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Importance Value Index (IVI) study of some Herbaceous plants from North-East Malegaon Forest of Nashik District (MS), India

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ABSTRACT

Herbaceous diversity indicates the importance of species diversity for producing primary production in herbaceous plants in forest. Frequency (%), density and basal areas data converted into relative frequency, relative density and relative basal area. The sum of all the three give an Importance Value Index (IVI) of each species. This will gives an overall picture of ecological importance of a species with respect to herbaceous community structure. Vegetation determines many ecological parameters such as climate, energy,photosynthesis,surface runoff and soil temperature (Tappeiner and Cernusca ,1996)

Key words: *Importance ValueIndex, Herbaceous, Frequency, Phytosociology, Malegaon.*

Introduction

Phytosociology is the branch of science which deals with qualitative study of the structure of the vegetation plant communities, their composition and development, and the relationships between the species with an emphasis on quantitative relationship of a few species. Which are judged to be dominant on the belief that these largely control the community. There by the occurrence of a large number of rare species. The structure of a community is determined mainly by the dominating plant species and not by other characteristics

There are detailed accounts on the Phytosociology of (I) Chhotaudepur (Shah, Yadav and Parabia, 1979) (II) Panchamahals (Shah and Bhatt, 1980) and (III) Phytosociological studies on Dang forest (Yadav, 1979). (IV) Phytosociological studies on Trymbakeshwer, Vani and Saptashringi forest of Nashik District (Jadhav, 2002, 2004, 2016, 2018, 2019 and 2020), Phytosociological Study of Herbaceous Plant Community in Yusmarg Forest: A Developing Hill Resort in Kashmir Valley (Asma Absar Bhatti, Rouf Ahmad Bhat, Ashok K. Pandit, 2014). A similar investigation is carried out in this study area with a view to study the herbaceous communities in different localities and to analyse them according to Raunkiaer (1934).

The data on frequency (%), density and basal area are converted into relative frequency, relative density and relative basal area. The sum of all the three gives an importance value index (IVI) of each species. This will gives an overall picture of ecological importance of a species with respect to community structure.

Materials and Methods

Study area

The present study was carried out in Nashik district and located in the Western ghats, is situated at 19°

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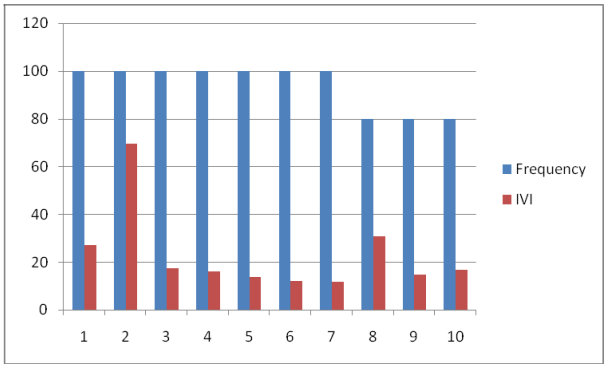
33′ – 22° 53′ N and 73° 16' – 75° 06′ E. Malegaon lies 18° 25′ 12" N 77° 31′ 48" E. The study area is 115 km away from district headquarter Nashik. Total geographical area of study is 773 hectares (7730000 sqm).

Soil and Geology

Northern, Western and Southern parts of Malegaon Tahasil are surrounded by hills. It is sloping area towards the eastern side. All the rivers in this region flow from west to east. The variation of lands can be observed here. Hills, forests and plains are found in Malegaon Tahasil. The height of plains is from 600 to 600 meters while the hilly areas from 600 to 900 meters from sea level. Except the northern and south-west parts, the whole area of Malegaon is covered by plains. Due to Girana, Mosam Panjan, Parsul and some small rivers, the central part of Malegaon is more fertile than the hilly regions. According to the geographical structure, Malegaon taluka have black, brown and medium type of soil.

Four areas located randomly in the forest of North-East Malegaon. Quadrats of 1m x1m were laid down in different directions in each of the places in different forests, so that quadrats represented almost all species in the area. 20 plots were laid for herbaceous plants. Sampling was done for a total area of 2000 sqm. Frequency (%); density and abundance were calculated by the formulae given by Raunkiaer (1934). The comparison between species of a community, the data collected on dispersion frequency (%) is index for the establishment of species in communities based on frequency (%) of all species, suggested by Pichi –Sermolli (1948), number (density and abundance) and cover (basal cover) can also be profitably used in comparing the vegetation composition of two or more stands, or of same stand over a period of time. The importance value index (IVI) gives a total picture of sociological structure of a species in a community but it does not give the dimension or share of relative values of frequency, density and basal cover.

Results



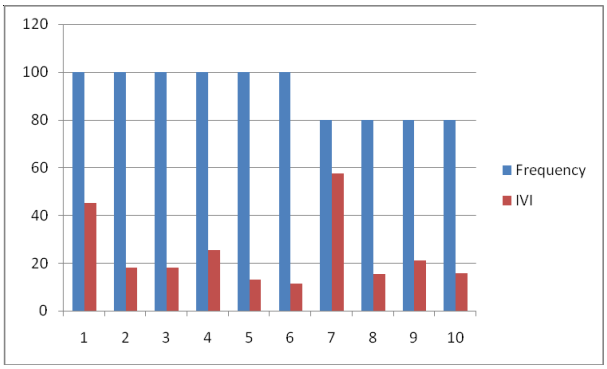
Histogram 1. Showing values of frequency (%) and Importance Value Index (IVI) of 10 dominant species from Stand No -1 of North-East Malegaon forest area.

Discussion and Conclusion

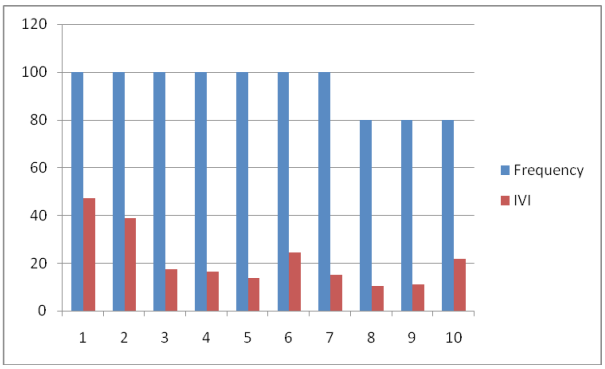
In this study area 21 herbaceous plant species were reported. Out of that only 10 dominant species were conciderd for the comparission of Frequency (%) and IVI values per stant. The ecological success of every species can be observed by the highest Importance Value Index (IVI) to the decreasing order. As stated by Braun- Blanquest (1932) a degree of regularity of a species in community is determined by

Table 1. Showing values of frequency (%) and IVI of 10 dominant species from Stand No- 1, 2, 3 and 4 of North-East Malegaon forest area.

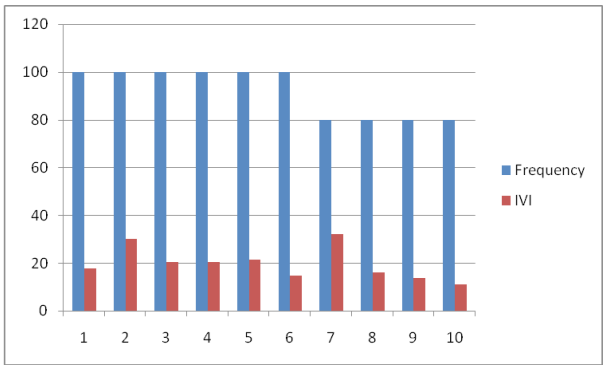
	Stand-1		Stand-2		Stand-3		Stand-4	
No	Freq (%)	IVI	Freq (%)	IVI	Freq (%)	IVI	Freq (%)	IVI
1	100	26.97	100	45.03	100	17.59	100	47.17
2	100	69.44	100	18.18	100	29.96	100	38.66
3	100	17.48	100	18.01	100	20.35	100	17.26
4	100	16.01	100	25.34	100	20.35	100	16.46
5	100	13.54	100	13.12	100	21.33	100	13.86
6	100	12.16	100	11.47	100	14.55	100	24.55
7	100	11.58	80	57.64	80	31.97	100	14.91
8	80	30.72	80	15.26	80	15.88	80	10.28
9	80	14.67	80	21.08	80	13.84	80	11.01
10	80	16.82	80	15.56	80	11.07	80	21.56



Histogram 2. Showing values of frequency (%) and Importance Value Index (IVI) of 10 dominant species from Stand No -2 of North-East Malegaon forest area.



Histogram 4. Showing values of frequency (%) and Importance Value Index (IVI) of 10 dominant species from Stand No- 4 of North-East Malegaon forest area.



Histogram 3. Showing values of frequency (%) and Importance Value Index (IVI) of 10 dominant species from Stand No-3 of North-East Malegaon forest area.

the presence of a species in a community. The species with highest IVI values are always ecologically best adapted species as in Stand-1,2 and 3 *Parthenium hysterophorus* (69.44), (57.64),(31.97), stand-4 *Sida acuta (47.17)*. Where in stand-1 *Amaranthus viridis* (11.58), stand-2 *Oxalis corniculata* (11.47) and stand-3, 4 *Cassia tora (11.07), (10.28)* with low IVI values, are poorly adapted species. The high IVI of a species indicated its dominance and ecological success, its good power of regeneration and greater ecological amplitude. Since *Parthenium hysterophorus* showed the maximum IVI values at all sites and therefore, emerged as dominant species .Species with low frequency and IVI are not suitable or unsuited to the environmental conditions and are under process of migration from one place to other. May be under the process of replacement by some one species or due to biotic interference.

Their existence is always threatened. *Parthenium hysterophorus* is best adapted species with high value of IVI than *Indigofera tinctoria and Chenopodium album* in stand -1, 2 and 3. Interesting feature is *Sida acuta* is best adapted species with high value of IVI than *Indigofera tinctoria* in the last stand-4.

A study of 10 dominant species in stand No-1, 2, 3 and 4 of North-East Malegaon forest area is repre-

Table 2. Showing 10 dominant species with higher values of frequency (%) in decreasing order each from Stand no-1, 2, 3 and 4 of North-East Malegaon forest area.

	Stand-1	Stand-2	Stand-3	Stand-4
1	*Euphorbia hirta*	*Indigofera tinctoria*	*Euphorbia hirta*	*Sida acuta*
2	*Parthenium hysterophorus*	*Achyranthes aspera*	*Chenopodium album*	*Indigofera tinctoria*
3	*Cassia tora*	*Cassia tora*	*Amaranthus viridis*	*Euphorbia hirta*
4	*Achyranthes aspera*	*Euphorbia hirta*	*Achyranthe aspera*	*Amaranthus viridis*
5	*Phyllanthus amarus*	*Phyllanthus amarus*	*Ipomoea hederacea*	*Phyllanthus amarus*
6	*Oxalis corniculata*	*Oxalis corniculata*	*Euphorbia hypericifolia*	*Argemone mexicana*
7	*Amaranthus viridis*	*Parthenium hysterophorus*	*Parthenium hysterophorus*	*Achyranthes aspera*
8	*Indigofera tinctoria*	*Sida acuta*	*Sida acuta*	*Cassia tora*
9	*Acalypha indica*	*Argemone mexicana*	*Acalypha indica*	*Portulaca oleracea*
10	*Cassia auriculata*	*Chenopodium album*	*Cassia tora*	*Acalypha indica*

sented by histograms to compare the frequency (%) and their IVI values.

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