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# **MEDICINAL PLANT DIVERSITY IN DEBRIGARH WILDLIFE SANCTUARY, ORISSA : UTILISATION, EXPLOITATION & CONSERVATION**

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## **ABSTRACT**

India with diverse agro-climatic conditions and regional topography has been considered as treasure house of medicinal plant resources. Field surveys were carried out in Debrigarh Wildlife Sanctuary of Bargarh district, Orissa, to account floristic diversity and documentation of medicinal plants. Several small villages are found nearby sanctuary. They are partially or fully dependent on these plant resources for their livelihood such as food, fodder, medicine etc. Due to over-exploitation of medicinal plants from forests, the resource has reduced to a greater extent. So, this study is an attempt to know the diversity of medicinal plants, its exploitation and to propose conservation strategies for sustainable use and socio economic development of the local people.

**Keywords:** Conservation, medicinal plant, Debrigarh Wildlife Sanctuary, Bargarh district, Orissa

## **INTRODUCTION**

PLANTS have been used in the traditional healthcare system from time immemorial, particularly among rural communities. The World Health Organization (WHO) has listed 20,000 medicinal plants globally (Gupta and Chadha, 1995); India's contribution is 15–20% (Singh, 2000). According to the WHO estimate, about 80% of the population in the developing countries depends directly on plants for its medicines (Mukhopadhyay, 1998). In India, about 2000 drugs used are of plant origin (Dikshit, 1999). Along with the development of 'Ayurveda' as a science of life and health three thousand years ago, studies have also been made in the identification of plants of medicinal values and also about their quality, uses and remedies for specific diseases (Dayal, 1977). Besides the written records of the uses of medicinal plants, some knowledge on the subject remains amongst the present day aboriginal societies and tribes and also with the villagers

of remote areas which descended through generations of oral folklore. With the passage of time, many of these valuable information have been lost and attempts are now being made to collect the surviving bits of that traditional oral folklore. Therefore, both traditional medicinal knowledge as well as the medicinal plants is important from the human health point of view that needs conservation.

Most of the rural folk still depend on traditional medicines for their various treatments. Although many of them are aware of the modern allopathic medicines, the economic conditions of these people do not permit them to undergo modern treatment. So, they have to depend on natural resources for cost effective medicines. Earlier few ethnobotanical works have been carried out in Orissa (Choudhury *et al*, 1975; Saxena & Dutta, 1975; Patnaik *et al*, 1986; Das & Mishra, 1987; Dash & Mishra, 1996; Pattanaik *et al.*, 2006a; Pattanaik *et al.*, 2006b). Thus, the present study was carried out with an objective to explore the medicinal plants in this area, its utilization, exploitation by local people and some constructive plans for conserve the remaining species.

## **STUDY AREA**

Debrigarh Wildlife Sanctuary (DWS) is located in Bargarh district of Orissa. The sanctuary stretches over 346.91 sq km and extends between 21° 28' to 21° 43' N latitude and 83° 30' to 83° 46' E longitude (Figure 1). It has declared as a wildlife sanctuary by government of Orissa vides notification No: 2409/FFAH/dated 08.02.1985. The sanctuary comprises of Lohara and Debrigarh Reserved Forests of famous Barapahad hills of Bargarh district. This sanctuary is not only famous for the sylvan beauty with magnificent waterfalls but is also very rich in flora and fauna. The dry deciduous forest with varied flora dominates the sanctuary area. Grasslands also cover some part of the forest. There is no revenue village inside Debrigarh sanctuary but there are four forest villages such as Debrigarh, Jhagadabehera, Lambipalli and Mundakati. The famous Hirakud reservoir adjoining the sanctuary not only provides scenic beauty but also meet the water requirement of wild animals during acute summer. The beauty of the sanctuary is further enhanced by hundreds of migratory birds during winter. This area enjoys a tropical monsoon climate. The mean annual rainfall ranges between 1527 mm. Normally the rain

depends on south-west monsoon. The maximum temperature goes up to 46° C in summer (April-May) where as the minimum it falls to 10° C in winter (December-January). The humidity is relatively high. Debrigarh sanctuary consists of mixed vegetation such as Bija, Sal, Sisoo, Bandhan, Mahul, Dhaura, Karada, Harda, Ainla, Bahada, Domkurdu, etc. Salia bamboo is scattered through out the sanctuary. The major wildlife includes Tiger, Leopard, Gaur, Sambar, Spotted Deer, Four horned antelope, Sloth bear, Wild boar, Langur, Percupine, Malabar giant squirrel, Common Civet, etc. Among Avifauna, Peafowl, Blue jay, Jungle crow, Spur fowl, varieties of eagle, and Owls are found. Migratory birds such as Great crested grebe, Brahminy duck, Pintail, Shoveller, Godwal, Tufted pochard and several other water ducks are seen during winter.

## **MATERIALS AND METHODOLOGY**

The present paper is the outcome of the study done during 2003-2006. The medicinal uses of plant species were collected from different people living around the sanctuary area. Besides, notes on habit, habitat, flowering period and distribution of species in specific areas were also noted. The plants were collected, dried and sample specimens were obtained for preparation of herbarium. Taxonomic identification of the specimens was done using State Flora. The plant specimens along with tagged vouchers were deposited in the Herbarium of Regional Research Laboratory (RRL-B), Bhubaneswar, Orissa. A comprehensive data on plant names with author citation are arranged alphabetically followed by local name, family, habit, plant parts used and its uses in curing different diseases are given in Table-1.

## **RESULTS AND DISCUSSION**

### **Utilization**

The present study revealed that a total of 77 plants belonging to 46 families have been documented for their therapeutic use against 43 diseases (Table 1). Among them 26

were herbs, 28 were trees, 10 were climbers and 13 were shrubs. The plant parts are used ranged from root (19), leaves (18), stem bark (18), whole plant (7), fruit (3), rhizome (3), latex (2), root bark (2), stem (2), gum (1), seed (1) and tuber (1). The most commonly represented families were Euphorbiaceae (7), Papilionaceae (7) and Asteraceae (4). Dysentery, rheumatism and skin disease are found very common in local people.

### **Exploitation**

Plant resources are depleting globally at an alarming rate and a number of economically and medicinally important plant species will soon be vulnerable. In the last few decades over-exploitation of forest resources has led to species loss. As a result, 20–25% of existing plant species in India has become endangered. The degree of threat to natural populations of medicinal plants has increased because more than 90% of medicinal plant raw material for herbal industries in India and also for export is drawn from natural habitat (Dhar *et al.*, 2002). About 20 species are found to be heavily exploited in the study area. Important among them are *Andrographis paniculata*, *Celastrus paniculatus*, *Costus speciosus*, *Gloriosa superba*, *Gymnema sylvestre*, *Rawolfia serpentina*, *Rubia cordifolia*, *Tinospora cordifolia* and *Woodfordia fruticosa*. It is evident from the present investigation that people are also using underground parts (roots, rhizomes and tuber) of many species which leads to complete annihilation of the species. Some of the major threats to the depletion of medicinal plant resources of DWS area are described below.

1. Intense and unrestricted grazing by cattle and goats from near by villages.
2. Unsustainable extraction of young plants and mature seeds from forests.
3. Excess forest fires cause loss of regeneration potential of the species.
4. Introduction of invasive and new exotic species in deforested areas which gradually replacing the native vegetation.
5. High market demand of medicinal roots, leaves and stems and illegal trade practices possess threat to the loss of valuable resources.
6. Uncontrolled tourism activities inside the forest area lead to trafficking of various wild animals and plants.

7. The waters of the Hirakud reservoir have also attracted a fishing community, which has established itself on the reservoir's margins, just outside the sanctuary area. This is not only an encroachment on revenue land, it also serves to keep the wildlife away from the water during the pinch summer months.
8. Lack of staffs in state forest department to control the huge sanctuary area.
9. Lack of awareness among local people how to harvest medicinal plant resources.

### **Conservation**

As stated above, the sanctuary area harbours a rich depository of economic and medicinal plant species. Conservation and judicious utilization of the plant wealth is an urgent need of the hour. Many medicinal plants are under threat due to over exploitation, habitat destruction and various anthropogenic activities. There is also a big lacuna in information about the total availability, distribution, seed biology, regeneration potential, reproductive biology and breeding systems of most of the species, which is very essential in the conservation and maintenance of viable populations. Conservation of the present vegetation and natural regeneration of the species having medicinal and other socio-economic importance should be done on top priority. The following management steps should be taken immediately for conservation and sustainable management of medicinal plants.

1. Deforestation and over-exploitation of plant resources should be checked and afforestation of natural trees and shrubs should be promoted to maintain the health of the ecosystem.
2. Identify villagers/farmers for on-farm pilot propagation and cultivation trials of medicinal plants to reduce pressure from wild populations.
3. Piloting of farmer based cultivation trials for a selected number of threatened and indigenous medicinal plant species on the edge of forest and in home gardens.
4. *Ex-situ* cultivation by promoting nurseries, home garden and plantation.
5. Establishing village management committees (VMC) and conservation area management committees (CAMC) to protect the forest from denudation.

6. Community mobilization and creating awareness on sustainable harvesting of plant parts among the local people of the surrounding villages.
7. Illegal trafficking of plants and animals should be thoroughly monitored.
8. Spread of weeds like *Lantana camara*, *Parthenium hysterophorus*, *Hyptis suaveolensis*, *Vernonia cinerea* etc. in the edge of the forests should be effectively checked. The weeds not only destroy the ground flora but also affect the health of forest ecosystem.
9. Cultivation of some selected medicinal plants should be done extensively in order to cater to the demand of the local pharmaceutical industries and traditional healers.
10. Stringent punishment should be enforced for violators.

## **CONCLUSION**

In this communication, an effort has been made to provide a conservation measures with a view to rescue these plants from becoming rare or extinct. Conservation and large scale propagation of these valuable plant species will help in supplying authentic raw materials to the pharmaceutical industries to produce quality drugs on one hand, and in the upliftment of the economic status of the local people on the other, besides improving the health of the environment.

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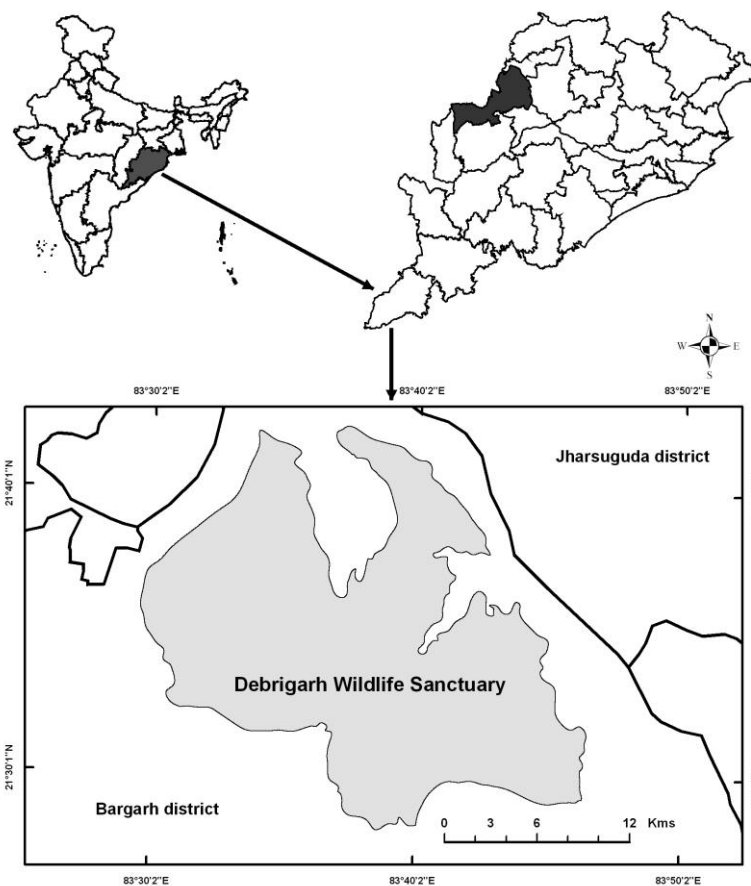
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**Figure 1: Location of Debrigarh Wildlife Sanctuary**

**Table 1: Medicinal plants used by local people in sanctuary area**

<b>Name of the plants</b>	<b>Local name</b>	<b>Family</b>	<b>Habit</b>	<b>Parts used*</b>	<b>Diseases treated</b>
<i>Abrus precatorius</i> L.	Kaincha	Papilionaceae	Climber	R	Abortifacient Mouth infection
<i>Acalypha indica</i> L.	Indramaricha	Euphorbiaceae	Herb	Wh	Quick delivery
<i>Achyranthes aspera</i> L.	Apamaranga	Amaranthaceae	Herb	L	Dysentery
<i>Aegle marmelos</i> (L.) Corr.	Bela	Rutaceae	Tree	L	Fever
<i>Aerva lanata</i> (L.) Juss.ex Schultes	Paunsia	Amaranthaceae	Herb	Wh	Dysentery
<i>Ageratum conyzoides</i> L.	Pokasunga	Asteraceae	Herb	Wh	Conjunctivitis
<i>Alangium salvifolium</i> Lam.	Ankula	Alangiaceae	Shrub	Sb	Headache
<i>Aloe vera</i> (L.) Burm.f.	Ghikuari	Agavaceae	Shrub	L	Skin disease
<i>Andrographis paniculata</i> (N.Burm.) Wall	Bhuin nimba	Acanthaceae	Herb	L	Headache
<i>Ardisia solanacea</i> Roxb.	Tinkoli	Myrsinaceae	Shrub	F	Check excess menstrual bleeding
<i>Asparagus racemosus</i> Willd.	Satabari	Liliaceae	Climber	R	Skin disease
<i>Azadirachta indica</i> A. Juss.	Nimba	Meliaceae	Tree	Sb	Headache
<i>Barleria montana</i> Nees	Daskarada	Euphorbiaceae	Shrub	L	Diuretic
<i>Boerhaavia diffusa</i> L.	Puruni	Nyctaginaceae	Herb	L	Boils
<i>Bombax ceiba</i> L.	Simuli	Bombacaceae	Tree	R	Burns
<i>Buchanania lanzan</i> Sprang.	Char	Anacardiaceae	Tree	Sb	Contraceptive
<i>Butea monosperma</i> (Lam.) Taub.	Palasha	Papilionaceae	Tree	R	Snakebite
<i>Calotropis gigantea</i> (L.) R.Br.ex Aiton	Arakha	Asclepiadaceae	Shrub	Lx	Laxative
<i>Cassia fistula</i> L.	Sunari	Caesalpiniaceae	Tree	S	Fever
<i>Cassia occidentalis</i> L.	Chakunda	Caesalpiniaceae	Herb	R	Skin disease
<i>Celastrus paniculatus</i> Willd.	Kharasana	Celastraceae	Climber	Sd	Vitiated bile
<i>Cipadessa baccifera</i> (Roth.) Miq.	Nahalabeli	Meliaceae	Tree	Sb	Jointpain
<i>Cissus quadrangularis</i> L.	Hadabhanga	Vitaceae	Climber	Wh	

<i>Cleistanthus collinus</i> (Roxb.) Benth.	Karada	Euphorbiaceae	Tree	L	Abortifacient
<i>Costus speciosus</i> (Koenig) Sm.	Kudha	Zingiberaceae	Herb	Rh	Epilepsy
<i>Curculigo orchioides</i> Gaertn.	Talamuli	Hypoxidaceae	Herb	Rh	Gonorrhoea
<i>Curcuma longa</i> L.	Haladi	Zingiberaceae	Herb	Rh	Boils
<i>Datura metel</i> L.	Dudura	Solanaceae	Shrub	R	Boils
<i>Dioscorea pentaphylla</i> L.	Bana alu	Dioscoreaceae	Climber	Tu	Sterility in males
<i>Elephantopus scaber</i> L.	Totamula	Asteraceae	Herb	R	Burns
<i>Erythrina indica</i> Lam.	Paladhua	Papilionaceae	Tree	Sb	Menorrhoea
<i>Euphobia hirta</i> L.	Chitakuti	Euphorbiaceae	Herb	Lx	Conjunctivitis
<i>Ficus hispida</i> L.	Dimiri	Moraceae	Tree	L	Conjunctivitis
<i>Gmelina arborea</i> Roxb.	Gambhari	Verbenaceae	Tree	Sb	Rheumatism
<i>Hemidesmus indicus</i> (L.) R.Br.	Ananta mula	Periplocaceae	Climber	R	Rheumatism
<i>Holarrhena pubescens</i> (Buch.-Ham.) G.Don	Kuda	Apocynaceae	Shrub	R	Dysentery
<i>Imperata cylindrica</i> (L.) P.Beaur.	Chhanghas	Poaceae	Herb	L	Cuts
<i>Justicia adhatoda</i> L.	Basanga	Acanthaceae	Shrub	Rb	Cough
<i>Kalanchoe pinnata</i> (Lam.) Pers	Amarpoi	Crassulaceae	Herb	L	Dysentery
<i>Lannea coromandelica</i> (Houtt.) Merrill.	Mahi	Anacardiaceae	Tree	Sb	Dysentery
<i>Madhuca indica</i> (Koenig.) Macb.	Mahula	Sapotaceae	Tree	Sb	Stomach pain
<i>Mallotus philippensis</i> (Lamk.) Muell-Arg	Sinduri	Euphorbiaceae	Tree	R	Earache
<i>Milletia extensa</i> Baker.	Gurendi	Papilionaceae	Climber	Sb	Fish poison
<i>Moringa oleifera</i> Lamk.	Sajana	Moringaceae	Tree	Sb	Conjunctivitis
<i>Mucuna puriens</i> (L.) DC.	Baidanka	Papilionaceae	Climber	R	Conception
<i>Nyctanthes arbortristis</i> L.	Gangasiuli	Nyctanthaceae	Shrub	L	Malaria Fever
<i>Oroxylum indicum</i> (L.) Vent	Phampani	Bignoniaceae	Tree	Sb	Liver disorder
<i>Pergularia daemia</i> (Forst.) Chior.	Uturuli	Asclepiadaceae	Climber	L	Malaria fever
<i>Phoenix acaulis</i> Buch-Ham ex Roxb.	Kojiri	Arecaceae	Shrub	L	Puerperal disease
<i>Phyllanthus emblica</i> L.	Amla	Euphorbiaceae	Tree	L	Dysentery
<i>Plumbago indica</i> L.	Raktachita	Plumbaginaceae	Herb	R	Hydrocele

<i>Plumbago zeylanica</i> L.	Chitaparu	Plumbaginaceae	Herb	R	Abortifacient
<i>Portulaca oleracea</i> L.	Purunisaga	Portulacaceae	Herb	Wh	Hookworm
<i>Pterocarpus marsupium</i> Roxb.	Bija	Papilionaceae	Tree	Sb	Bool dysentery
<i>Rauvolfia serpentina</i> Benth.ex Kurz	Patalagaruda	Apocynaceae	Herb	R	Snakebite
<i>Sida cordifolia</i> L.	Bisiripi	Malvaceae	Herb	Wh	Fracture
<i>Solanum surattense</i> Burm.f.	Ankaranti	Solanaceae	Herb	F	Asthama
<i>Soymida febrifuga</i> A. Juss.	Soma	Meliaceae	Tree	Sb	Snakebite
<i>Sterculia urens</i> Roxb.	Kodala	Sterculiaceae	Tree	G	Dysentery
<i>Riccinus communis</i> L.	Jada	Euphorbiaceae	Shrub	L	Piles
<i>Rubia cordifolia</i> L.	Katasingi	Rubiaceae	Herb	R	Fever
<i>Schleichera oleosa</i> (Lour.) Oken	Kusuma	Sapindaceae	Tree	Sb	Fracture
<i>Strychnos nux-vomica</i> L.	Kochila	Loganiaceae	Tree	Sb	Skin disease
<i>Syzygium cumini</i> (L.) Skeels	Jamu	Myrtaceae	Tree	Sb	Dysentery
<i>Tamarindus indicus</i> L.	Tentuli	Caesalpiniaceae	Tree	L	Cuts
<i>Tephrosia purpurea</i> (L.) Pers	Bananila	Papilionaceae	Herb	R	Abdominal pain
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Bahada	Combretaceae	Tree	Sb	Constipation
<i>Terminalia chebula</i> Retz.	Harida	Combretaceae	Tree	F	Purification of blood
<i>Tinospora cordifolia</i> (Willd)Hook.	Guluchilata	Menispermaceae	Climber	S	Jaundice
<i>Toddalia asiatica</i> (L.) Lam.	Tundapoda	Rutaceae	Shrub	Rb	Epilepsy
<i>Tridax procumbens</i> L.	Bisalyakarani	Asteraceae	Herb	Wh	Cuts
<i>Urginea indica</i> (Roxb.) Hook.f.	Ban piajo	Liliaceae	Herb	R	Abscess on throat
<i>Vanda tessellata</i> Hook.f.ex G.Don.	Malanga	Orchidaceae	Herb	L	Rheumatism
<i>Vernonia cinerea</i> (L.) Less	Pokasunga	Asteraceae	Herb	R	Elephantiasis
<i>Vitex negundo</i> L.	Begunia	Verbenaceae	Tree	L	Constipation
<i>Woodfordia fruticosa</i> (L.) Kurz.	Dhataki	Lythraceae	Shrub	R	Abortifacient
<i>Zizyphus mauritiana</i> Lamk.	Barakoli	Rahmanaceae	Tree	Sb	Headache

\*R: Root; L: Leaf; Sb: Stembark; Rh: Rhizome; F: Fruit; Lx: Latex; Rb: Rootbark; S: Stem; G: Gum; Sd: Seed; Tu: Tuber; Wh: Whole plant