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Ethno-botanical survey of some selected sacred natural sites of Betul district of Madhya Pradesh, India

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Abstract
Present research survey focused on sacred natural sites of Betul district of Madhya Pradesh. Present survey revealed that 25 plants species belonging to 16 families are used as sacred, religious, medicinal, rituals food and agricultural purposes by indigenous peoples of Bhopali, Jathandeo, Chandi devi, Lakha banjara, Maddeo and Salbardi. Ethno-botanical data is of significant value for conservation purposes. The high fidelity level (FL) of plant species *Cocos nucifera* 100% and *Ocimum sanctum* 100% indicates the prevalence use of plant and use value (UV) of plant determines the relative importance on use of plant species. The highest UV was calculated for *Bauhinia varigata* (0.157) and lowest *Gossypium hirsutam* (0.035) these finding demonstrate the extensive use of species in different purposes, similarly lowest UV shows minimum uses of species. The observed plants presented as main deity wise with scientific name and family.

Keywords: Ethno-botany, SNS, religious beliefs, Betul

Introduction
Ethno biology is the study of the biological knowledge of particular ethnic groups or communities, their cultural knowledge about plants and animals and their interrelationships. Ethno biological knowledge is far too important to ignore. It is important in the traditional cultures of the indigenous and rural societies of the world and these societies do not want to vanish it. Ethno biology contributes to be a source for knowledge about medicine, crops, agricultural techniques, conservation and management [1].

Ethno biology becomes an important and interesting branch of science. This new field of research gain importance by thoroughly and systematically investigation of unexplored areas of country. Plants and animals have become infinite sources for ethno biologists, anthropologists, plant geographers and other researchers. Ethno botany is considered as a branch of ethno biology. According to Schultes (1962), ethno botany is "The study of the relationship which exists between people of primitive societies and their plant environment." Though ethno-botany have different approaches in plant research [2], here only the plant resources which has traditional values in reference to religious beliefs and myths of primitive tribes of Betul, is mentioned.

Worshipping nature and various living beings has been practiced in our country from the time immemorial. There was a belief that all creation of nature had to be protected. Such beliefs preserved several virgin forests in pristine form. Sacred natural sites are precious as well as traditional resources for learning the native utilization pattern of plant varieties. SNS are defined by IUCN as "areas of land or water having special spiritual significance to people and communities [3] Rutte, 2011 defined it as paradigmatic example of community based resource management [4]. Present survey held in some selected SNS of Betul district of (M.P.) could see a total 25 plant species belonging to 15 Families. Many of the SNS have opulence of vegetation having ethno botanical and mythological significance.

Betul district is tribal dominated area of centrally located state Madhya Pradesh of India which is lying on the southern part of the state, almost wholly on the Satpura Plateau and extends between 21º 22´ and 22º24´ North latitude and 77º 04´ and 78º33´ East longitude occupy 10,078.1 sq. km. Gond and Korkus are main tribes resides in Betul [5]. Their economical status is very poor. So most of the tribal people rely on traditional agricultural techniques, traditional food, traditional medicine, and traditional healers like Bhagat, Bhumka and Vaidya. Advantage in preferring traditional medicine is that they believe in spiritual power and traditional herbal healers who are found within a short distance, most of them are familiar with the patient's culture and the environment and the cost associated with treatments are very less [6].

They also believe in traditional rituals for their all ceremonies and they often visited specific places called "Deo Khiliyan/Deogudi and Sarnas" Which are situated in remote forest areas, hilly places, agriculture fields, such types of places are called "Sacred Natural Sites". SNS are defined "as areas of land or water having special spiritual significances to people and communities". Every SNS have its own specific importance for nature and culture. It poses natural value to the diversity of life forms, habitat and ecosystem that they support, they also poses cultural value in term of belief system of so many indigenous local and spiritual traditions. SNS conserves biodiversity sacred sites including natural areas, as forests and also human built monumental places. They may be perceived as abode of deities and ancestral spirits; as sources of healing water, medicinal plants, and places of contact with the spiritual realm. They are sometimes the burial grounds of ancestors, places of pilgrimage, temple, shrine or church or sites associated with special events, saints and spiritual leaders. They are not static in time or space; new sites can be created in response to changing circumstances and environment. In past decade's scientists has taken efforts to preserve the indigenous knowledge and conserve biodiversity. For indigenous and local communities these natural areas have provided the focus for many of their spiritual traditions and are recognized as sacred. SNS of all kinds have played a key role in the creation of distinct places that record natural and cultural histories and provide a sense of identity [3]. As regards traditional ecological knowledge, many custodians of sacred natural sites have a wealth of knowledge on the biophysical environment. These custodians play role as, protectors of sacred species, traditional healers, herbalists and decision makers.

Materials and Methods

The present survey was carried out in all sub divisional areas of Betul district. Around 6 different sacred areas of religious purpose were surveyed during 2015 to 2017. Which were having old histories and religious importance along with plant diversity? The SNS were selected on the basis of importance of that particular area, its special significance and through selection of plants found in that area. Selected sites were regularly visited in different seasons, for collection of ethno-botanical data. Photographs of sites and plants were taken. Ethno-botanical data was collected from local inhabitants, ethnic communities, Stockholders, Priest, Bhagat, Bhumka and old persons of SNS. Semi-structured interview and group conversations were conducted to collect information on tribal beliefs, tribal deities, offerings to their deities, histories of SNS, SNS details and knowledge about religious plants from 60 informants. Indigenous knowledge of local inhabitants about the use of plants was collected through questionnaires, interview and discussion with people. Data was collected from priest, local people who visited these sites often, Village head and tribal people who reside in that area, old experienced people who know the history of particular area. Identification of plants were done with the help of Flora of Madhya Pradesh,[7] Flora of Jabalpur,[8] and internet sites like "Trees of India" [9] and confirmed with the help of taxonomist. Specimen of plants was kept as herbarium in research Institute.

Analysis

The Ethno-botanical data was analyzed using some quantitative indices (Prance *et al.* 1987) including Use value (UV) and Fidelity level (FL) [10].

Use value (UV): UV determines the relative importance on uses of plant species. It is calculated using the formula:-

$$UV = \sum U / N$$

Where UV indicates (Phillips *et al.* 1994) use value of individual species, 'U' is the number of uses recorded for that species and "N" represents the number of informants who reported that species [11].

Fidelity level (FL): FL is the percentage of informants who mentioned the uses of certain plant species to significant (Prance *et al.* 1987) use in the study area. The FL index is calculated using formula-

$$FL\ (\%) = (N_p / N) \times 100$$

Where N_p is the number of informants that claimed a use of certain plant species for a particular use and N is the total number of informants citing the species.

Observation

Approximately 50 Sacred natural sites are located in Betul district during 2015 to 2017. Six of them are selected for Ethno-botanical survey such as Bhopali, Jathandeo, Chandi devi, Lakha banjara, Maddeo and Salbardi. Because they are rich in floral diversity and oldest SNS of district Betul. They are also pose variation in their types. Local Inhabitants- 20 from each place.

Table 1: Highly utilized species of the study sites

S/N	Species name	Family	N_p	$U_{max/7}$	Main Deity	UV	FL (%)
1	*Aegle Marmelos*	Rutaceae	55	4	Mahadeo	0.072	91.67
2	*Azadirachta indica*	Meliaceae	59	4	Sheetla devi	0.079	98.33
3	*Anthocephalus cadamba*	Rubiaceae	42	5	Krishna	0.119	70.00
4	*Areca catechu*	Arecaceae	51	6	Ganesh	0.117	85.00
5	*Bambusa Sps.*	Poaceae	53	6	All deity	0.113	88.33
6	*Bauhinia varigata*	Fabaceae	38	6	Durga	0.157	63.33
7	*Butea monosperma*	Fabaceae	40	6	Ram	0.15	66.67
8	*Calotropis procera*	Asclepideaceae	48	2	Mahadeo	0.041	80.00
9	*Citrus limon*	Rutaceae	54	4	Durga,Mahadeo	0.074	90.00
10	*Cocos nucifera*	Arecaceae	60	7	All	0.116	100.00
11	*Curcuma longa*	Zingiberaceae	58	5	All	0.086	96.67
12	*Cynodon dactylon*	Poaceae	52	4	Ganesh	0.076	86.67
13	*Dasmostachya bipinnata*	Poaceae	49	3	All	0.061	81.67
14	*Datura metal*	Solanaceae	50	2	Mahadeo	0.04	83.33

15	*Ficus benghalensis*	Moraceae	47	6	Vishnu	0.127	78.33
16	*Ficus religiosa*	Moraceae	44	5	Bramha.Vishnu. Mahadeo	0.113	73.33
17	*Gossypium hirsutam*	Malvaceae	56	2	All	0.035	93.33
18	*Hibiscus rosa sinensis*	Malvaceae	52	3	Durga	0.057	86.67
19	*Mdhuca indica*	Sapotaceae	43	5	Jaganath	0.116	71.67
20	*Mangifera indica*	Anacardiaceae	58	6	All	0.103	96.67
21	*Ocimum sanctum*	Lamiaceae	60	4	All	0.066	100.00
22	*Oryza sativa*	Poaceae	54	4	All	0.074	90.00
23	*Phoenix sylvestris*	Arecaceae	51	7	Mahadeo, Badadeo	0.137	85.00
24	*Santalum album*	Santalaceae	48	6	All	0.125	80.00
25	*Triticum aestivum*	Poaceae	41	4	Jagannath	0.097	68.33

N- Number of total informants, U_{max}- Number of uses, (7), N_p- No. of informants who reported uses of species, FL- Fidelity level UV- Use value of plant

Table 2: Religion, Medicine, Ritual, Food, Agriculture, Sacred and Ornaments Uses

S/N	Species name	Family	Local name	Religious	Medicine	Ritual	Food	Agriculture	Sacred	Ornaments	Total uses
1	*Aegle Marmelos*	Rutaceae	Bel	Yes	Yes	No	Yes	No	Yes	No	4
2	*Azadirachta indica*	Meliaceae	Neem	Yes	Yes	Yes	No	Yes	No	No	4
3	*Anthocephalus cadamba*	Rubiaceae	Kadamb	Yes	Yes	No	No	Yes	Yes	Yes	5
4	*Areca catechu*	Arecaceae	Supari	Yes	Yes	Yes	Yes	No	Yes	Yes	6
5	*Bambusa*	Poaceae	Bans	Yes	Yes	Yes	Yes	Yes	No	Yes	6
6	*Bauhinia varigata*	Fabaceae	Kachnar	Yes	Yes	Yes	Yes	Yes	No	Yes	6
7	*Butea monosperma*	Fabaceae	Palash	Yes	Yes	Yes	Yes	Yes	No	Yes	6
8	*Calotropis procera*	Asclepideaceae	Akav	Yes	Yes	No	No	No	No	No	2
9	*Citrus limon*	Rutaceae	Neebu	Yes	Yes	Yes	Yes	No	No	No	4
10	*Cocos nucifera*	Arecaceae	Nariyal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7
11	*Curcuma longa*	Zingiberaceae	Haldi	Yes	Yes	Yes	Yes	No	No	Yes	5
12	*Cynodon dactylon*	Poaceae	Doob	Yes	Yes	Yes	No	No	Yes	No	4
13	*Dasmostachya bipinnata*	Poaceae	Kusha	Yes	No	Yes	No	No	Yes	No	3
14	*Datura metal*	Solanaceae	Dhatura	Yes	Yes	No	No	No	No	No	2
15	*Ficus benghalensis*	Moraceae	Bargad	Yes	Yes	Yes	Yes	Yes	Yes	No	6
16	*Ficus religiosa*	Moraceae	Peepal	Yes	Yes	Yes	No	Yes	Yes	No	5
17	*Gossypium hirsutam*	Malvaceae	Kapas	Yes	Yes	No	No	No	No	No	2
18	*Hibiscus rosa sinensis*	Malvaceae	Jason	Yes	Yes	No	No	No	No	Yes	3
19	*Mdhuca indica*	Sapotaceae	Mahua	Yes	Yes	No	Yes	Yes	No	Yes	5
20	*Mangifera indica*	Anacardiaceae	Aam	Yes	Yes	Yes	Yes	Yes	No	Yes	6
21	*Ocimum sanctum*	Lamiaceae	Tulsi	Yes	Yes	Yes	No	No	Yes	No	4
22	*Oryza sativa*	Poaceae	Dhan	Yes	Yes	Yes	Yes	No	No	No	4
23	*Phoenix sylvestris*	Arecaceae	Khajur	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7
24	*Santalum album*	Santalaceae	Chandan	Yes	Yes	Yes	N	Yes	Yes	Yes	6
25	*Triticum aestivum*	Poaceae	Gehu	Yes	Yes	No	Yes	No	No	Yes	4
Total		16 Families		25	24	17	14	12	11	13	

Results and Discussion

Demographic features

A total of 120 local informants were interviewed. In this survey male participants were higher than females, because females were reluctant in conversation with us. Maximum informants having traditional knowledgeable about plants, they possess religious faith on their deity, so many belief system, rituals and taboos [12]. Males were dominating in their society. In some places females above 15 year are restrict not allowed to enter into the sacred places. Even they are not allowed during their menus time. The informants above 55 year age have significant knowledge of plants and religious matter, as compare to educated respondents, illiterate informants shared more information on the matter. This may be due to urbanization and changing in lifestyle.

Taxonomic features

In taxonomic discussion 25 plant species belonging to 16 families were documented (Table-1) all are angiosperm plants which include monocot and dicot plants (36% and 64%, respectively) Poaceae is dominant (5 species) family followed by Aracaceae, Fabaceae, Moraceae, Rutaceae and Malvaceae (2 species each) while other families were represented by one species.

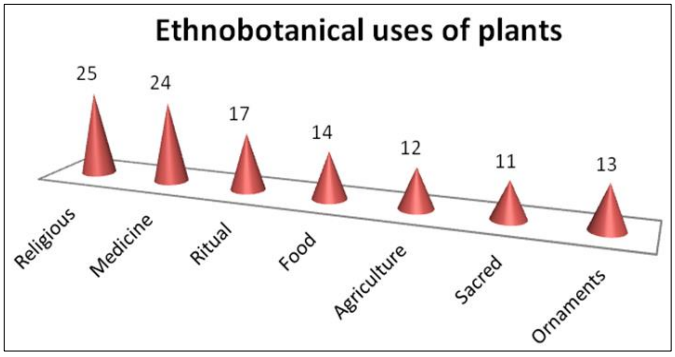

Fig 1: Ethno-botanical uses of plants

Ethno-botanical features

In Ethno-botanical survey all 25 plant species have common uses in which 25 plant species used in different religious festivals and ceremonies uses, 24 species as medicine in different ailments, 17 species as different rituals like birth,

marriage and death, 14 as food species, 12 species used in agriculture for making tools and fens, 11 species (Figure-1) considered as itself sacred for worshipping and 13 species used as ornaments and garlanding to God and Goddess. The similar worker has supportive evidence for present observation [13, 14, 15].

The high fidelity level (FL) of plant species *Cocos nucifera* 100%, and *Ocimum sanctum* 100% indicates the prevalence use of plant and use value of plant determines the relative importance on use of plant species. The highest UV was calculated for *Bauhinia varigata* (0.157) and lowest *Gossypium hirsutam* (0.035) these finding demonstrate (Table-2) the extensive use of species in different purposes, similarly lowest UV shows minimum uses of species.

Conclusion

Present survey revealed that a number of plant species are used as sacred, religious, medicinal, rituals food and agricultural purposes by indigenous people of Sacred Natural sites of Betul District of (M.P.) Ethno-botanical data is of significant value for conservation purposes. The high fidelity level (FL) of plant species *Cocos nucifera* 100% and *Ocimum sanctum* 100% indicates the prevalence use of plant and use value of plant determines the relative importance on use of plant species. The highest UV was calculated for *Bauhinia varigata* (0.157) and lowest *Gossypium hirsutam* (0.035) these finding demonstrate the extensive use of species in different purposes, similarly lowest UV shows minimum uses of species.

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