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Diversity and Distribution of Leguminosae Tree Plants in Kinwat and Mahur Forest Ranges of Nanded District

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Abstract : Leguminosae one of the most dominant and the important family, found under extremely varied soil and climate condition. It is cosmopolitan in distribution and most abundant in tropics, subtropics, temperate and worm climate. It is commonly known as the legume, pea, or bean family, are a large and economically important family of flowering plants. Kinwat and Mahur taluka of Nanded districts has old heritage of medicinal plants and herbal medicine. Forest is rich in biodiversity and consists of rare medicinal plants. Biogeographical condition such as altitude, soil type and average rain fall make the vegetation diversity in this area. In present study total 45 quadrate were taken from the study area out of this 27 quadrate were from the Kinwat taluka and 18 Quadrate from the Mahoor taluka. Quadrate analysis of the study area showed the presence of 27 leguminosae tree plant distributed in the 45 different quadrate. Out of this 27 leguminosae plants, 9 were belonging to the Papilionaceae, 6 were belonging to the caesalpincae and 12 were belonging to the family mimosaceae. Keywords- Leguminosae family, Diversity and Distribution

I. INTRODUCTION

Forest composition, structure and dynamics serve as a research base for diverse aspects of ecology. Forest surveys of permanent plots can provide information that is crucial for conservation and management of forest (Ayyappan and Parthasarathy, 1999). Forest ecosystem dynamics and conservation depends on the understanding of species composition and diversity (Zaman, et.al., 2011). This composition and diversity of species can be studied by the quantitative characteristics which include frequency percentage, density and abundance (Poore, 1955). The Frequency percentage, density and abundance are important ecological characteristics for a species. Frequency refers to the degree of dispersion of individual species in an area and is usually expressed as number of sampling unit in which particular species occurs (Patel, et.al., 2014). More frequency of a species shows the more occurrences of species. More frequency of a species in a particular area indicates that the species is more successful to survive than the other species. It also indicate that the particular region favorable for the species to its distribution. Frequency does not give correct idea of the distribution of species, unless it is correlated with other characters such as density and abundance. Density is the study of number of species per unit area. Density gives an idea of degree of competition. The Abundance indicates number of individuals or different species per sampling units of occurrence. Both this density and abundance gives the idea of the species in quantitative terms. Study area includes the forest ranges from Kinwat and Mahur taluka of Nanded district. Over all forest cover of Nanded is 91,748 hectors forest area which is 11.92 % of the total area. Forest cover in Kinwat is 57,800 hectares which is 39.34% of total forest cover of the taluka (Patil, et. al., 2010) while Mahur taluka has 14397.39 hectares forest cover (Vijigiri and Bembrekar, 2015). Geographical position of the Kinwat is 19° 25 to 19° 55 N latitude and 77° 51 to 78° 19 E longitude. Geographically position of the Mahur is 19° 49 to 19° 83 N latitude and 77° 91 to 77° 55 E longitude.

II. MATERIALS AND METHODS

Occurrence and distribution pattern of the leguminosae tree species was studied with the help of quadrate method. At random 45 quadrates were analyzed from the forest of the study area. Quadrate size was 100 m. \times 100 m. While taking the quadrate different region of the study area were in consideration like core region forest, buffer region forest, road side forest etc. Leguminosae plants from study area were identified with the help of available literature (Anonymous, 1948; Kirtikar and Basu, 1975; Nadkarni and Nadkarni, 1976; Naik, 1998; Yadav and Sardesai, 2000). Frequency percentage, Density, Abundance were calculated with following formula (Misra, 1968; Sharma, 2005).



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 $Frequency \% = \frac{Total number of quadrate in which species occurred}{Total number of quadrate studied} \times 100$

 $Density = \frac{Total number of individuals of the species}{Total number of quadrate studied}$

 $Abundance = \frac{\text{Total number of individuals of the species}}{\text{Total number of quadrate in which the species has occurred}}$

III. RESULTS

Total 45 quadrate were taken from the study area out of this 27 quadrate were from the Kinwat taluka and 18 Quadrate from the Mahur taluka. Quadrates were taken from the area where the plant biodiversity is more. GPS location of the quadrate and the diversity of leguminosae plants in each quadrate were recorded for the further analysis. Quadrate analysis of the study area showed the presence of 27 leguminosae tree plant distributed in the 45 different quadrate. Out of this 27 leguminosae plants, 9 were belonging to the Papilionaceae, 6 were belonging to the caesalpinaceae and 12 were belonging to the family mimosaceae. Plants belonging to the papilioniaceae family were Butea monosperma (Lam.) Taub., Dalbergia lanceolaria subsp. Paniculata (Roxb.) Thoth., Dalbergia sissoo DC., Desmodium oojeinense (Roxb.) H. Ohashi, Erythrina suberosa Roxb, Gliricidia sepium (Jacq.) Walp., Pongamia pinnata (L.) Pierre, Pterocarpus marssupium Roxb. And Peltophorum pterocarpum (DC.) K.Hevne. Caesalpiniaceace family comprised the following Bauhinia recemosa Lam., Caesalpinia pulcherrima (L.) Sw., Cassia fistula L., Senna siamea (Lam.) H.S.Irwin& Barnaby, Delonix regia (Hook.) Raf. And Tamarindus indica L. Plants belonging to the family mimosaceae were Acacia farnesiana (L.) Willd., Acacia catechu (L.f.) Willd., Acacia leucophloea (Roxb.) Willd. Acacia chundra (Rottler) Willd., Acacia nilotica (L.) Delile, Albizia leback (L.) Benth., Albizia procera (Roxb.) Benth. Albizia julibrissin Durazz., Albizia saman (Jacq.) Merr Leucaena latisiliqua (L.) Gillis & Stearn, Pithecellobium dulce (Roxb.) Benth and Prosopis juliflora (Sw.) DC. Phytosociologial characteristics of leguminosae tree plants were studied by using the parameter of the individual species such as frequency percentage, density and abundance in the study area. This data was analyzed using the different formula. Highest frequency percentage was found in Butea monosperma (Lam.) Taub (88.89) followed by Cassia fistula L. (71.11) and Bauhinia recemosa Lam. (55.56). Lowest frequency percentage was found in Acacia chundra (Rottler) Willd. (4.44), Acacia catechu (L.f.) Willd. (6.67) and Albezia julibrissin Durazz. (6.67). Maximum density was found in Butea monosperma (Lam.) Taub. (10.66), followed by Cassia fistula L. (6.91) and Gliricidia sepium (Jacq.) Walp. (3.71). Lowest density was found in Acacia chundra (Rottler) Willd. (0.067), Acacia catechu (L.f.) Wild. (0.13) and Albezia julibrissin Durazz. (0.178); Maximum abundance was found in Gliricidia sepium (Jacq.) Walp.(16.7), Butea monosperma (Lam.) Taub. (12) and Cassia fistula L. (9.72) and lowest abundance was found in Acacia chundra (Rottler) Wild.(1.5) and Pterocarpus marssupium Roxb (2) and Acacia catechu (L.f.) Wild.(2).

SN	Name of the	Total no. of	Total no of	Total no. of	Frequency	Densit	Abundance
	plants	individual	quadrate of	quadrate	%	у	
		of species	occurrence	studied			
1	Butea	480	40	45	88.89	10.66	12
	monosperma						
2	Albezia	08	03	45	6.67	0.178	2.67
	julibrissin						
3	Dalbergia	95	23	45	51.11	2.11	4.13
	lanceolaria						
	subsp.						
	paniculata						
4	Dalbergia	23	07	45	15.56	0.51	3.286
	sissoo						
5	Desmodium	15	05	45	11.12	0.33	3
	oojeinense						
6	Erythrina	34	11	45	24.45	0.76	3.09

Table No. 1- Frequency percentage, Density, Abundance of the leguminosae tree plants.



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	suberosa						
7	Gliricidia	167	10	45	22.22	3.71	16.7
	sepium						
8	Pongamia	22	06	45	13.33	0.489	3.67
	pinnata						
9	Pterocarpus	12	06	45	13.33	0.267	2
	marssupium						
10	Peltophorum	23	07	45	15.56	0.51	3.286
	pterocarpum						
11	Bauhinia	96	25	45	55.56	2.13	3.84
	recemosa						
12	Caesalpinia	29	06	45	13.33	0.64	4.83
	pulcherrima						
13	Cassia fistula	311	32	45	71.11	6.91	9.72
14	Cassia	40	07	45	15.56	0.89	5.71
	siamea						
15	Delonix regia	23	08	45	17.78	0.51	2.875
16	Tamarindus	42	06	45	13.33	0.93	7
	indica						
17	Acacia	22	07	45	15.56	0.489	3.14
	farnesiana						
18	Acacia	06	03	45	6.67	0.13	2
	catechu						
19	Acacia	34	09	45	20	0.756	3.78
	leucophloea						
20	Acacia	03	02	45	4.44	0.067	1.5
	chundra						
21	Acacia	124	13	45	28.89	2.756	9.54
	nilotica						
22	Albizia	25	09	45	20	0.56	2.78
	leback						
23	Albizia	19	08	45	17.78	0.43	2.375
	procera						
24	Leucaenalatis	25	07	45	15.56	0.56	3.57
	iliqua						
25	Pithecellobiu	29	07	45	15.56	0.64	4.14
	mdulce						
26	Prosopis	74	09	45	20	1.64	8.22
	juliflora						
27	Samanea	39	12	45	26.67	0.87	3.25
	saman						

Fig. No. 1- Frequency percentage, Density and Abundance of plants belonging to Papilionaceae, Caesalpiniaceace and Mimosaceae family.



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IV. CONCLUSION

Forest was studied phytosociological to get the complete description and classification of vegetation. It also gives the detailed information about the floristic composition structure and development. Present study of phytosociologial characteristic analysis by quadrate method provided the important information about the tree species diversity and distribution in the study area. Population diversity and composition can be studied with the help of percentage frequency, density and abundance. This study showed that the maximum tree diversity was found in the family Mimosaceae (11) and less in the Caesalpinaceae (06) family in the Kinwat and Mahur forest ranges.

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