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

M. S. Wankhade¹

¹Sunderrao Solanke Mahavidyalaya, Majalgaon. Dist-Beed (MS), India.

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 warm 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 quadrates were taken from the study area out of this 27 quadrates were from the Kinwat taluka and 18 Quadrates from the Mahoor taluka. Quadrate analysis of the study area showed the presence of 27 leguminosae tree plant distributed in the 45 different quadrates. 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 hectares 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 quadrates method. At random 45 quadrates were analyzed from the forest of the study area. Quadrate size was 100 m. × 100 m. While taking the quadrates 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).

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

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

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

III. RESULTS

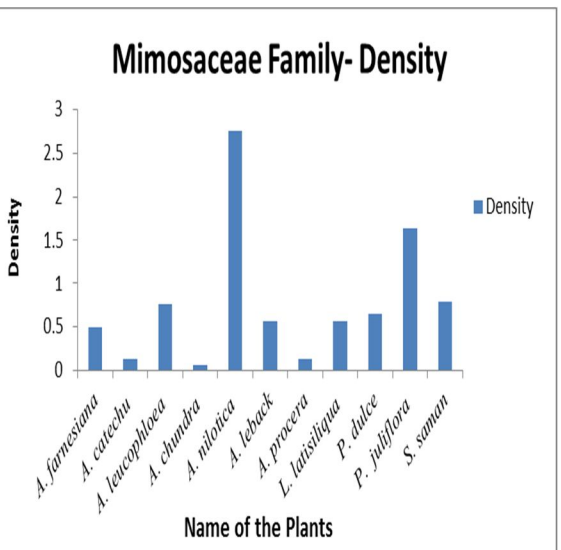
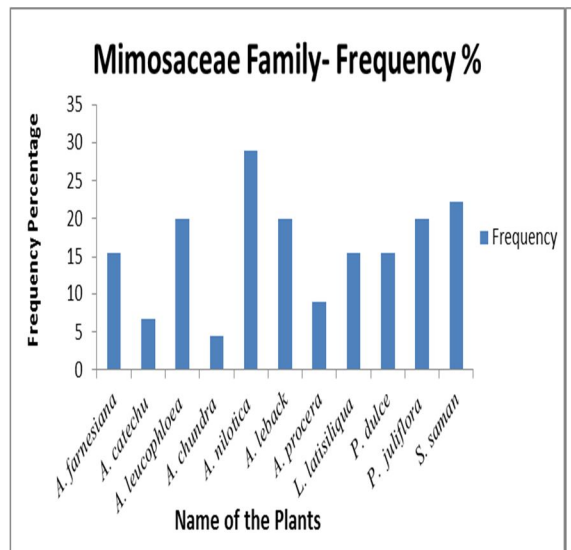
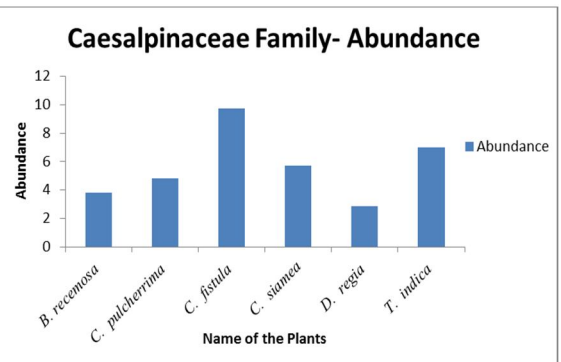
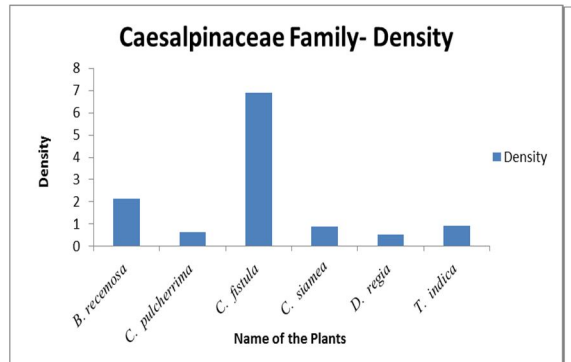
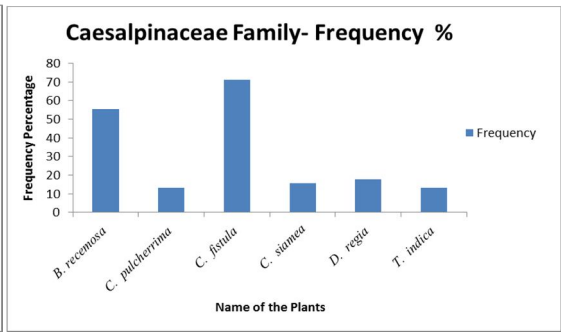
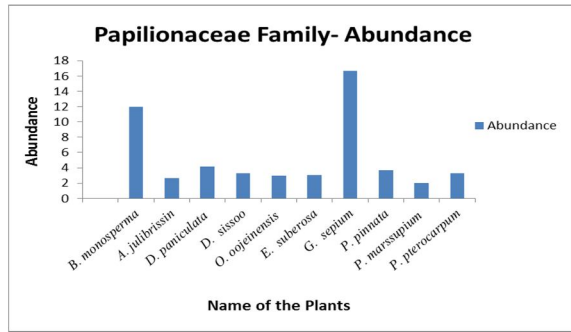
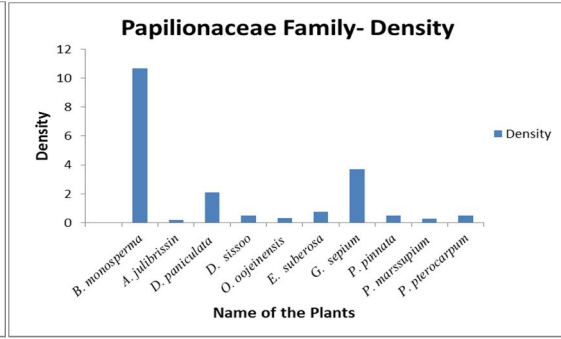
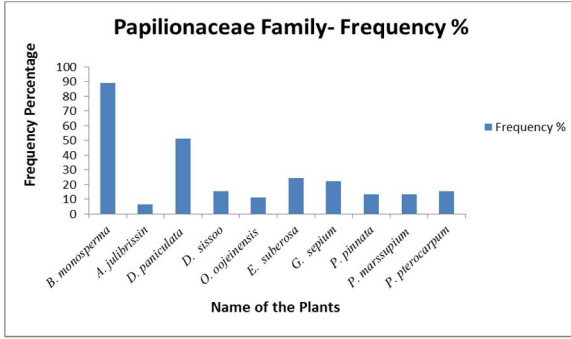
Total 45 quadrat were taken from the study area out of this 27 quadrat were from the Kinwat taluka and 18 Quadrat from the Mahur taluka. Quadrats were taken from the area where the plant biodiversity is more. GPS location of the quadrat and the diversity of leguminosae plants in each quadrat were recorded for the further analysis. Quadrat analysis of the study area showed the presence of 27 leguminosae tree plant distributed in the 45 different quadrat. 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 papilionaceae 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 marsupium* Roxb. And *Peltophorum pterocarpum* (DC.) K.Heyne. Caesalpinaceae 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. Phytosociological 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 marsupium* Roxb (2) and *Acacia catechu* (L.f.) Wild.(2).

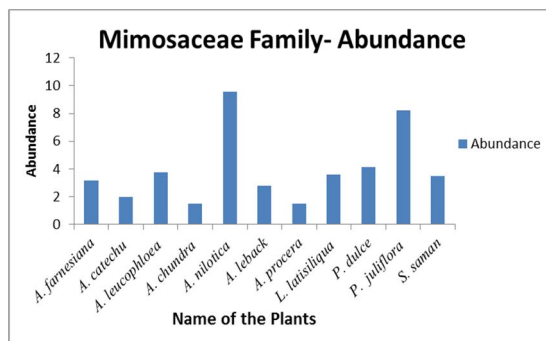
Table No. 1- Frequency percentage, Density, Abundance of the leguminosae tree plants.

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

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

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





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 phytosociological characteristic analysis by quadrat 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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