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Eco-floristic studies on Sacred Groves of Bamanghaty subdivision in Mayurbhanj district, Odisha and its conservation strategies

Subrat Kisku P.G. Department of Botany North Orissa University Takatpur, Baripada

Dr. Kamal Lochan Barik P.G. Department of Botany North Orissa University Takatpur, Baripada

ABSTRACT

Sacred groves are patches of vegetation of varying sizes, conserved on the basis of religious beliefs of the community. The sacred groves represent climax vegetation having rich floral diversity and are treasure houses of many rare and endemic plant species. An eco-floristic survey was conducted in 66 different sacred groves of Bamangaty subdivision in Mayurbhanj district and documented as many as 357 species belongs to 101 genera under 63 families. The degraded sacred groves should be immediately restored by raising awareness among the concerned villagers to conserve the rare, endemic and threatened taxa.

KEYWORDS Conservation, Floral diversity, Mayurbhanj, Sacred groves, Vegetation

Introduction:

The ethnic people all over the world have emotional and symbiotic relationship with biodiversity, which they have been protecting and conserving since ancient times. These can be seen in sacred groves, the tract of virgin forest harbouring rich biodiversity protected by the local people based on the ground of indigenous culture, religious beliefs and taboos. As deforestation has been taking place at an alarming rate in many areas, such sacred groves have come to be the only remnants of the original forest in a number of cases. Because of the absence of human interference, the sacred forests support the climax vegetation appropriate for their particular locality. Such climax vegetation is rich in species of trees, shrubs, herbs, climbers and epiphytes. As such, these sacred groves serve the vital function of preservation of plant species, which have become more rare or extinct elsewhere (Gadgil and Vartak, 1975). However sacred groves found in various regions of India possess rich diversity of rare plants and provide suitable habitat for their sustainable natural regeneration. Therefore the present study is an attempt to document the rare, endemic and threatened taxa present in various sacred groves of Bamanghaty subdivision in Mayurbhanj district.

Study Area:

Mayurbhanj is a land-locked district with a total geographical area of 10,418 sq.km & situated in the northern boundary of the state of Odisha. The district lies between 21^0 16′ & 22^0 34′ North latitude and 85^0 40′ & 87^0 11′ East longitude. The district is bounded in the North East by Midnapore district of West Benagal, Singbhum district of Jharkhand in the North West, Balasore district in the South East and by Keonjhar district in the South West. The Central part of the district is covered by a group of hills known as the Similipal range and the remaining portion is covered by undulating plains raising and falling in gentle slopes. Precisely the district may be divided into three distinct natural divisions. The Central hill ranges as dividing line running due north and south and dividing the plains of the district into two halves Eastern & Western. The Eastern division, which slopes gently from the foot of the hills towards the sea, is served by a number of hill streams forming an ideal land for cultivation comprising Baripada sadar and Kaptipada sub-division. The western division is mainly a plain rising and falling in gentle slopes studded with many rocky mounds and hills. The northern portion of this western division is very fertile for extensive cultivation comprising Bamanghaty sub-division and Southern portion is Panchpir sub-division. The district is 559.31 mts above the sea level.

The geological formations of the district chiefly belong to Meso Proterozoic age, Mio-Pliocene age and recent geological periods. The soil of the district may be broadly classified into Red and Laterite soil. The reddish and sandy soil favours the luxuriant growth of Sal, the dominant tree of the district.

The district enjoys tropical monsoon climate. The average rainfall of Odisha is 142.2cm, whereas Mayurbhanj receives the maximum rainfall of 158 cm per annum. Relative Humidity is quite high throughout the year, at places, it reaches upto 90% during the months of June & July.

Material and Methods:

An extensive floristic survey was carried out in the sacred groves of Bamanghaty subdivision in Mayurbhanj district at weakly intervals between December 2014 to May 2015. Information of the historical background and societal composition of Sacred grove were collected, after consulting the elderly people of the villages, governmental and non governmental agencies and other reliable sources. A preliminary database has been prepared following a questionnaire. The performa for the collection of data includes the general information regarding the grove, nearest human habitation, access to the grove, information regarding the deity etc. The second part of the format covers the information on the nature of vegetation surrounding the grove area, total number of species encountered, nature of ground cover, largest trees present in it. All the plant specimens encountered in these sacred groves were collected in quadruplicates either in flowering and fruiting stage and identified taxonomically with the help of floras (Hooker 1872-1897, Haines 1921, Mooney 1950, Saxena & Brahmam 1994-96, Nayak *et al* 2014) and housed in Herbarium, P.G. Department of Botany, North Orissa University. List of rare, endemic and threatened taxa found in the sacred groves were prepared following the published works of Nayar and Sastry (1990), The IUCN Red list categories (1994) and Red data books of Indian plants Vol.-I-III (2000).

Results & Discussion:

The detailed floristic analysis of 66 selected sacred groves revealed the presence of 357 species belongs to 101 genera under 63 families. The population is largely concentrated in twelve species, viz. *Shorea robusta*, *Pterocarpus marsupium*,*Terminalia tomentosa*, *Cassia fistula*, *Mangifera indica*, *Madhuca indica var. latifolia*, *Ficus bengalensis*, *Ficus religiosa*, *Annona reticulata*, *Bombax ceiba*, *Azadirachta indica* & *Schleichera oleosa*. Among the ten dominant families Leguminosae exhibits highest number of species i,e.45, followed by Asteraceae 38 spe-

cies, Euphorbiaceae 33 species, Rubiaceae 25 species, Acanthaceae 18 species, Convolvulaceae 16 species, Lamiaceae 10 species, Moraceae 07 species, Verbenaceae 06 species & Scrophulariaceae 05 species. Rest of the families comprises with 154 species. Coexistence of congeneric species in the sacred groves indicates difference in the phenology, pollination and dispersal agents of the species (Valencia *et al.* 1994).

According to the local people, eighty five percentages of the groves had a lush forest cover earlier and now becoming just merely a sacred place. These sacred groves harbour many rare, endemic and threatened taxa (Table-1) as well as repository of several medicinal plants and can be regarded as the remnant of the primary forest left untouched by the local inhabitants and protected by them due to the consideration that the deities reside in these forests patches. Major reason behind the threat status is over exploitation/extraction in the case of *Pterocarpus marsupium, Saraca asoca, Garcinia xanthochymus, Gloriosa superba, Hemidesmus indicus, Rauvolfia serpentina, Operculina turpethum and Aristolochia indica.* Now a days expansion of agriculture, urbanisation, grazing by cattle, changing in values and population pressure are the main causes for the depletion and degradation of the sacred groves. In order to conserve them and to form a biological continuation following strategies must be followed.

Strategies for sustainable management of sacred groves:
Specific biodiversity conservation corps should be formed and they should be trained to document the biodiversity of the sacred groves in People Biodiversity Register.

Mobilization and group formation with the support of the respective panchayat, panchayat level sacred groves conservation committee should be formed. Besides, groves specific sacred grove management committee should be formed involving representatives of all the stakeholders.

Technical support to local communities is essential for the sustainable management of sacred groves.

Strategies and action for ex-situ conservation, operational procedures for multiplication of native wild plants of sacred groves and planting through vegetative propagation and micro-propagation need to be developed. Local communities should be trained to raise nurseries of rare, endemic and threatened taxa of sacred grove and shall be planted in the restoration of degraded lands.

If sacred groves need to be protected, village communities should be provided with alternatives for fulfilling fuel and fodder to asset households that are currently depending on sacred groves.

Table 1. List of Rare, endemic and threatened taxa in Sacred groves of Bamanghaty subdivision

Sl. no	Name of the plants	Family	Status
01	*Boswellia serrata* Roxb.ex Colebr	Burseraceae	R
02	*Celastrus paniculata* Willd.	Celastraceae	VU
03	*Garcinia xanthochymus* Hook. f. Ex T. Anders	Clusiaceae	R
04	*Gloriosa superba* L.	Liliaceae	EN
05	*Oroxylum indicum* (L) Kurz	Bignoniaceae	EN
06	*Paederia foetida* L.	Rubiaceae	VU
07	*Pterocarpus marsupium* Roxb.	Leguminosae	EN
08	*Rauvolfia serpentina* (L.) Benth.*ex* Kurz	Apocynaceae	EN
09	*Rubia cordifolia* L.	Rubiaceae	VU
10	*Saraca asoca* (Roxb.) Willd.	Leguminosae	CR
11	*Strychnos potatorum* L. f.	Loganiaceae	VU
12	*Urginea indica* (Roxb.)Kunth	Liliaceae	VU
13	*Operculina turpethum* (L.) Silva-Mano	Convolvulaceae	VU
14	*Aristolochia indica* L.	Aristolochiaceae	R

Abbreviations: **VU**= Vulnerable, **CR**=Critically Endangered, **E**=Endangered, **R**= Rare.

Conclusion
These sacred groves are grand repository of Rare, endemic and threatened taxa. The rare taxa which are generally seen only in sacred groves are conserved due to religious beliefs and are not found generally in surrounding area of sacred groves and rarely found in forests. These might have been destroyed indiscriminately by people. Sacred groves are the last refuge for such rare taxa, so attempt should be made to conserve these sacred groves for the conservation of rare taxa.

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