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Study of plant community structure around Ramling: A sacred grove

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Abstract
Sacred groves comprise of patches of forests or natural vegetation – from a few trees to forests of several acres – that are usually dedicated to local folk deities or tree spirits (Vanadevatas). These spaces are protected by local communities because of their religious beliefs and traditional rituals that run through several generations. In India, sacred groves are found all over the country and abundantly along the Western Ghats in the states of Kerala and Karnataka. The total number of sacred groves in India could be in the range of 100,000 – 150,000. (Malhotra *et al*, 1998). (Amirthalingum,2016 and Patel,_2012) Sacred groves are ecological very significant because it Conserve the Biodiversity, (Deshmukh, 1999) it also Recharge the aquifers and prevent Soil conservation But day by day the importance of theses groves become reduced due to several reasons like Disappearance of the traditional belief systems, rapid urbanization and developmental interventions, Invasion by exotic weeds and Pressures due to increasing livestock and fuel wood collection. Keeping this view in mind in the present investigation an attempt has been made to study the vegetation around the important sacred grove Ramling (Nipani), and also carry out some steps to conserve the vegetation.

Keywords: sacred groves comprise, folk deities, tree spirits, western ghats

Introduction
Sacred groves comprise of patches of forests or natural vegetation – from a few trees to forests of several acres – that are usually dedicated to local folk deities (Example – Ayyanar and Amman) or tree spirits (Vanadevatais). (Gadgil, *et al.*, 1975) [3]. These spaces are protected by local communities because of their religious beliefs and traditional rituals that run through several generations. The degree of sanctity of the sacred forests varies from one grove to another. In some forests even the dry foliage and fallen fruits are not touched. People believe that any kind of disturbance will offend the local deity, causing diseases, natural calamities or failure of crops. For example, the Garo and the Khasi tribes of northeastern India completely prohibit any human interference in the sacred groves. In other groves, deadwood or dried leaves may be picked up, but the live tree or its branches are never cut. For example, the Gonds of central India prohibit the cutting of a tree but allow fallen parts to be used. Sacred groves are classified into three types 1) Traditional Sacred Groves – It is the place where the village deity resides, who is represented by an elementary symbol 2) Temple Groves – Here a grove is created around a temple and conserved. 3) Groves around the burial or cremation grounds.
Sacred groves are ecologically significant because they 1) Conserve Biodiversity – The sacred groves are important repositories of floral and faunal diversity that have been conserved by local communities in a sustainable manner. They are often the last refuge of endemic species in the geographical region. 2) Recharge of aquifers – The groves is often associated with ponds, streams or springs, which help meet the water requirements of the local people. The vegetative cover also helps in the recharging the aquifers. 3) Soil conservation: The vegetation cover of the sacred groves improves the soil stability of the area and also prevents soil erosion.
The sacred groves have some threats, The threats vary from one region to the other and even from one grove to the other. But the common threats identified are: 1) Disappearance of the traditional belief systems, which were fundamental to the concept of sacred groves. These systems and their rituals are now considered mere superstition. 2) Sacred groves in many parts of our country have been destroyed due to rapid urbanization and developmental interventions such as roads, railways tracks, dams including commercial forestry. Encroachment has led to the shrinkage of some of the largest groves in the country. 3) Many groves are suffering due to 'Sanskritisation' or the transformation of the primitive forms of nature worship into formal temple worship. 4) Invasion by exotic weeds such as *Eupatorium odoratum*, *Lantana camara* and *Prosopis juliflora* is a serious threat to some groves. 5) Pressures due to increasing livestock and fuel wood collection. (ENVIS report)
Ramling is a Temple grove 5 km away from nipani, near to the village Shippur in Hukkeri Tahsil from Belgaum Dist. Ramling is famous for gad Shiva, every Monday in the month of Shravan fair is arranged. This temple grove is present in the valley surrounded by hills in all sides. Thick vegetation is observed on the hilly slopes these plants are protected only because of local communities, their religious beliefs and traditional rituals that run through several generations. But day by day due to interference of some peoples the plants on the surface of hill are reducing for their needs. Keeping this view in mind in the present investigation an attempt has been made to study the vegetation around the important sacred grove Ramling (Nipani), and also carry out some steps to conserve the vegetation.

Material and Methods
The study of vegetation is essential for understanding the dynamics of a plant community which is either homogenous

or heterogeneous. The structure of the plant community can be analyzed by studying its qualitative and quantitative characters. The quantitative characters like Density, Frequency and Abundance using list quadrate method.

Quadrate is a sampling unit having an area of definite size with rectangular or square shape. The quadrate may be of different types list, chart, clip, count and permanent. In a list quadrate method the plant species present in a area are listed and individuals of each species are counted

For the study purpose 4 quadrates are laid down of 100 meter x 100 meter around the temple then the number of each species in each quadrate are listed, counted and noted in the observation table. The quadrate study was carried out in the month of December 2012.

After that Density, Frequency and Abundance were calculated by using the following formulae

Density (D): It represents the numerical strength of a sp. per unit area in a community

$$\text{Density (D)} = \frac{\text{Total No. of Individual of a species in all quadrate (a)}}{\text{Total No. Of quadrate studied (C)}}$$

Frequency (F): It is the degree of dispersion of individual sp. In given quadrate. Expressed in terms of percentage (%)

$$\text{Frequency (F)} = \frac{\text{Total No. of quadrate in which species occurs (b)}}{\text{Total No. Of quadrate studied (C)}} \times 100$$

Abundance (A): It is described as a number of individuals of different species in a given quadrate. It gives an idea about the distribution pattern of the species.

$$\text{Abundance (A)} = \frac{\text{Total No. of Individual of a species in all quadrate (a)}}{\text{Total No. of quadrate in which species occurs (b)}}$$

Results

The structure of the plant community can be analyzed by studying the quantitative characters like Density, Frequency and Abundance using list quadrate method. The number of each species in each quadrate is listed, counted and noted in the observation table as follows,

Table 1: The structure of the plant community around ramling: A sacred grove

Sr. No.	Name of the Plant Species	No. of diff. individuals of a species in each quadrate				Total No. of In. of a sp. in all qu. (a)	Total No. of qu. in which sp. occurs (b)	Total No. Of qu. studied (C)	Den.	Fre. %	Abu.
		1	2	3	4						
1	*Acacia auriculiformis*	40	8	4	0	52	3	4	13.0	75	17.3
2	*Acacia concinna*	12	8	2	4	26	4	4	06.5	100	6.5
3	*Aegle marmelos*	6	2	0	4	12	3	4	03.0	75	4.0
4	*Agave americana*	53	0	10	0	63	2	4	15.7	50	31.5
5	*Ageratum conyezoides*	34	15	18	4	71	4	4	17.7	100	17.7
6	*Aloe vera*	0	12	0	0	12	1	4	03.0	25	12
7	*Anacardium occidentale*	0	2	0	4	6	2	4	01.5	50	3.0
8	*Annona Squamosa*	0	0	0	4	4	1	4	01.0	25	4
9	*Annona reticulata*	0	0	0	3	3	1	4	0.75	25	3
10	*Artabotrys zeylanicus*	0	4	0	2	6	2	4	01.5	50	3
11	*Artemisia nilagirica*	18	10	6	0	34	3	4	08.5	75	11.3
12	*Azadirecta indica*	0	5	3	1	9	3	4	2.25	75	3
13	*Barleria cristata*	16	0	15	0	31	2	4	7.75	50	15.5
14	*Bauhinia purpuria*	0	4	0	0	4	1	4	01.0	25	4
15	*Bautea monosperma*	4	7	3	6	20	4	4	05.0	100	5
16	*Bixa orellana*	0	0	3	0	3	1	4	0.75	25	3
17	*Caesalpinia pulcherima*	0	5	0	6	11	2	4	2.75	50	5.5
18	*Carrisa carandus*	28	13	10	14	65	4	4	16.2	100	16.2
19	*Caryota urens*	0	0	0	2	2	1	4	00.5	25	2
20	*Cassia javanica*	0	0	0	4	4	1	4	01.0	25	4
21	*Centella asiatica*	0	0	0	40	40	1	4	10.0	25	40
22	*Clerodendrum philippinum*	0	8	0	6	14	2	4	03.5	50	7
23	*Clitoria ternatea*	0	0	0	4	4	1	4	01.0	25	4
24	*Calocasia esculenta*	0	4	0	13	17	2	4	4.25	50	8.5
25	*Cordia Wallichii*	2	4	0	4	10	3	4	2.50	75	3.3
26	*Cocus nucifera*	0	2	0	2	4	2	4	01.0	50	2
27	*Crinum asiaticum*	0	4	0	6	10	2	4	2.50	50	5
28	*Crotalaria leptostachya*	20	10	16	4	50	4	4	12.5	100	12.5
29	*Curcuma Sp.*	0	6	0	0	6	1	4	01.5	25	6
30	*Cymbopogon nardus*	0	4	0	6	10	2	4	2.50	50	5
31	*Dalbergia sisso*	0	4	6	0	10	2	4	2.50	50	5

Table 2

Sr. No.	Name of the Plant Species	No. of diff. individuals of a species in each quadrate				Total No. of In. of a sp. in all qu. (a)	Total No. of qu. in which sp. occurs (b)	Total No. of qu. studied (C)	Den.	Fre. %	Abu.
		1	2	3	4						
32	*Datura ferox*	0	16	6	0	22	2	4	05.5	50	11
33	*Eclipta prostrata*	0	0	0	85	85	1	4	21.2	25	85
34	*Emblica officinalis*	0	2	0	4	06	2	4	01.5	50	03
35	*Eriocaulon heterolepis*	0	0	0	54	54	1	4	13.5	25	54
36	*Eucalyptus globulus*	35	15	10	4	64	4	4	16.0	100	16
37	*Ficus bengalensis*	0	1	0	3	04	2	4	01.0	50	02
38	*Ficus religiosa*	0	2	0	4	06	2	4	01.5	50	03
39	*Ficus glomeruta*	0	4	0	5	09	2	4	2.25	50	4.5
40	*Gliricidia sepium*	4	0	7	0	11	2	4	2.75	50	5.5
41	*Hibiscus tetraphyllus*	5	8	20	0	33	3	4	8.25	75	11.5
42	*Ipomoea learii*	0	4	0	6	10	2	4	02.5	50	05
43	*Ipomoea staphylina*	0	6	16	0	22	2	4	05.5	50	11.0
44	*Laggera aurita*	20	10	30	0	60	3	4	15.0	75	20.0
45	*Mangifera indica*	0	4	0	6	10	2	4	02.5	50	05
46	*Michelia champaca*	0	2	0	4	06	2	4	01.5	50	03
47	*Mimusops elengi*	0	2	0	4	06	2	4	01.5	50	03
48	*Nothopoditus nimoniana*	0	0	0	3	3	1	4	0.75	25	03
49	*Occimum santum*	0	16	0	14	30	2	4	07.5	50	15
50	*Phoenix syvestris*	0	0	0	4	04	1	4	01.0	25	04
51	*Pithecellobium dulce*	1	0	4	0	05	2	4	1.25	50	2.5
52	*Plumeria alba*	0	3	2	0	05	2	4	1.25	50	2.5
53	*Rauvolfia serpentina*	0	4	0	2	06	2	4	1.50	50	03
54	*Ricinus communis*	4	0	2	0	06	2	4	1.50	50	03
55	*Rubia cordifolia*	0	10	0	7	17	2	4	4.25	50	8.5
56	*Santalum album*	0	0	0	2	2	1	4	0.5	25	2.0
57	*Solanum nigrum*	6	4	2	0	12	3	4	03.0	75	04
58	*Syzygium cumini*	0	2	0	6	08	2	4	02.0	50	04
59	*Tabernaemontana citrifolia*	0	3	0	4	07	2	4	1.75	50	3.5
60	*Tamarandus indica*	0	8	6	10	24	3	4	06.0	75	8.0
61	*Tectona grandis*	8	12	8	6	34	4	4	08.5	100	8.5
62	*Terminalia bellarica*	4	5	2	3	14	4	4	03.5	100	03.5
63	*Terminalia chebula*	0	2	1	3	06					
64	*Terminalia elliptica*	3	13	6	8	30	4	4	07.5	100	7.5
65	*Vernonia indica*	15	20	14	5	54	4	4	13.5	100	13.5
66	*Vitex trifolia*	6	7	10	4	28	4	4	7.0	100	7.0
67	*Zingiber officinalis*	0	6	0	10	16	2	4	4.0	50	4.0

Conclusions

The quadrates around the temple show high Density and Abundance of *Eclipta prostrate*. From the collected data it is concluded that around the temple within 100meter area, about 67 different plant sp. are observed out of that 36 plant sp. are medicinally important Only because of this sacred grove in the form of Ramling temple these plant are conserved otherwise the flora might not be there.

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