : *Enallagma* sp. (Blues)  
 FAMILY : PLATYCNEMIDAE  
 23. : *Copera annulata* (Selys)  
 ORDER : ORTHOPTERA  
 SUB-ORDER : ENSIFERA  
 FAMILY : TETTIGONIIDAE  
 24. : *Conocephalus indicus* (Redt.)  
 25. : *Holochlora albida*  
 26. : *Liogryllus bimaculatus* (de G)  
 FAMILY : GRYLLIDAE  
 27. : *Ceuthophilus* sp. (Cave Cricket)  
 28. : *Gryllus bimaculatus* (Field Cricket)  
 29. : *Gryllus domesticus* (House Cricket)  
 30. : *Oecanthus indicus* (Sauss.) (Tree Cricket)  
 31. : *Nemobius* sp. (Ground Cricket)  
 FAMILY : GRYLLOTALPIDAE  
 32. : *Gryllotalpa africana* (Pal.B) (Mole Cricket)  
 FAMILY : TETRIGIDAE  
 33. : *Acridium* sp. (Pygmy locust)  
 SUB-ORDER : CAELIFERA  
 FAMILY : ACRIDIDAE  
 34. : *Acridium melanocorne* (Grasshopper)  
 35. : *Acrida exaltata*  
 36. : *Chrotogonus lugubris* (Bl.)  
 37. : *Cytacanthacris tatarica* (Linn.) (Blackspotted Grasshopper)  
 38. : *Hieroglyphus furcifer* (Fabr.) (Rice Grasshopper)  
 39. : *Tetartodus monticollis* (GR.) (Giant Grasshopper)  
 40. : *Tyrotropidus didymus*

- FAMILY : PYRGOMORPHIDAE  
 41. : *Atractomorpha crenulata*  
 42. : *Poecilocerus pictus* (Fabr.)  
 ORDER : PHASMIDA  
 FAMILY : PHASMATIDAE  
 43. : *Carausius* sp. (Stick insect)  
 ORDER : DERMAPTERA  
 SUB-ORDER : FORFICULINA  
 FAMILY : LABIDURIDAE  
 44. : *Forcipula indica* (Brindal)  
 45. : *Forcipula trispinosa* (Dohrn)  
 ORDER : EMBIOPTERA  
 FAMILY : EMBIIDAE  
 46. : *Embia* sp.  
 ORDER : DICTYOPTERA  
 SUB-ORDER : BLATTARIA (Cockroaches)  
 FAMILY : BLATTELIDAE  
 47. : *Blatta germanica* (Linn.)  
 48. : *Periplaneta americana* (Linn.)  
 FAMILY : EPILAMPRIDAE  
 49. : *Stictolampra plicata* (Nava's)  
 SUB-ORDER : MANTODEA  
 FAMILY : MANTIDAE (Praying Mantis)  
 50. : *Deiphobe ocellata*  
 51. : *Gongylus gongyloides* (Linn.)  
 52. : *Hierodula coarctata* (West.)  
 53. : *Humbertiella indica* (Ss.)  
 ORDER : ISOPTERA  
 FAMILY : TERMITIDAE (Termites)  
 54. : *Microtermes obesi*  
 55. : *Odontotermes obesus*  
 ORDER : HEMIPTERA  
 SUB-ORDER : HOMOPTERA  
 FAMILY : CICADIDAE  
 56. : *Platypleuro mackinnoni* (Dist.)  
 57. : *Platypleuro octoguttata* (Fabr.)  
 FAMILY : JASSIDAE  
 58. : *Idocerus atkinsoni* (Leth.)  
 59. : *Idocerus clypealis* (Leth.)  
 60. : *Idocerus niveosparsus* (Leth.)  
 61. : *Nephotettix bipunctatus* (F.)

- FAMILY : APHIDIDAE
62. : *Aphis adusta* (Zehnt.)
63. : *Aphis brassicae* (Linn.)
64. : *Aphis gossypii* (Glove.)
65. : *Aphis craccivora* (K.)
66. : *Myzux persicae* (Sulz.)
67. : *Nyzus nerii* (Boyr.)
- FAMILY : FULGORIDAE
68. : *Pyrilla perpusilla* (Wlk.) (Cane leaf hopper)
- FAMILY : MEMBRACIDAE
69. : *Oxyrhachis tarandus* (Fabr.) (Tree hopper)
- SUB-ORDER : HETEROPTERA
- FAMILY : REDUVIIDAE
70. : *Brassivola hystrix*
71. : *Harpactor costalis* (Sal.)
72. : *Harpactor fusipes* (Fabr.)
- FAMILY : COREIDAE
73. : *Acanthocephala femorata* (Fabr.)
74. : *Anoplocemis phasiana* (Fabr.)
75. : *Cletus rubidiventris* (west.)
76. : *Homoeocerus inoratus* (Stal.)
77. : *Homoeocerus prominulus* (Dal.)
78. : *Petillia lobipes* (west.)
79. : *Serantha augur* (Fabr.)
- FAMILY : PYRHOCORIDAE
80. : *Dysdercus singulatus* (F.) (Red Cotton bug)
- FAMILY : NOTONECTIDAE
81. : *Enithares templetoni* (Kirby.) (Back swimmer)
- FAMILY : GERRIDAE
82. : *Gerris spinole* (Leth.) (Waterstrider)
- FAMILY : HYDROMETERIDAE
83. : *Hydrometra vittata* (Stal.) (Marsh treader)
- FAMILY : PENTATOMIDAE
84. : *Antestia anchora* (Thunb.)
85. : *Erthesina fullo* (Thunb.)
86. : *Erthesina* sp.
87. : *Halyomorpha picus*
88. : *Placosternam dama*
- FAMILY : LYGAEIDAE
89. : *Dieuches leucoceras* (Wlk.)
90. : *Pamera vincta* (Say.)

- FAMILY : BELOSTOMATIDAE  
 91. : *Sphaerodema molestum* (Duff.)  
 FAMILY : NEPIDAE  
 92. : *Laccotrephes maculatus* (Fabr.) (Water scorpion)  
 93. : *Ranatra filiformis* (Fabr.) (Water boatman)  
 FAMILY : HENICOCEPHALIDAE (ENICOCEPHALIDAE)  
 94. : *Henicocephalus basalis* (west.)  
 ORDER : THYSANOPTERA  
 SUB-ORDER : TEREBRANTIA  
 FAMILY : THIRIPIDAE  
 95. : *Scirtothrips dorsalis* (H.)  
 96. : *Thrips tabaci* (L.)  
 DIVISION : ENDOPTERYGOTA  
 ORDER : NEUROPTERA  
 SUB-ORDER : PLANIPENNIA  
 FAMILY : MYRMELEONTIDAE  
 97. : *Dendroleon* sp.  
 98. : *Myrmeleo singulare* (west.) (Antlion)  
 FAMILY : ASCALAPHIDAE  
 99. : *Ascalaphus* sp.  
 100. : *Helicomitus dicax* (Antlion)  
 ORDER : COLEOPTERA  
 SUB-ORDER : ADEPHAGA  
 FAMILY : CARABIDAE  
 101. : *Anthia sexguttata* (Ho.) (Sixspotted Beetle)  
 102. : *Bembidion extratum*  
 103. : *Bembidion kara* (Andr.)  
 104. : *Pheropsophus catoire* (De jean) (Bombardior Beetle)  
 FAMILY : DYTISCIDAE (Diving Beetles)  
 105. : *Cybister confusses* (Shp.)  
 106. : *Cybister tripunctatus* (Var-Asciatus) (Shp.)  
 FAMILY : GYRINIDAE  
 107. : *Dineutes indicus* (Aube) (Whirligig beetle)  
 SUB-ORDER : POLYPHAGA  
 FAMILY : MELOLONTHIDAE  
 108. : *Hollotricha serrata* (Cockchafer)  
 FAMILY : CERAMBYCIDAE  
 109. : *Acanthophorus serraticornis* (Olive)  
 110. : *Apomecyna* sp.  
 111. : *Bactocera rubra* (Linn.)  
 112. : *Coleosterna* sp.  
 113. : *Hypoeshrus indicus* (Gahan)

- FAMILY : BUPRESTIDAE
114. : *Chrysochora chinensis* (C & G)
115. : *Chrysochora mutabilis* (Olive)
116. : *Psiloptera fastuosa*
117. : *Sternocera chrysidoides* (C & G)
- FAMILY : TENEBRIONIDAE
118. : *Platynotus perforatus* (Muls.)
119. : *Gonocephalum* sp.
- FAMILY : HYDROPHILIDAE
120. : *Hydrophilus olivaceus* (Fabr.) (Water scavenger Beetle)
- FAMILY : COCCINELLIDAE
121. : *Chilomens sexmaculata* (Fabr.)
122. : *Coccinella septempunctata* (Linn.)
123. : *Epilachna viginti octopunctata* (Fabr.)
- FAMILY : CASSIDIDAE
124. : *Aspidomorpha millaris* (Fabr.) (Tortoise Beetle)
- FAMILY : LAMPYRIDAE
125. : *Lamprophorus* sp. (Firefly)
126. : Malacodermatid larvae
- FAMILY : MELOIDAE
127. : *Cantharis hirticornis* (Hacq.)
128. : *Epicautata hirticornis* (Hacq.)
129. : *Epicautata* sp.
130. : *Psolydolytla* sp.
131. : *Mylabris pustulata* (Thunb.)
- FAMILY : SCARABAEIDAE
132. : *Anatoma* sp.
133. : *Helicocarpis bucephalus*
134. : *Gynopleurus cyaneus*
135. : *Oxycetonia versicolour* (Var.)
- FAMILY : CHRYSOMELIDAE
136. : *Oldes bipunctata* (Fabr.)
137. : *Platycorynus* sp.
- ORDER : MECOPTERA
- SUB-ORDER : EUMECOPTERA
- FAMILY : BITTACIDAE
138. : *Bittacus* sp.
- ORDER : DIPTERA
- SUB-ORDER : BRACHYCERA
- FAMILY : ASILIDAE
139. : *Laxencera flavibarbis*
140. : *Promachus rufipes*

- FAMILY : BOMBYLIDAE
141. : *Bombylias orientalis* (Macq.)
142. : *Exoprosopa flammea*
143. : *Exoprosopa lar* (F.)
144. : *Systoechus nivalis* (Brun.)
- FAMILY : NEMESTRINIDAE
145. : *Hirmonœura annandalei*
- FAMILY : TABANIDAE
146. : *Pangonia longirostris*
147. : *Tabanus striatus* (Fb.)
- SUB-ORDER : CYCLORRHAPHA
- FAMILY : MUSCIDAE
148. : *Musca domestica* (Linn ) (Housefly)
- FAMILY : SYRPHIDAE
149. : *Helophilus bengalensis* (Hoverfly)
150. : *Microdon stilboides*
- SUB-ORDER : NEMETOCERA
- FAMILY : PSYCODIDAE
151. : *Phlebotomus argentipes*
152. : *Psycoda bengalensis*
- FAMILY : CULICIDAE (Mosquitoes)
153. : *Anopheles elegans* (James)
154. : *Anopheles stephensi* (Liston)
155. : *Culex fatigans* (Wied)
- FAMILY : SACROPHAGIDAE
156. : *Sacrophaga lineatacollis* (Macq.)
- ORDER : LEPIDOPTERA
- SUB-ORDER : DITRYZIA
- FAMILY : ACRAEIDAE
157. : *Acraea violae* (Fabr.)
- FAMILY : ARCTIIDAE
158. : *Pericallia ricini* (E)
- FAMILY : DANAIDAE
159. : *Danus limniace leopardus* (Butler.)
160. : *Danus crysippus* (Linn.)
161. : *Danus plexipus* (Linn.)
162. : *Euploea core* (Cramer)
- FAMILY : LIMANTIDAE
163. : *Porthesia* sp.
- FAMILY : LYCAENIDAE
164. : *Lampides boeticus*

- FAMILY : NOCTUIDAE  
165. : *Trichantra* sp.
- FAMILY : NYMPHALIDAE  
166. : *Hypolimnas missipus* (Linn.)  
167. : *Nymphalis orsis*  
168. : *Precis hierta* (Fabr.)  
169. : *Precis almana* (Linn.)  
170. : *Precis orithya* (Linn.)  
171. : *Phalanta phalanta* (Dry)
- FAMILY : PAPILIONIDAE  
172. : *Papilio bootes* (Wd.)  
173. : *Papilio demoleus* (Linn.)  
174. : *Papilio lomedon* (Moore)  
175. : *Papilio pammon* (Linn.)  
176. : *Polydorus hector* (Linn.)
- FAMILY : PIERIDAE  
177. : *Catopsila crocale* (Cr.)  
178. : *Catopsila crocale pomona* (F.)  
179. : *Catopsila pyranthe* D.S.F. *florella* (F.)  
180. : *Delia eucharis* (Drury.)  
181. : *Eurema hecabe* (Linn.)
- FAMILY : PSYCHIDAE  
182. : *Psyche vitrea* (Hmps. n.)
- FAMILY : PYRALIDAE  
183. : *Dichocrocis punctiferalis* (Guen.)
- FAMILY : SATURNIDAE  
184. : *Antheraea paphia* (Linn.)
- FAMILY : SATYRIDAE  
185. : *Melanitis leda ismene* (Cr.)  
186. : *Melanitis phedima* (Stall.)
- FAMILY : SPHINGIDAE  
187. : *Agrius* sp.  
188. : *Cephanodes hylas* (Linn.)  
189. : *Pseudosphinx discistriga* (Wlk.)  
190. : *Rhopalopsyche anycteris* (Koll.)  
191. : *Theretra nessus* (Drwy.)
- FAMILY : PYRAUSTIDAE  
192. : *Hapalia macheoralis*
- FAMILY : HYBLAEIDAE  
193. : *Hybloea puera* (Gram)

- ORDER : HYMENOPTERA  
 SUB-ORDER : APOCRITA  
     FAMILY : APIDAE  
         SUB-FAMILY : APINAE (Honey Bees)  
             194. : *Apis dorsata* (Fabr.)  
             195. : *Apis florea* (Fabr.)  
             196. : *Apis indica* (Fabr.)  
             197. : *Anthidium pulchellum* (Klug)  
         SUB-FAMILY : XYLOCOPINAE  
             198. : *Xylocopa aestuans* (Linn.) (Carpenter Bee)  
     FAMILY : CHRYSIDIDAE  
         199. : *Chrysis oculata* (Fabr.) (Cuckoo wasp)  
     FAMILY : EUMENIDAE  
         200. : *Eumenes esuriens* (Fabr.) (Potter wasp)  
         201. : *Eumenes petilata* (Fabr.)  
     FAMILY : FORMICIDAE  
         202. : *Camponotus compressus* (Fabr.) (Black ant)  
         203. : *Dorylus labiatus*  
         204. : *Eridomyrme anceps*  
         205. : *Oecophylla smargdina* (Fabr.) (Red ant)  
     FAMILY : POMPILIDAE  
         206. : *Pompilus analis*  
         207. : *Pseudagenia honesta* (Spider wasp)  
     FAMILY : SCOLIIDAE  
         208. : *Elis grossa*  
         209. : *Scolia quadripustulata* (Fabr.)  
     FAMILY : SPHEGIDAE  
         210. : *Ammophila atrips* (Smith)  
         211. : *Ammophila lavigata* (Smith)  
         212. : *Ampulex compressa*  
         213. : *Philanthus pulcherrimus* (Smith)  
         214. : *Sceliphron madraspattanam* (Fabr.)  
         215. : *Sphex lobatus* (Fabr.)  
         216. : *Stizus prismaticus*  
     FAMILY : VESPIDAE  
         217. : *Icaria ferruginea* (Fabr.)  
         218. : *Polistes herbroëus* (Sausseure)  
 CLASS : ARACHNIDA  
 ORDER : ARANEAE (Spiders)  
     FAMILY : OECOBIIDAE (Hunting)  
         219. : *Oecobius putus* (Cambridge)



- FAMILY : ERESIDAE (Web weavers)  
 220. : *Stegodyphus sarasinorum* (Karsch)
- FAMILY : ULLOBORIDAE (Web weavers)  
 221. : *Uloborus krishnae* (Tikader)  
 222. : *U. khasiensis* (Tikader)  
 223. : *U. danolius* (Tikader)  
 224. : *Uloborus* sp.  
 225. : *Uloborus* sp.  
 226. : *Uloborus* sp.  
 227. : *Miagrammopes* sp.
- FAMILY : ZODARIDAE (Hunting)  
 228. : *Storena* sp.
- FAMILY : HERSILIDAE (Hunting)  
 229. : *Hersilia savignyi* (Lucas)
- FAMILY : PHOLCIDAE (Web weaver)  
 230. : *Crossopriza lyoni* (Blackwall)
- FAMILY : SALTICIDAE (Hunting)  
 231. : *Plexippus paykullii* (Acdonin & Savigny)  
 232. : *Plexippus* sp.  
 233. : *Phidippus* sp.
- FAMILY : HETEROPODIDAE (Hunting)  
 234. : *Heteropoda bhalkakai* (Patel & Patel)
- FAMILY : CLUBIONIDAE (Hunting)  
 235. : *Clubiona pashabhaji* (Patel & Patel)  
 236. : *Castianeira tinae* (Patel & Patel)
- FAMILY : GNAPHOSIDAE (Hunting)  
 237. : *Megamymecoion* sp.
- FAMILY : OXYOPIDAE (Hunting)  
 238. : *Oxyopes wroughtoni* (Pocock)  
 239. : *Oxyopes* sp.  
 240. : *Peucetia* sp.
- FAMILY : THERIDIIDAE (Web weaver)  
 241. : *Theridion tikaderi* (Patel)  
 242. : *Theridion* sp.  
 243. : *Cyllognatha surajbae* (Patel)  
 244. : *Aroyrodes projiciens* (Cambridge)  
 245. : *Rhomphsea* sp.  
 246. : *Steotoda* sp.
- FAMILY : LYCOSIDAE (Hunting)  
 247. : *Hippasa madhuae* (Tikader & Malhotra)  
 248. : *H. lycosina* (Pocock)  
 249. : *H. pisaurina*

250. : *H. partita* (Cambridge)  
 251. : *Lycosa* sp.  
 252. : *Lycosa* sp.  
 253. : *Lycosa* sp.  
 254. : *Lycosa* sp.  
 255. : *Lycosa* sp.  
 256. : *Lycosa nigrotibialis* (Simon)  
 257. : *Lycosa madani* (Pocock)  
 FAMILY : PISAURIDAE (Web weaver)  
 258. : *Pisaura* sp.  
 259. : *Pisaura* sp.  
 FAMILY : TETRAGNATHIDAE (Web weaver)  
 260. : *Tetragnatha* sp.  
 FAMILY : ARANEIDAE/ARGIOPIDAE (Web weaver)  
 261. : *Nephila maculata* (Fabr.)  
 262. : *Argiope pulchella* (Thorell)  
 263. : *Argiope aemula* (Walckenaer)  
 264. : *Cytophera cicatrosa* (Stoliczka)  
 265. : *C. citricola* (Forskal)  
 266. : *Cyclosa moonduensis* (Tikader)  
 267. : *Cylosa* sp.  
 268. : *Larinia chloris* (Audouin)  
 269. : *Neoscona pavida* (Simon)  
 270. : *Zygeilla* sp.  
 ORDER : OPILIONES OR PHALANGIDAE  
 FAMILY : PHALANGODIADAE  
 271. : *Phalangium* Sp.  
 ORDER : SCORPIONIDA  
 FAMILY : SCORPIONIDAE  
 272. : *Heterasmetrus phipsoni* (Pocock)  
 273. : *Heterasmetrus swarmmerdami* (Simon)  
 274. : *Mesobuthus (Vachon) tamulus tamulus* (Fabr.)  
 ORDER : ACARINA (Ticks and Mites)  
 FAMILY : TROMBIDIDAE  
 275. : *Trombidium gigas*

Table 5 List of Mollusks collected from the study area

PHYLUM	: MOLLUSCA
CLASS	: GASTROPODA
ORDER	: PULMONATA
FAMILY	: LYMNÆIDAE
1.	: <i>Limnaea luteola</i> (F.)
2.	: <i>Limnaea pinguis</i> (Dohrn)
FAMILY	: PLANORBIDAE
3.	: <i>Planorbis exustus</i> (Deshayes)
FAMILY	: SUBULINIDAE
4.	: <i>Opeas gracile</i> (Hutton)
FAMILY	: ARIOPHANTIDAE
5.	: <i>Ariophanta solata</i>
FAMILY	: MELANIIDAE
6.	: <i>Melania striatella tuberculata</i> (Müller)
CLASS	: PELECYPODA
FAMILY	: UNIONIDAE
7.	: <i>Lamellidens marginalis</i> (Lamarck)
8.	: <i>Lamellidens consobrinus</i> (Lea)
9.	: <i>Indonaia caerulea</i> (Lea)

Table 6 List of Fishes collected from the study area

<b>CLASS</b>	<b>: PISCES</b>
<b>FAMILY</b>	<b>: CYPRINIDAE</b>
1,	: <i>Danio equipinnatus</i>
2.	: <i>Danio rerio</i>
3.	: <i>Labeo boggut</i>
4.	: <i>Labeo rohita</i>
5.	: <i>Barbus conchoniuis</i>
6.	: <i>Barbus titius</i>
7.	: <i>Barbus stigma</i>
8.	: <i>Barbus dorsalis</i>
9.	: <i>Nemacheilus botia</i>
10.	: <i>Resbora deniconius</i>
<b>FAMILY</b>	<b>: OPHICOCEPHALIDAE</b>
11.	: <i>Ophicocephalus gachua</i>
12.	: <i>Ophicocephalus marulis</i>
13.	: <i>Ophicocephalus punctatus</i>
<b>FAMILY</b>	<b>: RHYNCOBDELLIDAE</b>
14.	: <i>Mastacembelus armatus</i>
15.	: <i>Mastacembelus pancalus</i>
<b>FAMILY</b>	<b>: SILURIDAE</b>
16.	: <i>Clarias batrachus</i>
<b>FAMILY</b>	<b>: ANCUILLIDAE</b>
17.	: <i>Anguilla bangalensis</i>

collected from the area (Table 7). The obligate dependence on water and moist surroundings has led a large number of anurans to inhabit the sanctuary, which is an ideal habitat for anurans as it provides practically everything that an anuran needs for its survival. The richness in amphibian species is one of the factors for the abundance of snakes and carnivorous birds.

### 3. Reptiles

In the sanctuary there are many reptilian species that are usually found in a good forest habitat. The diversity and density of reptilian population in the SWS is greater than the surrounding areas. Interesting reptilian species found in the sanctuary are *Chameleon zeylanicus*, *Calotes calotes*, *Calotes rouxi*, *Sitana ponticeriana*, *Mabuiya macularia* and *Ramphotyphlops braminus* (Table 8). Most of these reptiles serve as prey species to a large number of predators especially the raptors of the sanctuary. In their turn, these reptiles predate upon insects, amphibians and even young nestlings.

### 4. Aves

In the sanctuary there are 175 species of birds, representing 47 families and seven sub families (Table 9). Of these 134 were residents, 27 winter visitors, five resident/winter visitors, one local migrant, two monsoon visitors and two breeding visitors. According to the food preferences the birds fall into five major categories, viz. Carnivores, Frugivores, Omnivores, Insectivores and Granivores. Carnivores form the major group of birds in the sanctuary represented by 52 species belonging to 12 families. With 66 representatives belonging to 22 families, the insectivores form the most abundant group of birds in the sanctuary. Cuckoos, Bee-eaters, Swallows, Drongos, Iora, Robins, Flycatchers and Wagtails are the most frequent species. Numerous plants with edible fruits and flowers attract several frugivores. During the course of study 17 frugivores representing 10 families were spotted in the sanctuary. Besides this, there are 26 omnivorous species belonging to nine families and 12 granivores representing five families in the sanctuary area.

### 5. Mammals

In the SWS the wild mammalian population ranges from very poor to good and exists in isolated pockets. These forms face the difficulty for survival because of shrinkage of the habitat. The 21 species (Table 10) of wild mammalian forms are either sighted or identified from the droppings. The herbivores such as Antelopes and other small

Table 7 List of Amphibians collected/sighted from the study area

<b>CLASS</b>	<b>: AMPHIBIA</b>
<b>ORDER</b>	<b>: ANURA</b>
<b>SUB-ORDER</b>	<b>: PHANEOROGLOSSA</b>
<b>SERIES A</b>	<b>: FIRMISTERNIA</b>
<b>FAMILY</b>	<b>: RANIDAE</b>
1.	: <i>Rana tigerina</i> (Daudin)
2.	: <i>Rana cyanophlyctis</i> (Schneider)
3.	: <i>Rana limnocharis</i> (Boie)
4.	: <i>Rana keralensis</i> (Dubois)
5.	: <i>Rana hexadactyla</i> (Stoliczka)
6.	: <i>Rana brevipalmata</i> (Peters)
7.	: <i>Rana temporalis</i> (Gunther)
8.	: <i>Rana phrynoderma</i> (Boulenger)
9.	: <i>Rana verruculosa</i> (Gunther)
10.	: <i>Rana</i> (Tromopterna) <i>breviceps</i> (Schneider)
<b>FAMILY</b>	<b>: RHACOPHORIDAE</b>
11.	: <i>Polypedates maculatus</i> (Gray)
<b>FAMILY</b>	<b>: MICROHYLIDAE</b>
12.	: <i>Microhyla omata</i> (dumerii and Bibron)
13.	: <i>Microhyla rubra</i> (Jerdon)
14.	: <i>Kaloula pulchra</i> (Gray)
15.	: <i>Uperodon globulosum</i> (Gunther)
<b>SERIES B</b>	<b>: ARCIFERA</b>
<b>FAMILY</b>	<b>: BUFONIDAE</b>
16.	: <i>Bufo melanostictus</i> (Schneider)
17.	: <i>Bufo stomaticus</i> (Lutken)
18.	: <i>Bufo microtympanum</i> (Boulenger)
19.	: <i>Bufo ferugusonii</i> (Boulenger)

Table 8 List of Reptiles collected/sighted from the study area

<b>CLASS</b>	<b>: REPTILIA</b>
<b>ORDER</b>	<b>: SQUAMATA</b>
<b>SUB-ORDER</b>	<b>: LACERTILIA</b>
<b>FAMILY</b>	<b>: CHAMAELIONIDAE</b>
1.	: <i>Chameleon zealanicus</i> (Laurenti)
<b>FAMILY</b>	<b>: AGAMIDAE</b>
2.	: <i>Calotes calotes</i> (Linn.) (Southern green calotes)
3.	: <i>Calotes versicolor</i> (Daudin) (Gardern lizard)
4.	: <i>Calotes rouxi</i> (Dum. & Bibr) (Forest calotes)
5.	: <i>Sitana ponticeriana</i> (Cuvier) (Fanthroated lizard)
6.	: <i>Agama</i> sp.
<b>FAMILY</b>	<b>: SCINCIDAE (Skink)</b>
7.	: <i>Mabuya carinata</i> (Schneider) (Common skink)
8.	: <i>Mabuya macularia</i> (Blyth) (Little skink)
<b>FAMILY</b>	<b>: GECKONIDAE (House/Wall lizard)</b>
9.	: <i>Hemidactylus flaviviridis</i> (Ruppell) (House gecko)
10.	: <i>Hemidactylus brooki</i> (Gray) (Brook's gecko)
<b>SUB-ORDER</b>	<b>: OPHIDIA</b>
<b>FAMILY</b>	<b>: COLUBRIDAE</b>
11.	: <i>Ptyas mucosus</i> (Linn.) (Rat snake)
12.	: <i>Xenochrophis piscator</i> (Schneider) (Checkered keelback)
13.	: <i>Macropisthodon plumbicolor</i> (Cantor) (Green keelback)
<b>FAMILY</b>	<b>: UROPELTIDAE</b>
14.	: <i>Eryx johnii</i> (Russell) (John's earth boa)
<b>FAMILY</b>	<b>: ELAPIDAE</b>
15.	: <i>Naja naja</i> (Linn.) (Cobra)
<b>FAMILY</b>	<b>: VIPERIDAE</b>
16.	: <i>Echis carinata</i> (Schneider) (Saw-scaled viper)
17.	: <i>Vipera russelli</i> (Shaw) (Russell's viper)
<b>FAMILY</b>	<b>: TYPHLOPIDAE</b>
18.	: <i>Ramphotyphlops braminus</i>

Table 9. Checklist of Birds of the study area

## FAMILY PHALACROCORACIDAE

1. *Phalacrocorax niger* - Little Cormorant

## FAMILY ARDEIDAE

2. *Ardea cinerea* - Grey Heron
3. *Ardeola grayii* - Pond Heron or Paddy bird
4. *Bubulcus ibis* - Cattle Egret
5. *Ardea alba* - Large Egret
6. *Egretta garzetta* - Little egret
7. *Nycticorax nycticorax* - Night Heron

## FAMILY CICONIIDAE

8. *Anastomus oscitans* - Openbilled Stork
9. *Ciconia episcopus* - Whitenecked Stork
10. *Ciconia ciconia* - White Stork

## FAMILY THRESKIORNITHIDAE

11. *Threskiornis aethiopica* - White Ibis

## FAMILY ANATIDAE

12. *Dendrocygna javanica* - Lesser Whistling Teal or Tree Duck
13. *Tadorna ferruginea* - Ruddy Shelduck

## FAMILY ACCIPITRIDAE

14. *Elanus caeruleus* - Blackwinged Kite
15. *Pernis ptilorhynchus* - Crested Honey Buzzard
16. *Milvus migrans govinda* - Pariah Kite
17. *Haliastur indus* - Brahminy Kite
18. *Accipiter badius* - Shikra
19. *Accipiter nisus melaschistos* - Sparrow-hawk
20. *Butastur teesa* - White-eyed Buzzard-Eagle
21. *Spizaetus cirrhatus cirrhatus* - Crested Hawk-Eagle
22. *Hieraaetus fasciatus* - Bonelli's Eagle
23. *Ichthyophaga ichthyaetus* - Greyheaded Fishing Eagle
24. *Gyps indicus* - Indian Longbilled Vulture
25. *Gyps bengalensis* - Indian Whitebacked Vulture
26. *Neophron percnopterus* - Egyptian or Scavenger Vulture
27. *Circus macrourus* - Pale Harrier
28. *Circus aeruginosus* - Marsh Harrier
29. *Spilornis cheela* - Crested Serpent Eagle
30. *Pandion haliaetus* - Osprey

## FAMILY FALCONIDAE

31. *Falco peregrinus peregrinator* - Shaheen Falcon
32. *Falco tinnunculus* - Kestrel

## FAMILY PHASIINIDAE

33. *Francolinus pictus* - Painted Partridge
34. *Francolinus pondicerianus* - Grey Partridge
35. *Coturnix coturnix* - Common or Grey Quail
36. *Gallus spadicea* - Red Spurfowl
37. *Gallus gallus* - Red Junglefowl
38. *Pavo cristatus* - Common Peafowl



## FAMILY TURNICIDAE

39. *Turnix suscitator* - Common or Indian or Bluelegged Bustard Quail

## FAMILY RALLIDAE

40. *Amauromis phoenicurus* - Whitebreasted Waterhen  
41. *Gallinula chloropus* - Indian Moorhen

## FAMILY RECURVIROSTRIDAE

42. *Himantopus himantopus* - Blackwinged Stilt

## FAMILY CHARADRIIDAE

43. *Vanellus indicus* - Redwattled Lapwing  
44. *Charadrius dubius* - Little Ringed Plover  
45. *Limosa limosa* - Blacktailed Godwit  
46. *Tringa totanus* - Redshank  
47. *Tringa nebularia* - Greenshank  
48. *Tringa glareola* - Wood Sandpiper  
49. *Tringa hypoleucos* - Common Sandpiper

## FAMILY LARIDAE

50. *Sterna aurantia* - Indian River Tern

## FAMILY COLUMBIDAE

51. *Treron phoenicoptera* - Yellowlegged Green Pigeon  
52. *Columba livia* - Blue Rock Pigeon  
53. *Streptopelia decaocto* - Indian Ring Dove  
54. *Streptopelia chinensis* - Spotted Dove  
55. *Streptopelia senegalensis* - Little Brown or Senegal Dove

## FAMILY PSITTACIDAE

56. *Psittacula eupatria* - Alexandrine Parakeet  
57. *Psittacula krameri* - Roseringed Parakeet  
58. *Psittacula cyanocephala* - Blossomheaded Parakeet

## FAMILY CUCULIDAE

59. *Clamator jacobinus* - Pied Crested Cuckoo  
60. *Cuculus varius* - Common Hawk-Cuckoo or Brainfever Bird  
61. *Cacomantis passerinus* - Indian Plaintive Cuckoo  
62. *Eudynamys scolopacea* - Indian Koel  
63. *Taccocua leschenaultii* - Sirkeer Cuckoo  
64. *Centropus sinensis* - Crow-Pheasant or Coucal

## FAMILY STRIGIDAE

65. *Tyto alba* - Barn Owl  
66. *Bubo bubo* - Eagle-owl or Great Horned Owl  
67. *Bubo zeylonensis* - Brown Fish Owl  
68. *Glaucidium radiatum* - Barred Jungle Owlet  
69. *Ninox scutulata* - Brown Hawk-Owl  
70. *Athene brama* - Spotted Owlet  
71. *Strix ocellata* - Mottled Wood Owl

## FAMILY PODARGIDAE

72. *Batrachostomus hodgsoni* - Hodgson's Frogmouth

## FAMILY CAPRIMULGIDAE

73. *Caprimulgus asiaticus* - Common Indian Nightjar

## FAMILY APODIDAE

74. *Apus affinis* - House Swift  
75. *Cypsiurus parvus* - Palm Swift

## FAMILY ALCEDINIDAE

- 76. *Ceryle rudis* - Lesser Pied Kingfisher
- 77. *Alcedo atthis* - Common or Small Blue Kingfisher
- 78. *Halcyon smymensis* - Whitebreasted Kingfisher

## FAMILY MEROPIDAE

- 79. *Merops philippinus* - Bluetailed Bee-eater
- 80. *Merops orientalis* - Green Bee-eater

## FAMILY CORACIIDAE

- 81. *Coracias benghalensis* - Indian Roller

## FAMILY UPUPIDAE

- 82. *Upupa epops* - Hoopoe

## FAMILY BUCEROTIDAE

- 83. *Tockus birostris* - Common Grey Hornbill

## FAMILY CAPITONIDAE

- 84. *Megalaima zeylanica* - Large Green Barbet
- 85. *Megalaima haemacephala* - Crimsonbreasted Barbet or Coppersmith

## FAMILY PICIDAE

- 86. *Picus myrmecophoneus* - Little Scalybellied Green Woodpecker
- 87. *Dinopium benghalense* - Lesser Goldenbacked Woodpecker
- 88. *Picoides mahrattensis* - Yellowfronted Pied Woodpecker
- 89. *Picoides nanus* - Browncrowned Pigmy Woodpecker
- 90. *Hemicircus canente* - Heartspotted Woodpecker
- 91. *Chrysocolaptes festivus* - Blackbacked Woodpecker
- 92. *Chrysocolaptes lucidus* - Larger Goldenbacked Woodpecker

## FAMILY PITTIDAE

- 93. *Pitta brachyura* - Indian Pitta

## FAMILY ALAUDIDAE

- 94. *Mirafra erythroptera* - Redwinged Bush Lark
- 95. *Eremopterix grisea* - Ashycrowned Finch-Lark
- 96. *Ammomanes phoenicurus* - Rufoustailed Finch-Lark
- 97. *Galerida cristata* - Crested Lark

## FAMILY HIRUNDINIDAE

- 98. *Hirundo concolor* - Dusky Crag Martin
- 99. *Hirundo rustica* - Common Swallow
- 100. *Hirundo smithii* - Wiretailed Swallow

## FAMILY LANIDAE

- 101. *Lanius excubitor* - Grey Shrike
- 102. *Lanius vittatus* - Baybacked Shrike
- 103. *Lanius schach* - Rufousbacked Shrike

## FAMILY ORIOLIDAE

- 104. *Oriolus oriolus* - Golden Oriole
- 105. *Oriolus xanthomus* - Blackheaded Oriole

## FAMILY DICRURIDAE

- 106. *Dicrurus adsimilis* - Black Drongo or King-Crow
- 107. *Dicrurus caerulescens* - Whitebellied Drongo
- 108. *Dicrurus paradiseus* - Greater Racket-tailed Drongo

## FAMILY STURNIDAE

- 109. *Sturnus pagodarum* - Blackheaded or Brahminy Myna
- 110. *Sturnus roseus* - Rosy Pastor or Rosecoloured Starling

- 111. *Acridotheres tristis* - Common Myna
- 112. *Acridotheres ginginianus* - Bank Myna
- FAMILY CORVIDAE**
  - 113. *Dendrocitta vagabunda* - Indian Tree Pie
  - 114. *Corvus splendens* - House Crow
  - 115. *Corvus macrorhynchos* - Jungle Crow
- FAMILY CAMPEPHAGIDAE**
  - 116. *Tephrodornis pondicerianus* - Common Wood Shrike
  - 117. *Coracina novaehollandiae* - Large Cuckoo Shrike
  - 118. *Coracina melanoptera* - Blackheaded Cuckoo-shrike
  - 119. *Pericrocotus cinnamomeus* - Small Minivet
- FAMILY IRENIDAE**
  - 120. *Aegithina tiphia* - Common Iora
  - 121. *Chloropsis aurifrons* - Goldenfronted Chloropsis/Leaf Bird/Green Bulbul
  - 122. *Chloropsis cochinchinensis* - Goldmantled Chloropsis
- FAMILY PYCNONOTIDAE**
  - 123. *Pycnonotus jocosus* - Redwhiskered Bulbul
  - 124. *Pycnonotus leucogenys* - Whitecheeked Bulbul
  - 125. *Pycnonotus cafer* - Redvented Bulbul
  - 126. *Pycnonotus luteolus* - Whitebrowed Bulbul
- SUBFAMILY TIMALINAE**
  - 127. *Turdoides caudatus* - Common Babbler
  - 128. *Turdoides malcolmi* - Large Grey Babbler
  - 129. *Turdoides striatus* - Jungle Babbler
- SUBFAMILY MUSCICAPINAE**
  - 130. *Muscicapa parva* - Redbreasted Flycatcher
  - 131. *Muscicapa tickelliae* - Tickell's Blue Flycatcher
  - 132. *Muscicapa thalassina* - Verditer Flycatcher
  - 133. *Culicicapa ceylonensis* - Greyheaded Flycatcher
  - 134. *Rhipidura aureola* - Whitebrowed Fantail Flycatcher
  - 135. *Rhipidura albicollis albugularis* - Whitespotted Fantail Flycatcher
  - 136. *Terpsiphone paradisi* - Paradise Flycatcher
- SUBFAMILY SILVIINAE**
  - 137. *Cisticola juncidis* - Streaked Fantail Warbler
  - 138. *Prinia hodgsoni* - Franklin's Wren-Warbler
  - 139. *Prinia socialis* - Ashy Wren-Warbler
  - 140. *Orthotomus sutorius* - Tailor Bird
  - 141. *Sylvia hortensis* - Orphean Warbler
  - 142. *Sylvia curruca blythi* - Lesser Whitethroat
- SUBFAMILY TURDINAE**
  - 143. *Erithacus svecicus* - Bluethroat
  - 144. *Copsychus saularis* - Magpie-Robin
  - 145. *Phoenicurus ochruros rufiventris* - Black Redstart
  - 146. *Saxicola caprata* - Pied Bushchat
  - 147. *Saxicoloides fulicata* - Indian Robin
  - 148. *Monticola solitarius* - Blue Rock Thrush
  - 149. *Zoothera citrina cyanotus* - Whitethroated Ground Thrush
  - 150. *Turdus merula nigropileus* - Blackbird

**FAMILY PARIDAE**

- 151. *Parus major* - Grey Tit
- 152. *Parus xanthogenys* - Yellowcheeked Tit

**FAMILY SITTIDAE**

- 153. *Sitta frontalis* - Velvetfronted Nuthatch
- 154. *Salpomis spilonotos* - Spotted Grey Creeper

**FAMILY MOTACILLIDAE**

- 155. *Anthus novaeseelandiae* - Paddyfield Pipit
- 156. *Motacilla indica* - Forest Wagtail
- 157. *Motacilla flava* - Yellow Wagtail
- 158. *Motacilla cinerea* - Grey Wagtail
- 159. *Motacilla alba* - White or Pied Wagtail
- 160. *Motacilla maderaspatensis* - Large Pied Wagtail

**FAMILY DICAETIDAE**

- 161. *Dicaeum agile* - Thickbilled Flowerpecker
- 162. *Dicaeum erythrorhynchos* - Tickell's Flowerpecker

**FAMILY NECTARINIIDAE**

- 163. *Nectarinia zeylonica* - Purplerumped Sunbird
- 164. *Nectarinia lotenia* - Loten's Sunbird
- 165. *Nectarinia asiatica* - Purple Sunbird
- 166. *Aethopyga siparaja* - Yellowbacked Sunbird

**FAMILY ZOSTEROPIDAE**

- 167. *Zosterops palpebrosa* - White-eye

**FAMILY PLOCEIDAE****SUBFAMILY PASSERINAE**

- 168. *Passer domesticus* - House Sparrow
- 169. *Passer montanus* - Tree Sparrow
- 170. *Petronia xanthocollis* - Yellowthroated Sparrow

**SUBFAMILY PLOCEINAE**

- 171. *Ploceus phillippinus* - Baya
- 172. *Ploceus manyar* - Streaked Weaver Bird

**SUBFAMILY ESTRILDINAE**

- 173. *Lonchura malabarica* - Whitethroated Munia
- 174. *Lonchura punctulata* - Spotted Munia

**FAMILY EMBERIZIDAE**

- 175. *Melophus lathami* - Crested Bunting

Table 10 List of Mammals sighted from the study area

CLASS	: MAMMALIA
ORDER	: LAGOMORPHA
FAMILY	: LEPORIDAE
1.	: <i>Lepus nigricollis</i> (Black-naped hare)
ORDER	: RODENTIA
FAMILY	: SCIURIDAE
2.	: <i>Funambulus pennati</i> (Palm squirrel)
3.	: <i>Bandicota bengalensis</i> (Indian mole rat)
FAMILY	: MURIDAE
4.	: <i>Millardia melitada</i> (Field rat)
5.	: <i>Mus boodunga</i> (Field mouse)
ORDER	: ARITODACTYLA
FAMILY	: BOVIDAE
6.	: <i>Muntiac muntjak</i> (Barking deer)
7.	: <i>Tetracerus quadricornis</i> (Four-horned antelope)
ORDER	: CARNIVORA
SUB-ORDER	: FISSIPEDIA
FAMILY	: FELIDAE
8.	: <i>Felis chaus</i> (Jungle cat)
9.	: <i>Panthera pardus</i> (Common Indian Leopard)
FAMILY	: CANIDAE
10.	: <i>Vulpes bengalensis</i> (Bengal fox)
11.	: <i>Cuon alpinus</i> (Indian wild dog)
12.	: <i>Canis aureus</i> (Golden jackal)
FAMILY	: HYNIDAE
13.	: <i>Hyaena hyaena</i> (Hyena)
FAMILY	: HERPESTIDAE
14.	: <i>Herpestes edwardsii</i> (Mongoose)
FAMILY	: URSIDAE
15.	: <i>Melarsus ursinus</i> (Sloth bear)
ORDER	: PRIMATES
SUB-ORDER	: HAPLORHINI
INFRA-ORDER	: CATARRHINA
16.	: <i>Macaca mulatta</i> (Rhesus monkey)
17.	: <i>Presbytis entellus</i> (Hanuman langur)

- ORDER : CHIROPTERA
- SUB-ORDER : MEGACHIROPTERA
18. : *Pteropus giganteus* (Indian flying fox)
19. : *Cyanopterus* sp. (Shortnosed bat)
20. : *Rosettus* sp. (Fulvus fruit bat)
- SUB-ORDER : MICROCHIROPTERA
21. : *Myotis* sp. (Whiskered bat)
22. : *Pipistrellum* sp.

mammals in large numbers can support big carnivores but the sanctuary has only the leopards at the apex of the food pyramid and these survive mainly by killing domestic animals.