Phytodiversity and Importance Value Index of Some Endemic Medicinal Plant Species in the Forest of Chhatarpur District

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Abstract: The field study was carried out in the forest of Chhatarpur district, MP, in about 12385 kilometers. Chhatarpur district is a part of Central India and lies in Satpura hill ranges adjoining Vindhyan scarp bordering Uttar Pradesh. It lies between 26º26" N to 25º21" N latitude and 78º59" to 80º26" E longitude. All attempts were made to assess the importance value index (IVI) of some endemic plant species of Chhatarpur district. Phytosociological data were conducted by using the quadrate and the pin-point method (10×10) meter size for measuring frequency, density and abundance of each plant species. On the basis of frequency, density and abundance, their values were calculated with relative frequency, relative density and relative abundance, which were considered for the determination of important value index (IVI) of each species in the forest of Chhatarpur district.

Introduction

Phytodiversity can be defined as richness of plants occurring as an interacting system in a given habitat. The term biodiversity was first used in its long version biological diversity by Levjoy (1980) and, most commonly used to describe about member of species [1]. In modern times, the industrial civilization has developed to a large scale, as a result of which, the life of several species of organisms has been endangered. Biodiversity of endangered plants near Chhatarpur district provides the fact that how can be conserved the biodiversity of endangered plants in the district. The Indian subcontinent, with its rich biodiversity, is one of the 12 Mega-diverse countries in the world. The Eastern Ghats, Western Ghats, Himalayas, Northeastern hills and Andaman's constitute important biodiversity area of India.

The climate of India is dominated by the Asiatic monsoon, most importantly, by rains from the South-West between June and October, and drier winds from the North between December and February. From March to May the climate is dry and hot. Chhatarpur district is full of generic, specific and ecological diverse due to different rocks, different types of soil and minerals. Floristic composition and phytosociological studies [2]. Studies in India Ethnobotany, less known uses of 50 common plants from tribal areas of Madhya Pradesh [3]. Phytosociological approach to the study of plant communities was elaborated by a number of researchers [4,5]. Present work has been based on phytodiversity of endemic plants in Chhatarpur district.

Materials and methods

Phytosociological methods have been developed for the study of plant communities. The quadrat

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method is very common to determine the quantitative characteristics of vegetation. The vegetational analysis of the selected forest stands was carried out in the year 2009 by using the 10×10 meter size quadrat. In this method, 40 numbers of quadrats were laid down randomly throughout in selected forest stands. In each quadrat, the name and number of each plant species were recorded. After collecting the data of various species, the value of frequency, density and abundance were determined for each species of the plant community, according to the formulas given by Mishra (1968) [6].

Result and discussion

The data of important value index (IVI) of different plant species of forest of Chhatarpur district are provided in Table 1, which shows that the forest in the Chhatarpur district contains 30 species such as *Abrus precatorius* L., *Andrographis paniculata, Andropogon hirtiflorus,*

Aristida funiculata, Aristida adcensionis L., *Aristida reducta stapt., Arthraxon lancifolius, Amaranthus candatus* L., *Bauhinia varigata* L., *Bidens bitemata, Cissus auriculata, Desmodium laxiflorum, Eragrostis minor, Ficus glomerata, Ficus hispida* L., *Ficus virens, Fimbristylis littoralis, Gloriosa superba* L., *Nymphoids cristatum, Nelumbo nucefera, Marytynia annua* L., *Polygala arvensis, Potamogeton crispus* L., *Roriph indica* L., *Scirpus barbatus, Tinospora cardifolia, Tridex procumbens* L., *Vanda tessellata, Verbesina prostratel,* and *Vetiveria zizanioides.*

In this investigation, herb, shrub, tree, liona, climbers and aquatic plants were taken including *Nelumbo nucifera*, and *Potomogeton crispus* as aquatic plants, *Tinospora cardifolia*, and *Venda tesellata* as lionas. Further, phytodiversity assessment was made for IVI study, and IVI data have been given in Table 1 which show less IVI (6.27) of *Nelumbo nucifera* (aquatic herb) and

Table 1. Importance value index (IVI) of some endemic plant species at Chhatarpur district

No.	Name of plant species	F	D	A	RF	RD	RA	IVI
1	*Abrus precatorius L.*	20	4	0.2	3.14	7.4	5.95	16.49
2	*Andrographis paniculata*	30	4	0.13	4.72	7.4	3.86	15.98
3	*Andropogon hirtiflorus*	30	3	0.1	4.72	5.6	2.97	13.29
4	*Aristida funiculate*	30	1.5	0.05	4.72	2.8	1.51	9.03
5	*Aristida adcensionis L.*	40	2	0.05	6.29	3.7	1.48	12.67
6	*Aristida reducta stapt.*	40	2.5	0.06	6.29	4.6	1.78	12.67
7	*Arthraxon lancifolius*	10	1.5	0.15	1.57	2.8	4.46	8.83
8	*Amaranthus caudatus L.*	50	2.5	0.05	7.8	4.6	1.48	13.88
9	*Bauhinia varigata L.*	40	3	0.07	6.29	5.6	2.08	13.97
10	*Bidens bitemata*	5	1	0.2	0.78	1.8	5.90	8.48
11	*Cissus auriculata*	30	3	0.1	4.72	5.6	2.97	13.29
12	*Desmodium laxiflorum*	30	1	0.03	4.72	1.8	8.34	14.86
13	*Eragrostis minor*	40	3	0.07	6.29	5.6	2.08	13.97
14	*Ficus glomerata*	5	1	0.2	0.78	1.8	5.95	8.53
15	*Ficus hispida L*	5	1	0.2	0.78	1.8	5.95	8.53
16	*Ficus virens*	5	1	0.2	0.78	1.8	5.95	8.53
17	*Fimbristylis littoralis*	5	1	0.2	0.78	1.8	5.95	8.53
18	*Gloriosa superba L.*	20	1.5	0.07	3.14	2.8	2.08	8.02
19	*Nymphoids cristatum*	20	1	0.05	3.14	1.8	1.48	6.42
20	*Nelumbo nucefera*	10	1	0.1	1.5	1.8	2.97	6.27
21	*Marytynia annua L.*	10	1	0.1	1.5	1.8	2.97	6.27

table 1. (continued).

No.	Name of plant species	F	D	A	RF	RD	RA	IVI
22	*Polygala arvensis*	10	4	0.4	1.5	7.4	11.90	20.80
23	*Potamogeton cripus L.*	20	1	0.05	3.14	1.8	1.48	6.42
24	*Roriph indica L*	10	1	0.1	1.5	1.8	2.97	6.27
25	*Scirpus barbatus*	10	1	0.1	1.5	1.8	2.97	3.76
26	*Tinospora cardifolia*	10	1.5	0.15	1.5	2.8	4.46	6.76
27	*Tridex procumbens L.*	70	2.5	0.03	11.02	4.6	8.34	23.96
28	*Vanda tessellate*	10	1	0.1	1.5	1.8	11.90	15.20
29	*Verbesina prostratel*	10	1	0.1	1.5	1.8	11.90	15.20
30	*Vetiveria zizanioides*	10	1	0.1	1.5	1.8	11.90	15.20

Frequency (F) = Number of sampling units in which the species occurred x 100 / Total number of units studies

Density (D) = Total no. of individuals of a species in all sampling unit/ Total number of sampling unit in which the species occurred

Abundance (A) = Total no of individuals of a species in all sampling unit/ Total number of sampling unit in which the species occurred

R_f = Frequency of a species × 100 / Total frequency of all species

Relative density (RD) = Density of a species × 100 / Total density of all species

Relative abundance (RA) = Abundance of a species × 100 / Total abundance of all species

Importance value index (IVI) = IVI = Relative Frequency + Relative Density + Relative Abundance

Marytynia annua) while IVI of *Polygala arvensis* shows high density (20.8). Other species showed IVI in the range of 6.27 to 20.8.

The IVI represents the extent of less dominance of a species in the community [7]. The frequent occurrence of these species proves that the edaphic and topographic conditions are very good for their growth and the soil parameters were appropriately related to the type of vegetation. Therefore, It is obvious to know the composition of the soil of that area by which we would in-crease the programs like conservation of plant species as afforestation, reforestation, social forestry, agro forestry and reduce environmental problems.

The study of importance value index (IVI) gives an idea regarding to the status of individual species within the community, hence, suggesting that the knowledge of importance value index (IVI) may be more important to manage the forest ecosystem.

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