ISBN: 978-93-90847-17-4

8. Similipal Biosphere Reserve (SBR): A General Discussion

Dr. Debabrata Das

Department of Botany,
Lalgarh Government College,
Lalgarh, Jhargram District, West Bengal, India.

Atmaja Avirupa Das

VSN, Midnapore, Paschim Medinipur,
West Bengal, India.

Abstract:

Biosphere reserve is a big term applied to a large scale system which is ecologically diverse and significant along with many more micro habitats. This amplifies a good governance to protect forest and its components. It is important because of many kinds of ecosystem services which run parallel in way to make the ecosystem meaningful. We can get facilities like water conservation, climate regulation, nutrient flow, soil protection and soil conversion, prevention of water loss from dry land, soil loss, increase organism production, photosynthesis by-product and biomass yield, wind break, minimization of pollutants, carbon-di-oxide influx, oxygen outcome, pest control, and conservation of wildlife and so on. Apart from the above, its main emphasis imposed on tribal people residing inside the biosphere reserve. Not only these above mentioned kinds, it is a habitat that gives us immense pleasure during visit. Botanists, ecologists, foresters, climatologists, horticulturists, zoologists, wildlife specialists, photographers, environmental scientists, scholars, policy maker and students will get benefit from different viewpoints particularly research, extension and management. It is a site laid down by state Govt. and local Forest Protection Committees (FPCs) and eco development committees (EDCs) for eco-tourism development. In this communication, authors are going to represent a general view of Similipal to know about the special eco-climate and wildlife of Similipal.

Key words*:* *Similipal, Eco-climate, Wildlife, tribal people and Management*.

8.1 Introduction:

Similipal biosphere is a biosphere reserve of Odisha and got its name from *simul* (red silk cotton tree). It covers an area of 2750 sq. km though only 303 sq. km is a core area. One sanctuary (Kuldiha bird sanctuary) and one Tiger reserve (STR) is inside the reserve. Due to heavy rain falls and varied microclimatic conditions, it shows a vast green vegetation form satellite image. It harbours wide range of dry deciduous to moist green vegetation

patch. Due to its own geographical features, the biosphere reserve harbours many species of flora and fauna. About 1100 species of plants have been recorded form the forests though the number is not static. Many species of mammals, birds, insects, fungi, molluscs, millipedes, centipedes and reptiles are commonly found in different sites. The high hillocks like khairiburu and meghashini and other peaks attract the tourists for the scenic beauty of land from distance site of the area. The entire land mass allow the rivers like budhabalanga, khairi, salandi, palpala and bhandan to flow and act as water carrying bodies originated from peaks and reverie belts that collect water through rivulets and canals. Many waterfalls attract people in this site. The famous waterfalls are barehipani, joranda and uski attract us and a source of water of foothills.

Government of Odisha has declared the site as Wildlife sanctuary in the year 1979 with an area of 2,200 sq. km and Govt. of India has declared it as Biosphere Reserve in the year 1994. In the year 2009, UNESCO declared it as world heritage site. Medicinal plant species like *Andrographis paniculata, Terminalia bellerica, Terminalia chebula, Phyllanthus emblica, Diospyros embryopteris, Ziziphus jujuba, Michelia champaca, Madhuca indica, Shorea robusta, Holarrhena antidysenterica* are found here. Various colourful mushrooms are available from the floor of the forest during post monsoon. A large number of collectors over the degraded land engage to collect '*Bidi leaf*' (*Diospyros melanoxylon*) so called '*tendu*' for the purpose to rise local economy.

A small herbaceous or shrubby plants get leaves which are marketed but the big trees bear large number of leaves but have no commercial value, as the leaves are thick and not up to the mark as quality leaf. The tract of river side *Eulaliopsis binnata* (Sabai grass/Chinese alpine rush) is common which is economically important. Ethnic people reside inside the forest and cultivate rice, sesame and mustard. Other local vegetables found in their home garden and they depend on the cultivation though forest department involve them to work in various micro-projects. The natural forest, degraded land and plantation sites of the Biosphere reserve cover the entire land mass a unique reserve of man and wildlife. Large number of plants, animals and microbes in the rhizosphere and phyllosphere of this BR is important. Therefore it is essential to know the some of the components of this biosphere reserve. Remembering the theme in mind present article has been placed as a brief overview of Similipal.

8.2 Study Area:

Study areas were podadiha, pithabata, gurguria, joranda, chahala, jamuani, jenabil, bangriposi, udala, karanjia, uski and kuldiha. All study sites are inside the biosphere reserve and nearby and included in the state of Odisha. It is located in the district of Mayurbhanj of Odisha aside the Jhargram district of West Bengal. It lies between 21^0 16' to 22^0 08' N latitude and 86^0 04' to 86^0 37' E longitude. It was declared as BR in June, 1994 by Govt. of India. It comprises tropical moist deciduous, deciduous and dry evergreen and semi evergreen forests. It hosts near about 1100 different plant species along with many diver fungi, algae and diverse animal species. These are under varied microclimatic conditions. Cultivated land and wet paddy field are the characteristic features of this area. So, as a whole, river, hills, dams, forests, home gardens, nursery, medicinal plant garden, fallow land and rice fields are main habitats for Wildlife.

8.3 Material and Methods:

Frequent visits in field was done and plants samples, specimens, soils, photographs and other data like soil temperature, light intensity, micro propagules were recorded to make a study report for annual basis. A compilation of 3 years data was prepared with the help of computer and presented here to locate the present scenario for future study and research. A total 36 (3 in each micro-site) study points were fixed with the help of GPS and recorded points were demarcated with the help of locators and studied for the medicinal plants available there and to study the ecology of them for future study and research. Help of local people was taken to know the common names of the plants and then a few herbarium specimens were prepared with the help of manual available in website along with the knowledge received from Botanical Survey of India, Shibpore, Howrah, West Bengal during the study with valid permission from Govt. office. Sample specimens were housed at herbarium section of Lalgarh Govt. College, Binpur-I, Jhargram and Seva Bharati Mahavidyalaya, Kapgari, Jhargram for preservation and future study. Similarly, soils and rocks including mushrooms were collected and preserved in the Botany Department, Lalgarh Govt. College for further study and research. Used references listed in bibliography [(1-23)] part for further study.

8.4 Results and Discussion:

The data on SBR soil analysis showed that the soil p^H was mainly acidic in nature (6.8) and range varied from 6.5 to 6.8 *i.e.* low variations thereby, indicating a minor variation from one site to another as there were different management for forest and agricultural land use practice. These soils obviously affect the plant growth. Moisture content varied from 11.76-34.12% (Table 8.a) in different types of study soils starting from summer to late summer to early monsoon.

In degraded stand of SBR, sand and silt are higher in value (Table 8.b) in compare to natural sites. Similarly, bulk density value is higher at degrade stand in compare to natural site. Here, clay, soil porosity and soil moisture content at degraded site is lower in compare to natural sites.

The soil of cultivable land at low lying land showed pH value ranged in between 6.4 and 6.6 during summer. Moisture content of the same site showed 14.0 -24.0 %. The same at degraded land (DL) showed mean pH 6.8 and moisture content 12.0-17.0 % in summer. Natural forest land showed the mean pH value 6.5 while the moisture content of soil in between 32 to 34%. This showed a great range due to different land sites from upper part of the degraded site to the lower tract of alluvial land via natural forest. Here we have recorded 200 plant species under 130 genera and 60 families during study. Most of the plants used as medicinal purpose directly or indirectly which are available at the territory of Similipal (Table 8.c). Here the family Euphorbiaceae showed species dominance followed by Fabaceae and Caesalpiniaceae. The site also showed planted species like Eucalyptus that gets flowers and fruits during late winter. Plantation of *Cassia siamea* and *Eucalyptus* makes the degraded land more greenish followed by *Acacia auriculiformis*. Huge medicinal herbs, shrubs and some trees make the land beautiful while ground is covered by medicinal grass. Ground cover of the land in summer showed less to lesser number of plants while

most of the tree species become leafless. The dry deciduous forest floor exhibits gregarious climbers and a few shrubs that show flowers. Potentially the degraded land shows good growth of *bidi* leaf (*Diospyros melanoxylon*) which is used widely by local people to generate income as the plant is commercially important and the demand is high. Similarly, green *sal* (*Shorea robusta*) plates and wide and broad leaves are used widely by local people to generate economy at the rural village. Here *Shorea robusta, Michelia champaca* and *Eucalyptus* sp. are the huge size tree found in the reserve (Table 8.d). The tribal people collect dry leaf litter and fuel wood for their livelihood. Some common medicinal plants are available in the periphery of tribal village inside the biosphere reserve. Diversity of plants in and around the SBR is unique. Here, species diversity is highest in case of tree species (3.12±0.22) and lowest in case of shrubs (1.76±0.16) and concentration of dominance (cd)is highest in case of shrubs (0.38±0.003) followed by herbs (0.30±0.027) and lowest in case of tree species (0.18±0.004) (Table 8.e). Therefore, the site is very interesting and that need more scientific research in a continuous way to know the trend of loss of biodiversity in near future.

Besides, the rich floral and faunal diversity, similipal Biosphere Reserve is also host many tribal populations like khadia, bhatudi, kolha, bhumija and munda people who have rich traditional culture and practice. They totally depend on forest for their livelihood. Village forest protections committees (VFPCs) are conjointly look after the area regarding the problems and even the mitigation process required any time along with the forest department. According to report the entire SBR forest area fall under one of the Schedule-V category (tribal sub-plan area) of the state as a majority of the people are tribal. So, ecologically this area is ecological interactive in which people and wildlife sit together in a common geographical territory. A good management plan is therefore required to make the process of ecosystem holistic that can protect the biodiversity too. Real time planning and management therefore is essential which need more comprehensive research in all fields of allied sciences to get a proper benefit through applications in near future.

Table 8.a: Range of Physico-chemical parameters of soil of some sites at SBR, Odisha, India

Study Parameter	Value (Range)
Soil p^H	6.5-6.8
Soil moisture (%)	11.76-34.12%
Organic carbon (%)	0.88-1.15%
$NO3^-$ - N (Kg ha^-)	12.14-19.05
Total N (%)	0.08-0.14
Available P (Kg ha^-)	21.88-22.66
Available K (Kg ha^-)	167.01-123.84
N.B.: Range of sample value of Degraded to natural via plantation stand basis.	

Table 8.b: Soil composition at depth 0-30cm in different sites under different management regimes at SBR, Odisha, India

Sr. No.	Type	Degraded stand (Range)	Natural site (Range)
1	**Sand (%)**	51.30-54.21	29.10-33.10
2	**Silt (%)**	26.16-30.89	21.41-25.67
3	**Clay (%)**	17.22-21.41	45.40-47.41
4	**Bulk density (g/cm^3)**	1.12-1.23	0.78-0.89
5	**Porosity (%)**	39.1-49.0	58.61-68.12
6	**Soil moisture (%)**	9.69-11.78	30.4-32.14

Table 8.c: Medicinal plants inventory at Similipal, Odisha, India

Sr. No.	Scientific Name / (English Name)	Common Name	Family
1.	**Abutilon indicum (Link) Sweet (INDIAN ABUTILON, INDIAN MALLOW)**	Patari, Atibala	Malvaceae
2.	**Acacia auriculiformis A. Cunn. ex Benth. (TAN WATTLE, EARLEAF ACACIA)**	Akashmoni, Sonajhuri, Minjam	Fabaceae
3.	**Achyranthes aspera L. (CHAFFY FLOWE, PRICKLY CHAFFY FLOWER)**	Apang	Amaranthaceae
4.	**Aegle marmelos (L.) correa (BENGAL QUINCE, GOLDEN APPLE, STONE APPLE, WOOD APPLE, JAPANESE BITTER ORANGE)**	Bael, Bel	Rutaceae
5.	**Ailanthus excelsa Roxb. (TREE OF HEAVEN)**	Simarubi	Simaroubiaceae
6.	**Alstonia scholaris (L.) R. Br. (DEVIL'S TREE)**	Chhatim, Saptaparni	Apocynaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
7.	**Alternanthera sessilis (L.) R. Br. ex DC. (SESSILE JOY WEED)**	Mati Kanduri	Amaranthaceae
8.	**Anacradium occidenatale L. (CASHEW TREE)**	Kaju	Anacardiaceae
9.	**Andrographis paniculata (Burm f.) Wall. ex Nees (KING OF BITTERS, CREAT, GREEN CHIRAYTA)**	Kalmegh	Acanthaceae
10.	**Andropogon aciculatus Retz. (GOLDEN FALSE BEARD GRASS, GREEN STEM GRASS, BROOM SEDGE)**	Chorkanta	Poaceae
11.	**Anisomeles ovate W. T. Aiton (CATMINT)**	Kalobhangra	Lamiaceae
12.	**Anogeissus latifolia (Roxb. ex DC.) Wall ex Bedd. (AXLE WOOD TREE)**	Dhaw	Combretaceae
13.	**Antidesma ghaesembilla Gaertn. (BLACK CURRANT TREE)**	Nonakul	Phyllanthaceae
14.	**Argemone Mexicana L. (MEXICAL PRICKLY POPPY, PRICKLY POPPY OR MEXICAN POPPY)**	Siyal-Kanta	Papaveraceae
15.	**Aristolochia indica L. (SERPENT ROOT PLANT, INDIAN BIRTH WORT)**	Iswarmul	Aristolochiaceae
16.	**Asparagus racemosus Willd. (BUTTERMILK ROOT, WILD CARROT, HUNDRED ROOTS, INDIAN ASPARAGUS)**	Satamuli, Satavari	Asperagaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
17.	**Atylosia scarabeoides (L.) Benth. (Not Available)**	Banur Kalai, Thit Kalai	Fabaceae
18.	**Azadirachta indica A. Juss. (MARGOSA TREE/INDIAN LILAC)**	Neem, Nim	Meliaceae
19.	**Barringtonia acutangula Gaertn. (INDIAN OAK, INDIAN PUTAT)**	Hijal	Lecythidaceae
20.	**Bauhinia variegate (L.) Benth. VARIEGATED BAUHINIA**	Harek Bauhuinia	Fabaceae
21.	**Boerhaavia repens L. (SPREADING HOGWEED, RED HOGWEED)**	Punarnava	Nyctaginaceae
22.	**Borassus flabellifer L. (PALMYRA PALM, TODDY PALM, WINE PALM, TAL PALM)**	Tal	Arecaceae
23.	**Botrychium daucifolium Wall. ex. Hook. & f. (WESTERN GOBLIN, MOUNTAIN MOONWORT)**	Chandni	Lygodiaceae
24.	**Breynia vitis-idaea (Burm. f.) Fisch. (INDIAN SNOWBERRY)**	Kali Sitki	Euphorbiaceae
25.	**Buchanania lanzan Spreng. (CUDDAPAH TREE, ALMONDETTE TREE, CHERONJEE)**	Piyal, Chiranji	Anacardiaceae
26.	**Butea monosperma (Lam.) Taub. (FLAME OF THE FOREST, BUTEA KINO)**	Kingshuk, Palas	Fabaceae
27.	**Butea superb Roxb. (RED KWAO KRUA, CREEPING BUTEA)**	Lat Palas	Fabaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
28.	**Caesalpinia sappan L. (SAPPAN WOOD / INDIAN REDWOOD)**	Nata, Lata	Caesalpiniaceae
29.	**Calotropis gigantean (L.) W. T. Aiton (CROWN FLOWER/GIANT MILKWEED, BOWSTRING HEMP)**	Bara Akanda	Asclepiadaceae
30.	**Calliandra haematocephala Hassk (WHITE POWDER PUFF FLOWER)**	Calliandra	Fabaceae
31.	**Capparis zeylanica L. (CEYLON CAPER)**	Dela	Capparaceae
32.	**Cardiospermum helicacabum L. (BALLOON VINE)**	Sibjhul	Sapindaceae
33.	**Careya arborea Roxb. (WILD GUAVA/CEYLON OAK/PATANA OAK)**	Kumbhi	Lecythidaceae
34.	**Cascabela thevetia (L.) Lippold Syn.-Thevetia peruviana (Pers.) K. Schum. (LUCKY NUT/YELLOW OLEANDER)**	Kolke	Apocynaceae
35.	**Casearia elliptica Willd. (Toothed leaf Chilla)**	Chilla	Salicaceae
36.	**Cassia alata L. (CANDLE BUSH/CHRISTMAS CANDLE)**	Dadmari	Caesalpiniaceae
37.	**Cassia fistula L. (GOLDEN SHOWER TREE)**	Bandar Lathi, Sonali	Caesalpiniaceae
38.	**Cassia occidentalis L. (COFFEE WEED/MOGDAD COFFEE)**	Kalkasunda	Caesalpiniaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
39.	**Cassia siamea Lam. (SIAMESE CASSIA/KASSOD TREE/CASSIA TREE)**	Minziri/Kasunde	Caesalpiniaceae
40.	**Cassia torab L. =Senna tora (L.) Roxb. (SICKLE SENNA)**	Jhunjhuni	Caesalpiniaceae
41.	**Cassytha filiformis L. (LOVE-VINE)**	Akashbel	Cassythaceae
42.	**Catharanthus roseus (L.) G. Don. (MADAGACAR PERIWINKLE/ROSE PERIWINKLE)**	Nayantara	Apocynaceae
43.	**Celastrus paniculatus Willd. (INTELLECT PLANT/CLIMBING STAFF TREE/BLACK OIL PLANT)**	Kijri, Malkagni, Jyotismati	Celastraceae
44.	**Cephalandra indica Naudin (IVY GOURD/SCARLET FRUIT)**	TelaKuncha/Bankundari	Cucurbitaceae
45.	**Cleistanthus collinus (Roxb.) Benth. ex. Hook. f. (GARARI)**	Parasi	Euphorbiaceae
46.	**Clerodendrum indicum (L.) Kuntze (TUBE FLOWER/SKY ROCKET/BOWING LADY/TURK'S TURBIN)**	Bamunhati	Verbenaceae
47.	**Clerodendrum serratum (L.) Moon (BLUE FLOWERED GLORY TREE)**	Bharangi	Verbenaceae
48.	**Clerodendrum viscosusm Vent. (HILL GLORY BOWER)**	Ghentu	Verbenaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
49.	**Cnicus arvensis (L.) Hoffm. (CALIFORNIA THISTLE, CANADA THISTLE, FIELD THISTLE)**	Biral kanta	Asteraceae
50.	**Cocculus hirsutus (L.) Diels (BROOM CREEPER)**	Dadaya/Doipata	Menispermceae
51.	**Cochlospermum religiosum (L.) Alston (Silk Cotton tree, Butter cup tree)**	Silk-cotton tree	Bixaceae
52.	**Combretum decandrum Jacq. (RANGOON CREEPER, BURMA CREEPER)**	Atang/Atur	Combretaceae
53.	**Costus speciosus (J. Koenig.) Sm. (CREPE-GINGER, CANE REED, SPIRAL GINGER)**	Keon, Keo, Keu, Kemuk	Costaceae
54.	**Cretava religiosa G. Forst. (SACRED GARLIC PEAR, TEMPLE TREE)**	Barun	Capparaceae
55.	**Croton bonplandianum Baill. (THREE LEAVES CRAPER)**	Ban tulsi, Banlank, Chrchuri	Euphorbiaceae
56.	**Croton oblongifolus Roxb. (CEYLON AROMATIC CROTON)**	Putli, Chuka, Baragachi	Euphorbiaceae
57.	**Cryptolepis buchanani Roem. & Schult. (INDIAN SARSAPARILLA)**	Shyamlata	Anacardiaceae
58.	**Curculigo orchioides Gaertn. (GOLDEN EYE GRASS)**	Kali musli, Talamuli, Tali)	Hypoxidaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
59.	**Curcuma aromatica Salisb. (WILD TURMERIC)**	Kali Haldu	Zingiberaceae
60.	**Cuscuta reflexa Roxb. (COMMON /GIANTDODDER)**	Swarnalata	Convolvulaceae
61.	**Dalbergia latifolia Roxb. (INDIAN ROSE-WOOD)**	Satisal	Fabaceae
62.	**Dalbergia sissoo Roxb. (NORTH INDIAN ROSE-WOOD)**	Sishu	Fabaceae
63.	**Datura metel L. (DEVIL'S TRUMPET)**	Datura	Solanaceae
64.	**Deeringia amaranthoides (Lam.) Merr. (SHRUBBY DERINGIA)**	Rongoli lata, Gol muhuni, Gol mohani.	Amaranthaceae
65.	**Delonix regia (Hook.) Raf. (ROYAL POINCIANA)**	Gulmohar	Caesalponiaceae
66.	**Dendrobium transpers Wall. (TRANSLUCENT DENDROBIUM)**	Translucent Dendrobium	Orchidaceae
67.	**Dendrophthoe falcate (L. f.) Ettingsh. (HONEY SUCKLE MISTLETOE)**	Bara Manda	Loranthaceae
68.	**Desmodium triflorum (L.) DC. (CREEPING TICK TREFOIL)**	Kudaliya, Kulaliya	Fabaceae
69.	**Dichrostachys cinerea Wight et Am. (Bell Mimosa, Chinese lantern tree, Kalahari Christmas tree)**	Sickle bush	Fabaceae
70.	**Dicliptera bupleuroides Nees (ROXBURGH'S FOLDWING)**	Lal jhnati, Lalsira	Acanthaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
71.	**Diospyros melanoxylon Roxb. (COROMANDEL EBONY, EAST INDIAN EBONY)**	Kend, Tendu	Ebenaceae
72.	**Diospyros sylvatica Roxb. (MOTTLED EBONY, MOUNTAIN PERSSIMON, BOMBAY EBONY)**	Bisgab, bistendu	Ebenaceae
73.	**Eragrostris tenella (L.) P. Beauv. (LOVE GRASS, FEATHER LOVEGRASS, JAPANESE LOVEGRASS)**	Shada fulka	Poaceae
74.	**Eranthemum nervosusm (Vahl) R. Br. ex Roem. & Schult. (BLUE ERANTHEMUM, BLUE SAGE)**	Gulson	Acanthaceae
75.	**Eria meghasaniensis Misra (ENDEMIC ODISHA ORCHID)**	Meghasaniensis orchid	Orchidaceae
76.	**Eucalyptus sp. (TASMANIAN BLUE GUM, BLUE GUM, SOUTHERN BLUE GUM)**	Eucalyptus	Myrtaceae
77.	**Eupatorium odoratum L. (BITTER BUSH, TONKA BEAN)**	Bankarpur, Banmara, Bhutbhairabi	Asteraceae
78.	**Euphorbia hirta L. (ASTHMA WEED)**	Dudhi, Lalkeru, Barokarni	Euphorbiaceae
79.	**Euphorbia trigona Mill. (AFRICAN MILK TREE, CATHEDRAL CACTUS, ABYSSINIAN EUPHORBIA)**	Bajbaran	Euphorbiaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
80.	**Evolvulus alsinoides (L.) L. (DWARF MORNING-GLORY)**	Shanapushpi, Sankhapuspi	Convolvulaceae
81.	**Evolvulus nummularious (L.) L. (ROUND LEAF BINDWEED)**	Bhnui-Akra	Convolvulaceae
82.	**Ficus benghalensis L. (BANYAN, BANYAN FIG, INDIAN BANYAN)**	Bot	Moraceae
83.	**Ficus hispida L. f. (HAIRY FIG, DEVIL FIG)**	Kak damur, Khoksha dumur	Moraceae
84.	**Ficus religiosa L. (PEEPAL TREE, ASWATHA TREE, BODHI TREE)**	Aswatha	Moraceea
85.	**Flacourtia cataphracta Roxb. ex Willd. (SPIKED FLACOUTIA, PUNEALA PLUM)**	Tali	Salicaceae
86.	**Gloriosa superba L. (FLAME LILY, TIGER CLAW)**	Glory lily	Colchicaceae
87.	**Gmelina arborea Roxb. ex Sm. (BEECH WOOD TREE, MALAY BEECHWOOD)**	Gamar	Verbenaceae
88.	**Gnetum ula Brongn. (LIANA GNETUM)**	Long Gnetum	Gnetaceae
89.	**Gomphrena globosa L. (GLOBE AMARANTH)**	Golkamal, Botamphul, Golmakhmal	Amaranthaceae
90.	**Gymnema sylvestre R. Br. (PERIPLOCA OF THE WOODS)**	Gurmar, Merasinghi	Asclepiadaceae
91.	**Haldinia cordifolia (Roxb.) Ridsdale =Adina cordifolia (Roxb.) Brandis (YELLOW TEAK OR HALDU)**	Haldu/Karam	Rubiaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
92.	**Hemidesmus indicus (L.) R. Br. (INDIAN SARSAPARILLA)**	Anantamul	Asclepiadaceae
93.	**Hemigraphis hirta T. Anderson (HAIRY HEMIGRAPHIS)**	Musakani	Acanthaceae
94.	**Hibiscus vitifolius L. (GRAPE LEAVED MALLOW)**	Ban Kapas	Malvaceae
95.	**Holarrhena pubescens Wall. ex G. Don (EASTER TREE)**	Kurchi	Apocynaceae
96.	**Holoptelea integrifolia (Roxb.) Planch. (INDIAN ELM TREE/JUNGLE CORK TREE)**	Challa	Ulmaceae
97.	**Hyptis suaveolens (L.) Poit. (AMERICAN MINT)**	Bilati Tulsi	Lamiaceae
98.	**Ichnocarpus frutescens (L.) W. T. Aiton. (BLACK CREEPER)**	Shama Lata	Apocynaceae
99.	**Impomoea obscura (L.) Ker Gawler (LESSER GLORY)**	Chaggalkuri	Convolvulaceae
100.	**Indigofera cassioides Rottler ex DC. (CASSIS INDIGO)**	-	Fabaceae
101.	**Indigofera linifolia (L. f.) Retz. (MUD INDIGO)**	Bhangra/Motiyari	Fabaceae
102.	**Inga dulcis (Roxb.) (MALINA TAMARIND)**	Ban Tetul, Kich mich, Jilapiphal	Mimosaceae
103.	**Ipomoea aquatic Forsskal (SWAM CABBAGE, WATER MORNING GLORY)**	Jal Kalmi	Convolvulaceae
104.	**Ipomoea carnea Jace. BUSH MORNING GLORY)**	Bera Kalmi	Convolvulaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
105.	**Jatropha gossypiifolia (L.) (BELLYACHE BUSH)**	Lal Bherenda	Euphorbiaceae
106.	**Kalanchoe pinnata (Lam.) Pers. (LIFE PLANT)**	Patharkuchi	Crassulaceae
107.	**Kaempferia rotunda L. (PEACOCK GINGER)**	Mayuri Ada	Zingiberaceae
108.	**Lannea coromandelica (Houtt.) Merr. (GURJON TREE/INDIAN ASH TREE)**	Jiyal	Anacardiaceae
109.	**Lantana camara L. (BIG-SAGE, WHITE-SAGE, RED-SAGE)**	Chotra/Putus/Chatra	Verbenaceae
110.	**Lepisanthes tetraphylla (Vahl) Radlk.**	-	Sapindaceae
111.	**Limonia acidissima L. (WOOD APPLE/ELEPHANT VAPPLE)**	Kot bel	Rutaceae
112.	**Lobelia nicotianifolia L. (WILD TOBACCO)**	Ban tamuk	Campanulaceae
113.	**Luffa aegyptiaca Mill. SPONGE GOURD)**	Purul chal	Cucurbitaceae
114.	**Lygodium japonicum L. (JAPANESE CLIMBING FERN)**	Berajal	Lygodiaceae
115.	**Madhuca longifolia (J. Kong) J.F. Macbr. Syn.: M. indica Benth. (INDIAN BUTTER TREE)**	Mohua/Mohul	Sapotaceae
116.	**Mikania micrantha Kunth. (BITTER VINE, AMERICAN ROPE)**	Taralata, Rabonlata(Ravan lata)	Asteraceae
117.	**Mimosa pudica L. (SENSITIVE PLANT/HUMBLE PLANT)**	Lajjwati	Mimosaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
118.	**Mimosa rubicaulis Lam. IHIMALAYAN MIMOSA)**	Shiakanta, Chirchitkanta	Mimosaceae
119.	**Mitragyna parviflora (Roxb.) Korth. (KAIM, TRUE KADAMB)**	Dharakadamb/Gulikadamb	Rubiaceae
120.	**Momordica charantia L. (BITTER GOURD, BITTER MELON))**	Karela	Cucurbitaceae
121.	**Morinda citrifolia L. (CHEESE FRUIT)**	Nani/Hurdi	Rubiaceae
122.	**Oldenlandia corymbosa L. Syn.-Hedyotis diffusa Willd. (DIAMOND FLOWER)**	Khetpapra	Rubiaceae
123.	**Passiflora foetida L. (STINKING PASSION FLOWER)**	Ban Jhumkolata	Passifloraceae
124.	**Peltophorum pterocarpum (DC.) K. Heyne COPPER POD / YELLOW FLAME)**	Radhachura	Caesalpiniaceae
125.	**Pergularia daemia (Forssk.) Chiov. (TRELLIS-VINE)**	Chagalbati	Asclepiadaceae
126.	**Phyllanthus simplex Retz. (SEED UNDER LEAF)**	Bhuiamla	Euphorbiaceae
127.	**Phyllanthus niruri L. (INDIAN SMALL GOOSEBERRY)**	Choto Bhuiamla	Euphorbiaceae
128.	**Plumbago zeylanica L. (CEYLON LEADWORT/DOCTOR BUSH)**	Sada Chita	Plubaginaceae
129.	**Pongamia pinnata (L.) Pierre (HONGE TREE/PONGAM TREE)**	Karanja	Caesalpiniaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
130.	**Premna latifolia Roxb. (ARARI)**	Agnimantha/Jaya/Gohara	Verbenaceae
131.	**Pterocarpus marsupium Roxb. (MALABAR KINO /INDIAN KINO)**	Bijasal/Piyasal	Sterculiaceae
132.	**Pterospermum acerifolium (L.) Willd. (DINNER PLATE TREE/BAYUR TREE)**	Kanakchampa	Sterculiaceae
133.	**Pterospermum xylocarpum (gaertn.) Santapau & Wagh (TADA)**	Kanakchampa	Sterculiaceae
134.	**Ricinus communis L. (CASTOR BEAN/CASTOR OIL PLANT)**	Reri	Euphorbiaceae
135.	**Rauvolfia serpentine (L.) Benth.ex Kurz. (SNAKE ROOT)**	Sarpagandha	Apocynaceae
136.	**Saraca asoka (Roxb.) Willd. (ASHOKA TREE) State flower of Odisha**	Ashok tree	Fabacveae
137.	**Schleichera oleosa (Lour.) Oken (CEYLON OAK, LAC TREE)**	Kusum	Sapindaceae
138.	**Sebastiania chamaelea (L.) Mull. -Arg. (CREEPING SEBASTIANA)**	Sebastin	Euophorbiaceae
139.	**Semecarpus anacardium L. (MARKING NUT TREE)**	Vela	Anacardiaceae
140.	**Senna didymobotrya (Fresen.) Irwin & Barneby (BLACK SENNA)**	Kali senna	Caesalpiniaceae
141.	**Senna hirsute (L.) H.S. Irwin (HAIRY SENNA)**	Hairy senna	Caesalpiniaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
142.	**Shorea robusta Gaertn. f. (SAL)**	Sal	Dipterocarpaceae
143.	**Smilax macrophylla Roxb. (INDIAN WILD SARSAPARILLA, ROUGH BINDWEED)**	Kumarika	Smilacaceae
144.	**Solanum virginianum L. (YELLOW –FRUIT NIGHT SHADE)**	Kantikari	Solanaceae
145.	**Spermacoce hispida L. (SHAGGY PUTTONWEED)**	Madanbata	Rubiaceae
146.	**Stachytarpheta indica (L.) Vahl (BLUE POTTER WEED/BLUE SNAKE WEED)**	Nilkanthi	Verbenaceae
147.	**Stephania japonica (Thunb.) Miers (SNAKE VINE)**	Tejomala	Menispermaceae
148.	**Sterculia foetida L. (JAVA OLIVE TREE/WILD ALMOND TREE)**	Jangli Badam	Sterculiaceae
149.	**Sterculia villosa Roxb. ex Sm. (HAIRY STERCULIA) (JAVA OLIVE TREE/WILD ALMOND TREE)**	Udal	Sterculiaceae
150.	**Streblus asper Lour. (TOOTH BRUSH TREE)**	Ash seora	Moraceae
151.	**Strychnos nux-vomica L. (NUX VOMICA / POISON NUT TREE)**	Kuchla	Loganiaceae
152.	**Tectona grandis L. f. (TEAK TREE)**	Segun	Verbenaceae
153.	**Tephrosia purpurea (L.) Pers. (WILD INDIGO/PURPLE TEPHROSIA)**	Ban nil	Fabaceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
154.	**Terminalia arjuna (Roxb.) Wight & Arn. (ARJUN)**	Arjun	Combretaceae
155.	**Terminalia bellerica Roxb. (Bastard Myrobolan)**	Bahera	Combretaceae
156.	**Terminalia chebula Retz. (BLACK OR CHEBULIC MYROBOLAN)**	Harituki	Combretaceae
157.	**Terminalia elliptica Willd. (ASAN, SAJ, INDIAN LAUREL, SADAR)**	Asan, Saj	Combretaceae
158.	**Tiliacora racemosa Colebr. (SILVER LIME)**	Telilata	Menispermaceae
159.	**Trewia nudiflora L. (FALSE WHITE TEAK)**	Pitali	Euphorbiaceae
160.	**Tylophora asthmatica (EMETIC SWALLOW-WORT)**	Antamul	Araceae
161.	**Vanda roxburghii R. Br. (VANDA ORCHID)**	Banda, Alokelata	Orchidaceae
162.	**Viscum articulatum Burm.f. (LEAFLESS OR JOINTED MISSTLETOE)**	Mandala	Loranthaceae
163.	**Vitis pedata (Lam.) Wall. ex Wight (SORREL VINE)**	Goalelata	Vitaceae
164.	**Vitis trifoliate (L.) Morales (POSSUM-GRAPE)**	Amal lata, Bundal	Vitaceae
165.	**Wendlandia heynii (Roxb.) DC. (TILAK I)**	Minri, Tilki	Rubiaceae
166.	**Woodfordia fruticosa (L.) Kurz. (FIRE FLAME BUSH)**	Dhatriphul, Dhai	Lythraceae

Sr. No.	Scientific Name / (English Name)	Common Name	Family
167.	**Zanthoxylum armatum DC. (WINGED PRICKLY ASH)**	Tambul, Gaira	Rutaceae
168.	**Ziziphus jujuba Mill. (INDIAN DATE, KOREAN DATE, CHINISE DATE, JUJUBE, RED DATE.)**	Kul	Rhamnaceae
169.	**Ziziphus oenoplia (L.) Mill. (WILD JUJUBE, JACKAL JUJUBE)**	Kan Kul	Rhamnaceae

Table 8.d: Types of plants under various stress in the Biosphere reserve at Similipal, Odisha, India

Sr. No.	Forest tree types	Species
1	Deciduous tree	*Careya arborea, Shorea robusta, Terminalia alata, Albizzia lebbeck, Terminalia bellirica, T. chebula, Phyllanthus emblica, Cassia fistula, Dalbergia sissoo, Bombax ceiba, Madhuca indica.*
2	Evergreen	*Diospyro embryopteris, Mangifera indica*
3	Canopy tolerance	*Diospyro embryopteris*
4	Fire tolerance	*Diospyro embryopteris*
5	Moderate size tree	*Careya arborea, Phyllanthus emblica, Cassia fistula*
6	Light demander	*Careya arborea, Shorea robusta, Terminalia alata, Albizzia lebbeck, Terminalia bellirica, Phyllanthus emblica, Cassia fistula and Dalbergia sissoo*
7	Drought resistance	*Careya arborea, Terminalia bellirica, Phyllanthus emblica*
8	Fire resistant	*Careya arborea, Terminalia bellirica, T. arjuna, Diospyros embryopteris*
9	Coppice	*Eucalyptus sp.*
10	No coppice	*Acacia auriculoformis*
11	Big tree	*Shorea robusta, Michelia champaca, Eucalyptus sp.*
12	Robust Tree	*Madhuca indica, Mangifera indica, Shorea robusta*

Table 8.e: Species diversity of SBR, Odisha, India

Species	Species Diversity	Concentration of dominance
Tree	3.12±0.22	0.18±0.004
Shrub	1.76±0.16	0.38±0.003
Herb	2.15±0.18	0.30±0.027

N.B.: Standard ecological method used for the calculation of plant diversity.

8.5 Photo Plates:

Figure 8.a: Similipal Tiger and Biosphere Reserve

Figure 8.b: Gurguria in Similipal

Figure 8.c: Centipede in forest

Figure 8.d: Orchid in the wild

Figure 8.e: Peacock in Wild

Figure 8.f: White-rumped Shama (Copsychus malabaricus)

Figure 8.g: Indigenous paddy field near Uski water falls (Tribal village)

Figure 8.h: Uski water falls

Figure 8.i: Barehipani waterfalls view point

Figure 8.j: Barehipani water falls from view point

Figure 8.k: Crested serpent eagle in the jungle

Figure 8.l: Emerald Dove on the way at jungle path

Figure 8.m: Spotted Deer in Sal forest

Figure 8.n: Heritage sacred place in SBR

Figure 8.o: Entrance of BR towards uski waterfalls

8.6 Conclusions:

The present study showed 200 plant species found in the Similipal Biosphere reserve as per our study in which 169 are medicinal. Exotic alien species like *Parthenium, Mikania, Mimosa, Eupatorium* and *Lantana* are discontinuously found inside the forest that needs attention which may cause loss of establishment of indigenous species. Here, abnormal activities like huge collection of fuel and leafy materials form forest and degraded land is going on which degrading the ecosystem continuously. The illegal felling and unwanted forest fire loss the forest at a higher rate which ultimately increasing eco-degradation process. This is supported by Dash and Behera, 2012. They found that the rich resource full Similipal Biosphere Reserve (SBR) is under serious threat. They also argued both the Govt. policies and local village level institutions have failed in a large way to conserve biodiversity as well as promote local livelihoods. To postpone the process need local management that might be made or demarcated using scientific means. This includes study on flow of biomass, study on soil loss, forest fire and rate of loss of local flora as well as fauna i.e. insects, butterflies and birds which are main agents for dispersal of propagules even act as pollinating agents. Government departments should take care to make it pristine rather than degraded in near future.

8.7 Acknowledgements:

Authors are grateful to the local people who helped us during field study. Scholars of various Institutes are acknowledged who accompanied us during field at SBR. We are also thankful to the Deputy Librarian of Vidyasagar University, Midnapore for helping us to study at Library particularly in Journal and periodicals sections. Thanks are also to the specialist in field from Odisha their help to consult on the degree of problems raised in field and in laboratory. Last but not least thank goes to local guide, forester who helped us in various ways to make the research complete in all aspect. Principal/OIC of Darjeeling Govt. College, Darjeeling and Lalgarh Govt. College, Lalgarh, W.B. are well acknowledged.

8.8 Bibliography:

1. Das, D. 2016. Ecological Studies on Jhitka Forest under Medinipur Forest Division, *IJSART*, 2 (12): 296-302.
2. Das, D. 2017a. Kansai Basin Flora at Lalgarh of Binpur-I Community Development Block in Jhargram Sub-Divison of Paschim Medinipur District in West Bengal, India, *IJSART*, 3(2): 1-11.
3. Das, D. 2017b. Flora of Kansai basin at Lalgarh of Paschim Medinipur District in West Bengal with special reference to Eco-degradation in India, *IOSR-JPBS*, 12(1): 28-51.
4. Das, D. 2016. Eco-tourism and Eco-degradation in Darjeeling Himalaya, West Bengal, Abstract and full Length Paper in a seminar-Variation and prospects of Eco-Tourism at Darjeeling and Dooars, 20th December, 2016, funded by Higher Education Department, Govt. Of West Bengal, Gorubathan Govt. College, Darjeeling.
5. Das, Debabrata et al. 2017. Presentation of Bio-fertilizer on VAMF: Spores isolated from Jhitka Forest in a Forest Fair (Banabandhab Mela at Lalgarh) on 28/01/2017 and 29/01/2017 at Lalgarh Ramkrishna Vidyalaya, Paschim Medinipur, West Bengal, India to Celebrate District Level Ban-bandhab Utsab-2017, Forest Deptt. Memo: reg., Memo No. 257 dated 16/01/2017- raising of Awareness towards Biodiversity Conservation. Theme: Save Green See Dream.
6. Das, D. 2017. Present day scenario of forest ecosystem in Lalgarh for community development in Paschim Medinipur District of West Bengal, National Conference on Non-linear Dynamics and Its Applications, Organised by Physics Deptt., Durgapur Govt. College, West Bengal, India, Full Length Paper, pp.12, 7-9th February, 2017.
7. Das, D. 2017. Eco-restoration: A General Discussion, Lecture cum workshop at Binod Smriti Agri Horticultural Farm, Panskura, 15-18th April, 2017, Lecture delivered on 16th April, 2017.
8. Das, D and Ghosh, P. 2017. Some Important Medicinal plants used widely in Southwest Bengal, India, *IJESI*, **6**(6): 28-50.
9. Das, D and Ghosh, P. 2017. Some medicinal plants of southwest Bengal used for instant remedy of ailments, *Indian J. Applied & Pure Bio*., **32**(2): 239-244.
10. Das, D; Mondal, S; Acharya, K and Acharya, S. 2017d. Diverse use of some eatable medicinal plants, fruits and flowers of Southwest Bengal with special reference to market demand, *IJIRD*, 6th year, 2(Additional): 44-47.
11. Das, D. 2018. Study of Purnapani Forest Vegetation at Lalgarh of Jhargram District, *IJSART*, **4**(8): 476-482.
12. Das, Debabrata. 2018. *Chromolaena odorata* (*Eupatorium odoratum*) –An exotic weed used in Lalgarh, Jhargram, West Bengal for fuel wood purpose, IJSART, **4**(11): 924-930.
13. Dash, M and Behra, B. 2012. Management of Similipal Biosphere Reserve Forest, *Advancers in Forestry Letter* (AFL), 1(1): 1-15.

14. Ghosh, P. 2014. Vesicular arbuscular mycorrhizal (VAM) status of some important Medicinal Plants from forest of Joypore, Bankura, West Bengal, *IJIRD*, 1:52-57
15. Ghosh, P and Das, D. 2014. Some medicinal plants of Joypore Forest Range of Bankura, West Bengal, India, *Environment & Ecology*, 32 (2): 465-470.
16. Ghosh, P and Verma, N. K. 2015. Vesicular arbuscular mycorrhizal (VAM) status of some medicinal plants of Gar-Panchakot hills in Purulia, West Bengal, India, *Int. J. Pure. App. Biosci.*, 3 (6): 137-149.
17. Ghosh, P. 2017. Vesicular-arbuscular mycorrhizal studies of selected medicinal plants of Southwest Bengal and its impact on yield, Ph. D. Thesis submitted to Vidyasagar University, Midnapore, West Bengal, India (Not yet been Awarded).
18. Ghosh, P and Verma, N. K. 2016. Effect of three AM fungal inocula on widely distributed medicinally important Periwinkle in red lateritic soil of Southwest Bengal, India, *International Journal of Integrated Research and Development*, 5th Year, Dec, II: 21-26, Jour.: Society for Journal of Integrated Research and Development of Nadia, West Bengal.
19. Ghosh, P and Das, D. 2017. VAMF spore diversity of Jhitka Forest floor under proposed Jhargram District in West Bengal, India, *IJSART*, 3(2): 227-232.
20. Ghosh, P. 2017. Mycorrhizal Biofertilizer, Lecture cum workshop at Binod Smriti Agri Horticultural Farm, Panskura, 15-18th April, 2017, Lecture delivered on 16th April, 2017.
21. Mishra, B.K. 2010. Conservation and management effectiveness of Similipal Biosphere reserve, Orissa, India, *The Indian Forester*, 136(10): 1310-1320.
22. Rout, S.D. 2008. Anthropogenic threats and biodiversity conservation in Similipal Biosphere Reserve, Orissa, India, *Tiger Paper*, 35(3): 22-26.
23. Pramanik, R; Bhakat, N; Kundu, S and Das, D. 2018. Preliminary study on forest macro-fungi at Purnapani forest of Jhargrm in West Bengal, *International Journal of Life Sciences Research*, **6**(3): 318-323.