BIODIVERSITY ASSESSMENT IN SOME SELECTED HILL FORESTS OF SOUTH ORISSA

VASUNDHARA
Democratizing Natural Resources Governance

BIODIVERSITY ASSESSMENT IN SOME SELECTED HILL FORESTS OF SOUTH ORISSA, INDIA

FIELD SURVEY AND DOCUMENTATION TEAM

PRATYUSH MOHAPATRA, PRASAD KUMAR DASH, SATYANARAYAN MIASHRA AND DEEPAK KUMAR SAHOO

&

BIODIVERSITY CONSERVATION TEAM

SWETA MISHRA, BISWARUP SAHU, SUJATA DAS, TUSHAR DASH, RANJITA PATTNAIK AND Y.GIRI, RAO

REPORT PREPARED BY

VASUNDHARA
A/70, SAHID NAGER
BHUBANESWAR
ORISSA

ACKNOWLEDGMENT

The authors are grateful to Concern Worldwide for providing financial support to carry out the study. The authors are also thankful to Dr. Dr. R.C .Mishra, Scientist, RPRC, Bhubaneswar, Dr. S.K Dutta, Head, Dept. of Zoology, North Orissa University and Dr. Manoj Nayar, Dr. N.K.Dhal and Mr. N.C.Rout, Scientist, Institute of Minerals and Materials Technology, Bhubaneswar, Dr. Virendra Nath, Scientist, National Botanical Research Institute, Lacknow, Dr. Dinesh Kumar Saxena, Professor, Barely collage, U.P for their technical input during the study design, identification of species and sincere guidance in preparing the report. Mr. Himanshu Sekhar Palei and Mr. Anup Kumar Pradhan, students, Msc. Wildlife, Baripada, Orissa are duly acknowledged for their information on Otters and Giant squirrels of south Orissa Dr. Bijaya Mishra, Mr. Biswjyoti Sahoo and Mr. Himanshu Patra are thanked for their support and cooperation during field visits to different hills. The help and co-operation rendered by the local informants of different ethnic groups in providing first hand information is highly appreciated and acknowledged. Last but not the least, the help and support provided by the Director Vasundhara is highly acknowledged.

PREFACE

Biodiversity is declining seriously on a global scale, underscoring the importance of conservation planning. Except protected areas and reserve forests, scientific studies on biodiversity of special habitats in India are meager like the other areas of the world. Furthermore, extensive surveys of biodiversity have not been conducted for a majority of taxonomic groups and ecosystem types. The situation is the same in tropical region, and only preliminary information on the biodiversity patterns of less well-known organism groups including many lower groups of plants and animals are available. Such a lack of information severely hinders the assessment of the value of existing species, their current status and threats which might facilitate their long term conservation. Documentation, conservation and finding enhancement strategies of biodiversity is considered to be one of the important challenges in present day conservation biology research and policy making process. Their importance is continuously being shown as they are found to be keystone for the sustainability of ecosystem. At the same time so many species of plants and animals are perished in wild before their documentation due to anthropogenic and developmental activities. Keeping in view of the above background the present study was undertaken in some of the hill forests of south Orissa.

EXECUTIVE SUMMARY

A survey was conducted in some selected mineral rich hill forests in four districts of South Orissa (Kalahandi, Koraput, Gajapati and Raygada) to explore and document biodiversity of the region during the period from January 2006 to December 2008. A total of 947 species of angiosperms (including 60 species of pteridophytes, 63 species of orchids and 5 species of gymnosperms) and 73 species of cryptogams (including 43 species of bryophytes, 20 species of fungi, 10 species of lichens) were recorded during the study period. After several rounds of discussion and interviews with the tribal people and user's group, 30 species of plants were identified that comes under different RET categories as per IUCN, India. Similarly the vertebrate fauna includes 110 species of birds, 36 species of mammals, 22 species of reptiles and 80 species of butterflies. The major findings include 9 species of snakes which includes *Ahaetulla nasuta, Ahaetulla rhodogaster, Gerarda prevostiana, Lycodon aulicus, Trimeruserus* sp., Argyorgena fasciolata, *Liopeltis calamaria, Coelognathus monticolaris, Boiga frostinii* and 2 species of frogs such as *Philautus* spp., *Fejervarya* sp. reported for the first time from the state. Similarly, good populations of *Crocodylus palustris* at Upper Kolab from Baphlimali, range extension of Golden gecko from many parts of Southern Orissa, documentation of the elephant migration routes in the study area, pugmarks of tigers were some of the major findings of the survey. Rediscovery of Pygmy shrew (*Suncus etruscus*), range extension of Golden gecko and Rana malabaricus from many parts of Southern Orissa were reported for the first time. Similarly 5 plant species like *Corallodiscus lanuginosa* and *Ophioglossum reticulatum* at Krishnamali, *Limnanthimum parviflora* at Maliparbat and Krishnamali, *Salvinia eligans* at Panchpatmali and *Pancriatum parvum* at Khandualmali are new distributional records for the Eastern Ghats of India and one mushroom, Dictyophora indusiata is a new to the main land of India. All the lower plants are new distributional records for the state of Orissa. Apart from the rich fauna, there are about 260 species of plants are recorded from South Orissa, which are used by different ethnic groups for treatment of different diseases and aliments. The list includes 24 species of threatened plants like *Rouvolfia serpentina, Plumbago indica, Saraca asoca, Gloriosa superba, Puraria tuberose, Puraria foetida, Ipomoea mauritiana, Gardenia gumifera* etc. Sacred grooves were identified in Niyamgiri, Karlapat, Baphlimali, Deomali and Mahendragiri. Similarly 13 species each of Himalayan range and South Indian range (The Nilgiris) and 5 species of both Northern Indian and Brumes range were also observed in Deomali and Mahendragiri during the study period. Range extension of Asian Small clawed Otters in Karlapat wildlife Sanctuary is first record of their range distribution to Eastern Ghats of India. The major threats to the biodiversity include fragmentation; deterioration and loss of habitat, poaching, invasion of exotic species, live stock grazing and last but not the least environmental pollution and habitat destruction due to mining activities.

INTRODUCTION: Biodiversity refers to the variety and variability of all life including all species of plants, animals and micro-organisms, the ecosystems and the ecological processes of which they are parts. Where rich biodiversity is an indicator of a healthy ecosystem, it also provides wide range of goods and services that are essential for the sustenance of the biota. Conservation and sustainable use of biodiversity is an indicator of sustainable development. Unfortunately, during the last century, a drastic decline in biodiversity has been observed in different parts of the world in an alarming rate leading to mass extinction. Anthropogenic activities and over exploitation of the resources existing in an ecosystem has destroyed its homeostasis and altered the habitat of the native species. This has threatened the survival of endemic species making them endangered. Therefore, the present day ecosystem research has advocated the conservation of habitat and the environment for giving all the species to grow undisturbed in their native habitat. Despite the considerable worldwide efforts to establish the wildlife protected areas, destruction of wildlife habitats has remained the leading threat to biodiversity. This destruction, taking different forms (i.e. degradation, fragmentation or outright loss) prompted mainly by such factors as poverty, demographic factors, land tenure systems, inadequate conservation status, development policies and economic incentives. Anthropogenic activities such as overgrazing, deforestation, bush fires, shifting cultivation, developmental activities like mining, urbanization and road construction inside the protected areas are found to be the major causes of lose in biodiversity. Last but not the least climate change is emerging as a new threat to the whole ecosystem. The Eastern Ghats are isolated hill ranges in Peninsular India (Andhra Pradesh, Orissa, Tamil Nadu and Karnataka), harbors primarily tropical moist deciduous vegetation, which represents species of high economic, timber, medicinal potential, lies in 110 30' to 210 0' N Latitudes and 770 22' to 850 20' E Longitudes. Eastern Ghats are highly significant in terms of its Bio-diversity. Of the estimated 3,200 flowering plant taxa, about 100 are endemics that need immediate attention for their conservation (Jonathan, 2006). There are 528 tree taxa under 271 genera belonging to 80 families (Sandhyarani et al., 2007) distributed in different regions of Eastern Ghats In total 454 species under 243 genera and 78 families are endemic to Eastern Ghats (Kanyana, 2008). Out of the 7,500 species plants of medicinal value reported in India, about 1800 species are known to occur in Eastern Ghats. It is the abode of 62 tribes who sustain their livelihood from the forest resources of Eastern Ghats. At least 50 dye yielding plants and 40 aromatic plants are also known to occur in this region. The Eastern Ghats constitute the principal mountain system of Orissa extending over 1.5 Lakh sq. km. areas, which is just 4.25% of the total landmass of the state, extending from north of Similipal in Mayurbhanj district and runs through Malkangiri basing on geological and tectonic considerations. Eighteen districts of Orissa including 14 protected areas (13 wild life sanctuaries, one Biosphere reserve, one National Park, two tiger reserve and one Ramser Wetland) comes under the Eastern Ghats of India. The biodiversity of Orissa consists of 2760 species of angiosperms, 543 species of algae, 132 species of pteridophytes, 473 species of birds, 110 specie of

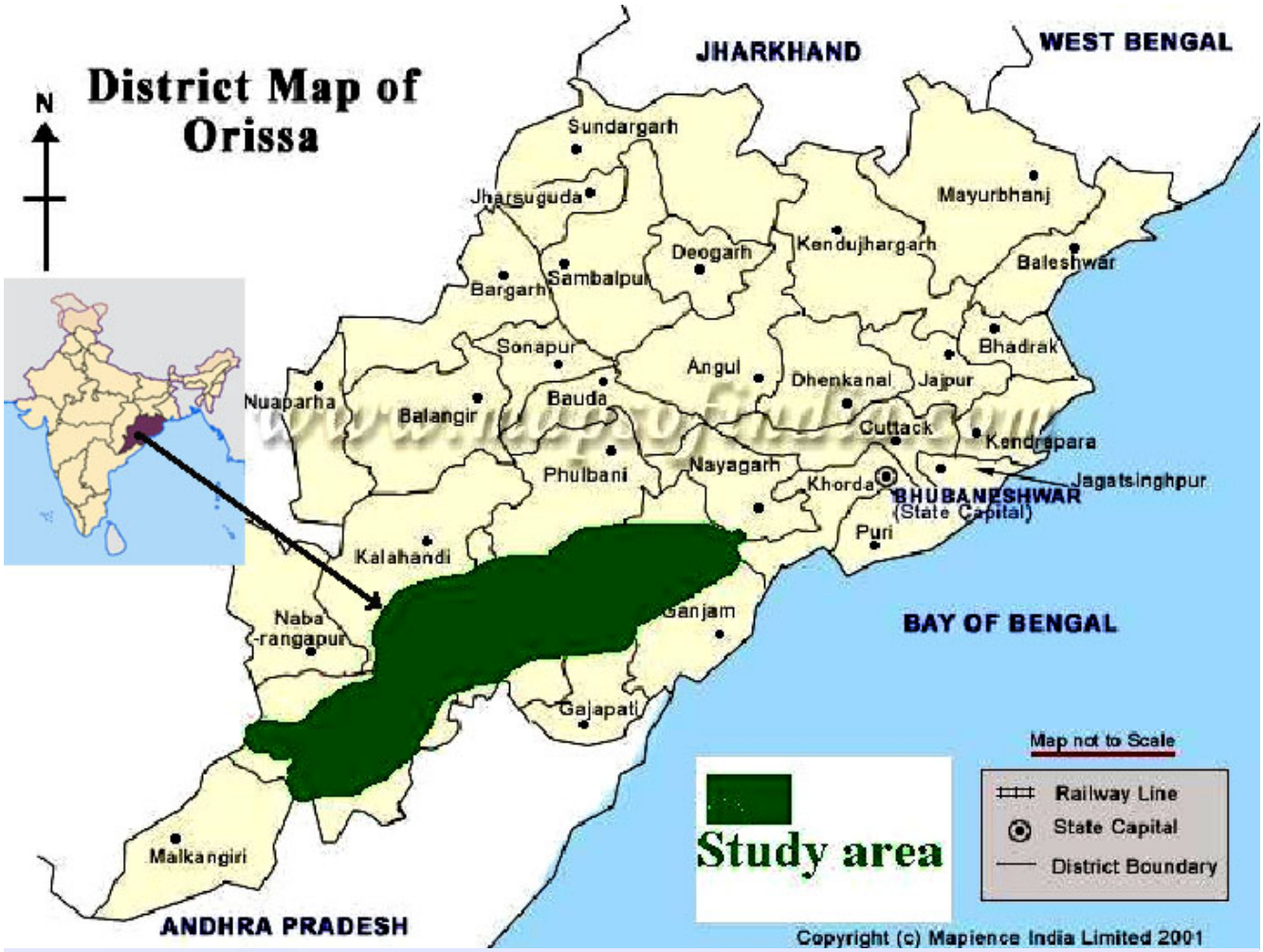
reptiles, 86 species of mammals and 20 species of amphibians. The biodiversity of South Orissa in general and Koraput, Rayagada, Kalahandi and Ganjam in particular is least explored as compared to northern districts of Orissa due to its diversified topography and difficult terrains. Except the mega fauna of major groups, a very few reports are available on micro fauna of the state and nothing has been done on southern region of the Orissa. The past history of elephant habitats in Orissa revels that elephants are not frequently available in the area south of river Mahanadi until 1907 (Cobdon Ramsay, 1910). The report mentions that few numbers of elephants occasionally strayed across Mahanadi in to the undivided Boudh and during 1907 a few number of elephants strayed the undivided Kalahandi district for a few days but the movement was unusual. However, now Kalahndi district is home for more than 40 elephants so also the Baudh and Rayagada districts, which are some of the examples of newly established elephant habitats in early twentieth century and is the common phenomenon of migration observed in many mega animals. There are also past report of migration of elephants in other states of India, and the cause is only because of anthropogenic pressure. Wild dog or Dhole (*Cuon alpinus dukhunensis*) was found throughout the district. The Indian Buffalo (Bubalis bubalis) Swamp deer (*Cervus duvauceli*), Black buck (Antelope cervicapra) are now locally extinct from the area. Honey badger (*Melivora capensis*), otter (*Lutrogale perspicillata*). In fact there are many groups of animals literally being untouched by the researchers after the Britishers, which need to be explored before they are perished by the so called developmental activities. The floristic of southern Orissa, often considered incomplete, was sporadically approached by Mooney, Gamble, Haines and subsequent workers. Hence, it provides an ideal background for further exploration and discovery of taxonomic novelties. However, Saxena and Brahmam, 1994-1997 has enlisted a small account on flora of Kalahandi in their book (Flora of Orissa, Vol-I to Vol-IV). Although different workers have documented the uses of various medicinal plants from some parts of Kalahandi districts of Orissa (Nayak. et al., 2003, Nayak. et al., 2004, Sarangi. et al., 2005 and Panda & Padhy, 2008) , information on the traditional and cultural practices of the varied tribes residing in Karlapat Wildlife Sanctuary is unavailable. Like Kalahandi, Rayagada and Koraput district of the state is also floristically least explored (Kala et al., 2005). A handful of information is available on medicinal plants and their application in curing different diseases and ailments of both the districts (Hemadri, 1991; Hemadri and Rao, 1989; Dash, 1994; Das and Mishra, 1987, 1988a, 1998, 2000). Similarly there are many lower plants and animals exist in the region like bryophytes, fungi and lichens are integrated part of an ecosystem and their contribution to the forest diversity and to the human society is unlimited which are also unexplored and under explore so far. The studies on this important group of plants, their diversity, distribution and their ecological role are almost unknown to state of Orissa. Fungi are one of the most important groups of organisms on the planet. Fungi, together with bacteria, are responsible for most of the recycling which returns dead material to the soil in a form in which it can be reused. They are vitally important for the good growth of most plants, including crops, through the development of mycorrhizal association. Fungi are also

important directly as food for humans. Lichens are the first group of plants in the plant succession. As lichens don't have roots; they are in direct contact with air which makes them a good indicator of environmental pollution. Several birds use lichens in nest construction. People have used lichens since antiquity as medicines, dyes, food, decoration, perfumes and even crude clothing. Bryophytes are the secondary colonizers on barren rocks next to lichens in plant succession in xerosere. They are extremely good soil binders as they form large mats on forest floors and roadside cuts, thus controlling soil erosion. They are a good source of humus and hence a heaven for a number of soil-dwelling invertebrates likes earthworms. They form very good seed beds for seedlings and saplings and are indicators of environmental pollution. A number of bryophytes are used as herbal medicine throughout the world. Bryophytes are not only used by man but also by other vertebrates and invertebrates. The forest concentration is mostly found on the hilly region and South Orissa is an abode of many small and big hills and mountains including the highest pick of Orissa, Deomali.The forest vegetation broadly falls under 5 out of 16 categories of forests differentiate by Champion and Seth, 1968 like tropical Semi-ever green forests, tropical moist deciduous forest, tropical dry deciduous forests, sub tropical broad leaved hill forests and littoral and swamp forests. Since most of the mountains of south Orissa are rich with minerals and are the source of origin for perennial hill streams, the forest ecosystems are rich in species diversity. Keeping in view of the above importance of these areas, the study was conducted in South Orissa to document the flora and fauna for the first time in a systematic manner by the research team of Vasundhara which consists of Researchers from multidisciplinary background including, Field Biologists and wildlife experts from Universities of Orissa .

STUDY AREA: The survey was conducted in some of the important mountainous ecosystems in three districts namely Kalahandi, Koraput and Rayagada and Gajapati districts of Orissa. Nestled at the northern part of Eastern Ghat hill ranges, the study areas are considered as large repository of minerals and are now considered to be under threat by the upcoming mining industries. The study area includes Panchpatmali, Maliparvat, Patangi, Kodingamali and Deomali in Koraput district, Niyamgiri hills, Sijimali hills, Khandualmali hills and Krishunmali hills in Kalahandi districts and Baphlamali hills and Kutrumali hills in Raygada districts and Chandragiri and Mahendragiri hills of Gajapati districts of South Orissa. (Map.1).

OBJECTIVES:

Rapid survey of biodiversity selected hill forests of South Orissa
Inventory of flora and fauna of the study area
Survey of ecologically sensitive plants and animals of the area
Identification of migratory route of mega fauna in the area
Identification of the threats on the existing wildlife of the area
Documentation of the community conservation initiatives in the study area.


District Map of Orissa
N
JHARKHAND
WEST BENGAL
Sundargarh
Jharsuguda
Mayurbhanj
Deogarh
Kendujhargarh
Baleshwar
Bargarh
Sambalpur
Sonapur
Angul
Bhadrak
Dhenkanal
Jajpur
Nuaparha
Balangir
Bauda
Cuttack
Kendrapara
Phulbani
Nayagarh
Khorda
Jagatsinghpur
BHUBANESHWAR
(State Capital)
Puri
Kalahandi
Ganjam
Naba rangapur
BAY OF BENGAL
Gajapati
Map not to Scale
Railway Line
State Capital
District Boundary
Study area
Malkangiri
ANDHRA PRADESH
Copyright (c) Mapience India Limited 2001


Niyamgiri Deposit 1306m
Sijimali Deposit 1216m
Karlapat Deposit 1141m
Krushnamali Deposit 1040m
Image © 2007 TerraMetrics
© 2007 Europa Technologies
Image NASA
Image © 2007 DigitalGlobe
Google

METHODOLOGY: Several field visits were carried out at the study area to understand the biodiversity of the region. Along the trek routes the vegetation, mammals, birds, herpetofauna and some invertebrates were surveyed. The vegetation survey was conducted both in pre-monsoon and monsoon season of the year 2007. All the hill forests were covered thoroughly and the sampling was made in open, closed and dense forest cover during the survey. The unidentified plants were collected in polythene bags and taken into the laboratory for identification. The plants were identified as per Flora of Orissa by Saxena and Brahmam 1997. The lower group of plants like bryophytes lichens and fungi were identified using standard monographs. New plants were identified by comparing the herbarium specimen of BSI, Kolkata; NBRI, Lucknow and IMMT (RRL), Bhubaneswar as and when required. Photographs of flowering plants, key identifying characters of plants, and animals were taken for identification. The orchids were identified following "Orchids of Orissa", Mishra, 2004. Informal interviews with the forest department officials, traditional healers/ Janis/ Disharis, local villagers, NTFP gatherers and livestock herders were held to collect secondary information regarding the ethnobiology of the region. Field guides for mammals (Menon, 2003 and Prater, 1971), birds (Grimmett et al., 1998 and Rasmussen and Anderton, 2005), herpetofauna (Das, 2002; Daniel, 1983; Smith, 1943 and Whitaker and Captain, 2005) were followed for identification. Butterflies and other invertebrates was photo documented and identified at the Regional Museum of Natural History, Bhubaneswar and by the experts. Data-sheets encompassing the detail habitat features were maintained in regular intervals with photo documentation of the biodiversity of the region. The mammalian fauna were recorded from direct sighting, indirect evidences like scat, scars and other signs and from secondary information sources like interacting with the villagers, livestock herders and NTFP gatherers. Birds were identified by sighting and indirect evidences like molted feathers, call etc. The herpetofaunal diversity was recorded by sighting and by showing pictures of the animals to the local inhabitants. Butterflies and other invertebrates were identified by search and sight methods and the unidentified species were photographed for identification by matching the field guides. Wild animal species were searched by the following methods.

- Day and night survey to search and sight the animals near hill streams and in forest routes.
- Indirect evidences like scat, scars and molted skins were examined for identification.
- Cave dwelling and arboreal animals were searched by paying special attention during the field visit.
- Binoculars are used for identification of birds.
- Amphibians and nocturnal animals were searched by locating their calls during night time and by searching along the hill streams.
- Data-sheets encompassing the detail habitat features were maintained in regular intervals with photo documentation of the biodiversity of the region.

- Data were also collected from the secondary information sources like the traditional healers, hunters, and older people by taking their interviews.

RESULTS AND DISCUSSION

Forest resources of South Orissa: There is occurrence of 4 types of forest in all the four districts of South Orissa classified by Champion and Seth (1968). The vegetation of Niyamgiri, Deomali, Mahendragiri, Khandualmali and Baphlimali are moist mixed deciduous type with many semi evergreen patches where as it is of dry deciduous types in Sijimali, Krishnamali, Potangi, Panchpatmali, Maliparvat Kodingamali and Kutrumali. But in all the hills many micro climatic variations with riparian forests were observed during the field survey.

Table – 1: Forest cover in four districts of South Orissa (area in sq km) Source: State of the Forest Report, 2005 (Forest Survey of India, Dehradun)

Sl no.	Name of District	Geographical area	Forest cover (Area in square km)				
			Very dense	Moderately dense	Open forest	Total forest	Percentage
1	Kalahandi	7920	370	743	1193	2306	28.72
2	Koraput	8807	104	718	856	1678	19.05
3	Rayagada	7073	456	901	1735	3126	44.20
4	Gajapati	4,325	90	1,523	872	2,485	57.46

FOREST TYPES OF SOUTH ORISSA

Ecologically, the forests of South Orissa are classified into the following types based on revised survey of forest types in India by champion and Seth (1968).

1. 2BC3 – Northern tropical semi evergreen forests (Orissa semi evergreen forests)
2. 3C – Northern Indian Moist deciduous forest

   3C/2c 2e – Moist peninsular Sal Forest, 3C/C2 e (i) – Moist peninsular high-level Sal, 3C/2C 2e (ii) – Moist peninsular low level Sal,

   3c/2S1 – Northern Secondary moist mixed deciduous forest &

   c/2S1 – Dry bamboo brakes
3. 5B – Northern Tropical dry deciduous forest

   5B – c1 Dry Sal bearing forests

   5B – 2c – Northern dry mixed deciduous forests
4. 5B BDS I – Dry deciduous scrub
5. 5B E9 – Dry Bamboo brake
6. Orissa semi evergreen forests (2BC3): This type of forest occurs over limited areas where elevation is more than 1000 meter above MSL. This is confined to moist valley of

Mahendragiri hill ranges, Deomali, Baphlimali, Niyamgiri and Khandualmali. The important species mate with is *Mangifera indica*, Markanda, *Diospyrous melanoxylon*, *Dillenia aurea*, *Messua ferrera*, *Syzygium cumini*, *Mallotus philippensis*, *Macaranga peltata*, *Terminalia paniculata*, *Treama aurientalis*, *Diospyrous malabarica*, *Ficus recimosa*, *Michelia champaka*, *Anogeissus acuminata*, *Barringtonia acutangula*, *Trewia nudiflora*, *Malotus phillipensis* etc. Regeneration of important species is in adequate.

7. Moist peninsular high-level Sal (3C/C2 e): This sub type is met on high hills and plateau in Mahendragiri, Baphlimali, Karlapat, etc. Quality of Sal varies between III – IV. The trees are well formed and Sal tends to become purest high elevation. The important associates of Sal are *Pterocarpus marsupium, Terminalia alata, Haldinia cordifolia, Myrtagyna parviflora, Bridelia retusa, Terminalia tomentosa* etc. Bamboo of poor quality also occurs. Natural regeneration is adequate.
8. Moist peninsular low-level Sal (3C/2C e): This sub-type is found in the hill slopes and plain forest of Kutrumali, Kodingamali and Panchpatmali. Top canopy is almost of pure Sal varying from quality III to IV. Regeneration of Sal is profuse. *Terminalia tomentosa, Pterocarpus marsupium, Haldinia cordifolia, Myrtagyna parviflora, Dalbergia sisso, Buchnania lanzan, Cleistanthus collinus* are common associates.
9. Northern Secondary moist mixed deciduous forest (3c/2 S1): Considerable areas of Rayagada Forest Division where the soil cover is poor and dry has resulted in this type of forests on hill slopes. Conditions are not suitable for the growth and establishment of Sal. The common species found are *Anogeisus latifolia, Madhuca indica, Pterocarpus marsupium, Haldinia cordifolia, Lagerstromia parviflora*, etc. The original forest has been destroyed at some point of time by shifting cultivation resulting in this type of forest. Siali and Atundi are the main climbers. Natural regeneration of important species is wanting.
10. Dry bamboo Brakes (Edaphic and Seral Type (3c/2S1): Dominant by only one species of Salia bamboo, this type of forest is met with in parts of Karlapat. Salia bamboo forms dense patches with or without sprinkling of trees. The ground floor is clean with average number of bamboo clumps per Ha. Coming upto 1500 clumps at places.
11. Dry Sal bearing Forest (5B-C1): This type of forest is met with in areas having shallow soil where quality of Sal is poor. Dry miscellaneous species are common associates. Canopy is less open. Regeneration of Sal is deficient. Mostly seen in and around Maharajapeta, Sialiloti forest blocks.
12. Northern Dry mixed Deciduous Forest (5B-C2): This occurs around higher slopes, mostly along southern aspect, where soil is dry and shallow. Condition doesn't favour growth of Sal.

This type tends to be moist in Western part and becomes dry towards East. It is seen around Maliparbat, Kutrumali, Khandualmali, Krishnamali etc. Bija, Dhoura, Sahaj, Mundi are important species with poor regeneration.

13. Dry Deciduous Scrub (5BDS1): Due to repeated tree loses its vigor resulting in dense under growth of thorny species. The area has been exploited beyond silvicultural and regenerative capacity. Eupatorium, Lantana species seems to be invading the area. Mainly found in Kodingamali, Balda, Mandibisi forest block.
14. Artificially introduced species: Teak is the single largest species, which has been planted over the years in different forest blocks of South Orissa. The other common species that has been artificially introduced are Red sander, Ghambar, Simaroba and Cashew etc.
15. DRY DECIDUOUS FOREST: *Anogeissus latifolia*, *Lannea coromandelica* and *Lagerstroemia parviflora*. The moist deciduous forest represents a transitional type from dry deciduous to semi evergreen vegetation. Thus, they have intermediate values of density, diversity and hospitality. The high variance of density and diversity parameters reflect considerable variation in the environmental parameters such as altitude, rainfall and influence of species from neighboring vegetation types. Ubiquity is high as most of the species are widespread. Some of the characteristic species of this type include *Terminalia crenulata, Lagerstroemia lanceolata, Grewia tiliaefolia, Dillenia pentagyna, Careya arborea and Xylia xylocarpa*.

FLORAL DIVERSITY OF SOUTH ORISSA

KALAHANDI:

KHANDUALMALI (83°, 10′, 02.47″ E and 19″, 29′, 01.11″ N):

It is situated along the boundary line of Karlapat wildlife Sanctuary of Kalahandi district between 83°, 10′, 02.47″ E and 19″, 29′, 01.11″ N. Nearly 20 hill streams are descending from the hills serve as the lifeline for wildlife as well as for millions of people of the area. The Khandualmali come across the migratory path of elephants. The contiguous forest across Devagiri of Rayagada district and Niyamgiri of Kalahandi district makes it an important migratory path for elephants, tigers and other mega herbivores. Apart from one of a wealthy reservoir of natural resources like bauxite, the area is home for a large number of endangered plants and animals. During a short field visit to the area, it was observed to be a biodiversity rich place. The

vegetation of the hill range falls under the category of tropical deciduous forests but depending on the biotic and abiotic factors, there is occurrence of semi evergreen, moist deciduous, moist peninsular sal type and grasslands in different parts of the hill.

SIGNIFICANT FINDINGS: The survey reveals the occurrence of about 300 plant species including 4 species of rare, threatened and conservation dependent plant species. Other salient feature of the study includes more than 45 species of medicinal plants and 35species of Pteridophytes of medicinal importance, 16 species of orchids, 12 species of Bryophytes, 10 species of Fungi, 4 species of Lichens. The ethno-botanical data in respect of 40 plant species were collected and compiled deserve merit as it provides new sources of herbal drugs/ edible plants or other aspect of plant utilization, which may serve as guide to the practitioners of Ayurvedic /Unani medicines.

KRISHNAMALI (19°, 41′, 12.53″N and 83°, 4', 28.97″E):

It is also situated along the boundary line of Karlapat wildlife Sanctuary of Kalahandi district between 19°, 41′, 12.53″N and 83°, 4', 28.97″E. The vegetation of the hill comes under different forest types depending upon the microhabitat, geographical location, topography and altitudinal extension. Tropical semi-evergreen forests are found along the hill streams. Moist deciduous, mixed dry deciduous, moist peninsular Sal forest was also observed in different patches. The preliminary study reveals the occurrence of 344 species of angiosperms, 40 species of pteridophytes, 28 species of bryophytes, 15 species of fungi, 12 species of lichens and 15 species of orchids including some rare/endangered/threatened taxa.

SIGNIFICANT FINDINGS: One species belonging to family Gesneriaceae was identified during the field survey from the hill. It is also a Himalayan species which is a new record for the Eatern Ghats. Occurrence of 60 species of medicinal plants for different ailments and diseases used by the tribal is another interesting finding from the hill. 5 rare terrestrial as well as ground orchids were found in the hill top some of which are endemic to the State and are conservation dependent.

NIYAMGIRI (19º 26’ to 19º 43’ N and 83º 18’ to 83 º 28’ E):

Niyamgiri hill ranges lying between 19º 26’ to 19º 43’ N latitude and 83º 18’ to 83 º 28’ E longitudes within the districts of Rayagada and Kalahandi in NE-SW direction is a part of the Eastern Ghats of India. The vegetation of the hill range, in general falls under the category of tropical deciduous forests but depending on the local microclimate, plant density, species association and composition and effect of biotic and edaphic factors, the vegetation of the region can be divided into 8 distinct types were observed. The flora of the hill range exhibits a very rich and varied assemblage of plant species owing to its diversified topography with high mountain peaks and flat plateaus, innumerable deep valleys and gorges, abundant springs and diverse vegetation resources. It remains unexplored or explored with very little sporadic surveys, but there is no detailed flora to assess the plant wealth of the region.

SIGNIFICANT FINDINGS: The preliminary floristic survey reveals the occurrence of 602 species of vascular plants distributed over 117 families of angiosperms, gymnosperms and pteridophytes. The study has been able to yield 15 plant species appearing to be rare / endangered/ conservation dependent though they occur in neighboring geographical region. More than 70 species of important medicinal and potentially economic plants were recorded. 31 species (19 epiphytic, 12 terrestrial) of orchids were recorded from the hill.

KORAPUT

MALIPARBAT (18°, 37′, 48.43″N and 82°, 54′, 11.87″E):

It is situated between 18°, 37′, 48.43″N and 82°, 54′, 11.87″E with highest elevation of 3136 ft above msl. The vegetation of Maliparvat is in general tropical deciduous forest type, however there is existence of different microclimates depending upon the edaphic, geological and orientation of the hill. There are perennial hill streams, gorges, water falls etc., which harbours tropical semi evergreen species, some evergreen species, moist deciduous species and peninsular Sal forests.

The vegetation of the hill ranges exhibit a very rich and varied assemblage of plants. The preliminary floristic survey reveals the occurrence of 450 species of vascular plants including angiosperms, pteridophytes, gymnosperms, 25 species orchids (both epiphytic and terrestrial), 10 species of bryophytes (mosses,

hornworts and liverworts), 12 species of fungi and 08 species of lichens. The study has been able to yield to 15 plant species appearing to be rare/endangered/threatened/conservation dependent though they are occurring in neighboring geographical region. More than 80 species of medicinal plants, 6 species of fibre yielding plants, 16 species of oil yielding plants and 15 species of wild edible plants were found during the survey. The ethnobotanical data reveals 60 species of plants which deserve merit as it provides new source of herbal drugs/edible plants or other aspect of plant utilization, which may serve as guide to the preparation of Ayurvedic/Unani medicines.

SIGNIFICANT FINDINGS: The study team has found 2 interesting fungus one of which (*Dictyophora indusiata*) occurring in the foothill is an indicator of rainforest and might be a new record to India. 2 new species of plants which are new record for Eastern Ghats, 35 bryophytes which are first report to the State. Some rare and endangered orchids which are conservation dependent and needs utmost attention. *Salvia elegans* (Lamiaceae) and an aquatic plant, *Limnanthimum parviflora* in the top of the hill of Mali Parvat are two new reports for the Eastern Ghats, India and new addition to the flora of Orissa.

POTANGI: (18° 36' N, 82° 58' E):

The forest vegetation of Pottangi is broadly divided into three categories viz. semi-evergreen, moist deciduous and bushy type. Along the stream courses, many patches of evergreen trees were observed which indicate a healthy ecosystem.

SIGNIFICANT FINDINGS: The vegetation of the hill harbours some evergreen species including 244 species of angiosperms, 40 species of pteridophytes, 30 species of bryophytes, 12 species of fungi, 10 species of lichens and 12 species of orchids, some of them are endemic to the state. There is one aquatic *Limnanthimum parviflora* belongs to family Menyanthacea is a new record to the State. This species was

reported earlier in flora of Madras. *Coleus barbatus* of family Lamiaceae is abundantly occurring in the hill top. This species is used by the tribals to cure malaria. There are almost 20 species of medicinal plants found in the hill top are reported to be used for different phototherapeutic claims by the tribal of the region.

DEOMALI (18°40'32"N 82°58'55"E) :

Deomali Peak, with an elevation of about 1,672 m, is the highest peak in Orissa and the tallest in the whole of the Eastern Ghats. It is situated near Doodhari village, which is 35 km from Koraput. Surrounded by deep green forest, the peak is rich in flora and fauna. This hill range is rich in mineral resources such as bauxite, limestone and gemstones. Deomali is dotted with brooks and deep valleys, and inhabited by tribes such Kandhas, Parajas, Bhumia, Malis and Bhotras.Though the lower hills have taller trees, the upper ones are completely devoid of arboreal species.

SIGNIFICANT FINDINGS: Species specific to these hills but not found elsewhere in the state are: *Habenaria grandifloriformis*, *Emilia zeylanica*, *Gynuura lycopersicifolia*. Healthy population of *Piperomia quadrifolia* and *Coleus barbatus*, a widely used medicinal plant was recorded in the hill top. Similarly *Exacum bicolor*, a rare medicinal herb was also growing luxuriantly is another noticeable finding.

PANCHPATMALI (83°1'24"E and 18°51'11"N):

The vegetation of the hill range falls under the category of tropical deciduous forests but depending on the biotic and abiotic factors, there is occurrence of moist deciduous, moist peninsular sal type and grasslands in

different parts of the hill. The plateau top is covered with grasses, phoenix (date palm) and weeds such as lantana and Eupatorium. Open forest and moderately dense forest are seen along eastern side slope of the hill. Common species found in the hill slopes are Amla, Kendu, Piasal, & Mango etc. The already mined out and reclaimed areas show good growth of vegetation of indigenous species.

SIGNIFICANT FINDINGS: The floral diversity of Panchpatmali hills consists of 160 plant species including 8 species of rare, threatened and conservation dependent plant species. Other salient feature of the study includes more than 25 species of medicinal plants and 12 species of Pteridophytes of medicinal importance, 12 species of orchids, 4 species of Bryophytes, 5 species of Fungi, 2 species of Lichens and 5 species of algae. Similarly the faunal diversity of the hills consists of 11 species of mammals, 8 species of amphibians, 20 species of reptiles, 10 species of herpetofauna and 25 species of birds.

RAYGADA

KUTRUMALI (83° 11' 23.89" E, 19° 34' 14.86" N):

The vegetation of the hill range falls under the category of tropical deciduous forests but depending on the biotic and abiotic factors, there is occurrence of semi evergreen, moist deciduous, moist peninsular sal type and grasslands in different parts of the hill.

SIGNIFICANT FINDINGS: The preliminary report reveals the occurrence of about 180 plant species including 2 rare, threatened and conservation dependent plant species. Other salient feature of the study includes more than 35 species of medicinal plants and 15species of Pteridophytes of medicinal importance, 11 species of orchids, 13 species of Bryophytes, 5 species of Fungi, 3 species of Lichens.

The ethno-botanical data in respect of 13 plant species were collected and compiled deserve merit as it provides new sources of herbal drugs/ edible plants or other aspects of plant utilization, which may serve as guide to the practitioners of Ayurvedic / Unani medicines.

BAPHLIMALI (82° 57’ 54.65” E, 19° 20’ 58.51” N):

Baphlaimali is situated in the southwestern part of Orissa, falls in the Eastern Ghats belt in the peninsular shield with the highest peak of 1056 m above msl. The location is situated at 19° 18’ to 19° 22’ N longitude and 82° 56’ to 82° 59’ E latitude and comes under Rayagada and Koraput districts of Orissa. The major part

of the hill falls under Kashipur block of Rayagada district and the rest in the Kalahandi district. Baphlimali is among the rich bauxite deposit mines in the Eastern ghat, came in to limelight in 1977 by the publication of GSI report and is taken up by MECL for bauxite extraction. The forest type constitutes of dry mixed deciduous forest, patchy bamboo thickets, degraded forest, agricultural slops and shrub forest. The slopes of the hill is encroached and cultivated by different crops, legumes, oil seeds, pulses etc by the local villagers. There are no surface water bodies on the top of the plateau but many of the hill streams are originated from the top storey of the hill. Apart from the perennial hill streams many rainfed water channels descend from the hill. The hill “Baphlimali” is surrounded by the villages like Udri, Kendumundi, Chirka, Durmusi in three sides and Indravati irrigation project on other side. (Full report is available at http://www.vasundharaorissa.org/Research).

SIGNIFICANT FINDINGS: The floral diversity of Baphlimali hills consists of 200 plant species including 8 species of rare, threatened and conservation dependent plant species. Other salient feature of the study includes more than 40 species of medicinal plants and 12 species of Pteridophytes of medicinal importance, 32 species of orchids, 8 species of Bryophytes, 10 species of Fungi, 8 species of Lichens and 10 species of algae. The ethno-botanical data in respect of 40 plant species were collected and compiled deserve merit as it provides new sources of herbal drugs/ edible plants or other aspects of plant utilization, which may serve as guide to the practitioners of Ayurvedic / Unani medicines. Similarly the faunal diversity of the hills consists of 21 species of mammals, 12 species of amphibians, 30 species of reptiles, 12 species of herpetofauna and 15 species of birds.

MANDIABISI (19° 23’ 34” N and 83° 09’ 53” E):

Mandibisi is situated at 19 23 34 N and 83 09 53 E at an altitude of 675 meters at MSL near to Baphlimali. We visited the Bagha Dangar coming under Mandibisi V. S. S., which is one of the good forest patches of the

area. As the name suggest, the area was earlier inhabited by Royal Bengal Tiger before five to ten years. Now people could occasionally hear the roaring of tiger. After discussion with the local villagers we could figure out that recently during September to October 2006 there was a leopard killed by the poachers of the nearby area. But the forest staffs denied to the statement. In Mandibisi, we visited the area with a traditional healer named Duryodhan Gopal, who is a renowned man of the area. He has vast experience on ethno-botany, which is his ancestral practice. We devoted a total of 23 hours in the field area in two days. We searched the caves, the plateau, the hill streams and the forest area and gained lots of experience and came across good diversity of plants and animals. There are 34 V. S. S. under Mandibisi, among which we visited Mandibisi, Putesh and Nalachuan V.S.S.

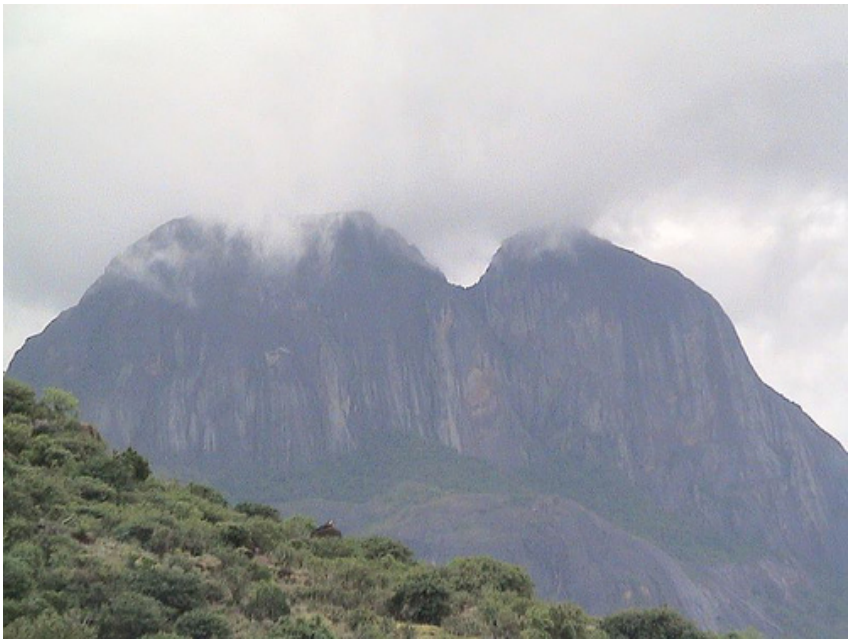
KODINGAMALI (83° 00' 48.14" E, 18° 50' 30.26" N):

Apart of the Eastern Ghat range stretching 22 Km lies in Laxmipur block of Koraput District and extends to some parts of Tikiri range of Rayagada District. This forest has nourished the life and culture of the local Kondh tribes and acted as a bridge between Kondha and Damba. The forest contains woody species and shrubs. In addition, the dense forest has several streams which act as a lifeline to the local inhabitants. Some of the streams are Jhilimili, Badamanguli, Pitua Jhola, Patapenu and Mundajhola. Masaninala receives water from these streams. The plateau is around 1,276 metres above sea level and its general ground level is 900 metres above sea level. The total mine area leased to the project is 447.25 hectare. It falls under the Kodinga Reserve Forest. Till date forest clearance has not been received. The life of the mining project is 20 years.

SIGNIFICANT FINDINGS: Four species of Bryophytes, 4 species of Fungi, two species of lichens, 30 species of medicinal plants including healthy population of some of the important medicinal plants like *Stachytarpheta indica, Kalanchoe pinnata, Habenaria plantaginea, Gloriosa superb, Acalypha indica, Curculigo orchiodes, Centella asiatica, Abrus precatorius, Andrographis paniculata and Heliotropium indicum* were observed in and around the hill.

GANJAM

MAHENDRAGIRI (18°58'28"N 84°22'5"E) :



Mahendragiri hills are situated in the Ganjam district of Orissa between 18° 58' N latitude and 84° 24' E longitude. The hills are roughly 25 km away from Bay of Bengal. The highest summit is 1500 m (4973 ft) above mean sea level. As per Gamble (1892), Mahendragiri is the amalgamation of biodiversity with specoes from both north and south, the Himalayas and the Nilgiris. Mahendratanya, the chief river of the hill rises in the peak and flows down into two streams- one southwards into the Paralakhemundi division joining the river Vansadhara and the other through Mandasa, entering Bay of Bengal near Barua in Andhra Pradesh. The hills are mede up of gneisses, charanockites and khondalites. The annual rainfsall is 1551.6 mm. Spread over an area of over 2,000 sq km bordering Andhra Pradesh, this majestic micro-environmental terrain is dotted with over 25 small and big hills among which Singaraj (1516 meters), Mahendragiri (1601 meters) and Devagiri (1392 meters) are the highest peaks in the region forming a golden triangle symbolizing the area's immense ecological asset. As per Champion and Seth (1968), the forest of Mahendragiri falls mainly under (a) Tropical moist deciduous and (b) Tropical dry deciduous type. The vegetation can be classified broadly into four types- Sal forest. Mixed deciduous forest, grasslands and scrub forests.

Table. 1: ANGIOSPERMS OF SOUTH ORISSA

Sl. no.	Class	Families	Genera	Species
1	Gymnospermae	2	2	2
2	Angiosprmae			
	Dicotyledonae	99	359	516
	Monocotyledonae	17	86	124
	Total	118	447	642

SIGNIFICANT FINDINGS: The floral diversity of the hill includes 642 species of plants which is 35% of the flora of Orissa. The 10 most dominant families of Mahendragiri are Fabaceae, Poaceae, Asteraceae, Euphorbiaceae, Acanthaceae, Rubiaceae, Lamiaceae, Cyperaceae, Apocynaceae and Orchidaceae The characteristic Himalayan species occurring on Mahendragiri are *Moutia puya, Viola serpens, Viola betonicifolia, Clematis roylei, Rhamnus nepalensis, Anotos calycina, Ajuga macrosperma, Thalictrum foliolosum, Rubus ellipticus, Rubia corditolis, Sarcococca trinervia, Zanthoxylum armatum, Ophiopogon intermedius* etc. The important south

Indian species represented in the hills are *Taphrosia rosburghiana, Sida rumbifolia* ssp. *Retusa, Todalia asiatica* var. *obtusifolia, Sophora interrupta, Wendelandia gamble, Pavetta brevifolia, Anaphalis lawii, Sanecia candicans, Diospyros candolleuna, Peperomia portulacoides, Neolitsea zylenica, Molineria finlaysoniana, Clausena heptaphylla* etc. It is interesting to note that some North Eastern species like *Syzygium cuneatum, Linociera macrophylla, Litsea laeta etc. and some species of Burma and Java such as Psychoteria fulva, Ophiorhiza trichocarpos* etc. were also observed in Mahendragiri. Except Poaceae, Cyperaceae and Orchidaceae other monocots are poorly represented. Gymnosperm represented by 2 indigenous species such as *Cycas circinalis* and *Gnetum ula*. Varied plant and animal species still survive in the wilds of the region. Out of 32 plant species in the country identified for conservation, cultivation and sustainable commercial exploitation by the National Medicinal Plants Board under the Ministry of Health and Family Welfare, botanists have identified at least 15 species available in the Mahendragiri eco-system. Ecologically, the Mahendragiri terrain is in a very bad shape today as the vegetation cover has become very thin except in the valleys and towards the lower regions which still have patches of dense forest. Mahendragiri represents the transitional flora between southern peninsular India and the Himalayas making the region an ecological estuary of genetic diversities. There are three temples on the top of the mountain. They are Kunti Temple, Yudhisthira temple and Bhima temple. It is most popular for its Fauna like Elephants, Spotted Deer, Leopards, Peacock, Flying Squirrels, and Talking Mynas. The Mahendra Tanaya rivulet wends its way through the forest which abounds in peacocks, flying squirrels and even the talking mynas. The extravagant beauty of the forested hill is quite breathtaking.

KEY OBSERVATIONS/FINDINGS

Discovery of *Corallodiscus lanuginosus* from Krishnumali hills

Corallodiscus lanuginosus, a medicinal herb belonging to family Gesneriaceae is an endemic plant, was reported to grow in North Eastern India and China between altitudes of 1000-4000 m msl. Recently discovery of the plant from Krishnamali hills of Similipadar village (19°41′12.53″N, 83°4′28.97″E) between altitudes of 600-800 m msl from Karlapat hill ranges of Kalahandi District, Orissa has extended its distribution to peninsular India. According to Himalayan doctors and healing herbs, a traditional medicinal magazine, the species is used for Kidney disorder in many parts of the world and shown promising result in ailments. This provide ample opportunities for scientists and researchers to explore the area for some more novel findings which may provide helping hands to our ongoing search for the modern drugs of herbal origin. The checklist of angiosperms of southern Orissa is given in Appendix-1.1

Discovery of *Nymphoides parvifolia* from Maliparbat and Krishnumali hills

Nymphoides parvifolia belongs to family Menyanthaceae is an aquatic angiosperm reported to occur in Malyasia, Australia, Srilanka and India. According to Flora of British India and Flora of Madras Presidency, in India the species is distributed in Western Deccan peninsula, Sillong, Konkon coast and in most part of Gujurat in plane land, rice fields and water tanks at mean see level. The species was collected from Krishnamali hills in Karlapat range of Kalahandi district and Maliparbat of Koraput district of Orissa from an altitude of 950 to 1000m above mean see level. Interestingly, this is the first report of the species from the Eastern Ghats of India. The recent discovery of the species extends its distribution to peninsular India.

Discovery of *Dictyophora indusiata* from Kutrumali hills and *Morchella esculanta*/*Morchella crassipes* from Baphlimali hills

The mushroom fungus *Dictyophora indusiata* or *Phallus indusiatus* commonly called long net stinkhorn is a macrofungus that belongs to the order Phallales in the fungal phylum Basidiomycotina. The fungus has been reported to grow at a temperature between 21°C to 25°C, in moist bamboo thickets at 300–600 m amsl and relative humidity of 45–85% from tropical areas including Mexico, South America, Malaysia, southern China and Japan. Recent discovery of this fungus from the Western Ghats and the Eastern Ghats extends its distribution to peninsular India. The fungus was found to grow at an altitude of 420 m amsl in a bamboo thicket near the foot of Kuturmali hill of Koraput district of Orissa during post rainy season. As per the local inhabitants, the species has multipurpose medicinal applications for different ailments and diseases and is a sign of good luck for those who saw this species at least once in his lifetime and is rare to the State of Orissa. The checklist of fungi of southern Orissa is given in Appendix-1

Morchella esculenta is an important edible mushroom belonging to the family Helvellaceae and found in the Himalayan forest between 1800 and 3600 masl and is locally sold to middlemen and traders at Rs 5000 per kg. It is cooked as food and used in medicine and health care system by the traditional societies and also considered important for clinical use. Six species, namely *Morchella esculenta*, *M. conica*, *M. deliciosa*, *M. angusticeps*, *M. arassipes* and *M. hybrid* (*M. semilibera*) have been reported from India. The discovery of *M.esculanta* from Baphlimali extends its distribution to peninsular India.

Discovery of *Pancriatum parvum* from Karlapat

Pancratium parvum belong to family Amaryllidaceae is reported to grow in Western Ghats (Maharastra, Tamil Nadu, Kerla and Karnataka) and Noprthern India (Himalayas) in most deciduous and semi-evergreen forests. The smell of the bulb is inhaled to cure Epilepsy by Pawra tribe of Satpura Hills, Maharashtra, India. The recent discovery of this species from Karlapat wildlife sanctuary extends its distribution to Eastern Ghats of India.

Healthy population of *Radermanchera xylocarpa* from Karlapat

Radermachera xylocarpa (Padri Tree) is a large deciduous tree belong to family Bignoniaceae, growing up to 5-10 m tall. It is usually found in dry deciduous forests of Central India. It is a rare species in the Central Indian region with very thin and scattered population. A healthy population of almost 100 trees was encountered within Karlapat. This report has extended the range of this species to Orissa. As per the local inhabitants, the fruits of this species are consumed by the Samber inside the sanctuary.

Discovery of *Ophioglossum reticulatum* from Krishnamali hills

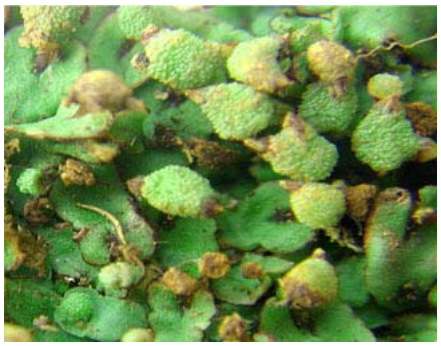
The genus *Ophioglossum* L. commonly known as Adder's tongue or Snake tongue fern of eusporangiate belonging to family Ophioglossaceae. About 40 species under the genus *Ophioglossum* are known so far worldwide, but in India the genus is represented by 12 species. Ophioglossum reticulatum is reported to be distributed in Western Ghats, Southern India, Central India and Northern India. The discovery of this species from Krishnamali hills of Karlapat has extended its distribution to Eastern Ghats of India. The checklist of pteridophytes of southern Orissa is given in Appendix-1.1.

First report of Lichens from Orissa state

The occurrence of *Heterodermia diademata* in Baphlimali, Niyamgiri and Mahendragiri is an indication of mixture of flora of Northern and Southern elements. The species was earlier reported from North-east and Western Ghats of India. *Parmelia saxatilis* and *Parmelia sulcata,* the two most common indicator species were observed during the survey shows the richness and diversity in Lichens of south Orissa.

Healthy population and first report of Bryophytes from Orissa state

Twenty three species of Bryophytes were collected during the survey belongs to 13 family and 17 genera from different forest types of south Orissa. *Bryum argenteum*, *Funaria hygrometrica, Marchantia palmate, Phaeoceros laevis, Plagiochasma appendiculatum, Riccardia levierii* were most common in their occurrence while, *Targionia hypophylla, Asterella angusta* and *Riccia gangetica, Pallavicinea lyeli, Pellia epiphylla* were observed in only near semi-evergreen forest patches of Khandualmali, Niyamgiri, Baphlimali, Mahendragiri and Deomali hills. Since there is no available literatures on Bryoflora of Eastern Ghats in general and Orissa in particular, all the Bryophytes reported during this study are treated as new distributional record of their corresponding occurrence to Orissa.



The checklist of bryophytes and lichens of southern Orissa is given in Appendix-1.3 and 1.4.

THREATS TO FLORAL DIVERSITY OF SOUTH ORISSA:

However, short-cycled shifting cultivation, reclamation of forestland for agriculture, removal of timber, firewood and over-collection of minor forest produce, indiscriminate vegetation clearance and loss of biodiversity, stone quarrying, cattle grazing, reduced flow of water in the streams, loss of fertile top soil, loss of soil moisture and lowering of the water table are some of the causes of eco-degradation of the Mahendragiri hill complex. The checklist of threatened plants of south Orissa is given in Appendix-1.2.

FAUNAL DIVERSITY OF SOUTH ORISSA

DEOMALI (18°40'32"N 82°58'55"E) :

The avifauna of Deomali comprised of more than 50 species. The raptors like Peregrine Falcon, Common Kestrel, Black- shouldered kite and pheasants like Peafowl, Red jungle fowl and Grey Jungle fowl were observed here and there in the forest. Different species of Bee-eater, Cuckoos, Swifts, Swallows, Bulbul and many species of small to medium seized bush birds were also encountered during the survey. The checklist of the avifauna is provided in Appendix-2.

The herpetofauna include ore than 20 species of snakes that were encountered during the survey including discovery of a snake species earlier not reported from Orissa. The Sri Lankan Stripe-necked snake or *Liopeltis calamaria* was earlier recorded from Western Ghats of Kerala, Maharashtra, Tamil Nadu (Tinnevelly Hills), Karnataka (Mysore and Bangalore) and Madhya Pradesh; and outside India in Bangladesh (?) and Sri Lanka. During the winter survey, three specimens were encountered at the top plateau of Deomali. The snakes were found in dry zones of the plateau, bellow rock boulders preferably near Phoenix bush at an altitude of 1505m above msl. We observed three specimens after searching for 20 hours by 4 people and uplifting >500 rock boulders of 5" to 15" size. The other interesting herpetofauna of the area was *Mabuya beddomei*, which was also recorded for the first time in Orissa. Earlier, the species was recorded from Karnataka (Mysore), Kerala (Malappuram, Sivagiri Hills, Silent Valley and New Amarambalam Reserve Forest) and Tamil Nadu (Tirunelveli and Salem); and outside India in Sri Lanka. After the discovery of the species from Deomali its range extends to the Eastern Ghat ranges of Orissa. This species of skink prefer to live in the same type of habitat as the Srilankan stripe-necked snake and in Deomali they were found bellow rock boulders at an altitude of 1500-1600m above msl. We also recorded a good population of bush frogs (*Philautus* sp) from the area. The checklist of the faunal diversity of south Orissa is provided in appendix-2. The invertebrate fauna was diverse and among the observed species most of the species photographed were unidentified.

Surveillance of some of the key mammals of Deomali

SCIENTIFIC NAME	REMARK
Melursus ursinus	Sloth bears, popularly known as Bhalu, are occasionally seen in Deomali proper but are common in the adjacent hill ranges. They take shelter in the caves and are active just before dusk for foraging whole night and retire by dawn. As a part of their daily routine they work hard in search for food to support their bulky body.
Canis lupus pallipes	Wolves, which is popularly known as Kug. The wolf may live in forest but are common in bare and open region. They prefer to live in thickets of shrub, thorn forest, lying up in open fields and some times take shelter in caves during rainy season. They hunt by day and night and near human habitation they are believed to be cattle and goat lifters. The wolves are occasionally encountered in the forest and we were fortunate enough to sight a single individual near Deomali during early morning.
Canis aureus	Deomali and its hill ranges are inhabited by a small population of Jackals or the *Maluas* (in traditional language) and are frequently sighted at the foot hills during dusk. They are smaller than wolf and perhaps the most adaptable canid and can live in almost any kind of habitat. They are mostly found in lowlands, inside holes near agricultural field, among dense grasses and scrub thicket. They are occasionally seen in groups except during breeding period.
Sus scrofa	The wild boar herds are also uncommon in Deomali, which are always hearted by the farmers for their crop raiding activities in the agricultural fields situated near the forest land. They are often victimized by the poachers for meat and use of their jaw bone in traditional healing of tonsillitis
Muntiacus muntjak	In the forest Barking deer is found along the hill tracts.
Hysterix indica	The Indian porcupine is relatively common in Deomali. They occasionally venture at the top plateau, which was evident from the

MALIPARBAT (18°, 37′, 48.43″N and 82°, 54′, 11.87″E):

Surveillance of some of the key mammals of Mali Parvat

The faunal diversity of Maliparavat includes 27 species of mammals, 63 species of birds, 25 species of snakes, 8 species of lizards, 14 species of frogs, 3 species of scorpions and 31 species of butterflies. The Mali parvat hill ranges were found to be a good habitat for Sloth bear, Wolves, Barking deer, Wild boars, Jackals, Civetys, Pangolin, percupines and many other species of mammals. The presence of some of the important species of mammal is presented in tabular form as follows and the complete checklist is given in Appendix---. The avifauna of Mali parvat documented during the survey comprised of more than 63 species. The raptors sighted were Peregrine Falcon, Common Kestrel, Black- shouldered kite, Shickra, Sparrow hawk, Hunny buzzard and one unidentified species. Pheasants like Peafowl, Red jungle fowl, Grey Jungle fowl are also abundantly in the forest. Different species of Bee-eaters, Cuckoos, Swifts, Swallows, Bulbul and many species of small to medium seized bush birds were encountered during the survey.

SCIENTIFIC NAME	REMARK
Panthera pardus	According to the secondary information collected, Leopards found in the Mali Parvet and is uncommon. They are rarely sighted by the live stock herders and they are occasionally sighted near the villages.
Melursus ursinus	Sloth bears, popularly known as Bhalu, are common in the Mali parvat and the adjacent hill ranges. They take shelter in numerous caves and bush thickets. Sloth bears are very often encountered by the villagers and they avoid disturbing them inside forest. They are active just before dusk for foraging whole night and retire by dawn and sometimes raid in the crop field for Maize, Jack fruit etc.
Canis lupus pallipes	Wolves, locally known as Kug are relatively common in the area. They are common in bare and open region. They hunt by day and night and near human habitation they are believed to be cattle and goat lifters. The wolves are sometimes sighted in the forest as per the secondary information sources.
Hyaena hyaena	Hyaena or Gadha bagh are rarely encountered in the area.
Canis aureus	Jackals or locally known as the *Maluas* are frequently sighted at the foot hills during dusk. We had direct sighting of more than 5 individuals during one night in that area. The Jackals are smaller than wolf and perhaps one of the most adaptable canid. They are mostly found in lowlands, inside holes near agricultural field, among dense grasses and scrub thicket. They are occasionally seen in groups except during breeding period.
Sus scrofa	The wild boar herds are also uncommon in Mali parvat, which are always hearted by the farmers for their crop raiding activities in the agricultural fields situated near the forest land. They are often victimized by the poachers for meat and use of their jaw bone in traditional healing of tonsillitis.

The encounter rate of herpetofaunal diversity of the area was quite high in the sense that we encountered 11 species of snakes and 7 species of lizards and 7 species of frogs during two days field survey. Observation of some of the herpetofauna, altitudinal variation in species distribution and their habitat specification is provided in the following table. The checklist of herpetofauna is provided in Appendix_.

NIYAMGIRI (19º 26' to 19º 43' N and 83º 18' to 83 º 28' E):

The Niyamgiri hill ranges come across the migratory path of elephants and in 2004 the State Wildlife Department brought a proposal for declaration of certain parts as elephant reserve, which comes under Phulbani- Gajapati and Kalahandi Elephant reserve. The area has been recommended for creation of Niyamgiri wildlife sanctuary in the revised working plan for the reserve forest and proposed R.F. of Kalahandi Forest Division for the period of 1997-1998 to 2006-2007 comprising an area of 9129.19 hectors. The area was declared as Nature conservation / game sanctuary by the Raja of Kalahandi in pre independence era, which shows the rich biodiversity. The contiguous forest across Devagiri of Rayagada district, Niyamgiri and Karlapat Wildlife Sanctuary of Kalahandi district makes it an important migratory path for elephants, tigers and other mega herbivores.

Surveillance of some of the key mammals of Niyamgiri

SCIENTIFIC NAME	REMARK
Panthera tigris	Rarely sighed near Khambeshi and Jarpa area of Khambesi R.F.
Panthera pardus	Leopard sighting is common in the forests of Lanjigarh Forest Range, Niyamgiri and they were also frequently seen on the top plateau. Scats of leopards were collected from many places of the forest, which signifies their abundance in Khambesi, Niyam Dongar and at the foot hills. Scat analysis of the Leopards from Niyamgiri revels they were feeding predominantly on Barking deer, Hare and Languor. Just before our visit to the study area one Leopard had ventured in to the Lanjigarh town on June, 2005
Prionailurus bengalensis	Sometimes sighted inside forest. We encounter two individuals during our night survey in the forest.
Elephas maximus	Niyamgiri forest comes under the migratory route of Elephants passing from Karlapat Wildlife Sanctuary to Korgarh Wildlife Sanctuary. Due to large scale of human disturbances, elephants take shelter in the undisturbed forest patch of Niyamgiri. We located elephant dung at several places near Khambesi and Jarapa Village
Melursus ursinus	Commonly sighted in the forest. We sighted one individual at the foot-hill.
Bos gaurus	According to the local forest dwellers Gaurs are sometimes sighted inside Niyamgiri forest.
Cervus unicolor	Commonly sighted throughout the forest
Tetracerus quadricornis	Observed scat at many places on the hill top
Moschiola meminna	Sometimes sighted in the forest. We had one sighting near Khambesi
Manis crassicaudata	According the forest dwellers, sometimes sighted inside the forest
Cuon alpanius	According to the forest dwellers Wild dog packs are sometimes found in the forest
Petaurista philippensis	Common in the Niyamgiri forest. We observed some of the Flying Squirrel nests on Jamun tree near the foot hill
Ratufa indica	Very common in the Niyamgiri Forest. Frequently sighted near the hill streams.
Mellivora capensis	Rattles are sighted throughout the Niyamgiri Forest. Occasionally they venture near Human habitation.
Anoyx cinerius	It is quite possible that the hill streams of Niyamgiri and other hill tracts of South Orissa are inhabited by the Clawless Otter. The Otters are found to be common in all the major hill streams of Niyamgiri.

The herpetofaunal diversity of Niyamgiri observed during the last field trip was consisting of 20 species of amphibians, 19 species of lizards and 22 species of snakes. Numerous hill streams and the vegetation are suitable for holding such a high diversity of herpetofauna. Discovery of two new species of frogs of the genus *Bufo* (Family: Bufonidae) and *Philautus* (Family: Rachophoridae) are new to science. Range extension of the frog species *Rana malabaricus* (Family Ranidae) is very much interesting from the biogeography point of view. The species was thought to be endemic to the Western Ghats and after its discovery in the Eastern Ghats from the Niyamgiri forest; it emphasizes the theory of landmass link between the two geographic regions of India. Apart from the frogs we found a skink of genus *Scincella* sp., which was not recorded from Orissa. The skink lives near the hill streams and mostly found bellow rocks or in leaf litter. Niyamgiri forest

havens a very good population golden gecko; the endangered species of gecko is placed under Schedule I of WPA. Presence of golden gecko is characterized by the typical microclimate with high humidity, dark and cool place. During the 5 days of field survey in Niyamgiri we came across 20 species of snakes, which shows a very good diversity of snake fauna. Finding of the Cantor's black-headed snake (*Sibynophis sagitaria*) and St Johns keel back (*Xenocrophis sanctijohanis*) are first reports from Orissa. Rediscovery of Travancore Wolf Snake (*Lycodon travancoricus*) from the area has confirmed its distribution in the Eastern Ghats. Another most important discovery of the survey was the cat snake (*Boiga* sp.), which deserves another species status. This shows Niyamgiri is one of the least studied habitats from herpetofaunal point of view. A detail survey may reveal many additional species of herpetofauna from the area.

COMPARISION OF SIGHTING OF KEY MAMMALS IN DIFFERENT HILLS OF SOUTHERN ORISSA.

Sl. no.	Common name	Scientific name	PPM	PTN	MHG	MLP	KDM	KLP	NMG	KTM	KSM	WPA status
1	Tiger	*Panthera tigris*	✖	✖	✖	✖	✖	✓	✓	✖	✖	Sch-I
2	Leopard	*Panthera pardus*	✖	✖	✓	✓	✖	✓			✓	Sch-I
3	Leopard cat	*Prionailurus bengalensis*	✖	✖	✓	✖	✖	✓	✓	✖	✖	Sch-I
4	Jungle cat	*Felis chaus*	✓	✓	✓	✓	✓	✓	✓	✓	✓	Sch-II
5	Elephant	*Elephas maximus*	✖	✖	✓	✖	✖	✓	✓	✖	✖	Sch-I
6	Wolf	*Canis lupus*	✖	✓	✖	✓	✖	✓	✓	✓	✓	Sch-I
7	Jackal	*Canis aureus*	✓	✓	✓	✓	✓	✓	✓	✓	✓	Sch-II
8	Striped hyena	*Hyaena hyaena*	✓	✖	✓	✓	✖	✓	✓	✖	✖	Sch-III
9	Nilgai	*Boselaphus tragocameus*	✖	✖	✖	✖	✖	✓	✓	✖	✖	
10	Sambar	*Cervus unicolor*	✖	✖	✓	✖	✖	✓	✓	✖	✖	Sch-III
11	Chital	*Axis axis*	✖	✖	✓	✓	✖	✓	✓	✖	✖	Sch-III
12	Barking Deer	*Muntiacus muntjak*	✓	✓	✓	✓	✓	✓	✓	✓	✓	Sch-III
13	Hare	*Lepus nigricollis*	✓	✓	✓	✓	✓	✓	✓	✓	✓	Sch-IV
14	Porcupine	*Hystrix indica*	✖	✓	✓	✓	✓	✓	✓	✖	✓	Sch-IV
15	Indian Pangolin	*Manis crassicaudata*	✖	✖	✓	✓	✖	✓	✓	✓	✓	Sch-I
16	Wild Dog	*Cuon alpanius*	✖	✖	✖	✓	✖	✓	✓	✖	✓	Sch-II
17	Small Indian civet	*Vivericula indica*	✓	✓	✓	✓	✓	✓	✓	✓	✓	Sch-II

Sl. no.	Common name	*Scientific name*	PPM	PTN	**MHG**	MLP	**KDM**	KLP	**NMG**	**KTM**	KSM	WPA status
18	Common palm civet	*Paradoxurus hermophroditus*	✓	✓	✓	✓	✓	✓	✓	✖	✓	Sch-II
19	Grey mongoose	*Herpestes edwardsii*	✖	✖	✓	✓	✓	✓	✓	✓	✓	Sch-II
20	Ruddy mongoose	*Herpestes smithii*	✓	✓	✖	✓	✖	✓	✓	✓	✓	Sch-II
21	Indian giant flying squirrel	*Petaurista philippensis*	✖	✖	✓	✓	✖	✓	✓	✖	✖	Sch-II
22	Indian giant squirrel	*Ratufa indica*	✖	✖	✓	✓	✖	✓	✓	✓	✖	Sch-II
23	Honey badger (Ratel)	*Mellivora capensis*	✖	✖	✖	✓	✓	✓	✓	✖	✖	Sch-I
24	Rhesus monkey	*Macaca mulatta*	✓	✓	✖	✓	✖	✓	✓		✓	Sch-II
25	Wild pig	*Sus scrofa*	✓	✓	✓	✓	✓	✓	✓	✖	✓	Sch-III
26	Hanuman langur	*Semnopithecus entellus*	✓	✓	✓	✓	✓	✓	✓	✓	✓	Sch-II
27	Clawless Otter	*Aonix cinerea*	✖	✖	✖	✖	✖	✓	✓	✖	✖	Sch-II

✓: Present,✖: Absent

PPM - Panchpatmali, PTN -Patangi, MLP - Maliparvat, KDM - Kodingamali, KLP - Karlapat, NMG - Niyamgiri, SJM - Sijimali, KTM - Kutrumali, KSM – Krishnamali, KHML- Khandualmali, MHNG- Mahendragiri.

KEY FINDINGS/OBSERVATIONS

Elephant habitats:

The past history of elephant habitat revels that elephants are not frequently available in the area south of river Mahanadi until 1907 (Cobdon Ramsay, 1910). The report mentions that few numbers of elephants occasionally strayed across Mahanadi in to the undivided Boudh and during 1907 a few number of elephants strayed the undivided Kalahandi district for a few days but the movement was unusual. However, now Kalahndi district is home for more than 40 elephants so also the Baudh and Rayagada districts, which are some of the examples of newly established elephant habitats in early twentieth century and is the common phenomenon of migration observed in many mega animals. There are also past report of migration of elephants in other states of India, and the cause is only because of anthropogenic pressure.

During the rapid biodiversity survey we came across all the major Elephant habitats of the South Orissa elephant reserve, namely Bhanjanagar, Kotgarh, Chandrapur, Karlapat, Lakhari valley and Mahendragiri. According to the 2002 Elephant census the proposed elephant reserve is of 7713 sq. km. area having 185 elephants. In our study area except for Koraput the rest districts are the elephant habitats. It is quite interesting to note that though Koraput is having the similar type of topography, vegetation and geo-morphology as compared to the adjacent elephant habitats in Kalahandi and Rayagada still there is absence of elephants. This might be attributed due to rampant practice of shifting cultivation in the past and ongoing mining activities.The checklist of mammals of south Orissa is given in Appendix 2.6.

Herpetofaunal diversity of South Orissa

The herpetofauna of south Orissa is represented by 22 species of lizards, 3 species of crocodilians, more than 45 species of snakes and 12 species of fresh water turtles and tortoises. This excludes the sea turtles and sea snakes. However detailed field studies, specifically in the unexplored forest areas reveals several species of frogs, snakes, lizards and turtles new to sciences or were not recorded earlier. Some of these taxa includes lizards: Ophisops sp, *Hemidactylus subtriedrus*, Geckoella sp, *Calodactylodes aureus*; frogs; *Philautus similipalenissi*, *Fejerverya orissaensis*, *Fejerverya* sp, *Rana malabaricus*, *Microhyla* sp, *Polypedates teraiersis* and *Chirixalus* sp; snakes:*Boiga forsteni*, *Boiga orchracea*, *Oligodon affinis*, *Sybnophis sagittarus*, *Lycodon striatus*, *Lycodon* sp, *Elepha helna monticolaries*, *Trimmeresurus gramineus*, *Ahetulla pulverunlentus*. Several of these species are found either in the Western Ghat ranges or in North East India. Their presence and discovery in south Orissa indicate that similar climatic and habitat features are also found in some areas of Orissa. Hence we consider these as indicator species of both climatic and physiographic factors. It is suspected that additional survey in Orissa will yield more such species, which will add new dimension to the existing knowledge on the herpetofauna of India. The checklist of herpetofaunal diversity of southern Orissa is given in Appendix 2.2, 2.3,2.4.

KEY OBSERVATIONS/FINDINGS

Discovery of *Ahaetulla rhodogastor, Ahaetulla annomalus and Ahaetulla* sp. from Ganjam

During the study we came across a good population of Vine snake species along the Coast line of Ganjam. The species looks close to *Ahaetulla nasuta*, but differs in some of the typical characters. After careful examination of the species and consultation with the Vine snake experts from different museums the species was considered as a long forgotten species, described by some workers during 1912. The snake is found on trees and bushes and has the similar life style like *Ahaetulla nasuta*. The discovery of the species from Orissa, added a new insight to taxonomy of Vine snakes and detail study is being undertaken to know more about the taxonomy and biology of the snake. Similarly *Ahaetulla rhodogastor, Ahaetulla annomalus* were discovered from Mahendragiri, Chandragiri and Baphlimali hills of south Orissa.

Ahaetulla rhodogastor

Ahaetulla annomalus

Discovery of *Gerarda prevostiana* from Rushikulya river mouth

The snake is well known as crab eating snake and is specialized on feeding the recently molted crabs. The species is reported for the first time from Orissa from Rushikulya river mouth. The snake was observed during afternoon, when it was resting near a crick. This species is generally found in the mangrove swamps, but occurrence of the species in the Rushikulya River Mouth is quite surprising. The snake is characterized by smooth scales, short tail; body colour grey, lower part of dorsum cream coloured with median dark streaks. This is a little known species, earlier reported from Gulf of Mannar, as well as isolated localities in South East Asia, including Myanmar, Thailand and Malay Peninsula.

Discovery of *Lycodon* sp. from Ganjam

An odd looking Wolf snake (*Lycodon* sp.) was observed in Mahendragiri, Ganjam, which differs from the usual *Lycodon aulicus*. The snake species observed is smaller than the previous species with a typical colour pattern. More study is needed to validate the species status. Now we are working on the molecular level to know the authentic identity of the species.

Discovery of *Trimeruserus* sp. from Ganjam

Recently we added the name of Bamboo pit viper to the snake list of Orissa and soon after we encountered another pit viper, which looks close to the bamboo pit viper but completely differs in its colouration and head scale count. We came across a single specimen from a height of 20 ft from ground on a bamboo tree. The animal was located with the help of search light and after observing the snake, we were very much excited for the surprising result. More work is going on to describe the species.

Discovery of Black headed snake from Deomali

Cantor's Black headed snake

The colubrid snake genus *Sibynophis* comprises some nine species distributed in southern and south-eastern Asia. Up to three species are known from mainland India, *S. collaris*, *S. subpunctatus*, and *S. sagittarius* Cantor's Black headed snake, *Sibynophis saggitarius* is one of the common species that we had encountered during our study. The finding has extended its authentic record to Orissa. The similar species was also recorded from other 17 locations of Orissa. The checklist of snakes of south Orissa is given in Appendix 2.4

Discovery of Green pit viper, wolf snakes and Ophisops sp. from Niyamgiri and Mahendragiri hills

During a brief herpetological survey of three days a green Pit viper was found which could be a new species or sub species of pit viper from India, since this could not be matched with existing pit viper records of India, further studies on this species are in progress to conform its authenticity. The Travancore wolf snake which was last reported from Orissa by the British herpetologists in pre independence era has also been rediscovered from here recently. A species of skink which was hitherto unreported in any published literature could be a new report. An interesting species of wolf snake was discovered from Koraput and might be a new species of wolf snake from Orissa. Two species of Ophisps were recorded from Baphlimali and Niyamgiri hills and a viable population of skink was observed during the study period.


Mabuya dossumeri **from Kashipur, Rayagada**

Authentic record of Banded Racer:


Ophisops **sp. from Baphlimali**

Argyorgena fasciolata or Banded Racer is distributed in western Ghats and Northern India but its distribution in Orissa was uncertain. After the discovery of a road killed specimen from Baghamari of Khurdha district, the distributional record of the species in Orissa is authenticated. It was a juvenile snake, found road killed near a canal surrounded with paddy fields. From published literatures and looking at the habitat from where the specimen was obtained, it can be presumed that the snake lives in open forest, in agricultural fields and near human habitation. The same species was also recorded at Niyamgiri hills during the survey. This is the first authentic record of the Banded Racer from Orissa state.The herpetofauna of the hills has indicated a healthy nature of the forest as some of the species are found in Western Ghats and Eastern Himalayas. The presence of all the above species has extended their distribution to Eastern ghats of Orissa, India.

Discovery of *Liopeltis calamaria* from Baphlimali and Deomali

While venturing in the mountain platue of Baphlimali and Deomali, we came across a tiny snake found bellow medium sized rock boulders. The snake species was identified as Liopeltis calamaria or the Sri Lankan Stripe snake. During winter the snakes are some times found in pairs living in the same habitat with *Mabuya dissimilis*. We observed five specimens after searching for 20 hours in Baphlimali and uplifting more than 500 rock boulders of 5" to 15" size. The animal lives bellow boulders, preferably near the root of Cycas plants, which is typical to any Bouxite deposited area. The snakes are found on the top plaque above 1500 meters height from MSL. We also observed a single individual of the same snake species in Baphlimali.

Discovery of *Boiga forsteni* from Karlapat

The species is polymorphic in nature and is represented by four morphotypes in the eastern Indian State of Orissa, India. Based on available specimens, published distribution records and recent collections, the taxonomic status of the species is established. This species is purely nocturnal and found in dense forest patches along with tree holes and reported in Karlapat wildlife sanctuary and Niyamgiri hills.

Discovery of *Coelognathus monticolaris* from Koraput

Coelognathus monticolaris

Coelognathus monticolaris, the entire Indian subcontinent is their widespread, the range is currently not precisely known, particularly from the central region of India lacks precise localities. *Coelognathus helenus* inhabited mainly the elevated plains and low mountain ranges between sea level and 900 m above sea level. Preferred habitats of these snakes are the bush areas of the semi evergreen forest edges, rice fields, plantations, meadow edges, and especially near water. The Indian jewelry snake lives largely on the ground, sometimes sighted in the tree

branches. This species was observed at Deomali, Baphlimali and Mahendragiri hills are also a new record for the state.

Range extension of Golden gecko (*Calodactyloeds aureas*)

The Golden Gecko (Calodactyloeds aureas) is said to be endemic to Eastern Ghats of India and is a schedule-I species under the wildlife protection act, 1970. A viable but small population of the species were recorded in most part of south Orissa (Karlapat, Niyamgiri, Mahendragiri) extending its distribution to Orissa.

Range extension of *Rana malabaricus*

The Fungicoid frog (*Rana malabaricus*) is said to be endemic to Western Ghats and Eastern Himalayas in caves and moist environment of India and is a schedule-I species under the wildlife protection act, 1970. A viable but small population of the species were recorded in most part of south Orissa (Karlapat, Maliparbat and Kutrumali hills) extending its distribution to Orissa.

Discovery of many species of amphibians from south Orissa:

Discovery of different populations of *Philautus* spp., Fejervarya sp. from Mahendragiri and Pottangi, Taptapani and Karlapat whose identities are so far not known is a good indicator of the status of forest in southern Orissa. Since the amphibians are very good environmental indicators, the finding needs further research on amphibians of the southern Orissa. The checklist of amphibians is given in Appendix 2.2.

Apart from all these interesting findings the study also yields some more new records of herpetofauna from southern Orissa that includes,

- A new species of cat snake was discovered from the area, which was found inside a Sal tree hole at a height of 27' from the Niyam Donger.
- A new species of Wolf snale (*Lycodon* sp.) discovered from Koraput.
- A new species of Bamboo pit viper from Ganjam.
- Rediscovery of Travancore wolf snake from Niyamgiri.
- Range extension of Bamboo pit viper *Trimeroserus gramineus* from Orissa
- Range extension of Foresten's cat snake
- Range extension of St. Johns Keelback.
- Rediscovery of Pygmy shrew (*Suncus etruscus*) from Southern Orissa
- Observed a good population of *Crocodylus palustris* at Upper Kolab
- Discovery of a *Ophisops* sp. (Lacertidae) from Baphlimali
- Discovery of a scorpion species of family Scorpiopsidae from Chandragiri

  Documentation of several species of butterflies from southern Orissa, with possibility of some new records of species from Orissa

Pigmy screw, observed in many forests of Orissa

Close up of marsh crocodile basking on the mud flat

***Geckoella nebulosus* from Karlapat**

Healthy population of Indian Giant Squirrel:

Along with 36 species of mammals, including some of the endangered species, like Royal Bengal tiger, Leopard, Striped Hyena, Elephant, Sloth bear, Gaur, Sambar, Nilgai, Rattel, Indian Pangolin and Wolf, we have encountered a healthy population of Ratufa indica in almost all the hills of south Orissa. The maximum population of *Ratufa indica* was observed at Niyamgiri hills and Karlapat wildlife sanctuary.

However, flying squirrel could not be sighted on spot even though the local people stressed their presence in few part of southern Orissa.

First authentic record of Small clawed Otters from Orissa:

A key species in wetland environment, otters are recognized as one of the top predators of freshwater ecosystem and there are 13 species distributed worldwide. There are three species of otters found in Indian subcontinent, viz. the Eurasian otter (*Lutra Lutra* L.), the Smooth-coated otter (*Lutra perspecillata* Geoffrey) and the Oriental small-clawed otter (*Anonyx cinerea* Illiger). All three species of otters found in India are becoming increasingly rare outside protected areas and are threatened in many locations by a reduction in prey biomass, poaching and loss of habitat. The otters, at the apex of food web are good indicators of healthy riverine ecosystem In India. *Aonyx cinereus* is seen from Himachal Pradesh to Assam hill ranges and in some parts of Tamil Nadu and Kerala down south. As per the recommendations of the First otter Action Plan, they were restricted to the foothills of Himalayas, Madhya Pradesh, West Bengal and in southern India. Very little information is available on the status of otters from from Jammu and Kashmir, Himachal Pradesh, Orissa and Northeast Indian states. Being enlisted as insufficiently known taxa in the IUCN red data book and as a Schedule II species in the Indian Wildlife (Protection) Act, 1972, the smooth-coated otter is one of the least studied species in Eastern Ghats of India. During the preliminary field visit, the study team observed foot marks and scats/droppings of the Otters in the banks of all most all

the perennial hill streams of Sothern Orissa. This spesis has recorded for the first time form Orissa.

Butterflies of South OrissaA total of 45 species of butterflies were identified during the survey with maximum population recorded at Baphlimali hills. The short preliminary work on Butterflies has shown some interesting features of the butterfly fauna of southern Orissa and it should be continued for more sampling occasions. If such is possible, the present faunal list is likely to be extended and many more species could be discovered as new records for the state. The checklist of butterflies of southern Orissa is given in Appendix 2.1

Avifaunal diversity of South Orissa: BIRDS are ideal bio-indicators and useful models for studying a variety of environmental problems (Newton, 1995). As increasingly more attention is now being given to conservation monitoring and ecological studies of bioindicators, avifauna warrants a closer examination in forest ecosystems. Out of the 9,000 species of birds under 75 families found globally, India accounts for more than 1300 species under 48 families in 10 bio-geographic zones (Ali and Ripley, 1987). There are 479 species of birds found in Orissa (Dev, 1997). From the survey it is found that, the hills are potential hot spot for the birds due to its geographical location in the hill ranges of Eastern Ghats of India that provides a wide range of habitat for many vulnerable and threatened birds that are not found in many parts of the state which makes it a unique place for the point of species conservation. Apart from healthy population of common birds we encountered many threatened birds like, Golden Orioles, Indian grey horn bills, lesser kestrels, Hill mynas, Green avadavat etc. in large numbers during our survey at Baphlimali, Niyamgiri, Mahendragiri, Khandualmali and Krishnamali. The checklist of birds of southern Orissa is given in Appendix 2.5.

Kestrel at Deomali Platue

Ethnobotanical status of South Orissa

During the study more than 160 species of plants are recorded from South Orissa, which are used by different ethnic groups for treatment of different aliments. The traditional healers or the Jani/ Dohari/ Disri/ Majhi use the plant products to treat more than fifty diseases or disease complexes. The ethno-medicinal plants were identified under more than 130 genera and 68 families. The identified plants comprise 80 herbs, 21 shrubs, 27 climbers and some epiphytic groups.

Saxena and Brahrnam (1983) have done an assessment of the rare plants of Eastern Ghats and Orissa respectively. Analyzing the flora of south Orissa, after consulting major Indian Herbaria and local communities, it is found that there is no true endemic species in the region, some new or apparent endemic species have, however, been reported. Such species are *Egostemma verticillaturn, Lavendula bipinnata, Cassine albens, Eulophia herbacea, Mucuna minima, Lasiococca cornberi* and *Cynodon barberi* found in isolated habitats only and need adequate

protection. The species like *Impatiens kleinii*, *Elatostema surculosum*, *Argosternma verticillatum*, *Lecanthus wightii* etc. have not been collected from the region after the first collection by Mooney. Major biotic factors such as over-exploitation, fire and shifting cultivation seem to be responsible for disappearance and rarity of the species. Plants like *Cayratia auriculata*, *Gloriosa superba*, *Gymnema sylvestre*, *Melasma thomsonii*, *Pueraria tuberosa*, *Raderrnachera xylocarpa*, *Rauvolfia serpentina*, *Tectaria cicutaria*, *Tylophora fasciculata* have been badly depleted due to over-exploitation for medicinal uses. All these plants deserve special attention for their conservation on account of their rarity, phytogeographic importance and to preserve their natural heritage. The checklist of medicinal plants of south Orissa and its applications is given in Appendix 1.6.

Threats to the biodiversity: Mining and industrialization

The state's biodiversity is at stake due to the rapid growth of mining and industrialization activities. We need development and we also want the Biodiversity to be conserved for our future generation, is it possible! The debate has no conclusion, as we understand. If we give priority to the development processes, then why there are laws to protect the biodiversity? There should be sustainable utilization of the natural resources, but not like the way it is going on. It is quite evident from the past experiences that mushrooming of mining projects and other developmental activities are nothing but ruthless exploitation of biodiversity of the area. The catastrophic impacts are directly observed as loss of water, global warming, desertification etc. or will be observed very soon in the near future.

Poaching:

Poaching is another big threat to wildlife next to the developmental processes, which causes direct elimination of a species from wild. In Orissa, rampant poaching is going on causing an irreversible loss to the ecosystem of some areas. The network of poachers is some times unnoticed by the

wildlife managers. During our survey we came across evidences of skins of leopards, Otters, Giant squirrels, pangolins, Percupines etc. from most parts of southern Orissa.

Large scale shifting cultivation and encroachment in the past:

Large scale of slash and burn/ shifting cultivation/ practiced by various ethnic groups, living inside and out side the protected areas has harsh impact on the wildlife habitat. The cultivation practice is well pronounced in many parts of Southern Orissa, such as Nayagarh, Phulbani, Ganjam, Gajapati, Kandhamal, Rayagada, Koraput and Malakanagiri districts, where Lanjia Saora, Saora, Kandha, Kutia Kondh, Dongria Kondh, Koya, Paraja and Gadaba tribes are still dependant on this type of cultivation. Though very little studies has been undertaken to quantify the impact of shifting cultivation on wildlife, in general the impact is negative. Now-a-days due to shortage of forest land the practice is no longer a good concept, when it is the time to think for wildlife habitat restoration.

Community conservation initiatives of landscape and species:

During the study period we came across many sacred grooves and community conserved landscapes that need legal recognision and support from different stake holders and policy makers. There are good reasons to support, and not to dismantle, community forest management. First, the diversity of arrangements with community forestry provides a rich reservoir of experiences from which to learn. Second, local problem solving has the potential to be more responsive to local needs, as in the choice of species for replanting. Third, there are a number of operational advantages to community-based management. For example, community forest management seems to result in better monitoring than does JFM. By building on the existing strengths of India's diverse and vibrant community-based resource management traditions, JFM can contribute to increasing the set of viable options rather than decreasing them.

Sacred groves are remnants of natural vegetation, protected and conserved by the spiritual beliefs of local people. Since these sacred groves are free from disturbances, they reflect the original vegetation of that area. A number of human societies in Asia, Africa, Europe, America and Australia have preserved sections of their natural environment as sacred groves. Besides catering to the spiritual and cultural needs of the host community, they also play an important role in conserving biodiversity by facilitating the conservation of medicinal as well as endangered flora and fauna and hence of great ecological value.

In the predominantly tribal Koraput and Rayagada districts, forests play a pivotal role in the cultural and economic status of the tribal communities. Forests and wildlife have a great influence on their lives. Though the tribal communities are fierce defendants of the forests, large-scale timber exploitation and the pressure exerted on these communities by the mining, hydroelectric and defense establishments have led to massive deforestation. A significant portion of the forest cover is either conserved by the local people as Community Protected Forests or in the form of sacred groves.

Cultural and Ecological Importance of Sacred Groves of Kondhs: Sacred groves of the Kondhs generally fall under two categories viz., the Jakeyr and the Nishanimunda. The Jakeyr is the formal sacred grove while the Nishani munda is a sacred grove established prior to the setting up of the village. Hence there can be as many Jakeyr while there can be only one Nishanimunda for each village. The Earth God, Darni Depta, usually represented by a small cave-like structure made of stones is the deity that is worshipped by the community. Four festivals take place in the sacred groves viz., bicha porav, maha porav, taku porav and dealli porav. Animals such as goat, chicken, buffalo and cow are sacrificed during the festivals and as individual offerings. Along with the sacrificial meat, rice and liquor are given as offerings, and also served as community feast. The Dishari (astrologer) assists the Jani in conducting the rituals. The Jani is mostly the custodian of the sacred groves and is responsible for the well being of the groves and indirectly of the village. One characteristic feature of the Kondh spiritual set up is the participation of women in the rituals. Women irrespective of their age are allowed to enter the sacred groves. There are specialist women priests known by a collective term ‘Bijeni’ who chant and actively take part in the

rituals. They are at times chant for hours together. The role of Bijeni is non-hereditary. The elder Bijeni chooses a new Bijeni as disciple and teaches her the traditional chants and skills. The sacred groves are well managed by a set of unwritten oral laws with which all the villagers are familiar. Hunting of birds and animals are prohibited. While medicinal plants and fruits can be collected in a non-destructive manner, felling of trees is a taboo. Even dead wood is allowed only to rot. However, this practice is changing slowly. There are no punishments for the offender and it is left to be punished by God himself. Though the sacred grove by itself may not cover an impressible land area, in many cases, they facilitate the protection of their background vegetation.

The Kondh sacred groves support a good biodiversity. Some of the major plant species recorded from Kondh sacred groves include, *Lannea coromandelica*, *Mangifera indica*, *Syzygium cumini*, *Mallotus philippensis*, *Costus speciosus*, *Ficus religiosa, Michelia champaca, Garuga pinnata* and *Bauhinia semla*. Wild populations of threatened medicinal plants like *Rauvolfia serpentina* are still conserved in the sacred groves of Kondhs. Some of the tree species present in the sacred groves such as *Ficus religiosa*, Syzygium cumini and *Mangifera indica* attract a large number of birds and insects. *Garuga pinnata* is given prominence in cultural and religious ceremonies. For example, a branch of Garuga is given to the newly-elected community shepherd as a mark of transfer of authority and responsibility. Since the Kondh sacred groves conserve several tree species belonging to dry deciduous forests and play an important role in their culture, special efforts need to be taken to conserve them in the changing cultural scenario.

Sacred grooves were identified at the top of Niyamgiri and Mahendragiri. Niyamaraja lives in the dense forests and on the top of a mountain named Niyamagiri. Niyamaraja is the presiding deity of the Dongaria Kondhas. He is the sprit of their ancestors and he protects all inhabitants of the forests. The Kondha tribes believe it is through his miracle alone that numerous streams flow perennially. The Dongaria Kondhas are also known as Jharnia Kondhas, as they base their villages along the 'jharana' which means streams. They are excellent fruit growers. At the top of the hill is the sacred grove of Niyamaraja, where many rare medicinal plants and herbs are found.

CONCLUSION: The biodiversity assessment in some of the important hill forests of southern Orissa has revealed many interesting and new findings some of which are new to Eastern Ghats of Orissa, and also to peninsular India. The authentic identification of some species could not be completed due to non availability of desired information and other characterstics as we got single species of those groups.

REFERENCES:

Ali, S. and Ripley, S.D., 1987. *Compact handbook of the birds of India and Pakistan.* Bombay: Oxford University Press.

Aminuddin, R. D. Girach , 1991. Ethnobotanical studies on Bondo tribe of district Koraput (Orissa), Ethnobotany 3, 15--19.

Champion, H.G and Seth, S.K., 1968. A revised survey of forest types of India. Manager of publication, Govt. of India, New Delhi.

Cobden Ramsay L.E.B., 1910. Bengal Gazetteers, Feudatory States of Orissa, Patna State. 408 pgs.

Daniel, J.C., 1983. The Book of Indian Reptiles. Oxford University. Press/Bombay Natural History Society, Bombay. 141 pp.

Das, A.K. and M.K. Mishra, 1998. Some medicinal plants of Koraput District (Orissa). Ancient Science of Life 8, 1, 60—67.

Das, I., 1996. Biogeography of the Reptiles of South Asia. Krieger Publishing Company, Malabar, Florida. 16pl +vii +87 pp.

Das, I., 2002. A Photographic Guide to Snakes & Other Reptiles of India, Holland Publishers, UK.

Das, I., 2002. *A Photographic Guide to Snakes and other Reptiles of India*. New Holland Publishers (UK) Ltd., London, 144pp.

Das, P. K. and Misra, M. K. 1987. Some medicinal plants used by the tribals of Deomali and adjacent areas of Koraput district, Orissa. Indian Journal of Forestry, 10: 301-303.

Das, P. K. and Misra, M. K. 1988a. Some medicinal plants among Kondhas around Chandrapur (Koraput). Journal of Economic and Taxonomic Botany, 12: 103-109.

Das, P. K. and Misra, M. K. 2000. Vegetation and floristic studies on Koraput district of Orissa. In: Higher Plants of Indian Sub-continent, Vol. ix: 115-130, Bishen Singh Mahendra Pal Singh, Dehra Dun, India.

Dash, S. S. 1994. Ethnobotanical study of Narayanapatna area of Koraput district, Orissa. M.Phil. Dissertation, Berhampur University, Berhampur, Orissa.

Dev. U.N., 1997. *A profile of Birds of Orissa*, Reference Orissa, edited by A.N. Tiwari, Enterprising Pub., 596 p.

Grimmett, R., Inskipp. C. and Inskipp, T., 1998. *Birds of the Indian subcontinent*. Christopher Helm, London.

Hemadri, K. 1991. Medico-Botanical Exploration of Phulbani and Koraput Districts of Orissa, Central Council for Research in Ayurveda and Siddha, New Delhi, India.

Hemadri, K. and Rao, S. S. 1989. Folklore claims of Koraput and Phulbani districts of Orissa state. Indian Medicine, 1: 11-13.

Jonathan, K.H., 2006. Ecological and economic aspects of certain endemic flora of Eastern Ghats forests. *ENVIS-SDNP Newsletter* Special Issue, pp.8-9.

Kala, A., Nath, P., Mallick, PK. and Biswas, S., 2005. Biodiversity monitoring in Rayagada Forest Division, Orissa with emphasis on floristic-cum-ecological evaluation. Proceeding of National Symposium on recent advances of: A Prospective, organized by Dolphin (PG) Institute of Biomedical and Natural Sciences, Dehradun, 3-5 June 2005: TS-S/P 15.

Kanyana, S., 2008. Biodiversity of Eastern Ghats (www.nbaindia.org/docs/semi_conservation-easternghats.pdf)

Menon, V., 2003. A Field Guide to Indian Mammal, Dorling Kindersley (India) pvt. ltd., Delhi.

Mishra, S., 2004. *Orchids of Orissa.* Bishen Singh Mahendra Pal Singh, 23-A, New Connaught Place, Dehra Dun, India.

Nayak P.K, Nayak R.K and Choudhury B.P, 2003.A check list of medicinal plants of Kalahandi District in Orissa, Ethnobotany and Medicinal Plants of India and Nepal, V.

Nayak S, Behera S.K and Misra M.K, 2004. Ethno-medico-botanical survey of Kalahandi district of Orissa, India, Indian Journal of Traditional Knowledge, 3(1), pp. 72-79.

Newton, I., 1995. The contribution of some recent research on birds to ecological understanding. *J. Anim. Ecol*., 64, 675–696.

Panda, T. and Padhy, R.N., 2008. Ethnomedicinal plants used by tribes of Kalahandi district, Orissa. Indian Journal of Traditional Knowledge 7(2), pp. 242-249.

Pattanaik, C., Reddy, S., Dhal, N.K. and Das, R., 2006. Some Phytotherapeutic Claims by Tribals of Rayagada District, Orissa, India. Ethnobotanical Leaflets 10: 189-197. 2006.

Pattanaik, C., Reddy, S.C., Dhal, N.K. and Das., 2006. Some Phytotherapeutic Claims by Tribals of Rayagada District, Orissa, India. Ethnobotanical Leaflets 10: 189-197.

Prater., 1971. Book of Indian Animals, 3rd Edition, Bombay Natural History Society & Oxford University, Press, Mumbai.

Rasmussen, P. and Anderton, J., 2005. *Birds of south Asia*: *the Ripley guide*. Vols. 1 and 2. Smithsonian Institution and Lynx Edicions, Washington D.C. and Barcelona.

Sandhyarani, S., Murthy, K.S.R. and Pullaiah, T., 2007. Tree flora in Eastern Ghats of Southern Peninsular India. *Res. J. Bot*., 2: 176-185.

Sarangi, N. and Sahu, R.K, 2005. Ethno-medicinal plants used in venereal and gynecological disorders in Kalahandi, Orissa, Ethnobotany, 16 (1/2) pp-16-20.

Saxena, H.O and Brahmam. M., 1994-1997. (Vol-I to IV). The flora of Similipal, Orissa. Regional Research Laboratory, Bhubaneswar.

Saxena, H.O. and Brahmam, M., 1996. The Flora of Orissa. - Vol. I-IV. Regiona Research Laboratory (CSIR), Bhubaneswar & Orissa Forest Development Corporation Ltd., Bhubaneswar.

Smith, M.A., 1943. The fauna of British India, Cylon & Burma, including the whole of the Indo-Chinese region. Vol.3. Serpentes. Taylor & Francis, London. Xii + 583pp + 1map.

Whitaker, R., and A. Captain, 2005. Snakes of India- a field guide. Draco books, Chennai.

APPENDIX-1: CHECKLIST OF FLORA OF SOUTH ORISSA
APPENDIX-1.1: ANGIOSPERMS

Sl. No.	Species	Family	Morphological form
1	*Abelmoschus moschatus* Medic.	Malvaceae	Herb
2	*Abrus precatorious* L.	Fabaceae	Shrub
3	*Abutilon hirta* (Lam.) Sweet	Malvaceae	Shrub
4	*Abutilon persicum* (Burm.f.) Merr.	Malvaceae	Shrub
5	*Acacia catechu* (L.f.) Willd.	Mimosaceae	Tree
6	*Acacia lenticularis* Buch.- Ham.	Mimosaceae	Tree
7	*Acacia leucocephala* (Roxb.) Willd.	Mimosaceae	Tree
8	*Acacia nilotica* (L.) Delile	Mimosaceae	Tree
9	*Acacia odoratissima* (L.f.) Benth.	Mimosaceae	Tree
10	*Acacia procera* (Roxb.) Benth.	Mimosaceae	Tree
11	*Acacia sinuate* (Lour.) Merr.	Fabaceae	Tree
12	*Acampe carinata* (Griff.) Panig.	Orchidaceae	Herb
13	*Acrocephalus hispidus* (L.)Nicolson	Lamiaceae	Herb
14	*Acros calamus* L.	Arecaceae	Herb
15	*Acrostichum coastatum* (wall. ex hook.) ching	Lomariopsidaceae	Herb
16	*Actinopteris radiata (*SW.) link.	*Actiniopteridaceae*	Herb
17	*Adiantum caudatum* L.	*Pteridaceae*	Herb
18	*Adiantum phillipanse* L.	*Pteridaceae*	Herb
19	*Adina cordifolia* (Roxb.) Hook.f	Rubiaceae	Tree
20	*Aegle marmelos* (L.) Lorr.	Rutaceae	Tree
21	*Aerides maculosum* Lindl.	Orchidaceae	Herb
22	*Aeschynomene americana* L.	Fabaceae	Herb
23	*Aganosma caryophyllata* G.Don	Apocyanaceae	Shrub
24	*Aglaia elaegnoides* (Juss.) Benth.	Meliaceae	Tree
25	*Aglaia spectabilis* (Wall. Ex voigt) DC.	Meliaceae	Tree
26	*Ailanthus excelsa* Roxb.	Simarobaceae	Tree
27	*Ajuga macrosperma* Wall. Ex Benth.	Lamiaceae	Herb
28	*Alangium salvifolium* (L.f.) Wang.	Alangiaceae	Tree
29	*Albizia chinensis* (Osbell) Merr.	Mimosaceae	Tree
30	*Albizia lebbeck* (L.) Benth.	Mimosaceae	Tree
31	*Albizia marginata* (Lam.) Mer.	Mimosaceae	Tree
32	*Albizia odoratissima* (L.f) benth	Mimosaceae	Tree
33	*Albizia procera* (Roxb.) Benth.	Mimosaceae	Tree
34	*Alchornea mollis* Muell.-Arg	Euphorbiaceae	Tree
35	*Aleuritopteris albomarginata* (C.B.Clark)	*Pteridaceae*	Herb
36	*Alloteropsis cimicina* (L.) stapf	Poaceae	Herb

37	*Alocasia fornicata* (Roxb.) Schott	Araceac	Herb
38	*Alsophila Spinulosa* wall	Hymenophyllaceae	Herb
39	*Alsophilla gigantean* Wall. ex Hook.	*Cyatheaceae*	Herb
40	*Alstonia scholaris* (L.)	Apocyanaceae	Tree
41	*Alstonia venenata* R.Br.	Apocyanaceae	Tree
42	*Amorphophalus bulbifera (*Roxb.) Bl	Araceac	Herb
43	*Anacardium occidentale* L.	Anacardiaceae	Tree
44	*Ananas comosus* (L.) Merr.	Bromaniaceae	Tree
45	*Andodendron paniculatum* A.DC.	Apocyanaceae	Climber
46	*Andrographis paniculata* (Bedd.) C.B.Cl.	Acanthaceae.	Herb
47	*Angiopteris electa*. (Forst.) Hoffm	*Angiopteridaceae*	Herb
48	*Annona reticulata* L.	Anonaceae	Tree
49	*Annona squamosa* L.	Anonaceae	Tree
50	*Anogeissus accuminata* (Rox.ex Dc.) Wall.	Combretaceae	Tree
51	*Anogeissus latifolia* (Roxb. ex Dc.) Wall.	Combretaceae	Tree
52	*Anthocephalus chinensis* (Lam.) A.	Rubiaceae	Tree
53	*Antidesma acidum* Retz.	Fabaceae	Tree
54	*Antidesma bunius* L.	Euphorbiaceae	Tree
55	*Antidesma ghaesembilla* Gaertn.	Fabaceae	Tree
56	*Aporusa octandra* (Buch.-Ham. ex D.Don) Vick.	Fabaceae	Tree
57	*Ardisia depressa* C.B.Cl.	Myrsinaceae	Tree
58	*Argyreia setosa* (Roxb.) Choisy	Convolvulaceae	Climber
59	*Arisaema tortuosum* (wall.) Schott	Araceac	Herb
60	*Aristida setacea* Retz.	Poaceae	herb
61	*Artocarpus heterophyllus* Lam.	Moraceae	Tree
62	*Artocarpus lacucha* Roxb. ex Buch.-Ham	Moraceae	Tree
63	*Arundinella holcoides* (Kunth) Trin	Poaceae	Herb
64	*Arundinella pumila* (Hochst. ex A. Rich) Stend.	Poaceae	Herb
65	*Arundinella benghalensis* (Spreng.)Oruce	Poaceae	Herb
66	*Arundinella setosa* Trin.	Poaceae	Herb
67	*Asparagus racemosus* L.	Liliaceae	Herb
68	*Asplenium erectum* Bory ex Willd.	*Aspleniaceae*	Herb
69	*Asplenium formosum* Willd.	*Aspleniaceae*	Herb
70	*Asplenium lunulatum* Sw	*Aspleniaceae*	Herb
71	*Asplenium obscurum* Bl.	*Aspleniaceae*	Herb
72	*Asplenium unillaterale* Lam.	*Aspleniaceae*	Herb
73	*Asplenium yoshinagae* Makino var. *plnicaule*Morton.	*Aspleniaceae*	Herb
74	*Asplenium. unilaterale* lam	*Aspleniaceae*	Herb
75	*Athyrium hohenackerianum* (Kunze) Moore	*Athyriaceae*	Herb
76	*Athyrium anisopterum* Christ.	*Athyriaceae*	Herb
77	*Athyrium falcatum* Bedd	*Athyriaceae*	Herb
78	*Athyrium parasanathese* (C. B. Clarke) Chiang	*Athyriaceae*	Herb
79	*Atlantia monophylla* (L.) Corr.	Rutaceae	Tree
80	*Atylosia cajanifolia* Haines.	Fabaceae	Shrub
81	*Azadirachta indica* A. Juss	Meliaceae	Tree
82	*Barringtonia acutangula* (L.) Gaertn.	Baringtoniaceae	Tree
83	*Bauhinia malabarica* Roxb.	Caesalpiniaceae	Tree
84	*Bauhinia retusa* Roxb.	Caesalpiniaceae	Tree
85	*Bauhinia semla* Wounderl	Caesalpiniaceae	Tree
86	*Bauhinia vahlii* Wight.	Caesalpiniaceae	Tree
87	*Baunihia purpurea* L.	Caesalpiniaceae	Tree
88	*Baunihia variegata* L.	Caesalpiniaceae	Tree
89	*Begonia picta* Sm.	Begoniaceae	Herb
90	*Bergia ammannioids* Roxb.	Elatinaceae	Herb

91	*Blechnum orientale* L.	*Blechnaceae*	Herb
92	*Blepharispermum subsessile* DC.	Asteraceae	Shrub
93	*Bolbitis appendiculata* (Willd.) K. Iwats.	Lomariopsidaceae	Herb
94	*Bolbitis bipinnatifida* (J. Sm.) K. Iwats.	Lomariopsidaceae	Herb
95	*Bolbitis contaminans* (Wall.) Ching	Lomariopsidaceae	Herb
96	*Bolbitis virens* (Wall ex. Hook. et Grev) Schoot.	Lomariopsidaceae	Herb
97	*Bombax ceiba* L.	Bombacaceae	Tree
98	*Boswellia serrata* Roxb. ex Colebr.	Burseraceae	Tree
99	*Breynia retusa* (Dennst.) Alston	Euphorbiaceae	Shrub
100	*Bridelia pubescens* Kurz.	Euphorbiaceae	Tree
101	*Bridelia retusa* (L.) Spreng.	Euphorbiaceae	Tree
102	*Buchanania lanzan* Spreng.	Anacardiaceae	Tree
104	*Buchneria hispida* Buch. - Ham.	Scrophulariaceae	Herb
105	*Bulbophyllum guttalatum* Wall. Ex. Lindl	Orchidaceae	Epiphytes
106	*Bulbostylis densa* (wall.) Hand. Mazz	Cyperaceae	Herb
107	*Bursera serrata* Wall.ex Colebr.	Burseraceae	Tree
108	*Butea monosperma* (Lam.) Taub.	Fabaceae	Tree
109	*Butea parviflora* Roxb	Fabaceae	Tree
110	*Butea superba* Roxb.	Fabaceae	Climber
111	*Caesalpinia cuculata* Roxb.	Caesalpiniaceae	Shrub
112	*Calamus guruba* Buch. - Ham.	Arecaceae	Tree
113	*Callicarpa tomentosa* (L.) Murr.	Verbenaceae	Tree
114	*Calliearpa tomentosa* (L.) Murr	Verbenaceae	Tree
115	*Calycopteris floribunda* Lam.	Dioscoreaceae	Shrub
116	*Cannabis sativa* L.	Ulmaceae	Herb
117	*Canscora diffusa* (Vahl.) R. Br.	Gentianaceae	Herb
118	*Capillipedium assimile* (steud.) A.	Poaceae	Herb
119	*Capparis olacifolia* Hook. f.	Capparaceae	Shrub
120	*Capparis zeylanica* L.	Capparidaceae	Liana
121	*Carex bacans* Nees.	Cyperaceae	Herb
122	*Carex cruciata* Wahlenb	Cyperaceae	Herb
123	*Carex phacota* Spreng	Cyperaceae	Herb
124	*Careya arborea* Roxb.	Lecythidaceae	Tree
125	*Carisa carandus* L.	Apocyanaceae	Shrub
126	*Caryota urens* L.	Arecaceae	Tree
127	*Casearia elliptica* Willd.	Flacourtiaceae	Tree
128	*Casearia graveolens* Dalz.	Flacourtiaceae	Tree
129	*Cassia fistula* L.	Caesalpiniaceae	Tree
130	*Cassia siamea* L.	Caesalpiniaceae	Tree
131	*Cayratia trifolia* (L.) Domin.	Vitaceae	Climber
132	*Celastrus paniculatus* Willd.	Celastraceae	Herb
133	*Celtis tetrandra* Roxb.	Ulmaceae	Tree
134	*Ceratopteris thalictroides* (L.) Brongn	*Adiantaceae*	Herb
135	*Cheilanthus concolor* (Langed. ex. Fisth.) R.Tryon	*Aspleniaceae*	Herb
136	*Cheilanthus dalhousiae* Hook	Cheilanthaceae	Herb
137	*Cheilanthus swartzii* Web et. Berth	*Aspleniaceae*	Herb
138	*Chenopodium ambrosioides* L.	Chenopodiaceae	Herb
139	*Cherita haemosa* L.	Gesneriaceae	Herb
140	*Chionanthus intermeditus* (Wight)	Oleaceae	Tree
141	*Chloris dolichostaihya* Lagasca	Poaceae	Herb
142	*Chlorophytum laxum* R.Br.	Liliaceae	Herb
143	*Choroxylon swietiana* DC.	Rutaceae	Tree
144	*Chrozophora prostrata* Dalz	Euphorbiaceae	Herb
145	*Chrysopogon montatus* L.	Poaceae	Herb

146	*Chynchospora longisetis* R. Br.	Cyperaceae	Herb
147	*Cipadessa baccifera* (Roth.) Miq.	Meliaceae	Tree
148	*Cissampelos pareira*	Menispermaceae	Climber
149	*Citrus aurantium* L.	Rutaceae	Tree
150	*Clausena heptaphylla* (Roxb.) Wight.	Rutaceae	Shrub
151	*Cleistanthus collinus* (Roxb.) Benth. ex Hook.f.	Euphorbiaceae	Tree
152	*Clematis gouriana* Roxb.	Ranunculaceae	Climber
153	*Clematis roylei* Rehder	Ranunculaceae	Climber
154	*Clematis smilacifolia* Wall.	Ranunculaceae	Climber
155	*Cleome chelidonii* L.f.	Capparaceae	Herb
156	*Clerodendrum indieum* (L.) Kuntze	Acanthaceae.	Herb
157	*Cochlospermum religiosum* (L.) Alston	Flacourtiaceae	Tree
158	*Coelachne simpliciuscula* (wight & Arn. ex steud) Munro	Poaceae	Herb
159	*Combretum decandrum* Roxb.	Combretaceae	Shrub
160	*Combretum roxburghii*	Combretaceae	Shrub
161	*Corallodiscus lanuginosus* (Wallich ex R.Br.) B. L. Burtt	Gesneriaceae	Herb
162	*Cordia macleodii* (Griff.) Hook.f. & Thoms.	Cordiaceae	Herb
163	*Cordia oblica*	Cordiaceae	Shrub
164	*Crataeva magna* (Lour.) DC.	Capparidaceae	Tree
165	*Crateva religiosa*	Capparidaceae	Tree
166	*Crinum defixum* Ker-Gawl.	Amaryllidaceae	Herb
167	*Crotolaria ferruginea* Grab.	Fabaceae	Herb
168	*Croton roxburghii* Balak.	Euphorbiaceae	Tree
169	*Curculigo orchoides* (Lour.) Kuntze	*Hypoxidaceae*	Herb
171	*Curculigo trichocarpa* (Wight.) Bennett.	*Hypoxidaceae*	Herb
172	*Cyanotis fasciculata* (Roth)Schult & Schult	Commelinaceae	Herb
173	*Cyanotis tuberosa* (Roxb.)Schult & Schult	Commelinaceae	Herb
174	*Cycas circinalis* L.	Cycadaceae	Tree
175	*Cyclosorrus interruptus* (Willd.) H.	*Thelypteridaceae*	Herb
176	*Cyclosorus calcaratus* (Bl.) Panigr.	*Thelypteridaceae*	Herb
177	*Cyclosorus dentatus* (Forrsk.) Ching.	*Thelypteridaceae*	Herb
178	*Cyclosorus falcilobus* (Hook,) Panigr.	*Thelypteridaceae*	Herb
179	*Cyclosorus nudatus* (Roxb.) Nayar & Kaur.	*Thelypteridaceae*	Herb
180	*Cymbopogon flexuosus* (Nees exsteud) Wats	Poaceae	Herb
181	*Cynodon arcuatus* J.S. Presl	Poaceae	Herb
182	*Cynodon dactylon* L.	Cyperaceae	Herb
183	*Cyperus distance* L.	Cyperaceae	Herb
184	*Cyperus flaridus* Retz	Cyperaceae	Herb
185	*Cyperus melanospermum* (Nees) Valcken	Cyperaceae	Herb
186	*Cyperus pilosus* Vahl	Cyperaceae	Herb
187	*Cyperus platistylis* R. Br.	Cyperaceae	Herb
188	*Cyperus sesquiflorus* (Torr.) Mattf	Cyperaceae	Herb
189	*Cyperus alopecuroides* Rottb.	Cyperaceae	Herb
190	*Cyperus compressus* L.	Cyperaceae	Herb
191	*Cyperus diffuses* Vabl.	Cyperaceae	Herb
192	*Cyperus exattatus* Retz.	Cyperaceae	Herb
193	*Cyperus triceps* Endl.	Cyperaceae	Herb
194	*Cyrtococcum oxyphyllum*, (Steud.) stapf	Poaceae	Herb
195	*Dalbergia lanceolaria* L.f.	Fabaceae	Tree
196	*Dalbergia latifolia* Roxb.	Fabaceae	Tree
197	*Dalbergia paniculata* Roxb.	Fabaceae	Tree
198	*Dalbergia sissoo* Roxb.	Fabaceae	Tree
199	*Dendrobium aphyllum* (Roxb.) Fischer	Orchidaceae	Herb
200	*Dendrobium crepidatum* Lindl.	Orchidaceae	Epiphytes

201	*Dendrobium regium* Prain	Orchidaceae	Epiphytes
202	*Dendrobium transparens* Wall.ex Lindl.	Orchidaceae	Epiphytes
203	*Dendrocalamus strictus* Nees.	Poaceae	shrub
204	*Dendrophthoe falcata* (L. f.) Ettingsh	Loranthaceae	Epiphyte
205	*Deparia petersenii (Kunze.) M*	*Dryopteridaceae*	Herb
206	*Desmodium giganticum* (L.) DC.	Fabaceae	Herb
207	*Desmodium laxifolium* DC.	Fabaceae	Shrub
208	*Desmodium oojeinensis* (Roxb.) Ohashi	Fabaceae	Tree
209	*Desmostachya bipinnata* (L.) stapf	Poaceae	Herb
210	*Dicanthium carricossum*	Poaceae	Herb
211	*Dicliptera suffruticosus* (Roxb.)Voigt.	Acanthaceae.	Herb
212	*Dicliptera verticillata* (Forsk) Christen	Acanthaceae.	Herb
213	*Dicranopteris linearis* (Burm.) Underw.	*Glelchenlaceae*	Herb
214	*Digitaria longifolia* (Retz.) Pers.	Poaceae	Herb
215	*Dillenia aurea* L.	Dilleniaceae	Tree
216	*Dillenia pentagyna* Roxb.	Magnoliaceae	Tree
217	*Dimeria ornithopoda*, Trin	Poaceae	Herb
218	*Dioscorea alata* L.	Dioscoreaceae	Twinner
219	*Dioscorea anguina* L.	Dioscoreaceae	Twinner
220	*Dioscorea bulbifera* L.	Dioscorreaceae	Twinner
221	*Dioscorea oppositifolia* L.	Dioscoreaceae	Twinner
222	*Dioscorea pentaphyla* L.	Dioscoreaceae	Twinner
223	*Dioscorea walichii* L.	Dioscoreaceae	Twinner
224	*Diospyros ebenum* Koenig.	Ebenaceae	Tree
225	*Diospyros embryopteris* Pers.	Ebenaceae	Tree
226	*Diospyros malabarica* (Desv.) Kostl.	Ebenaceae	Tree
227	*Diospyros melanoxylon* Roxb.	Ebenaceae	Tree
228	*Diospyros paniculata* Roxb.	Ebenaceae	Tree
229	*Diospyros sylvatica* Roxb.	Ebenaceae	Tree
230	*Diospyros.montana* Roxb.	Ebenaceae	Tree
231	*Dipcadi montanum* (Dalz.) Baker	Liliaceae	Herb
232	*Diplazium esculentum* (Retz) Sw	*Athyriaceae*	Herb
233	*Dolichondrone falcata* (Wall.ex DC.) Seem	Bignoniaceae	Tree
234	*Dopatrium junceum* (Roxb.) Buch.- Ham.	Scrophulariaceae	Herb
235	*Drymaria cordata* (L.) Willd.	Caryophyllaceae	Herb
236	*Dryopteris cochleata* (D. Don) c.chr.	*Dryopteridaceae*	Herb
237	*Dryopteris cochleata* (Ham. ex D. Don) C.Chr	*Dryopteridaceae*	Herb
238	*Dryopteris oteria* (Kunze) O.Ktze	*Dryopteridaceae*	Herb
239	*Dryopteris sparsa* (D. Don) Kuntze	*Dryopteridaceae*	Herb
240	*Ehretia acuminata* R.Br. Var .serata (Roxb.)John.	Ehretiaceae	Tree
241	*Ehretia laevis* Roxb.	Ehretiaceae	Tree
242	*Elaeocarpus tectorius* (Lour.) Poir.	Tiliaceae	Tree
243	*Elatostema cuneatum* Wight.	Urticaceae	Herb
244	*Eleocharis congesta* D.Ron	Cyperaceae	Herb
245	*Elephantapus scaber* L.	Asteraceae	Herb
246	*Elytrophorus spicatus* (Wild) A. camus	Poaceae	Herb
247	*Entada phaseoloides* (L.) Merr.	Mimosaceae	Climber
248	*Equisetum debile* Roxb.	*Seleginellaceae*	Herb
249	*Equisetum ramossissimum* Desf.	*Seleginellaceae*	Herb
250	*Eragrostiella bifaria* (Vahl.) Bor	Poaceae	Herb
251	*Eragrostis Japonica* (Thunb.) Trin	Poaceae	Herb
252	*Eragrostis aspera* (Jaeq.) Nees	Poaceae	Herb
253	*Erigeron subleyratus* DC.	Asteraceae	Herb
254	*Eriolaena hookeriana* Wight & Arn.	Sterculiaceae	Tree

255	*Eryngium foetidium* L.	Apiaceae	Herb
256	*Erythrina suberosa* Roxb.	Fabaceae	Tree
257	*Erythrina variegate* L.	Fabaceae	Tree
258	*Eulophia explanata* Lindl.	Orchidaceae	Herb
259	*Eulophia herbacea* Lindl.	Orchidaceae	Herb
260	*Eulophia ochreata* Lindl.	Orchidaceae	Herb
261	*Eusteralis crassicaulis* (Benth.) Paing.	Lamiaceae	Herb
262	*Eusteralis stellata* (Lour.) Paing.	Lamiaceae	Herb
263	*Ficus benghalensis* L.	Moraceae	Tree
264	*Ficus hispida* L	Moraceae	Tree
265	*Ficus racemosa* L.	Moraceae	Tree
266	*Ficus religiosa* L.	Moraceae	Tree
267	*Ficus arnottiana* (Miq.) Miq.	Moraceae	Tree
268	*Ficus auriculata* Lour.	Moraceae	Tree
269	*Ficus benjamina* L.	Moraceae	Tree
270	*Ficus cunia* Buch.- Ham.ex Roxb.	Moraceae	Tree
271	*Ficus heterophylla* L.	Moraceae	Tree
272	*Ficus hispida* L.	Moraceae	Tree
273	*Ficus lutescens* Desf.	Moraceae	Tree
274	*Ficus microcarpa* L.	Moraceae	Tree
275	*Ficus mollis* Vahl.	Moraceae	Tree
276	*Ficus palmata* Forrsk.	Moraceae	Tree
277	*Ficus racemosa* L.	Moraceae	Tree
278	*Ficus rumphii* Bl.	Moraceae	Tree
279	*Ficus virens* Ait.	Moraceae	Tree
280	*Ficus virens var. glabella* (Bl.) Corner	Moraceae	Tree
281	*Fimbristylis cinnamometorum* (vahl.) kunth.	Cyperaceae	Herb
282	*Fimbristylis falcata* (Vahl.) Kunth	Cyperaceae	Herb
283	*Fimbristylis fusca* (Nees.) C.B.cl.	Cyperaceae	Herb
284	*Fimbristylis tormentosa* Vahl	Cyperaceae	Herb
285	*Fimbristylis bisumbellata* (Forssk) Bubani	Cyperaceae	Herb
286	*Fimbristylis complanata* (Retz.) Link	Cyperaceae	Herb
287	*Fioria vitifolia* (L.) Mattei	Malvaceae	Shrub
288	*Firmiana colorata* (Roxb.) R.Br.	Moraceae	Tree
289	*Flacourtia jangomas* (Lour.) Raeusch.	Flacourtiaceae	Tree
290	*Flacourtia indica* (Burm.f.) Merr	Flacourtiaceae	Tree
291	*Flemingia involucrata* Benth.	Fabaceae	Shrub
292	*Flemingia lineata* (L.) Roxb.	Fabaceae	Shrub
293	*Floscopa scandens* Lour.	Commelinaceae	Herb
294	*Galactia longifolia* Benth.	Fabaceae	Herb
295	*Garcinia xanthochymus* Hook.f.	Clusiaceae	Tree
296	*Gardenia gummifera* L.f.	Rubiaceae	Shrub
297	*Gardenia latifolia* Ait.	Rubiaceae	Tree
298	*Gardenia turgida* Roxb.	Rubiaceae	Shrub
299	*Garuga pinnata* Roxb.	Burseraceae	Tree
300	*Glochidion lanceolarium* (Roxb.) Voigt.	Euphorbiaceae	Tree
301	*Glochidion velutinum* Wight	Euphorbiaceae	Tree
302	*Glochidion zeylanicum* (Gaertn.) Juss.	Euphorbiaceae	Tree
303	*Gloriosa superba* L.	Colchicaceae	Climber
304	*Glycosmis pentaphylla* (Retz.) DC.	Rutaceae	Tree
305	*Gmelina arborea* Roxb.	verbenaceae	Tree
306	*Gnetum ula* Bromgn.	Gnetaceae	Tree
307	*Gounia tiliaefolia* L.	Acoraceae	Shrub
308	*Grewia elastica* Royle.	Tiliaceae	Tree

309	*Grewia rothii* DC.	Tiliaceae	Shrub
310	*Grewia tiliaefolia* Vahl.	Tiliaceae	Tree
311	*Guazuma ulmifolia* Lam.	Sterculiaceae	Tree
312	*Gymnema sylvestre* R.Br.	Asclepiadaceae	Climber
313	*Gynura aurantica* (Bl.) DC.	Asteraceae	Herb
314	*Gynura lycopersicifolia* DC.	Asteraceae	Herb
315	*Habenaria commelinifolia* Wall.	Orchidaceae	Herb
316	*Habenaria foliosa* A. Rich.	Orchidaceae	Herb
317	*Habenaria furcifera* Lindl.	Orchidaceae	Herb
318	*Habenaria grandifloriformis* Blatter	Orchidaceae	Herb
319	*Habenaria longicorniculata* Graham	Orchidaceae	Herb
320	*Habenaria panigrahiana*	Orchidaceae	Herb
321	*Haldina cordifolia* (Roxb.) Ridsd.	Rubiaceae	Tree
322	*Haplanthades verticillatus* (Roxb.)Nees.	Acanthaceae.	Herb
323	*Hedychium coronarium* Koenig	Zingiberaceae	Herb
324	*Helianthus lanceolatus* Brondis	Rhamnaceae	Shrub
325	*Helminthostachys zeylanica* (L.) Hook.	*Ophioglossaceae*	Herb
326	*Hemidesmus indicus* (L.) R.Br.	Periploaceae	Climber
327	*Hemiedelphis polysperma* (Roxb.) Nees	Acanthaceae.	Herb
328	*Hemionitis arifolia* (Burm. F.)Moore	*Hemionitidaceae*	Herb
329	*Herpullia arborea* (Blanco) Radlk.	Sapindaceae	Tree
330	*Heteropogon contortus* L.	Poaceae	Herb
331	*Heteropogon melanocarpus* (Ell) Benth	Poaceae	Herb
332	*Hibiscus aculeatus* Roxb.	Malvaceae	Herb
333	*Hibiscus platanifolius* (Willd.) Sweet.	Malvaceae	Tree
334	*Hiptage benghalensis* (L.) Kurz.	Malpighiaceae	Climber
335	*Holarrhena antidysenterica* Wall. ex A.DC.	Apocyanaceae	Tree
336	*Holarrhena pubescens* (Buch.-Ham.) Wall	Apocyanaceae	Shrub
337	*Homalium nepalense* Benth.	Rubiaceae	Tree
338	*Hygrophila salicifolia* (Vahi) Nees.	Acanthaceae.	Herb
339	*Hygrophila heinei* Sreemadh	Acanthaceae.	Herb
340	*Hymenachne acutigluma* (Steud) Gilliand	Poaceae	Herb
341	*Hymenodictyon excelsum* (Roxb.) Wall.	Rubiaceae	Tree
342	*Hymenodictyon orixense* (Roxb.) Mabb.	Rubiaceae	Tree
343	*Hypoxis auria* Lour.	*Hypoxidaceae*	Herb
344	*Ichnocarpus frutescens* (L.) R.Br.	Apocyanaceae	Shrub
345	*Impatiense chinensis* L.	Balsminaceae	Herb
346	*Impatiense kheinii* Wight.	Balsminaceae	Herb
347	*Indigofera cassiodies* Rottl.ex DC.	Fabaceae	Shrub
348	*Indocourtoisia cyperoides* (Roxb) Bennet & Raizada	Cyperaceae	Herb
349	*Indoneesiella echioides* (L.) sreemadh.	Acanthaceae.	Herb
350	*Ipomoea barleriodies* (Choisy) Benth.	Convolvulaceae	Climber
351	*Ischne globosa* (Thunb.) Kuntze	Poaceae	Herb
352	*Iseilema anthephoroides*, Hack	Poaceae	Herb
353	*Jasminum grandiflorum* L.	Oleaceae	Tree
354	*Justicia japonica* Thunb.	Acanthaceae.	Herb
355	*Kydia calycina* Roxb.	Malvaceae	Tree
356	*Lagerstroemia parviflora* Roxb.	Lythraceae	Tree
357	*Lannea coromondelica* (Houtt.) Merr.	Anacardiaceae	Tree
358	*Lasia spinosa* (L.) Thw. Enum.	Araceac	Herb
359	*Launaea acaulis* (Roxb.) Babc.	Asteraceae	Herb
360	*Lavandula bipinnata* Kuntze.	Lamiaceae	Herb
361	*Leea indica (Burm.f.) Merr.*	Vitaceae	Shrub
362	*Leea macrophylla* Roxb.	Vitaceae	Shrub

363	*Leersia hexandra* Sw.	Poaceae	Herb
364	*Leonotis nipitifolia* (L.) R.Br.	Lamiaceae	Herb
365	*Lepidagathis fasciculate* (Retz.) Nees.	Acanthaceae.	Herb
366	*Lepidagathis incurve* Buch - Ham	Acanthaceae.	Herb
367	*Lepidagathis cuspidate* Nees.	Acanthaceae.	Herb
368	*Leptochloa chinensis* (L.) Nees	Poaceae	Herb
369	*Leucas aspera* (Willd.) Link	Lamiaceae	Herb
370	*Leucas clarkei* Hook.	Lamiaceae	Herb
371	*Leucas indica* (L.) R.Br.	Lamiaceae	Herb
372	*Liculata Peltata* Roxb.	Araceac	Tree
373	*Limonia acidissima* L.	Rutaceae	Tree
374	*Lippia javanica* (Burm. F) spreng	Acanthaceae.	Herb
375	*Litsea glutinosa* (Lour.) Robins.	Lauraceae	Tree
376	*Litsea monopetala* (Roxb) Poir.	Lauraceae	Tree
377	*Lycopodiella cernua* (L.) pichi sermolli	*Lycopodiaceae*	Herb
378	*Lygodium flexiosum* (L.) Sw.	*Lycopodiaceae*	Herb
379	*Macaranga peltata* (Roxb.) Muell. Arg.	Euphorbiaceae	Tree
380	*Macrothelypteris ornate* (Wall. ex Bedd.) Ching	*Thelypteridaceae*	Herb
381	*Macrothelypteris torresiana* (Gaud.)ching	*Thelypteridaceae*	Herb
382	*Macrothylipteris setigera* (Bl.) Ching	*Thelypteridaceae*	Herb
383	*Macrothylipteris torresiana* (Gaud.) ching	*Thelypteridaceae*	Herb
384	*Madhuca indica* Gmel	Sapotaceae	Tree
385	*Madhuca longifolia* (Koenig) Macbr.	Sapotaceae	Tree
386	*Malaxis mackinonii* (Duthie) Ames	Orchidaceae	Herb
387	*Mallotus philippensis* (Lam.) Muell.- Arg.	Euphorbiaceae	Tree
388	*Malvastrum coromandelianum* (L.) Garcke	Malvaceae	Shrub
389	*Mangifera indica* L.	Anacardiaceae	Tree
390	*Manilkara hexandra* (Roxb.)Dubard	Sapotaceae	Tree
391	*Margaritaria indica* (Dalz.) Airyshaw	Euphorbiaceae	Tree
392	*Maytenus bailadillena* (Narayanan & Mooney) Raju	Celastraceae	Tree
393	*Maytenus emarginatus* (Willd.) Ding Hou.	Celastraceae	Tree
394	*Maytenus hookerii* Loes.	Celastraceae	Tree
395	*Melastoma malbathricum* L.	Melastomaceae	Shrub
396	*Melia azadirachta* L.	Meliaceae	Tree
397	*Melia composite* Willd.	Meliaceae	Tree
398	*Memecylon umbellatum* Burm.f.	Melastomataceae	Tree
399	*Mesua ferrea* Linn.	Clusiaceae	Tree
400	*Michelia champaca* L.	Anonaceae	Tree
401	*Microchloa Indica* (L.f.) P. Beauv	Poaceae	Herb
402	*Microlepia palatiphylla* (D. Don) smith	*Dennstaedtiaceae*	Herb
403	*Microlepia speluncea* (L.) Moore.	*Dennstaedtiaceae*	Herb
404	*Microlepia spelunceae* (L.). Moore	*Dennstaedtiaceae*	Herb
405	*Micromelum minutum* (Forst.f.) Wight.	Rutaceae	Tree
406	*Microstegium cillatum* (Trin). A. Camus	Poaceae	Herb
407	*Miliusa tomentosa* (Roxb.) Sinclair	Annonaceae	Tree
408	*Miliusa velutina* Hook. f. & Thoms	Anonaceae	Tree
409	*Millettia extensa*	Fabaceae	Shrub
410	*Mimusops elengi* L.	Sapotaceae	Tree
411	*Mitragyna parviflora* (Roxb.) Korth.	Rubiaceae	Tree
412	*Mnesithea laevis* (Retz) Kunth	Poaceae	Herb
413	*Morinda pubescens* Sm.	Rubiaceae	Tree
414	*Morus australis* Poir.	Moraceae	Tree
415	*Mucuna pruriens*	Fabaceae	Climber
416	*Murdannia edulis* (Stokes) Faden	Commelinaceae	Herb

417	*Murdannia pauciflora* Brueck.	Commelinaceae	Herb
418	*Murraya koenigii* (L.) Spreng.	Rutaceae	Tree
419	*Murraya paniculata* (L.) Jacq.	Rutaceae	Shrub
420	*Musa prnata* Roxb.	Musaceae	Herb
421	*Naravelia zeylanica* (L.) DC.	Ranunculaceae	Climber
422	*Naringi crenulate* (Roxb.) Nicolson	Rutaceae	Tree
423	*Neocinnamomum caudatum*	Lauraceae	Tree
424	*Neolitsea foliosa* (Nees) Gambel	Lauraceae	Tree
425	*Nephrolepis auriculata* (L.) Trimen	*Oleandraceae*	Herb
426	*Nephrolepis bisserata* (Sw.) Schott.	*Oleandraceae*	Herb
427	*Nervilia aragoana* Gaud.	Orchidaceae	Herb
428	*Nervilia crocoformis* L.	Orchidaceae	Herb
429	*Nervilia infundibulifolia* Blatt & Mc. Cann	Orchidaceae	Herb
430	*Nervilia prainiana* (King & prantl)Seiden	Orchidaceae	Herb
431	*Nyctanthes arbor-tristis* L.	Oleaceae	Tree
432	*Oberonia falconeri* Hook. f.	Orchidaceae	Epiphytes
433	*Ochna obtusata* DC.	Ochnaceae	Tree
434	*Operculina turpethum* (L.) S. Manso	Convolvulaceae	Herb
435	*Ophioglossum reticulatum* L.	*Ophioglossaceae*	Herb
436	*Opilia mentacea* L.	Opiliaceae	Shrub
437	*Oplismenus compositus* (L.) P. Beauv	Poaceae	Herb
438	*Oplismenus neyeriana* (Zoll & Mor.) Baill	Poaceae	Herb
439	*Oplismenus burmanii* (Retz) P. Beauv	Poaceae	Herb
440	*Oreocnide frutiscens* (Thunb.) Miq.	Urticaceae	Shrub
441	*Oreocnide integrifolia* (Gaud.)Miq.	Urticaceae	Tree
442	*Oroxylum indicum* (L.) Vent.	Bignoniaceae	Tree
443	*Osbeckia chinensis L.*	Melastomataceae	Herb
444	*Osbeckia stellata* Buch.	Melastomataceae	Herb
445	*Paederia foetida* L.	Rubiaceae	Shrub
446	*Paederia scandens* (Lour.) Merr.	Rubiaceae	Shrub
447	*Pancratium triflorum* Roxb.	Amaryllidaceae	Herb
448	*Paniuim pedicillatum* Trin	Poaceae	Herb
449	*Paniuim polystachyon* (L.) Schult	Poaceae	Herb
450	*Paniuim Psilopodium* Trin.	Poaceae	Herb
451	*Paniuim repens* L.	Poaceae	Herb
452	*Paniuim pakidosum* Roxb.	Poaceae	Herb
453	*Parabaena sagittata* Miers.	Menispermaceae	Climber
454	*Parahemionitis arifolia* (N. Burm.) Panigr.	*Adiantaceae*	Herb
455	*Paraleptochilus decurrens* (Bi.) copel	*Polypodiaceae*	Herb
456	*Paramignya scandens* (Griff.) Craib.	Rutaceae	Climber
457	*Paspalidium germinatam* (Forssk.) stapf	Poaceae	Herb
458	*Paspalum canarae* (steud.) veldk	Poaceae	Herb
459	*Pavonia repanda* (J.E.Sm.)Spreng	Malvaceae	Herb
460	*Pecteilis trifoliat* (Sm.) Rafin.	Orchidaceae	Herb
461	*Penisetum persinatum* L.	Poaceae	Herb
462	*Pennisetum honenackeri* Hochst.	Poaceae	Herb
463	*Peperomia tetraphylla* (Forst.) Hook.	Piperaceae	Herb
464	*Peristylus constrictus* (Lindl.) Lindl.	Orchidaceae	Herb
465	*Peristylus goodyeroides* (D. Don) Lindl.	Orchidaceae	Herb
466	*Peristylus lawii* Wight.	Orchidaceae	Herb
467	*Peristylus plantgenius* (Lindl.) Lindl.	Orchidaceae	Herb
468	*Persia macrantha* (Ness) Kosterm.	Lauraceae	Tree
469	*Persia villosa* (Roxb.) Kostrm	Lauraceae	Tree
470	*Peucedanum dhana* Buch.	Apiaceae	Herb

471	*Phaius tankervilleae* (Banks & l'Herit.) Bl.	Orchedaceae	Herb
472	*Phalopsis imbricate* (Forssk) Sw.	Acanthaceae.	Herb
473	*Phoenix sylvestris* (L.) Roxb.	Arecaceae	Tree
474	*Phragonites karka* (Retz.) Trin	Poaceae	Herb
475	*Phrynium placentarium* (Lour.) Merr.	Marantaceae	Herb
476	*Phyla nodiflora* (L.) Greene	Acanthaceae.	Herb
477	*Phylanthus emblica* L.	Euphorbiaceae	Tree
478	*Phyllanthus amarus* Schum. & Thonn	Euphorbiaceae	Herb
479	*Phyllanthus emblica L.*	Euphorbiaceae	Tree
480	*Picrasma javanica* Bl.	Simarobaceae	Tree
481	*Pilea scripta* Wedd.	Urticaceae	Herb
482	*Pimpinella bracteata* Haines	Apiaceae	Herb
483	*Pimpinella heyneanum* (Wall.ex DC.) Kurz.	Apiaceae	Herb
484	*Piper longum* L.	Piperaceae	Herb
485	*Pittosporum wightii* A.k. mukherjee	Pittosporaceae	Tree
486	*Platostoma africanum* Beauv.	Lamiaceae	Herb
487	*Plecospermum spinosum* Trecul	Moraceae	Shrub
488	*Plectranthus barbatus* Andr.	Lamiaceae	Herb
489	*Plectranthus japonicus* (Burn.f.)Koidz	Lamiaceae	Shrub
490	*Pleopeltis asciopndaria* (Ham. Ex D. Don)	*Polypodiaceae*	Herb
491	*Pogonatherum crinitum* (Thunb) kunth	Poaceae	Herb
492	*Polyalthia longifolia* (Sonn.) Thw.	Anonaceae	Tree
493	*Polyalthia simiarum* (Buch.-Ham.) Hook.f. & Thoms.	Anonaceae	Tree
494	*Polygala elongata* Klein ex Willd.	Polygalaceae	Herb
495	*Polygonum glabrum* Willd	Polygonaceae	Herb
496	*Polygonum serrulatum* Lagase.	Polygonaceae	Herb
497	*Polystachya concerta* L.	Orchidaceae	Herb
498	*Pongamia pinnata* L.	Fabaceae	Tree
499	*Pouzolzia pentandra* (Roxb.) Bennett	Urticaceae	Shrub
500	*Pouzolzia zeylanica* (L.) Bennett	Urticaceae	Herb
501	*Premna latifolia* Roxb.	Verbenaceae	Tree
502	*Premna tomentosa* Willd.	Verbenaceae	Tree
523	*Pronephrium nudatum* (Roxb. Ex Griff.) Holttum	*Thelypteridaceae*	Herb
504	*Protium serratum* (Wall ex Colebr.) Engl.	Fabaceae	Tree
505	*Prunus ceylanica* (Wight.) Miq.	Rosaceae	Tree
506	*Pseudoraphis brunoniana*, Griff	Poaceae	Herb
507	*Psilotum nudum* (L.) P Beauv	*Psilotaceae*	Herb
508	*Pteridium aquilinum* (L.) Kuhn	*Pteridiaceae*	Herb
509	*Pteris vittata* L.	*Pteridaceae*	Herb
510	*Pteris biaurifa* L.	*Pteridaceae*	Herb
511	*Pteris heteromorpha* Fee, Gen Fil.	*Pteridaceae*	Herb
512	*Pteris linearis* Poir.	*Pteridaceae*	Herb
513	*Pteris quadriaurita* Retz.	*Pteridaceae*	Herb
514	*Pteris vensuta*	*Pteridaceae*	Herb
515	*Pteris vittata* L.	*Pteridaceae*	Herb
516	*Pterocarpus marsupium* Roxb.	Fabaceae	Tree
517	*Pterospermum xylocarpum* (Gaertn) Sant &Wagh	Sterculiaceae	Tree
518	*Pueraria belophylla*	Dioscoreaceae	Climber
519	*Pureria trifolia* (Willd.) DC.	Fabaceae	Climber
520	*Pyrrosia lanceolata* (L.) Farwell.	*Polypodiaceae*	Herb
521	*Pyrrosia mannii* (Gies.) Chiang.	*Polypodiaceae*	Herb
522	*Pyrrosia nayariana* Chiang.	*Polypodiaceae*	Herb
523	*Pyrrosia nuda* (Giesenh) Ching	*Polypodiaceae*	Herb
524	*R. wightiana* (Nees) steud.	Cyperaceae	Herb

525	*Randia dumetorum*	Rubiaceae	Shrub
526	*Raphidophora hookeri* Schott.	Araceac	Climber
527	*Rauvolfia rifoliate* (L.) Benth.	Apocyanaceae	Shrub
528	*Rauvolfia tetraphylla* L.	Apocyanaceae	Shrub
529	*Reinwardtia indica* Dumort.	Linaceae	Shrub
530	*Rhynchostylis retusa* (L.) Bl.	Orchidaceae	Epiphytes
531	*Rodermachera xylocarpa* (Roxb.) K.	Bignoniaceae	Tree
532	*Rorippa indica* (L.) Hiern	Brassicaceae	Herb
533	*Rottboellia cochinchinensis* (Lour) clayton	Poaceae	Herb
534	*Rungia repens* (L.) Nees.	Acanthaceae.	Herb
535	*Saccharum narenga* (Nees exsteud) Hack	Poaceae	Herb
536	*Sacciolepis myosuroides* (R. Br) a. camus.	Poaceae	Herb
537	*Salix tetrasperma* Roxb.	Salicaceae	Tree
538	*Salvia tifolia* R.Br.	Lamiaceae	Herb
539	*Samanea saman* (Jacq.) Merr.	Mimosaceae	Tree
540	*Santalum album* L.	Santalaceae	Tree
541	*Saraca asoca* ((Roxb.) de Wilde.	Caesalpineaceae	Tree
542	*Sarcococca saligna* (D. Don) Muell-Arg	Buxaceae	Shrub
543	*Sauropus quadrangularis* (Willd.) Muell.-Arg.	Euphorbiaceae	Shrub
544	*Schizachyrium brevifolium* (Sw) Nees ex Buese in miq.	Poaceae	Herb
545	*Schleichera oleosa* (Lour.) Oken	Sapindaceae	Tree
546	*Scilla tifoliate* (Roth.) Macbr.	Liliaceae	Herb
547	*Scirpus juncoides* Roxb.	Cyperaceae	Herb
548	*Scleria terrestris* (L.) Fassett.	Cyperaceae	Herb
549	*Securinega virosa* (Roxb.ex Willd.) Baill	*Selaginellaceae*	Tree
550	*Selaginella cataractrum* Alston	*Selaginellaceae*	Herb
551	*Selaginella cillaris* (Retz.) Spring.	*Selaginellaceae*	Herb
552	*Selaginella indica* (Milde) Tryon	*Selaginellaceae*	Herb
553	*Selaginella kurzii* Barker	*Selaginellaceae*	Herb
554	*Selaginella nairii* Dixit	*Selaginellaceae*	Herb
555	*Selaginella repanda* (Desv.) Spring.	*Selaginellaceae*	Herb
556	*Selaginella vaginata* Spring.	*Selaginellaceae*	Herb
557	*Semecarpus anacardium* L.f.	Anacardiaceae	Tree
558	*Setaria palmifolia* (Koenig) stapf	Poaceae	Herb
559	*Shorea robusta Gaertn*.f.	Dipterocarpaceae	Tree
560	*Sida rhombifolia* L.	Malvaceae	Herb
561	*Simarouba glauca* DC.	Simarubaceae	Tree
562	*Smilax ovalifolia*	Smilacaceae	Climber
631	*Smilax perfoliata*	Smilacaceae	Climber
563	*Solanum viarum* Dunal	Solanaceae	Shrub
564	*Sorghum tremulus* (Wild.) Kunth	Poaceae	Herb
565	*Sorghum halepense* (L) Pers	Poaceae	Herb
566	*Soymida febrifuga* (Roxb.) A. Juss.	Meliaceae	Tree
567	*Stemona tifolia* Lour.	Stemonaceae	Herb
568	*Sterculia villosa* Roxb. Ex DC.	Sterculiaceae	Tree
569	*Sterculia urens* Roxb.	Sterculiaceae	Tree
570	*Stereospermum angustifolium*	Bignoniaceae	Tree
571	*Stereospermum colais* (Buch.-Ham.ex Dillw) Mab.	Bignoniaceae	Tree
572	*Stereospermum personatum* (Hassk.) Chatterjee	Bignoniaceae	Tree
573	*Stereospermum suaveolens* (Roxb.) DC.	Bignoniaceae	Tree
574	*Streblus asper* Lour.	Moraceae	Tree
575	*Streblus taxoids* (Heynexroth.) Kunz.	Moraceae	Tree
576	*Strobilanthes circorensis* Gamble	Acanthaceae.	Herb
577	*Strobilanthes cuspidatus* (benth) T. Anders.	Acanthaceae.	Herb

578	*Strobilanthes jeyporensis* Bedd.	Acanthaceae.	Herb
579	*Strobilanthes lithosperma* (L.) Sw.	Cyperaceae	Herb
581	*Strobilanthes neglectus* T. Andors	Acanthaceae.	Herb
582	*Strobilanthes pulneyensis* C.B.Cl	Acanthaceae.	Herb
580	*Strobilanthes lupulinus* Nees.	Acanthaceae.	Herb
583	*Strychnos nux-vomica* L.	Strychnaceae	Tree
584	*Strychnos potatorum* L.f.	Strychnaceae	Tree
585	*Stylanthus hamata*	Myrtaceae	Tree
586	*Symphorema polyandrum* Wight	Verbenaceae	Shrub
587	*Symplocos cochinchinensis* (Lour.) S.	Symplocaceae	Tree
588	*Symplocos racemosa* Roxb.	Symplocaceae	Tree
589	*Syzygium cerasoides* (Roxb.) Chatt. & Kanjilal	Myrtaceae	Tree
590	*Syzygium cumini* (L.) Skeels	Myrtaceae	Tree
591	*Syzygium cuminii* Linn.	Myrtaceae	Tree
592	*Syzygium operculatum*	Myrtaceae	Tree
593	*Tamarindus indica* L.	Caesalpiniaceae	Tree
594	*Tamarix dioica* Roxb.	Tamaricaceae	Tree
595	*Tectaria cicutaria* (L.) copel	Aspidiaceae	Herb
596	*Tectaria griffithii* (Bak.) C. Chr.	Aspidiaceae	Herb
597	*Tectona grandis* L.	Verbenaceae	Tree
598	*Tephrosia tinctoria* Pers.	Fabaceae	Shrub
599	*Terminalia alata* Heyne ex Roth	Combretaceae	Tree
600	*Terminalia arjuna* (Roxb.ex DC.) Wight.	Combretaceae	Tree
601	*Terminalia bellirica* (Gaertn.) Roxb.	Combretaceae	Tree
602	*Terminalia chebula* Retz.	Combretaceae	Tree
603	*Thalictrum foliolosum* DC.	Ranunculaceae	Herb
604	*Thelypteris confluence* (Thumb.) C. Morton	*Thelypteridaceae*	Herb
605	*Themeda laxa* (Anderss) A. camus	Poaceae	Herb
606	*Themeda triandra* Forssk	Poaceae	Herb
607	*Themeda Candata* (Nees) A. Camus	Poaceae	Herb
608	*Themeda saxicola* Bor.	Poaceae	Herb
609	*Theriophonum minutum* (willd.) Baillon	Araceac	Herb
610	*Thysanolaena maxima* (Roxb.) Kuntze.	Poaceae	Herb
611	*Toona trifoli* Roem.	Meliaceae	Tree
612	*Trachyspermum stictocarpus* (C.B.Cl.) Wlf.	Apiaceae	Herb
613	*Tragia plukenetii*	Euphorbiaceae	Climber
614	*Trema orientalis* (L.) Bl.	Ulmaceae	Tree
615	*Trema politoria* Planch.	Ulmaceae	Tree
616	*Trewia nudiflora* L.	Euphorbiaceae	Tree
617	*Trichilia connaroides* (Wight & Arn.) Bentv.	Meliaceae	Tree
618	*Trichosanthes curumerina*	Cucurbitaceae	Climber
619	*Trichosanthes tricuspidata* Blanco.	Cucurbitaceae	Climber
620	*Tripogon capillatus* Jaub. & Spach	Poaceae	Herb
621	*Tripogon jaequemontii* Stapf	Poaceae	Herb
622	*Tripogon roxburghianus* (Stend) Bhide	Poaceae	Herb
623	*Tripogon bromoides* Roem & Schult	Poaceae	Herb
624	*Triumfeta annua* L.	Tiliaceae	Herb
625	*Triumfeta pilosa* Roth.	Tiliaceae	Shrub
626	*Urginea indica* (Roxb.) Kunth	Liliaceae	Herb
627	*Urochloa panicoides* P. Beaur.	Poaceae	Herb
628	*Uvaria lurida* Hook. f & Thoms.	Anonaceae	Tree
629	*Vanda tessellata* (Roxb.) Hook. Ex G.Don.	Orchidaceae	Epiphytes
630	*Vanda testacea* (Lindl.) Reichb.	Orchidaceae	Herb
631	*Vernicia trifoli* Lour.	Euphorbiaceae	Tree

632	*Vernonia cineria* (L.) Less.	Asteraceae	Herb
633	*Vetiveria zizanioides* (L) Nabh in Smal	Poaceae	Herb
634	*Viscum album* L.	Loranthaceae	Epiphyte
635	*Viscum articulatum* L.	Loranthaceae	Epiphyte
636	*Vitex leucoxylon* L.	Verbenaceae	Shrub
637	*Vitex peduncularis*	Verbenaceae	Shrub
638	*Vitex quinata* (Lour.) F.n	Verbenaceae	Shrub
639	*Vitis heyneana* Roem.	Vitaceae	Climber
640	*Walsura trifoliate* (A. Juss.) Harms	Meliaceae	Tree
641	*Wattakaka volubilis* (L.f.) Stapf	Asclepiadaceae	Climber
642	*Weddia utricifolia* DC.	Asteraceae	Herb
643	*Wendlandia exerta* (Roxb.) Dc.	Rubiaceae	Tree
644	*Woodfordia fruticosa* (L.) Kurz.	Lythraceae	Shrub
645	*Wrightia tinctoria* (Roxb.) R. Br.	Apocyanaceae	Tree
646	*Wrightia arborea* (Dennst.) Mabb.	Apocyanaceae	Tree
647	*Xylia xylocarpa* (Roxb.)Taub.	Mimosaceae	Tree
648	*Xylosma longifolium* Clos.	Flacourtiaceae	Tree
649	*Zanthoxylum armatum* DC.	Rutaceae	Tree
650	*Ziziphus rugosa* Lam.	Rhamnaceae	Tree
651	*Ziziphus xylopyrus* (Retz.) Willd.	Rhamnaceae	Tree
652	*Ziziphus glaberima* Heyne ex Roth.	Rhamnaceae	Shrub
653	*Ziziphus mauritiana*	Rhamnaceae	Shrub
634	*Ziziphus nummularia* (Burm.f.) Wight & Arn.	Rhamnaceae	Tree
655	*Ziziphus oenoplea* Mill.	Rhamnaceae	Tree
656	*Zizyphus funiculosa* Buch.-Ham.	Rhamnaceae	Shrub

APPENDIX-1.2: Threat assessment status on flora of South Orissa (R-Rare, EN- Endangered, VU-Vulnerable, CR-Critically endangered, ID- Indeterminate)

Sl. No.	Name of the Species	Family	**IUCN Status**
1	*Blepharispermum subsessile* DC.		*VU*
2	*Bulbophyllum guttalatum*		*EN*
3	*Celastrus paniculatus* Willd.		*VU*
4	*Cherita haemosa*		*EN*
5	*Cordia macleodii* (Griff.) Hook.f. & Thoms.		*EN*
6	*Crataeva magna* (Lour.) DC.		*VU*
7	*Cycas circinalis* L.		*VU*
8	*Dendrobium crepidatum*		*VU*
19	*Dendrobium regium*		*EN*
10	*Eulophia herbacea*		ID
11	*Garcinia xanthochymus* Hook.f.		*VU*
12	*Gardenia gummifera* L.f.		*VU*
13	*Gloriosa superba*		*EN*
14	*Habenaria glandifloriformis*		*VU*
15	*Habenaria panigrahiana*		*EN*
16	*Hedychium coronarium* Koenig		VU
17	*Litsea glutinosa* (Lour.) Robins.		EN
18	*Mesua ferrea* L.		EN
19	*Mucuna gigantean* (Willd.) DC.		EN
20	*Neocinnamomum caudatum*		*VU*
21	*Nervilia crocoformis*		*EN*
22	*Operculina turpethum* (L.) S. Manso		VU
23	*Oroxylum indicum* (L.) Vent.		EN

24	*Paederia foetida* L.		*VU*
25	*Paramignya scadens*		*CR*
26	*Piper longum* L.		EN
27	*Polyalthia simiarum* (Buch.-Ham.) Hook.f. & Thoms.		*VU*
28	*Polystachya concerta*		R
29	*Pterocarpus marsupium* Roxb.		*EN*
30	*Pueraria tuberosa* (Willd.) DC.		*VU*
31	*Rauvolfia serpentina* (L.) Benth. ex Kurtz		*VU*
32	*Saraca asoca* (Roxb.) de Wilde		*R*
33	*Scindapsus officinalis* (Roxb.) Schott		*VU*
34	*Stemona tuberosa* Lour.		*EN*
35	*Themeda saxicola*		*R*
36	*Vanda teres/Dendrobium teres*		*VU*
37	*Stereospermum suaveolens* (Roxb.) DC.		CR
38	*Symplocos racemosa* Roxb.		*VU*
39	*Thalictrum foliolosum* DC.		*VU*

APPENDIX-1.3: BRYOPHYTES

Sl. No.	Name of the species	Family
1	*Asterella angusta* (Lehm. & Lindenb.)	Aytoniaceae
2	*Bryum argenteum* Hedw. var. *argenteum*	Bryaceae
3	*Campylopus gracillis* (Griff.) A.Jaeger	Dicranaceae
4	*Cyathodium cavernacum* Kashyap	Targioniaceae
5	*Dumortiera hirsuta* (Sw.) Nees	Marchantiaceae
6	*Fissidens involutus* Mitt. subsp. *involutus*	Fissidentaceae
7	*Funaria hygrometrica* Hedw. var. *hygrometrica*	Funariaceae
8	*Herpetineuron toccoae* (Sull. & Lesq.) Cardot	Thuidiaceae
9	*Heteroscyphus argutus* (Reinw. & al.) Schiffn.	Geocalycaceae
10	*Isopterygium albescens* (Hook.) A. Jaeger	Hypnaceae
11	*Marchantia subintegra* Kashyap	Marchantiaceae
12	*Marchantia linearis* Lehm. et. Lindb.	Marchantiaceae
13	*Marchantia palmata* Nees	Marchantiaceae
14	*Phaeoceros carolianus* (Michx.) Prosk.	Anthocerotaceae
15	*Phaeoceros laevis* Prosk.	Anthocerotaceae
16	*Plagiochasma appendiculatum* Lehm. & Lindenb.	Aytoniaceae
17	*Reboulia hemisphaerica* (L.) Raddi	Aytoniaceae
18	*Riccardia levierii* Schiffn.	Riccardiaceae
19	*Riccia crystalline* L. C	Ricciaceae
20	*Riccia discolor* Lehm. & Lindenb.	Ricciaceae
21	*Riccia fluitans* L. Ricciaceae	Ricciaceae
22	*Riccia gangetica* Ahmad	Ricciaceae
23	*Targionia hypophylla* L.	Targioniaceae

APPENDIX-1.4: LICHENS

Sl. No.	Name of the species	Family
1	*Caloplaca biatorina* (A. Massal.) J. Steiner	*Teloschistaceae*
2	*Cetraria melaloma* Kremp. - Wei	Parmeliaceae
3	*Cetraria olivetorum* Nyl.	Parmeliaceae
4	*Evernia mesomorpha* Nyl. - Wei	Parmeliaceae

5	*Heterodermia diademata* (Taylor) D.D. Awasthi	*Physciaceae*
6	*Leptogium trichophorum* Müll. Arg. - Wei	Thelotremataceae
7	*Lobaria pulmonaria* (L.) Hoffm.	*Lobariaceae*
8	*Parmelia squarrosa* Hale - Wei	Parmeliaceae
9	*Parmelia saxatilis* (L.) Ach.	Parmeliaceae
10	*Parmelia sulcata* Taylor.	Parmeliaceae
11	*Stereocaulon sp.*	*Steriocaulaceae*
12	*Sticta praetextata* (Ras) D. D. Awasthi – Sochting	*Lobariaceae*
13	*Sulcaria virens* (Taylor Bystr. ex Brodo & D. Hawksw. - Wei	Thelotremataceae

APPENDIX-1.5: FUNGI

Sl. No.	Name of the Species	Family
1	*Agaricus bisporus* (J.E. Lange) Pilat.	*Agaricaceae*
2	*Agaricus nivescens* (F.H. Moeller) F.H. Moeller.	*Agaricaceae*
3	*Armillaria cepistipes* Velenovsky.	Physalacriaceae
4	*Armillaria tabescens* (Scop.) Emel	Physalacriaceae
5	*Cantharellus subalbidus* Smith & Morse	Cantharellaceae
6	*Coprinus cinereus* (Schaeff. ex Fr.) S. F.	Psathyrellaceae
7	*Coprinus congregatus* Bull. ex Fr.	Psathyrellaceae
8	*Coprinus pachyspermus* P.D. Orton.	Psathyrellaceae
9	*Dictyophora indusiata* (Vent. ex Pers.) Desv.	Phallaceae
10	*Morchella esculenta* Fr.	Morchellaceae
11	*Phallus impudicus* Linn.	Phallaceae
12	*Polyporus sp.*	*Polyporaceae*
13	*Russula emetica* Fr.	Russulaceae
14	*Russula xerampelina* (Schaeff.) Fr.	Russulaceae

APPENDIX-1.6: MEDICINAL PLANTS AND ITS USES

Sl. No.	Name of the species	Local Name	Family	Diseases
1	*Abutilon indicum*	Pedipedika	Malvaceae	Jaundice
2	*Alangium salvifolium*	Dholanki	Alangiaceae	Rheumatism
3	*Alternanthera sessilis*	Madaranga	Amaranthaceae	Jaundice
4	*Andrographis paniculata*	Bhuin nimba	Acanthaceae	Malaria
5	*Anthocephalus chinensis*	Kadamba	Rubiaceae	Chronic ulcer
6	*Ardisia solanacea*	Sahajamari	Myrsiniaceae	Back pain
7	*Aristolochia indica*	Pannoari	Aristolochiaceae	Stomatitis & piles bleeding
8	*Azadirachta indica*	Limba	Meliaceae	Viral fever
9	*Barleria prionitis*	Daskerenta	Acanthaceae	stomach cancer
10	*Capparis brevispina*	Kontaikoli	Capparaceae	Backache & joint swelling
11	*Caryota urens*	Salapa	Arecaceae	Spermatorrhoea
12	*Caryplolepis buchananii*	Gopakanu	Periplocaceae	Ottis
13	*Casytha filiformis*	Nirmuli	Lauraceae	Ascites.
14	*Catharanthus roseus*	Sadabihari	Apocyanaceae	Diabetes
15	*Cissus qudrangularis*	Hadasinkuda	Vitaceae	Asthma

16	*Dendropthoe falcata*	Madanga	Loranthaceae	Leucorrhoea
17	Desmodium trifolium	Luduru	Fabaceae	Bone fracture
18	*Diplocyclos palmatus*	Chitachori	Cucurbitaceae	Snake bite
19	*Ficus hispida*	Dimiri	Moraceae	Diarrhoea in infants
20	*Gardenia turgida*	Kurdu.	Rubiaceae	Enhancing memory power
21	*Glycosmis mauritiana*	Chauladhua	Rutaceae	Severe diarrhoea
22	*Gouaniale ptostachya*	Raktapichuli,	Rhamnaceae	Body pain due to internal injuries
23	*Grewia rothii*	Homolapata	Tiliaceae	Oedema
24	*Hiptage benghalensis*	Madhavilata	Malpighiaceae	Tuberculosis
25	*Holarrhena pubescens*	Kurei	Apocynaceae	Tuberculosis
26	*Ichnocarpus frutescens*	Dudhi lata	Apocynaceae	Conjunctivitis
27	*Ludwigia adscendens*	Jagal	Onagraceae	Eczema
28	*Millettia extensa*	Guadhuni	Fabaceae	Wounds
29	*Moringa oleifera*	Sajana	Moringaceae	Rheumatism
30	*Olax scandens*	Bhad	Olacaceae	Bone-fracture
31	*Pueraria tuberosa*	Bhuin kakharu	Papilionaceae	Tuberculosis
32	*Phyllanthus amarus*	Badi onla	Euphorbiaceae	Malaria
33	*Phyllanthus fraternus*	Badi onla	Euphorbiaceae	Paralysis
34	*Phyllanthus lawii*	Jhar	Euphorbiaceae	Lung cancer
35	*Phyllanthus reticulatus*	Jandaki	Euphorbiaceae	Filarial swellings
36	*Pygmaeopremna herbacea*	Ghantiana	Verbenaceae	Rheumatism
37	*Smilax zeylanica*	Muturi	Smilacaceae	Diarrhoea
38	*Solanum virginianum*	Bhejibaigan	Solanaceae	Asthma & cold
39	*Soymida febrifuga*	Rohini	Meliaceae	Asthma
40	*Streblus asper*	Sahada	Moraceae	Conjunctivitis
41	*Symphorema polyandrum*	Mahasindu	Verbenaceae	Rheumatism
42	*Terminalia arjuna*	Arjuna	Combretaceae	Blood in Urine
43	*Tragia involucrata*	Bichuati	Euphorbiaceae	Tuberculosis
44	*Urginea indica*	Bona piaja	Liliaceae	Rheumatism
45	*Vernonia cinerea* (L.)	Poka sungha	Asteraceae	Filariasis
46	*Ventilago denticulata*	Kantamali	Rhamnaceae	Mumps
47	*Vitex negundo*	Begunia	Verbenaceae	Asthma
48	*Vitex pinnata*	Muria	Verbenaceae	Nephritis
49	*Zingiber zerumbet*	Parsu kedar	Zingiberaceae	Snake bite
50	*Zingiber officinale*	Sunthi	Zingiberaceae	Pre-natal diseases and labour pain
51	*Ziziphus oenoplia*	Kantaikoli	Rhamnaceae	Headache

APPENDIX 2: CHECKLIST OF FAUNAL DIVERSITY

APPENDIX 2.1: BUTTERFLIES

Sl No.	*Scientific names*	*Common names*
1	*Hasora badra*	Common Awl
2	*Tagaides litugiosa*	Water snow flat
3	*Spialia galba*	Indian skipper
4	*Iambrix salsala*	Chertnut bob
5	*Polanthus pseudomaesa*	Indian Dart
6	*Graphium doson*	Common jay
7	*Graphium agammemnon*	Tailed jay
8	*Pachiolpta aristolochia*	Crimson Rose
9	*Princeps memnon*	Great mormon
10	*Papilio demoleus*	Lime Butterfly
11	*Chilasa clytia*	Common Mime
12	*Leptosia nina*	Psyche
13	*Papilio polytes*	Common mormon
14	*Pieris canidia*	Indian Cabbage White
15	*Pareronia veleria*	Common gull
16	*Cepora nadina*	Lesser Gull
17	*Dalias eucharis*	Common jezebel
18	*Catopsila Pomona*	Common Emigrant
19	*Eurema bacabe*	Common Grass Yellow
20	*Appias* sp.	Puffin
21	*Spindasis vulcanus*	Common Silverline
22	*Arhopala amantes*	Large Oakblue
23	*Loxura atymnus*	Yam Fly
24	*Melanitis leda*	Evening Brown
25	*Orsothriona medus*	Nigger
26	*Charaxes polyxena*	Tawny Rajah
27	*Phalantha phalantha*	Common Leopard
28	*Precis hierta*	Yellow Pansy
29	*Precis lemonias*	Lemon Pancy
30	*Precis almanac*	Peacock Pancy
31	*Precis atlites*	Grey Pancy
32	*Hypolymnas misippus*	Danied Egg Fly
33	*Hypolymnas bolina*	Great egg fly
34	*Parathyma nefte*	Colour Sergeant
35	*Parathyma precius*	Common Sergeant
36	*Moduza procris*	Commander
37	*Danaus genutia*	Common Tiger
38	*Thirumala limnacoae*	Plain Tiger
39	*Euploea core*	Common Crow
40	***Abisara echerius***	Plum judy

Habitat types: HH: human habitation, AG: agricultural field, SC: scrub forest, MF: mesic forest Adaptive types: A: arboreal, T: terrestrial, AQ: aquatic, aq: semi aquatic, F: fossoreal

APPENDIX 2.2: AMPHIBIANS

SPECIES	MICRO-HABITAT
Duttaphrynus melanostictus	Human habitation (HH) [T]
Bufo fergusonii	Agricultural fields (AG), [T/F]
Fejervarya sihydrensis	Agricultural fields; swamps, ditches and near hill streams (AG), [AQ/aq)
Fejervarya species complex	Agricultural fields, swamps, ditches and near hill streams (AG); [AQ/aq]
Fejervarya orissaensis	Swamps, agricultural fields near aquatics margins, ditches and near hill streams (AG), [AQ/aq]
Hoplobatrachus tigerinus	Swamps, agricultural fields near aquatics margins, ditches and near hill streams (AG), [AQ/aq]
Euphlyctis cyanophlyctis	Agricultural fields, swamps, ditches and near hill streams (AG, MF); [AQ)/aq]
Spaerotheca rolandae	Scrub forest, below rock boulders (SC), [F]
Spaerotheca breviceps	Scrub forest, below rock boulders (SC), [F]
Microhyla ornata	Agricultural fields, swamps, ditches and near hill streams, during winter season (AG, MF); [F/aq]
Kaloula taprobanica	On tree holes in scrub land, near human habitation (SC, HH), [A]
Uperodon systoma	Swamps, ditches, agricultural field near human habitation (AG, HH); [F]
Ramanella variegate	Agricultural fields (AG), [F/A]
Polypedates maculates	Scrub forest, on trees, near human habitation (HH, SC), [A]
Philautus sp.	Busy forest, on trees and near hill streams (SC, MF), [A/aq]
Hydrophylax malabaricus	Near hill streams, below rocks, on trees (!), (MF), [T/A]

APPENDIX 2.3: LIZARDS

Mabuya macularia	Scrub forest, near human habitation, mesic forest (SC, HH,MF), [T]
Mabuya carinata	Scrub forest, near human habitation, mesic forest (SC, HH, MF), [T]
Lygosoma albopunctata	Scrub forest, near human habitation, mesic forest (SC, HH, MF), [T]
Assembllypherus sp	Mesic forest. Near hill streams (MF), [T/F]
Sitana ponticeriana	Scrub forest (SC). [T]
Calotes versicolor	Scrub forest, near human habitation (SC, HH), [A]
Psammophilus blanfordanus	Scrub forest (SC), [T/A]
Chamaeleo zeylanicus	Mesic forest (MF), [A]
Geckoella nebulosus	Below rock boulders, rotten logs, below leaf litters, commonly seen on forest floor during evening hours, Mesic forest (SC, MF), [T]
Geckoella jeyporensis	Below rock boulder, rotten log and sometimes leaf litters, Mesic forest (MF), [T]

Eublepharis hardwikii	Below rock boulder, rotten log and on forest floor during early evening hours in Scrub forest and mesic forest (SC, MF), [T]
Hemidactylus frenatus	Scrub forest, near human habitation (SC, HH), [T/A]
Hemidactylus brookii	Scrub forest, near human habitation (SC, HH), [T]
Hemidactylus leschenaultii	Mesic forest, on trees (SC), [A]
Hemidactylus subtriedrus	Inside caves, below boulders in mesic forest and scrub forest (SC, MF), [T]
Varanus bengalensis	Near human habitation, in scrub forest (HH,SC), [T, A]

APPENDIX 2.4: SNAKES

Ramphotyphlops braminius	Forest floor, leaf litter and below rock boulder, near human habitation and in scrub forest (HH, SC), [T/F]
Python molurus	Caves, trees, forest floor in mesic forest (MF), [T/A]
Gonglyophis conicus	Inside root holes or below rock boulders in scrub forest and occasionally near human habitation (SC), [F]
Ahaetulla nests	On trees near human habitation, in scrub forest and mesic forest (HH, SC, MF), [A]
Dendrelaphis tristis	On trees near human habitation, in scrub forest and mesic forest (HH, SC, MF), [A]
Amphiesma stolatum	On forest floor, below rock boulders near human habitation, scrub forest (HH, SC), [T]
Xenochropis piscator	Water holes, agricultural field, near hill streams in mesic forest (MF), [T]
Xenochropis sanctijohnnis	Water holes and near hill streams in mesic forest at above 700m asl.(MF), [T]
Macropisthodon plumbicolor	Water holes, below rocks and forest floor in mesic forest (MF), [T]
Lycodon aulicus	Forest floor, caves, leaf litter and below rock boulder near human habitation and in scrub forest (SC, HH), [T/A]
Lycodon striatus	Forest floor, caves, leaf litter and below rock boulder near human habitation, scrub forest and in mesic forest, (SC, HH, MF), [T/F]
Lycodon travancoricus	Forest floor, caves, leaf litter and below rock boulder in mesic forest (MF), [T/F]
Boiga trigonata	Bush and shrub forest, below rocks, (SC), [T]
Boiga forsteni	Tree holes, mostly in Sal forest (MF), [A]
Ptyas mucosa	Forest floor, termite mound and below rock boulder near human settlement, (SC, HH), [T/F]
Coelognathus helena	Found in scrub forest, in mesic forest and occasionally ventures near human habitation, (SC), [T]
Naja naja	Forest floor, degraded termite mound, near human habitation and in scrub

	forest, (SC, HH), [T]
Bungarus caeruleus	Forest floor, degraded termite mound, near human habitation and in scrub forest, (SC, HH), [T]
Daboia russelii	Forest floor, degraded termite mound, near human habitation and in scrub forest, (SC, HH), [T]
Bamboo pit Viper	Mesic forest, scrub forest, tree holes and caves.(SC, MF), [A]

APPENDIX 2.5: AVIFAUNA

Sl. no.	Common name	Scientific name	Status
1	Indian peafowl	Pavo cristatus	*Endemic/ common*
2	Pied hornbill	*Anthracoceros albirostris*	Resident / fairly common
3	Indian gray hornbill	*Ocyceros birostris*	Endemic/ fairly common
4	Greater flame back	*Chrysocolaptes lucidus*	Resident / Fairly Common
5	Black rumped flame back	*Dinopium benghalensis*	Near endemic/ Common
6	Coppersmith barbet	*Megalaima haemocephala*	Resident / abundant
7	Common Whoopee	*Upupa epops*	Resident / common
8	Indian roller	*Coraceous bengalensis*	Resident / common
9	Common kingfisher	*Alcedo atthis*	Resident / abundant
10	White throated kingfisher	*Halcyon smyrnensis*	Resident / abundant
11	Green bee eater	*Merops orientalis*	Resident / abundant
12	Blue tailed bee eater	*Merops philippinus*	Resident / fairly common
13	Chestnut headed bee eater	*Merops leschenaulti*	Resident / fairly common
14	Pied cuckoo	*Clamator jacobinus*	Migratory / uncommon
15	Common Hawk cuckoo	*Hierococcyx varius*	Resident / common
16	Asian koel	*Eudynamys scolopacea*	Resident / abundant
17	Greater coucal	*Centropus sinensis*	Resident / abundant
18	Alexandrine parakeet	*Psittacula eupartia*	Resident / fairly common
19	Rose ringed parakeet	*Psittacula krameri*	Resident / abundant
20	Plum headed parakeet	*Psittacula cyanocephala*	Endemic/ common
21	House swift	*Apus affinis*	Resident / abundant
22	Crested tree swift	*Hemiprocne coronata*	Resident / fairly common
23	Barn owl	*Tyto alba*	Resident / fairly common
24	Collared Scops owl	*Otus bakkamoena*	Resident / uncommon
25	Spotted owlet	*Athene brama*	Resident / abundant
26	Indian Nightjar	*Caprimulgus asiaticus*	Resident / abundant
27	Rock pigeon	*Columba livia*	Resident / abundant
28	Spotted dove	*Streptopelia chinensis*	Resident / abundant
29	Eurasian collared dove	*Streptopelia decaocta*	Resident / abundant
30	Emerald dove	*Calcophaps indica*	Resident / common
31	Yellow footed green pigeon	*Treron phoenicoptera*	Resident / common
32	White breasted water hen	*Amaurornis phoenicurus*	Resident / abundant
33	Red wattle lapwing	*Venellus indicus*	Resident / abundant
34	Yellow wattle lapwing	*Venellus malabaricus*	Endemic/ fairly common
35	Black shouldered kite	*Elanus caerulens*	Resident / common
36	Black kite	*Milvus migrans*	Resident / abundant
37	Shikra	*Accipiter badius*	Resident / common
38	Oriental Honey Buzzard	*Pernis ptilorhyncus*	Resident / common
39	Steppe Eagle	*Aquila nepalensis*	Winter/ common
40	Crested serpent eagle	*Spilornis cheela*	Resident / common

41	Little cormorant	*Phalacrocorax niger*	Resident / common
42	Little egret	*Egretta gazzetta*	Resident / common
43	Cattle egret	*Bubulcus ibis*	Resident / abundant
44	Indian pond heron	*Ardeola grayii*	Resident / abundant
45	Golden fronted leaf bird	*Chloropsis aurifrons*	Resident / fairly common
46	Rufus tree pie	*Dendrocitta avagavanda*	Resident / common
47	House crow	*Corvus spelndens*	Resident / abundant
48	Large billed crow	*Corvus macrorhyncos*	Resident / common
49	Eurasian golden oriole	*Oriolus oriolus*	Resident / common
50	Black hooded oriole	*Oriolus xanthops*	Resident / common
51	Scarlet minivet	*Pericrocotus flammeus*	Resident / common
52	White throated fantail	*Rhipidura albicollis*	Resident / common
53	Black drongo	*Dicrurus macrocercus*	Resident / abundant
54	White bellied drongo	*Dicrurus caerulescens*	Endemic / fairly common
55	Asian paradise flycatcher	*Terpsiphone paradisi*	Resident / fairly common
56	Common Iora	*Aegithina tiphia*	Resident / common
57	Oriental magpie robin	*Copsychus saularis*	Resident / abundant
58	White rumped shama	*Copsychus malabaricus*	Resident / fairly common
59	Indian robin	*Saxicoloides fulicata*	Endemic / abundant
60	Brahminy starling	*Sturnus pagodarum*	Resident / fairly common
61	Asian pied starling	*Strurnus contra*	Resident / common
62	Common mynah	*Acridotheres tristis*	Resident / abundant
63	Jungle mynah	*Acridotheres fuscus*	Resident / abundant
64	Hill mynah	*Gracula religiosa*	Resident / fairly common
65	Red whiskered bulbul	*Pycnonotus jocosus*	Resident / abundant
66	Red vented bulbul	*Pycnonotus cafer*	Resident / abundant
67	Plain prinia	*Prinia inornata*	Resident / common
68	Zilting cisticala	*Cisticala juncidis*	Resident / common
69	Common tailor bird	*Orthotomus sutorius*	Resident / abundant
70	Dark necked tailor bird	*Orthotomus atrogularis*	Resident / fairly common
71	Jungle babbler	*Tordoides striatus*	Endemic / abundant
72	Purple rumped sunbird	*Nectarinia zeylonica*	Resident / common
73	Purple sunbird	*Nectarinia asiatica*	Resident / abundant
74	House sparrow	*Passer domesticus*	Resident / abundant
75	Indian Pitta	*Pitta brachyura*	Endemic / fairly common
76	Paddy field pipit	*Anthus rufulus*	Resident / fairly common
77	Baya weaver	*Ploceus philippinus*	Resident / common
78	White rumped munia	*Lonchura striata*	Resident / common
79	Orange headed thrush	*Zoothera citrina*	Resident/Fairly common
80	Scaly breasted munia	*Lonchura punctulata*	Resident / common
81	Common Quail	*Coturnix coturnix*	Resident/ fairly common
82	Red jungle fowl	*Gallus gallus*	Resident / common

APPENDIX 2.6: MAMMALS

Sl. No.	Scientific name	Common name	Local name	WPA status
1	*Panthera tigris**	Tiger	Bada bagh	Schedule-I
2	*Panthera pardus*	Leopard	Druka	Schedule-I
3	*Prionailurus bengalensis**	Leopard cat	Bana bhuan	Schedule-I
4	*Felis chaus*	Jungle cat	Bhuan	Schedule-II
5	*Elephas maximus*	Elephant	Hati	Schedule-I
6	*Melursus ursinus*	Sloth Bear	Bhalu	Schedule-I
7	*Bos gaurus*	Gaur	Gayala	Schedule-I
8	*Cervus unicolor*	Sambar	Sambhari	Schedule-III
9	*Axis axis*	Chital	Jiada	Schedule-III
10	*Muntiacus muntjak*	Barking Deer	Rekad kutura	Schedule-III
11	*Tetracerus quadricornis*	Chousingha	Bhutel kutura	Schedule-I
12	*Moschiola meminna*	Mouse Deer	Kebada	Schedule-I
13	*Lepus nigricollis*	Hare	Khudar	Schedule-IV
14	*Hystrix indica*	Porcupine	Sai	Schedule-IV
15	*Manis crassicaudata*	Indian Pangolin	Sarakati	Schedule-I
16	*Cuon alpanius**	Wild Dog	Kok	Schedule-II
17	*Canis lupus**	Wolf	Kuliha	Schedule-I
18	*Canis aureus*	Jackal	Rama siali	Schedule-II
19	*Hyaena hyaena**	Striped hyena	Gedha	Schedule-III
20	*Vivericula indica*	Small Indian civet	Patni musa	Schedule-II
21	*Paradoxurus hermophroditus*	Common palm civet	Patni musa	Schedule-II
22	*Herpestes edwardsii*	Grey mongoose	Sap katara musa	Schedule-II
23	*Herpestes smithii*	Ruddy mongoose	Sap katara musa	Schedule-II
24	*Petaurista philippensis*	Indian giant flying squirrel	Masana chadhei	Schedule-II
25	*Ratufa indica*	Indian giant squirrel	Udanta gunduchi	Schedule-II
26	*Mellivora capensis**	Honey badger (Ratel)	Gada bhalu	Schedule-I
27	*Macaca mulatta*	Rhesus monkey	Mankada	Schedule-II
28	*Sus scrofa*	Wild pig	Baraha	Schedule-III
29	*Semnopithecus entellus*	Hanuman langur	Hanu mankada	Schedule-II
30	*Lutra lutra*	Smooth Indian Otter	Pani musa	Schedule-II