Role of Sacred Groves in Phytodiversity Conservation in Rajouri (J&K)

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Abstract: *Sacred groves are a group of trees or a patch of vegetation protected by the local people through religious and cultural practices evolved to minimize destruction. Nature worship is an ancient Indian tradition and all forms of life have been considered as sacred. The present study was conducted to study the sacred groves from ecological and floristic point of view in Rajouri tehsil of Rajouri district, J&K. For this the tree diversity in some prominent sacred groves of Rajouri was studied by random sampling using Quadrat method. Altogether, 75 plant species were enumerated from the sacred groves, which include 48 tree species. Based on the calculations of frequency, density and abundance, IVI of each species was calculated. Some important trees in the area are Ficus religiosa, Olea ferruginea, ficus palmata, Grevillea robusta etc.*

Keywords: Sacred grove, Tree diversity, Religious and cultural rites, Rajouri.

1. Introduction

Sacred groves are distinct patches of vegetation (ranging in size from a small cluster of a few trees to a large forest stand spanning several hundred acres) which are consecrated in the name of local deities or ancestral spirits. Removal of any living things from the SG is a taboo. This institution is perhaps the best example of indigenous traditional resource use practices promoting conservation of biodiversity (Deb, D). Man worshipped varied wonders and mysteries in nature due to many reasons necessary for his survival. Living in close interaction with nature, ancient man knew that natural resources are necessary for his survival and its misuse would be disastrous. (Murugan et al, 2008).

Concept of Sacred Groves is as old as the civilization where a patch of forest or water body is dedicated to local deities and nobody is permitted to cut plants or to kill animals or any form of life. (Agnihotri et al, 2012). It has been estimated that total number of sacred groves in the country lie between 100,000 and 150,000 (Saini et al., 2011). With the objective to study diversity of vegetation in the sacred groves and role played by them in phyto diversity conservation, the present study was conducted in some prominent sacred groves of Rajouri.

2. Literary Survey

Sacred groves were perhaps the first temples of worship in the world. Concept of Sacred Groves is as old as the civilization where a patch of forest or water body is dedicated to local deities and nobody is permitted to cut plants or to kill animals or any form of life. Sacred Groves are such a traditional socio-cultural mechanism aiming at nature conservation that integrated socio-cultural aspects for conservation. (Murugan et al, 2008). Sacred groves and other ethnoforestry elements are examples of traditional biophilia of ancient human cultures, which express a tendency to love and respect of nature (Deb, 2007).

3. Previous Work

Bhakat and Pandit (2003) studied the role of a sacred grove in conservation of medicinal plants in Chilkigarh Sacred grove. Twelve famous sacred groves of North Malabar region of Kerala were studied by#**Prasad and Raveendran (2012)** with reference to endemic and rare medicinal plants and to know the threats to them. **Rashid et al (2008)** studied less known wild edible plants used by the Gujjar Tribe inhabiting hilly areas of District Rajouri, J&K.

4. Study Area

In order to assess the role of sacred groves in phytodiversity conservation in the rural areas through the practices, cultures, religions, customs, taboos, folk-tales associated with them, the present study was conducted in the sacred groves of different areas, both rural as well as urban, of Rajouri Tehsil. The tehsil Rajouri is one of the 8 tehsils in the district Rajouri viz. Rajouri, Nowshera, Sunderbani, Kalakote, Budhal, Thannamandi, Darhal and Manjakot. Rajouri tehsil comprises of 117 villages and 7 muncipalities. About 16 sacred groves were studied located in different villages as well as wards of Rajouri tehsil. The details of these sacred groves are given in Table 1.

5. Methodology

To study the role of sacred groves in phytodiversity conservation, an inventory of plant species (Trees, Shrubs and Herbs) was prepared by field survey in the different sacred groves of Rajouri. Also, IVI (Importance value index) of each tree species was obtained by calculating frequency, density and abundance of each tree species in the studied sacred groves using random sampling by Quadrat method. A survey based on questionnaire was also carried out to study the importance of these groves in phytodiversity conservation and also what roles they play in the lives of surrounding people.

5.1. Analysis of Data

Data was analysed for frequency, density and abundance of tree species according to the formulae given by Curtis and Mc Intosh (1950).

Frequency: it refers to the degree of dispersion of individual species in an area and usually expressed in terms of percentage occurrence. It is calculated by equation:

$$Frequency = \frac{Number\ of\ Quadrats\ in\ which\ species\ occurred}{Total\ Number\ of\ Quadrats\ studied} \times 100$$

Density: It represents the number of individuals of the species in any unit area. It is expressed as the numerical strength of the species in the community.

$$Density = \frac{Total\ Number\ of\ Individuals\ of\ a\ species\ in\ all\ quadrats}{Total\ Number\ of\ Quadrats\ studied}$$

Abundance: It represents the number of individuals of any species per sampling unit of occurrence. It is the ratio of the total number of individuals of species in all quadrats and the total number of quadrats in which species occurred.

$$Abundance = \frac{Total\ Number\ of\ individuals\ of\ a\ species\ in\ all\ quadrats}{Total\ Number\ of\ Quadrats\ in\ which\ species\ occurred}$$

Basal Area: Basal area refers to ground actually penetrated by the stems and is used to calculate dominance of tree species. It is considered as good indicator of size, volume, or weight of tree. It provides information on the proportion or dominance of larger and smaller tree in a community. It is one of the most important parameter in estimating the standard biomass in an area that in turn used as a measure of productivity. The basal area is calculated by using following formulae:

Basal Area = $\frac{(CBH)^2}{4\pi}$ (Where, CBH is circumference at the breast height)

Importance Value Index (IVI): Importance value index of a species in the community gives the idea of relative importance of the species as compared to other species. For calculating the importance value index of species, the absolute values recorded were converted to relative values. It thus incorporates following three parameters:

Relative Frequency: as the proportion of frequency of a species to the stand as a whole and calculated as:

$$Relative\ Frequency = \frac{Frequency\ of\ the\ species}{Total\ frequency\ of\ all\ the\ species} \times 100$$

Relative Density: as the proportion of density of a species to the stand as a whole and calculated as:

$$Relative\ Density = \frac{Density\ of\ the\ species}{Total\ density\ of\ all\ the\ species} \times 100$$

Relative Dominance: as the proportion of dominance of a species to the stand as a whole and calculated as:

$$Relative\ Dominance = \frac{Basal\ Area\ of\ the\ species}{Total\ Basal\ Area\ of\ all\ the\ species} \times 100$$

In calculating the importance value index, the percentage value of relative frequency, relative density, and relative dominance are summed together and this value is designated as importanve value index or IVI of species (Curtis, 1959) which determines vegetation status and importance of component species with in a stratum stand.

IVI = Relative density + Relative Frequency + Relative density

6. Results

The study was conducted in various sacred groves of Rajouri. The names, local deities associated and other related information has been given in Table 1.

6.1. Quantitative Analysis

The results of quantitative analysis of data obtained is given in Table 5. It was found that *Ficus religiosa* has maximum IVI (37.025), followed by *Olea ferruginea* (22.769), *Ficus palmata* (18.607), *Grevillea robusta* (14.623).

6.2. Qualitative Analysis

For the qualitative analysis of data, a detailed questionnaire was prepared to know the significance of these groves in the lives of people living in surrounding areas. It was found that apart from religious purposes, most of the trees growing in these groves are used by the people for different purposes like fuel, fodder, as medicinal, firewood collection, grazing of animals, recreational purposes and also as edibles. Mostly believe that sacred groves are an important repository of indigenous flora in the region. Also, these sacred groves are gradually shrinking in size and number due to civilization in remote areas, land requirements, agricultural practices, monsoon failure, low rainfall, education and literacy brought to the tribal people.

7. Conclusion

Various communities follow nature worship based on the premise that all creations of nature have to be protected. But these living creatures are still destroyed to fulfill various human needs. There is an urgent need to preserve and acknowledge the efforts of the people of this area in preserving the other small sacred patches of forests as local biodiversity.

8. Future Scope

Sacred groves possess a great heritage of diverse gene pool of many forest species having socio-religious attachment and possessing medicinal values. As they are gradually shrinking due to human activities to fulfill various human needs, the legal status and management of sacred groves in the country need to be examined.

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Tables

Table 9.1: List of Sacred Groves selected for vegetative study in Rajouri

S. No.	Name of the Sacred Grove	Place	Built in	Built/ Maintained by	Deities Associated	No of Tree species
1	Baba Qutubdin Naughazia Ziarat	Dhanidhar	200-300 yrs ago	Fakir Mohd Sahib	Baba Qutubdin	17
2	Baba Sain Abdul Aziz Ziarat	Nagrota (Palma)	Before 1947	Islamic Committee Nagrota	Sain Abdul Aziz	15
3	Boli Mata Mandir	Dhanidhar	1968	Boli Mata	Vaishno Devi	19
4	Chandershekhar Temple	Dhangri	2002	Vishwananda Saraswati	Lord Shiva	11
5	Durga Mata Mandir	Bathuni	2006	Yograj Sharma S/o Ganpat Ram	Shivling, Shiv Parivar, Durga	15
6	Jama Masjid	Dhangri	Before 1947	Syed Madad Ali Shah	-	8
7	Markaz Idgah Bamakam Ziarat	Dassal Gujjran	Not known	-	Sain Bamakam	1
8	Panjpeer Ziarat	Rajouri	-	Panjpeer Committee		7
9	Peer Khewe Shah Ziarat	Dhangri	Before 1947	Syed Madad Ali Shah	Peer Khewe Shah	13
10	Pracheen Radha Krishna Mandir	Rajouri	200 yrs ago in 19th century	Mian Hathu, Wazeer of Raja Ghulab Singh	Radha- Krishna	12
11	Pracheen Shiv Mandir	Rajouri	400 years ago	Few sages, maintained by Mandir Committee	Lord Shiva, Ram Darbar	16
12	Ram Mandir	Dhangri	1963	Kasturi Lal	Ram Darbar, Radha-Shyam, LaxmiNarayan,Durga	11
13	Sain Challa Sahib Ziarat	Pullulian	100 yrs old	Ajif Fateh and Mohd Mushtak Hussain	Sain Challa Sahib	13
14	Sarv Dharam Sthal	Dalogra	1993	Major Harish Kumar Arora S/o Late Om Prakash Arora	Radha Krishna, Shivling,Guru Granth Sahib, jesus Christ, Bible	7
15	Shri 108 Brahmarishi Barfani ji maharaj Ashram	Chhachhara	Newly constructed in 2002	Prabhu das ji Maharaj	Shri 108 Brahmarishi Barfani ji Maharaj	20
16	Wali Rafiq Sahib Ziarat	Chapprian	2000	Mohd Qyoom Raie	Wali Rafiq Sahib	15

Table 9.2: Phyto-sociological Parameters for Trees in the selected sacred Groves in Rajouri

S.No	Name of the species	Frequency	Density	Basal Area	Relative frequency	Relative Density	Relative dominance	IVI
1	*Acacia catechu*	12.5	0.25	0.08963	1.064	0.299	0.167	1.53
2	*Aegle marmelos*	43.75	0.75	0.0115	3.723	0.898	0.021	4.642
3	*Bauhinia variegata*	12.5	0.125	0.01863	1.064	0.15	0.035	1.249
4	*Bombax cieba*	25	0.375	0.77148	2.128	0.448	1.437	4.013
5	*Callistemon lanceolatus*	6.25	0.1875	0.01834	0.532	0.224	0.034	0.79

6	*Carica papaya*	6.25	0.1875	0.07659	0.532	0.224	0.143	0.899
7	*Celtis australis*	56.25	2.3125	1.48578	4.78	2.768	2.767	10.315
8	*Cestrum nocturnum*	6.25	0.625	1.99045	0.532	0.748	3.707	4.987
9	*Citrus aurantium*	6.25	0.0625	0.0109	0.532	0.075	0.02	0.627
10	*Citrus limon*	12.5	0.125	0.02064	1.064	0.15	0.038	1.252
11	*Citrus chinensis*	18.75	0.3125	0.10676	1.59	0.374	0.199	2.163
12	*Cordia dichotoma*	6.25	0.125	0.60659	0.532	0.15	1.13	1.812
13	*Cupressus sempervirens*	25	0.4375	0.07313	2.128	0.524	0.136	2.788
14	*Dalbergia sissoo*	18.75	0.4375	0.43189	1.59	0.524	0.804	2.918
15	*Eriobotrya japonica*	31.25	0.375	0.11523	2.66	0.448	0.215	3.323
16	*Eucalyptus citridora*	37.5	0.875	0.26376	3.191	1.047	0.491	4.729
17	*Ficus benghalensis*	18.75	0.187	0.76026	1.59	0.224	1.416	3.23
18	*Ficus carica*	12.5	0.1875	0.24268	1.064	0.224	0.452	1.74
19	*Ficus palmata*	68.75	1.4375	5.9269	5.85	1.72	11.037	18.607
20	*Ficus racemosa*	18.75	0.1875	0.1776	1.59	0.224	0.331	2.145
21	*Ficus religiosa*	37.5	1	17.5263	3.191	1.197	32.637	37.025
22	*Grevillea robusta*	12.5	0.4375	7	1.064	0.524	13.035	14.623
23	*Grewia optiva*	43.75	1.6835	2.00391	3.723	2.015	3.732	9.47
24	*Juglans regia*	12.5	0.125	0.10599	1.064	0.15	0.197	1.411
25	*Leucaena leucocephala*	12.5	0.25	0.16233	1.064	0.299	0.302	1.665
26	*Mallotus philippensis*	37.5	0.75	0.4103	3.191	0.898	0.764	4.853
27	*Malus domestica*	43.75	0.4375	0.07303	3.723	0.524	0.136	4.383
28	*Mangifera indica*	25	0.3125	0.35645	2.128	0.374	0.664	3.166
29	*Melia azaderach*	56.25	1.4375	2.86548	4.787	1.72	5.336	11.843
30	*Morus alba*	31.25	1.0625	0.77828	2.66	1.272	1.449	5.381
31	*Olea ferruginea*	37.5	10.0625	4.0466	3.191	12.043	7.535	22.769
32	*Phyllanthus emblica*	50	0.6875	0.87007	4.255	0.823	1.62	6.698
33	*Pinus roxburghii*	12.5	0.125	0.35352	1.064	0.15	0.658	1.872
34	*Platanus orientalis*	6.25	0.0625	0.02924	0.532	0.075	0.054	0.661
35	*Populus ciliata*	31.25	0.75	0.44184	2.66	0.898	0.823	4.381
36	*Prunus armeniaca*	12.5	0.4375	0.28889	1.064	0.524	0.538	2.126
37	*Prunus domestica*	18.75	0.3125	0.06509	1.596	0.374	0.121	2.091
38	*Prunus persica*	12.5	0.1875	0.00537	1.064	0.224	0.01	1.298
39	*Psidium guajava*	18.75	0.6875	0.40827	1.596	0.823	0.76	3.179
40	*Punicum granatum*	25	0.25	0.04618	2.128	0.299	0.086	2.513
41	*Pyrus communis*	6.25	0.0625	0.00717	0.532	0.075	0.013	0.62
42	*Pyrus pashia*	50	1.125	0.51648	4.255	1.346	0.962	6.563
43	*Quercus leucotrichophora*	6.25	0.0625	0.49761	0.532	0.075	0.927	1.534
44	*Salix alba*	12.5	0.3125	0.1682	1.064	0.374	0.313	1.751
45	*Toona ciliata*	50	1.3125	1.14495	4.255	1.571	2.132	7.958
46	*Ulmus wallichiana*	6.25	0.0625	0.1185	0.532	0.075	0.221	0.828
47	*Zanthoxyllum armatum*	25	0.25	0.01684	1.128	0.299	0.031	1.458
48	*Ziziphus mauritiana*	37.5	1.375	0.19581	3.191	1.646	0.365	5.202

Total		1175	83.558	53.7014	103.757	42.11	101.001	241.081

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