

Distribution Pattern of Some Ethnomedicinal Plants of Mayali in Jashpur District

Sangeeta Yadav*, Lata Sharma

Department of Botany, Dr. C.V. Raman University, Kargi road Kota, Bilaspur (C.G.), India

*Corresponding author: sangeeta.me143@gmail.com

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Abstract Present study aimed to compare the distribution pattern and trends of medicinal plants. Present work was focused on the study of relationship of local people with indigenous plants and the documentation of indigenous their knowledge on how local plant resources are utilized to cure different diseases. The field work was carried out in two distinct sites for studying both distribution pattern and folk medicinal uses of plants. A total of ten quadrates in Mayali site were used to calculate phytosociological characteristics (Frequency, density, abundance and important value index). During the present investigation fifteen ethnomedicinal plants species families were document from Mayali site situated at Jashpur district. *Cynodon dactylon*, *Bambusa vulgaris*, *Alkana tinctoria*, *Senna tora* and *Crnum latifoliumi* exhibited maximum value of RF, RD, RM and IVI at Mayali site. The outcome of present research work was the documented plant diversity of at Mayali site that could generate further research activities and will help the upcoming generations to conserve ethno-medicinal knowledge of medicinal herbs for the benefit to society and ecosystem.

Keywords: abundance, density, ethno medicinal plants, frequency, important value index, plant diversity

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1. Introduction

Jashpur district lies in the north-eastern corner of the central Indian state of Chhattisgarh adjoining the border of Jharkhand and Odisha. Jashpur nagar is the administrative headquarters of the district. It is placed among valleys and surrounded with lush green environment. Jashpur nagar is nearest town to Mayali which is approximately 35 km away. The village Mayali in Jashpur district situated in Chhattisgarh state, with a population 682. The size of the area is about 6.12 square kilometer. The studies of the interrelation of Phytosociological characters represent the status of plant diversity [1]. The present investigation was carried out on phytosociological and species diversity in the Mayali district of Jashpur. The main purpose of the phytosociological is to understand floristic vegetation characteristics to estimate the species richness and diversity existing in the study area.

2. Materials and Methods

The research methodology of present study was adopted from Kanaujia et al. [2], Krishna et al. [3], Negi and Nautiyal [4], Ojha [5], Pielou [6] and Srinivsa Rao et al. [7] with slight modification as per authors research knowledge.

2.1. Study Area

The present study area was Jashpur district in Chhattisgarh state which is a tribal area. The geographical area of Jashpur district is 5737.00 sq. km. The South-North length of this study area is about to 150 km and its West-East breath is 85 km. Mayali is located in Kunkuri Tehsil of Jashpur district in Chhattisgarh, India. It is situated 15 km away from sub district headquarter Kunkuri and 35 km away from district headquarter Jashpur nagar.

2.2. Survey Method

We conducted study in the rural areas of Mayali site that come under Jashpur district. We talked to the indigenous people about the native plants of that area, took pictures of each plants available in that area. Quadrate method (at a square of 100 X 100 cm) was used to study the diversity of medicinal plants including herbs, shrubs and trees of Mayali site during rainy, winter and summer season. Phytosociological studies were carried out during 2019 to 2020 to cover all spectrum all vegetation. Ten-quadrat were randomly selected from different sites of Mayali village. Number of species and number of individual in each quadrate were recorded. These observations were used to calculate Frequency, Density, Relative Density (RD), Abundance, Relative Dominance (RA) and Important Value Index (IVI) of each species.

2.3. Identification

Plant identification was done as per the morphological clues by comparing known plants with unknown plants. The objectives of the present study were to stratify the vegetation into different type and to analyze the community structure for species (population structure, density, frequency, abundance and species girth class relationship). The following calculations were used for the assessment of major parameters included in Phytosociological studies of plants inhabited in specific inhabitation.

$$\text{Density} = \frac{\text{Number of individuals species A}}{\text{Area sampled}}$$

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

$$\text{Dominance} = \frac{\text{Total cover of basal area of species}}{\text{Area sampled}}$$

$$\text{Relative Dominance} = \frac{\text{Dominance of species A} \times 100}{\text{Total dominance of all species}}$$

$$\text{Frequency} = \frac{\text{No. of plots in which species A occurs}}{\text{Total number of plots sampled}}$$

$$\text{Relative Frequency} = \frac{\text{Frequency value for species} \times 100}{\text{Total frequency values of all species}}$$

$$\text{Relative Frequency Abundance/ Quadrate} = \frac{\text{Total no. of species A occur in all quadrates}}{\text{Total no. of quadrate in which species A occur}}$$

Important Value Index

$$= \frac{(\text{Relative Density} + \text{Relative Dominance}) + \text{Relative Frequency}}{3}$$

3. Results

The present research work was conducted to assess the phytosociological study of Mayali site of Jashpur district to understand the floristic vegetation characteristics, species richness and diversity exist in the study area. The Mayali site of Jashpur district is shown in Figure 1. A total of 20 species of medicinal plant (herb, shrub and tree) have been recorded in Mayali site of Jashpur district. These species have been belonged to fifteen families and widely used by indigenous society to cure different diseases. The present investigations have revealed that twenty leafy plants were distributed over fifteen families. These have occupied various life forms and out of them thirteen were tree species, one was shrub species and six were herb species (Table 1). The phytosociological study was carried out using primary data obtained from field survey which revealed that the maximum density of *Bambusa vulgaris* and *Crinum lotifolium*. The frequency measurements emphasized the importance of distribution of individuals belonging to a particular species in the vegetation sampled. Therefore, species diversity is considered as the best measures of community structure. Observations divulged that among twenty observed ethno medicinal plants i.e., *Cynodon dactylon*, *Bambusa vulgaris*, *Alkana tinctoria*, *Senna tora* and *Crinum latifolium* exhibited maximum value of RF, RD, RM and IVI while *Tasmanian pepper*, *Ficus religiosa* have shown minimum value of RF, RD, RM and IVI (Table 2).

Table 1. List of medicinal plants documented as per the knowledge of indigenous respondents (peoples) of Mayali village Kunkuri Tehsil of Jashpur district (Chhattisgarh)

Medicinal plant	Family	Type of plant	Number of species	Percentage distribution
<i>Argemon Mexicana</i>	Papaveraceae	Herb	3	3.2
<i>Alkana tinctoria</i>	Boraginaceae	Herb	4	4.1
<i>Aegle marmelos</i>	Rutaceae	Tree	3	3.2
<i>Azadirachta indica</i>	Meliaceae	Tree	2	2.1
<i>Bambusa vulgaris</i>	Poaceae	Tree	6	6.1
<i>Bauhinia variegata</i>	Fabaceae	Tree	2	2.2
<i>Cynodon dactylon</i>	Poaceae	Herb	6	6.1
<i>Crinum lotifolium</i>	Amaryllidaceae	Herb	2	2.1
<i>Ficus benghalensis</i>	Moraceae	Tree	3	3.1
<i>Ficus religiosa</i>	Moraceae	Tree	2	2.1
<i>Lantana camara</i>	Verbenaceae	Shrub	3	3.2
<i>Madhuca longifolia</i>	Sapotaceae	Tree	5	5.1
<i>Mangifera indica</i>	Anacardiaceae	Tree	3	3.2
<i>Millettia pinnata</i>	Fabaceae	Tree	2	2.1
<i>Phoenix dactylifera</i>	Arecaceae	Tree	4	4.2
<i>Shorea robusta</i>	Dipterocarpaceae	Tree	6	6.1
<i>Senna tora</i>	Fabaceae	Herb	5	5.2
<i>Syzygium cumini</i>	Myrtaceae	Tree	3	3.1
<i>Tamarindus indica</i>	Fabaceae	Tree	2	2.1
<i>Tasmanian pepper</i>	Winteraceae	Herb	3	3.2

Table 2. Phytosociology of medicinal plant species documented during Rainy, Winter and Summer season (from 2019 to 2020) in Mayali village Kunkuri Tehsil of Jashpur district (Chhattisgarh)

S. No.	Name of species	Frequency (%)	Density	Abundance	Relative Frequency (R.F.)	Relative Density (R.D.)	Relative Dominance (R.M.)	Important Value Index (IVI)
1	<i>Argemon Mexicana</i>	34	43.5	46	6.5	4.35	5.35	30.40
2	<i>Alkana tinctoria</i>	64	3.12	4.45	3.11	4.850	9.22	18.56
3	<i>Aegle marmelos</i>	39	2.76	2.91	7.820	3.62	0.018	8.770
4	<i>Azadirachta indica</i>	32	2.11	7.04	4.31	0.55	1.76	4.53
5	<i>Bambusa vulgaris</i>	95	8.60	3.02	2.11	0.130	0.40	50.61
6	<i>Bauhinia variegata</i>	20	2.60	82.1	3.12	10.280	6.62	18.63
7	<i>Cynodon dactylon</i>	93	9.40	1.30	4.157	0.453	0.16	60.67
8	<i>Casia tora</i>	19	1.3	1.54	11.4	2.260	3.48	12.30
9	<i>Crinum lotifolium</i>	94	08.48	2.32	5.21	0.919	2.25	39.43
10	<i>Ficus benghalensis</i>	34	1.42	12.10	1.31	0.383	1.39	13.57
11	<i>Ficus religiosa</i>	30	0.4	1.46	4.24	1.66	2.57	6.56
12	<i>Lantana camara</i>	55	30.00	83.12	2.1	0.10	0.134	17.43
13	<i>Madhuca longifolia</i>	17	0.10	3.47	3.17	3.92	0.457	13.34
14	<i>Mangifera indica</i>	18	2.60	2.11	2.50	0.356	3.55	13.32
15	<i>Millettia pinnata</i>	66	1.11	4.03	3.21	2.234	0.86	8.98
16	<i>Phoenix dactylifera</i>	50	1.2	1.01	1.22	3.25	2.87	18.12
17	<i>Shorea robusta</i>	82	60.40	2.14	2.74	1.10	1.19	39.34
18	<i>Senna tora</i>	80	9.720	3.41	3.21	0.58	2.016	33.67
19	<i>Syzygium cumini</i>	76	10.40	16.27	1.44	35.610	40.810	18.53
20	<i>Tamarindus indica</i>	65	2.3	2.56	3.22	27.18	30.70	31.86
21	<i>Tasmanian pepper</i>	16	1.40	4.3	1.81	0.300	1.65	17.56



Figure 1. Photo Plate – Mayali Site

4. Discussion

The phytosociology study of plant vegetation deals with the composition, development and the relationship between the species among plant communities. Similar kind of studies have been done i.e., Prajapati et al. [8] conducted a research in tropical dry deciduous forest of Jashpur district of Chhattisgarh state, Painkara et al. [9] assessed the tribal knowledge of medicinal plants of Jashpur district, Kurre [10] explored the variety of medicinal plants and their application inhabited in Jashpur District, Chatterjee [11] conducted ecological studies of the plant vegetation of Odgi Forest situated at Sarguja district. Recently, Yadav and Sharma [12] assessed the distribution Pattern of some Ethnomedicinal Plants at Kunkuri Tehsil of Jashpur District. However these studies need to be more insightful, in order to meet the need the present investigation has been initiated in Mayali village of Jashpur District. The Random distribution has been found in uniform environment only whereas the regular distribution occurs where the severe competition exists between plant species. Moreover, each species of a community plays a specific role and represent the definite quantitative relationship between abundant and rare species. The research analysis of primary data revealed six herb species were recorded in the study sites. The *Cynodon dactylon* exhibited the maximum IVI values at Mayali site. Certain literature claimed the variety of medicinal applications of *C. dactylon*. Recently, Singh et al. [13] advocated the antioxidant, anti-inflammatory, wound-healing and immunomodulatory properties of *C. dactylon* (L.) and Savadi et al. [14] have been observed the significant antibacterial potential of methanolic extract of *C. dactylon* rhizomes against human pathogenic bacteria viz., *Bacillus cereus* and *Escherichia coli*. However, the more precise plant diversity needs to be explored in Jashpur District.

5. Conclusion

The phytosociology study of plant diversity in Chhattisgarh is still need to explore because this state has rich medicinal plant diversity that has been utilized for the indigenous peoples since long ago. The information of the application of plant species for specific utility is passed from one generation to another one. As they practice the routine utilization of plant species to maintain health and to cure diseases, thereby the indigenous peoples aware of the exact utility of their indigenous plant communities. The *Cynodon dactylon* exhibited the maximum IVI values at Mayali site and therefore it is emerged as dominant species of that ecosystem. Conclusively we observed low grazing pressure and moderate human impact on normal distribution of plant species which may cause reduction in plant diversity in the Mayali ecosystem. Hence the documentation and preservation of plant diversity plays a crucial role to maintain sustainable ecosystem. Such

studies could generate the opportunities for further research activities and help the upcoming generation in pursuing ethno-botanical knowledge of different regions of Chhattisgarh state.

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