

# PHYTOSOCIOLOGICAL STUDY OF GOPALPURA FOREST

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## **Abstract -**

*Present paper deals with the evaluation of vegetation in Gopalpura site of tropical dry deciduous forest of Sagar. Tropical dry deciduous forests of Sagar (Gopalpura) are under constant threat due to over exploitation for various socio-cultural reasons and increasing growth of pharmaceutical industries. Further, the other disturbances due to overgrazing frequent fires etc. one also exerting constant pressure on the vegetation. The present work is aimed to study the existing vegetation of tropical dry deciduous forest of Sagar at Gopalpura.*

*The climate of the study well defined seasons viz. summer, winter and rainy. Soil of the study area are derived from two different soil formation i.e. basalt and vindhyan sandstone.*

**Key words:** Vegetation, Tropical dry deciduous forest, Phytosociological.

## **Introduction -**

The term phytosociology is self explanatory. It is study of inter relationship of individuals of many species growing together or a set of individuals of a species growing together in the field. More usually, however, it means the study of sets of species forming communities under natural condition. Phytosociological investigations in forest of India have been carried out by a number of workers. Studies on various aspects of Sal forests in different part of India (Tiwari, 1967; Kumar et al., 1994; Pandey, 1999; Shah et al., 1978; Rao and Balasubramanian, 1993; Shah and Bhatt, 1980).

Study of vegetation composition is fundamentally essential for understanding



the structural aspects of community, as Braun Blanquet (1932) has long back conceived the idea of existence of social relations between various species. Oosting (1956) has suggested the importance of a few phytosociological parameters for expressing sociological behavior of plants.

Vegetation ecology is the study of both the structure of vegetation and vegetation systematics. This includes the investigation of species composition and sociological interaction of species in communities from broad Physiognomic formation to the very fine floristic pattern occurring on a small area. Further, it is much concerned with correlations between environment and vegetation (Muller-Dombois and Ellenberg, 1974). It is concerned not only with identifying the plant communities on an area, but also with determining how they are related to one another and to the environmental factors.

Tropical dry deciduous forest of Sagar are under constant threat due to over exploitation for various socio-cultural reasons and increasing growth of pharmaceutical industries. Further, the other disturbance due to overgrazing, frequent fires are also exerting constant pressure on the vegetation.

#### **Study Sites -**

This site is situated 9 kilometers away on Sagar-Jhansi road (NH-26). It lies at 22°53'N latitude and 77°40'E longitude. Forests consist of medium sized trees due to moderate biotic disturbances. The feeling gaps are well regenerated by seedlings and coppices of forest tree species.

Tree layer is dominated by *Lanea coromandelica* and *Terminalia arjuna* and *Diospyros melanoxylon* are other associated species. Shrub layer is dominated by *Lantana camara* and *Zizyphus oenoplia*, *Mitreola oldenlandioidea* and *Cassia tora* cover the maximum part of ground flora. Main geological formation on this site is vindhyan sandstone (Plate 01).



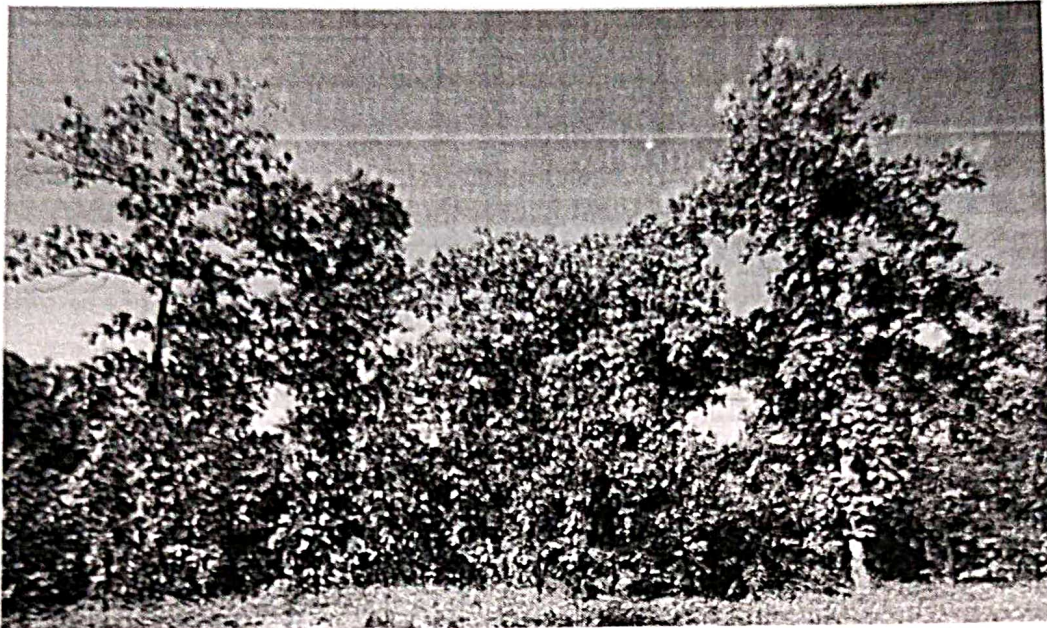


Plate 01: A view of forest vegetation at Gopalpura site

### **Climate :**

In general, climatic condition of the entire district is more or less alike due to similar topographic features.

On the basis of rainfall, temperature and humidity condition, the climate of Sagar district can broadly be termed as seasonal. The year is divisible into three well marked seasons i.e. rainy, winter, and summer. The rainfall in this area is distinctly seasonal and nearly 90% of the total rainfall is received in the rainy season i.e. from June to September. Relative humidity is one of the most important climatic factor governing the growth of plants like temperature, relative humidity also varies from season to season.

### **Materials and Methods -**

After surveying the study area, representative site, Gopalpura was selected. At study site Quadrats of 10 x 10 m size were randomly placed for the analysis of tree layer. Shrub layer was analysed laying quadrats of 5 x 5 m at study site. Cover and number of individuals were recorded.

Herb layer was analysed laying quadrats of 1 x 1 m at study site. Line transects



of 1 meter length was considered for recording of cover area of herbs. At study site seedlings and saplings of tree species were also recorded.

#### **Data Analysis -**

The vegetation data were quantitatively analysed for frequency, density, abundance and basal area (Curtis and McIntosh, 1950).

#### **Importance Value Index (IVI) -**

Relative values of frequency, density and dominance were determined Mishra (1968). The sum of all above relative values represented importance value index (IVI) on the basis of IVI, dominant, co-dominant and main associate species were recognized in different sites (Mueller-Dombais and Ellenberg, 1974). Standard formulae were used for the above analysis.

Table 1: Composition of forest tree vegetation at Gopalpura

S. No.	Name of plant species	Frequency %	Density (plants ha <sup>-1</sup> )	Abundance	A/F Ratio	Basal area (m <sup>2</sup> )	Relative Dominance	Relative Density	Relative frequency	Importance Value Index (IVI)
1.	<i>Tectona grandis</i>	100	450	4.5	0.045	2.69108	35.03	24.65	12.90	72.58
2.	<i>Diospyros melanoxylon</i>	100	375	3.75	0.037	0.71101	9.25	20.54	12.90	42.69
3.	<i>Cassia fistula</i>	100	325	3.25	0.032	0.15875	2.06	17.80	12.90	32.76
4.	<i>Butea monosperma</i>	100	175	1.75	0.017	0.24745	3.22	9.58	12.90	25.7
5.	<i>Anogeissus latifolia</i>	50	50	1	0.02	1.05768	13.76	2.73	6.45	22.94
6.	<i>Bridelia retura</i>	50	50	1	0.02	0.7802	10.15	2.73	6.45	19.33
7.	<i>Schleichera oleosa</i>	50	50	1	0.02	0.70417	9.16	2.73	6.45	18.34
8.	<i>Lagerstroemia parriflora</i>	50	100	2	0.04	0.15589	2.02	5.47	6.45	13.94
9.	<i>Adina cordifolia</i>	25	25	1	0.04	0.70350	9.15	1.36	3.22	13.73
10.	<i>Acacia leucophloea</i>	50	75	1.5	0.03	0.12452	1.62	4.10	6.45	12.17
11.	<i>Buchanania lanzab</i>	50	50	1	0.02	0.1787	2.32	2.73	6.45	11.5
12.	<i>Terminalia tomentosa</i>	25	75	3	0.12	0.04793	0.6239	4.10	3.22	7.94
13.	<i>Lannea coromandelica</i>	25	25	1	0.04	0.12109	1.57	1.36	3.22	6.15

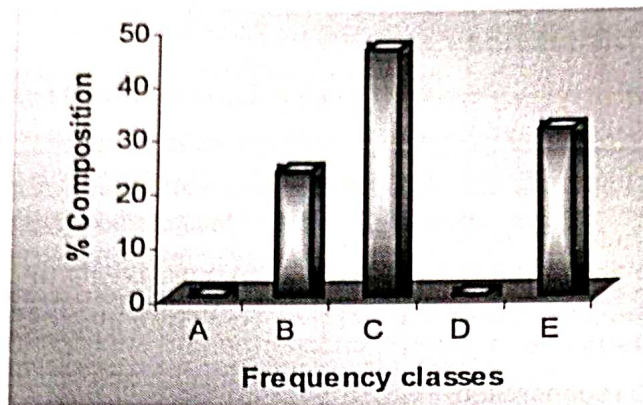


Table 2: Composition of shrub vegetation at Gopalpura

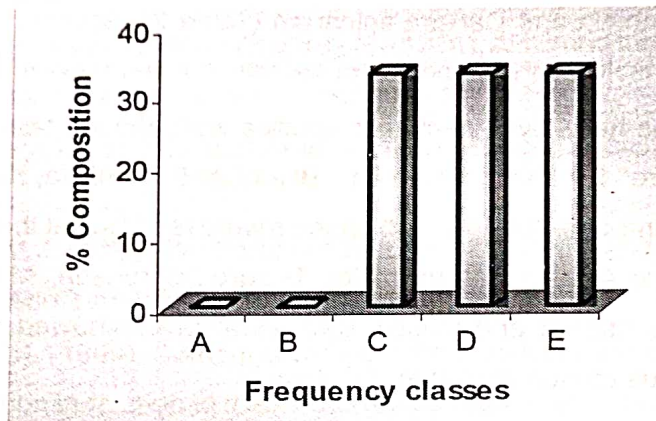
S. No.	Name of plant species	Frequency %	Density (plants ha <sup>-1</sup> )	Abundance	A/F Ratio	Relative Dominance	Relative Density	Relative frequency	Importance Value Index (IVI)
1.	<i>Gymnosporia spinosa</i>	100	500	1.25	0.012	23.57	50	44.44	118.01
2.	<i>Zizyphus oenoplia</i>	75	300	1	0.013	43.90	30	33.33	107.23
3.	<i>Carissa spinarum</i>	50	200	1	0.02	32.52	20	22.22	74.74

Table 3: Composition of herb layer at Gopalpura

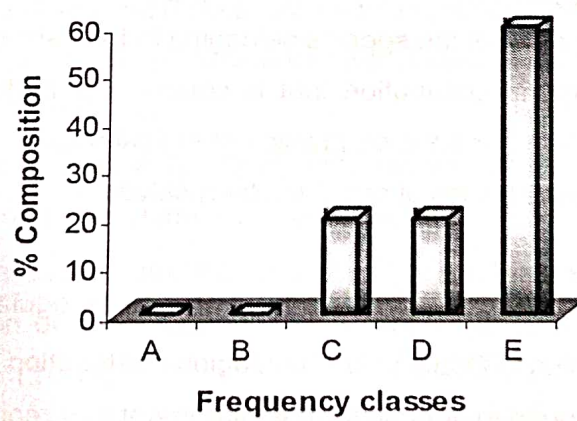
S. No.	Name of plant species	Frequency %	Density (plants m <sup>-2</sup> )	Abundance	A/F Ratio	Relative Dominance	Relative Density	Relative frequency	Importance Value Index (IVI)
1.	<i>Bridens bifernata</i>	100	4.75	4.75	0.047	16.03	23.45	12.5	51.98
2.	<i>Sida veronicaefolia</i>	100	3.5	3.5	0.035	11.45	17.28	12.5	41.23
3.	<i>Bryonopsis laciniosa</i>	75	2.5	3.33	0.044	16.03	12.34	9.37	37.74
4.	<i>Xanthium strumarium</i>	100	1.75	1.75	0.017	13.99	8.64	12.5	35.13
5.	<i>Tridax procumbens</i>	100	2.25	2.25	0.022	8.39	11.11	12.5	32
6.	<i>Alysicarbus monilifer</i>	100	1.5	1.5	0.015	9.92	7.40	12.5	29.82
7.	<i>Eragrostis tenella</i>	75	1.25	1.66	0.022	4.83	6.17	9.37	20.37
8.	<i>Mitreola oldenlandiodes</i>	50	0.5	1	0.02	9.16	2.46	6.25	17.87
9.	<i>Achyranthes aspera</i>	50	1.25	2.5	0.025	4.58	6.17	6.25	17
10.	<i>Cassia tora</i>	50	1	2	0.04	5.59	4.93	6.25	16.77



Tree



Shrub



Herb

Fig. 1: Frequency diagram of different communities at Gopalpura



## Result and Discussion -

Values of IVI indicate that *Tectona grandis* showed highest IVI (Table 1). While co-dominant species of the site were *Diospyros melanoxylon* and *Cassia fistula*. Most of the tree species showed random distribution. While the total composition of vegetation appear to be heterogeneous (Fig. 1).

In this site 1310 seedlings and 2270 saplings were found. The maximum number of seedlings recorded in *Butea monosperma* and saplings in *Diospyros melanoxylon* showing good regeneration.

Shrub layer was dominated by *Gymnosporia spinosa* and other species were *Zizyphus oenoplia* and *Carissa spinarum* (Table 2). Species composition of site was homogeneous. Majority of species of the site showed regular distribution.

In the herb layer, dominant species were *Bidens biternata* while co-dominant species were *Sida veronicaefolia*, *Bryonopsis laciniosa*, *Xanthium strumarium* and *Tridax procumbens*. Total 10 herb species were recorded at the site (Table 3). Common species were *Alysicarpus monilifer*, *Eragrostis tenella*, *Mitreola oldenlandioidea*, *Achyranthes aspera* and *Cassia tora*. Herb layer showed regular distribution and homogeneous composition (Fig. 1).

Maximum importance value index of species indicates its dominance and ecological success, its good power of regeneration and greater ecological amplitude. In the study area, most of the species belonging to tree, shrub and herb layers in general showed contagious distribution that is commonest pattern in nature. The trend of distribution pattern depends on physic - chemical nature of environment as well as on the biological peculiarities of organism themselves. Trend of distribution in general was as follows.

Contagious > random > regular

According to Odum (1971) contagious distribution is common in nature, random distribution is found in very uniform environment and regular distribution occurs under severe competition.



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