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Diversity of forest herbs during summer season in the reserve forest of Bhupdeopur of district Raigarh (C.G.) India

***Vijay Laxmi Naidu**

Department of Botany,
Govt. V.Y.T PG (Autonomous) College, DURG (C.G.) INDIA
Email- tusharajen@gmail.com

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ABSTRACT

In the present study the emphasis is given on the study of herb layer vegetation in Bhupdeopur reserve forest of Raigarh district of Chhattisgarh as the exclusive studies on herb layer in forest ecosystems are the need of present ecological time.An extensive survey has been conducted in summer to find out the various types of forest herbs. Forty four herb species were recorded in summer season , their local names and various uses by the local inhabitants including medicinal values were recorded. The parameters such as frequency , density and adundance were also undertaken.

Figures : 07 References : 06 Table : 01
KEY WORDS : Abundance, Biodiversity, Bhupdeopur reserve forest, Chhattisgarh, Density, Forest herbs, Frequency

Introduction

Forests are one of the most important recognized ecosystems in the biosphere and India is rich in all aspects of Biodiversity and Ecosystems . Forests are generally considered as assemblage of trees but in actual sense it is a multistoried vegetation system in which vegetation can be classified into three main storeys: tree storey , shrub storey and herb storey.

The herb storey or under storey vegetation is considered an important component of forest ecosystem[1]. These plant strata are integral part of food chain for mammals and birds and control microclimate of the site. The herb layer biomass generally plays an important role in the recycling of nutrients . In forest ecosystem, under storey studies have not been given a proper weightage like the tree constituents .Hence only a few studies on the role of under storey vegetation in different types of plantation ecosystems are known[2,6]. Phytosociological analysis of a plant community is an important aspect of ecological study of any piece of vegetation .Species composition is one of the important characters of plant community .Analytical character viz. Frequency ,density and abundance are very useful in the composition of two different plant communities.The present study was conducted in Bhupdeopur reserve forest of district Raigarh Chattisgarh.(Table-1).

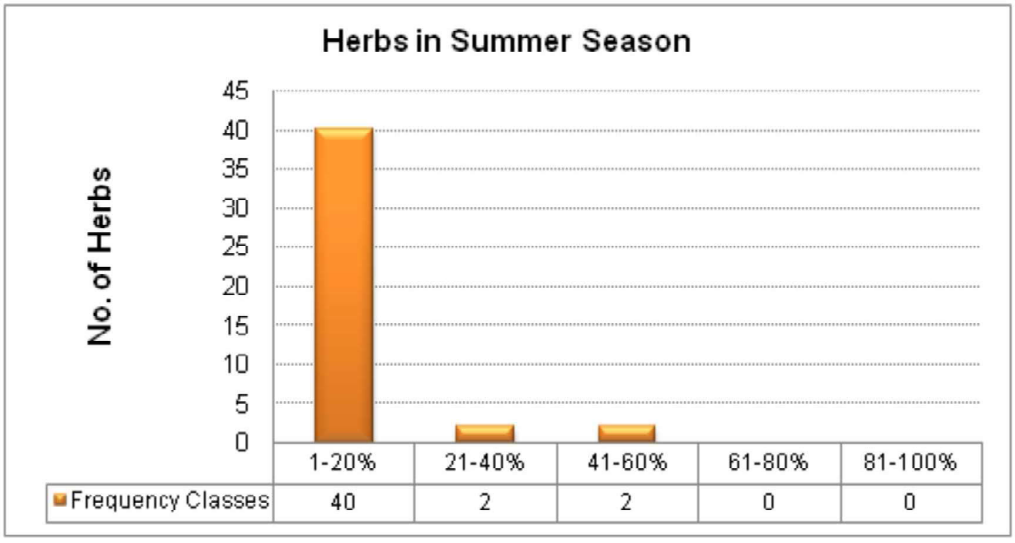

Fig. 1 : Frequency of Herbs determined in Bhupdeopur Reserve forest area

Aim / Purpose :

1. Identification of herb species of Bhupdeopur reserve forest .
2. To study the herb diversity of Bhupdeopur reserve forest .
3. Identification of endangered herb species which is of promising value.
4. To study the floristic composition of Bhupdeopur reserve forest .
5. To enlist ethnobotanical uses of herbs specifically of health and livelihood security.

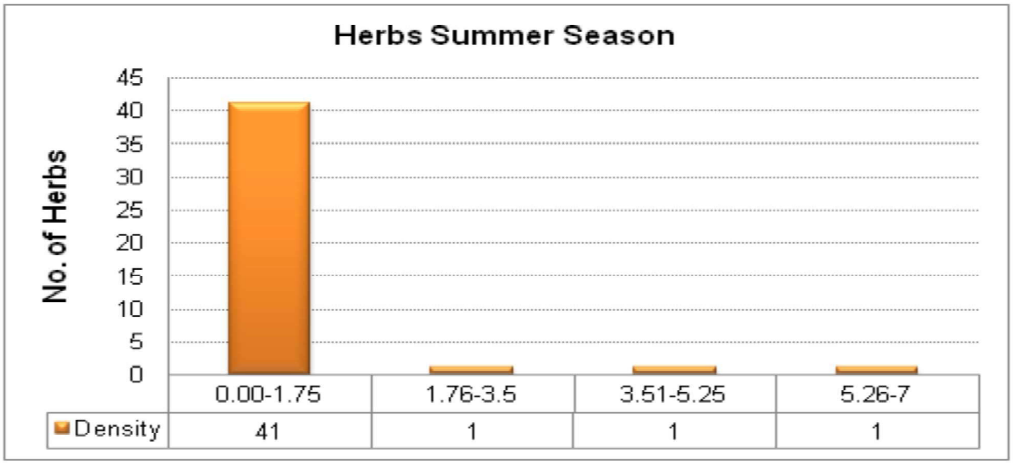

Fig. 2 : Density of Herbs recorded in Bhupdeopur Reserve forest area.

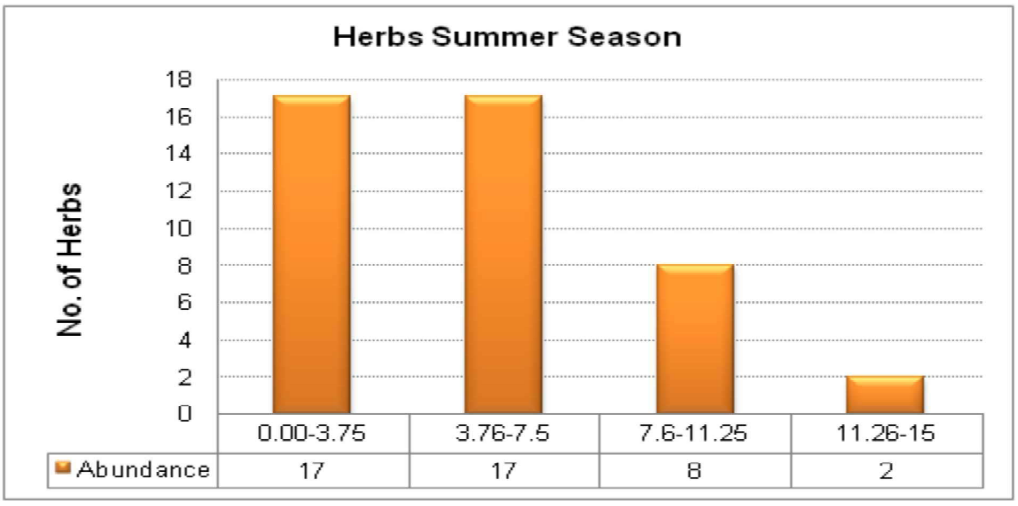

Fig. 3 : Abundance of Herbs determined in Bhupdeopur Reserve forest area.

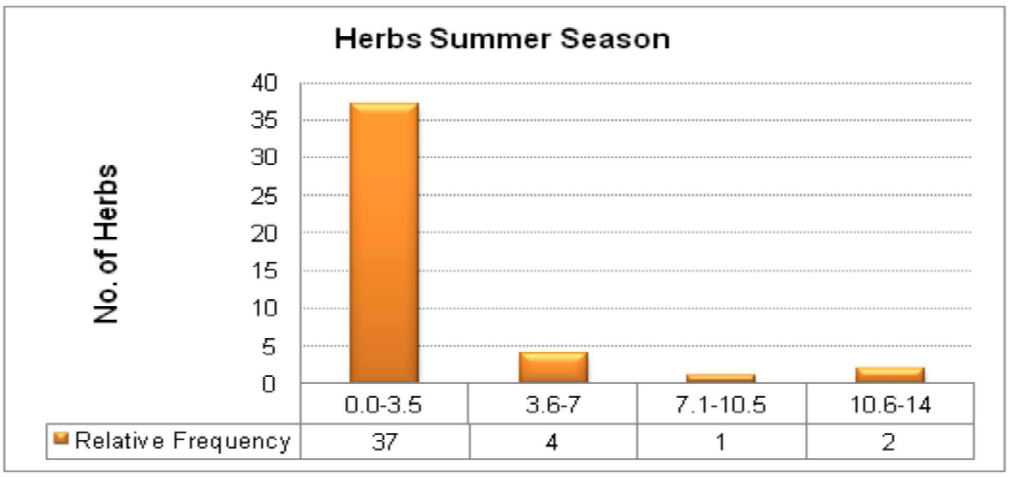

Fig. 4 : Relative Frequency of Herbs determined in Bhupdeopur Reserve forest.

Materials and Methods

1. Selection of study sites

The present study was conducted in BhupdeopurReserve forest of district Raigarh, Chhattisgarh.The study area was divided into 4 circles named as Naharpali, Kerajhar, Delari and Khairpur. Each circle was further divided into beats and a total of 20 beats in 16 villages were considered for the study. The study site was spread over in 25 km of North West of Raigarh city block.

Method of sampling

In the study Phytosociological diversity analysis was carried out by quadrate method. Random sampling of study area was done[4-6]. 1mtr sq. circular quadrates were used for the sampling of herb layer. On the basis of the data obtained from the quadrate samples the structural distribution of forest herbs in the summer season were analysed. The parameters such as percentage frequency , density , abundance were obtained and were calculated from the data as follows.

$$\%F = \frac{\text{Numer of sampling units in which plant species occurred}}{\text{Total number of sampling units studies}} \times 100$$

$$\text{Density} = \frac{\text{Total number of individuals of a plant species in all sampling units}}{\text{Total Number of sampling units studied}}$$

TABLE-1: Phytosociological study of Herbs in Bhupdeopur Reserve forest area of district Raigarh during Summer season.

S. no.	Botanical Name	Local / Vernacular Name	Family	Habitat	% Frequ-ency	Density	Abun-dance	Relative Frequ ency	Relative Density	Relative Abund-ance	Important Value Index
1	*Ageratum conyzoides*	Lango	Asteraceae	Wild	5	0.18	3.60	1.35	0.66	1.70	3.71
2	*Alysicarpus vaginalis*	Latkana	Fabaceae	Wild	9	0.45	5.00	2.43	1.65	2.36	6.44
3	*Andrographis paniculata*	Bhuineem	Acanthaceae	Wild	8	0.26	3.25	2.16	0.95	1.53	4.64
4	*Aristida adscensionis*	KattaBirni	Poaceae	Wild	8	0.87	0.16	2.16	3.20	0.07	5.43
5	*Astercantha longifolia*	Kantali	Acanthaceae	Wild	3	0.15	5.00	0.81	0.55	2.36	3.72
6	*Biophytum sensitivum*	Laxmana	Oxalidaceae	Wild	2	0.16	8.00	0.54	0.58	3.78	4.90
7	*Centella asiatica*	Brahmi	Apiaceae	Wild	3	0.17	5.66	0.81	0.62	2.67	4.10
8	*Crotalaria pallida*	Jungali San	Fabaceae	Wild	1	0.01	1.00	0.27	0.03	0.47	0.77
9	*Crotalaria retusa*	Ghunghunian	Fabaceae	Wild	3	0.14	4.66	0.81	0.51	2.20	3.52
10	*Cynodond actylon*	Doobghass	Poaceae	Wild	4	0.28	7.00	1.08	1.03	3.30	5.41
11	*Cyperus rotundus*	Nagarmotha	Cyperaceae	Wild	9	0.44	4.88	2.43	1.62	2.30	6.35
12	*Cyperus scariosus*	Motha	Cyperaceae	Wild	9	0.98	0.75	2.43	3.60	0.35	6.38
13	*Cyperus triceps*	Nirbisi	Cyperaceae	Wild	4	0.43	0.37	1.08	1.58	0.17	2.83
14	*Desmodiam triflorum*	Kudaliya	Fabaceae	Wild	36	3.00	8.33	9.72	11.04	3.93	24.69

15	*Desmodium gangeticum*	Salparni	Fabaceae	Wild	5	0.20	4.00	1.35	0.73	1.89	3.97
16	*Eragrostis ciliaris*	Ghass	Poaceae	Wild	6	0.24	4.00	1.62	0.88	1.89	4.39
17	*Eragrostis diarrhena*	Ghass	Poaceae	Wild	4	0.46	11.50	1.08	1.69	5.43	8.20
18	*Eremopogon foveolatus*	Pirichit	Poaceae	Wild	15	1.64	1.36	4.05	6.04	0.64	10.73
19	*Euphorbia hirta.*	Dudhi	Euphorbiaceae	Wild	1	0.07	7.00	0.27	0.25	3.30	3.82
20	*Evolvulusal sinoides .*	Shankhapuspi	Convolvulaceae	Wild	9	0.02	0.22	2.43	0.07	0.10	2.60
21	*Hemidesmus indicus*	Anantmool	Asclepiadaceae	Wild	21	0.42	2.00	5.67	1.54	0.94	8.15
22	*Heteropogon contortus*	Shuklakanta	Poaceae	Wild	14	1.32	9.42	3.78	4.86	4.45	13.09
23	*Hyptis suaveolens*	Van Tulsa	Lamiaceae	Wild	45	6.55	14.55	12.16	24.12	6.87	43.15
24	*Justicia procumbens .*	Kalmashi	Acanthaceae	Wild	2	0.12	6.00	0.54	0.44	2.83	3.81
25	*Ludwigia perennis*	JalDhawai	Onagraceae	Wild	3	0.18	6.00	0.81	0.66	2.83	4.30
26	*Lygodium flexuosum*	Indraraj	Schizaecaceae	Wild	1	0.03	3.00	0.27	0.11	1.41	1.79
27	*Mentha virdis*	Pudina	Lamiaceae	Wild / cultivated	4	0.20	5.00	1.08	0.73	2.36	4.17
28	*Merremiae marginata*	Musakani	Convolvulaceae	Wild	50	1.21	8.42	13.51	15.50	3.98	32.99

29	*Oxalis corniculata*	ChukaTripati	Oxalidaceae	Wild	4	0.25	6.25	1.08	0.92	2.95	4.95
30	*Peristrophebi calyculata*	Atrilal	Acanthaceae	Wild	2	0.15	7.50	0.54	0.55	3.54	4.63
31	*Peucedanum nagpurense*	Tejraj	Apiaceae	Wild	8	0.87	0.20	2.16	3.20	0.09	5.45
32	*Phyllanthus niruri*	Bhuiamla	Euphorbiaceae	Wild	5	0.02	0.40	1.35	0.07	0.18	1.60
33	*Polygonum aviculare*	Macheti	Polygonaceae	Wild	1	0.10	10.00	0.27	0.36	4.72	5.35
34	*Psoraleacory lifolia*	Bakuchi	Fabaceae	Wild	3	0.29	9.66	0.81	1.06	4.56	6.43
35	*Ruellia tuberosa*	Jurbula	Acanthaceae	Wild	2	0.04	2.00	0.54	0.14	0.94	1.62
36	*Rungia pectinata*	Tavashu	Acanthaceae	Wild	7	0.19	2.71	1.89	0.69	1.28	3.86
37	*Rungia repens*	Kharmor	Acanthaceae	Wild	3	0.12	4.00	0.81	0.44	1.89	3.14
38	*Scoparia dulcis*	Ghoda Tulsi	Scrophulariaceae	Wild	2	0.20	10.00	0.54	0.73	4.72	5.99
39	*Sidarhom bifolia*	Lal Barela	Malvaceae	Wild	5	0.01	0.20	1.35	0.03	0.09	1.47
40	*Thysanolaena maxima*	Phool Bahari	Poaceae	Wild	18	0.90	5.00	4.86	3.31	2.36	10.53
41	*Tridax procumbens*	Khargosh ghass	Asteraceae	Wild	9	0.40	4.44	2.43	1.47	2.09	5.99
42	*Trigonella foenum graecum*	Methi	Fabaceae	Wild / Cultivated	4	0.16	4.00	1.08	0.58	1.89	3.55
43	*Vernonia cinerea*	Sahdevi	Asteraceae	Wild	12	0.24	2.00	3.24	0.88	0.94	5.06
44	*Zornia gibbosa*	Samarpani	Fabaceae	Wild	1	0.03	3.00	0.27	0.11	1.41	1.79

$$\text{Abundance} = \frac{\text{Total number of individual plant species in all the sampling units}}{\text{Total number of sampling units of occurrence}}$$

Result and Discussion

A total of 44 species of herbs belonging to 38 genera of 16 families were recorded : out of them 33 plant species belonged to dicotylodonae, 9 belonged to monocotyledonae and 1 belonged to pteridophyte. Fabaceae was found the dominant family recorded 08 species, while, 07 species each of Acanthaceae and Poaceae, 03 of Asteraceae and Cyperaceae, 02 each for Oxalidaceae, Apiaceae, Euphorbiaceae, Convolvulaceae and Lamiaceae were recorded. The Minimum number of species (01) was recorded for 06 of the families like Periplocaceae, Onagraceae, Schizaecaceae, Polygonaceae,Malvaceae and Scrophulariaceae. Out of 44 herbs species recorded during summer season 42 species were wild and 02 were wild/ cultivated.(Table-1).

Distribution of Herbs

1. **% Frequency of herbs-** % frequency was calculated for the 40 species under the range of 1% to 20%, 02 plant species in the range of 21% to 40%, 02 plant species in the range of 41% to 60% and none of the plant species was in the range of 61% to 80% and 81% to 100%. The maximum % frequency 50% was estimated for the plant species *Merremiae narginata* and the minimum 1% for 04 plants species viz. *Crotalaria pallida Euphorbia hirta*, *Lygodium flexuosum*, *Polygonun aviculare* (Fig. 1).
2. **Density of herbs-** Density was calculated for 41 plant species in the range 0.00 to 1.75, 01 plant species in the range of 1.76 to 3.50, 01 plant species in the range of 3.51 to 5.25 and 01 plant species in the range of 5.26 to 7.00. The maximum density 6.55 was calculated for the plant species *Hyptissua veolens* Poit.and the minimum 0.01 for the plant species *Crotalaria pallida* and *Sidarhom bifolia* (Fig. 2).
3. **Abundance of Herbs-** Abundance of 17 plant species was calculated in the range of 0.00 to 3.75, 17 plant species in the range of 3.76 to 7.50, 08 plant species in the range of 7.60 to 11.25 and 02 plant species in the range of 11.26 to 15.00. The maximum abundance 14.55 was estimated for the plant species *Hyptissua veolens* and the minimum for the plant species *Aristida adscensionis* (Fig. 3).
4. **Relative frequency of herbs-** Relative frequency of 37 plant species was determined in the range of 0.00 to 3.50, 04 plant species in the range of 3.60 to 7.00, 01 plant species in the range of 7.10 to 10.50 and 02 plant species in the range of 10.60 to 14.00. The maximum relative frequency 13.51 was recorded for the plant species *Merremiae marginata* and the minimum relative frequency (0.27) was calculated for 05 of the plant species like *Polygonum aviculare*, *Zornia gibbosa*, *Euphorbia hirta*, *Lygodium flexuosum* and *Crotalaria pallida* (Fig. 4).
5. **Relative density of herbs-** Relative density was calculatedfor 41 plant species in the range of 0.00 to 6.25, 01 plant species in the range of 6.26 to 12.5, 01 plant species in the range of 12.51 to 18.75 and 01 in the range of 18.76 to 25.00. The maximum relative density 24.12 was determined for the plant species *Hyptissua veolens* and the minimum relative density 0.03 for 02 of the plant species *Crotalaria pallida* and *Sidarhom bifolia* (Table-1, Fig.5).
6. **Relative Abundance of herbs-** Relative abundance was estimated for 17 plant species in range of 0.00 to 1.75, 17 plant species in the range of 1.76 to 3.50, 08 plant species in the range of 3.51 to 5.25 and 02 plant species in the range of 5.26 to 7.00. The maximum Relative abundance 6.87 was calculated for the plant species *Hyptissua veonens* Poit and the minimum was determined for the plant species *Aristida adscemsionis* (Table-1, Fig.6).

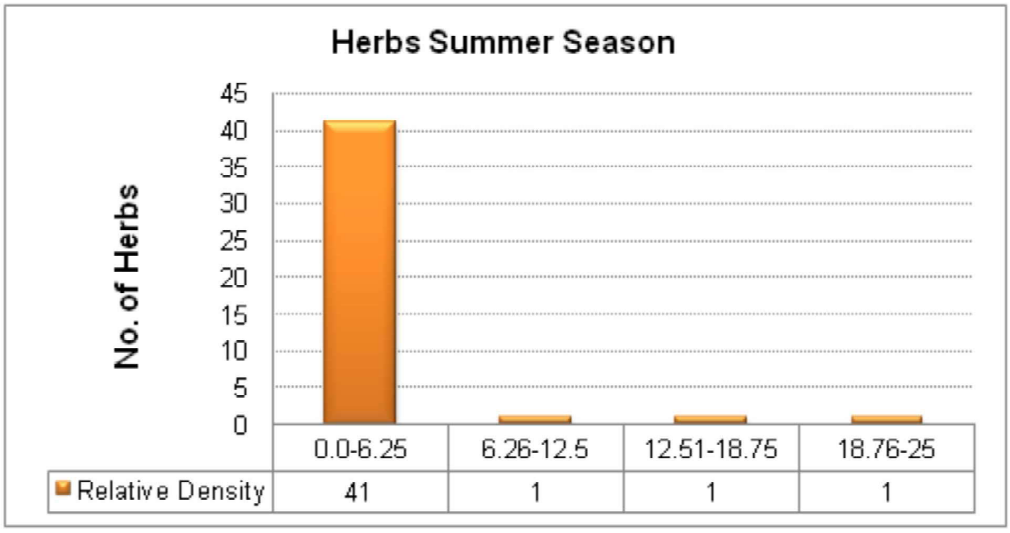

Fig. 5 : Relative Density of Herbs determined in Bhupdeopur Reserve forest area.

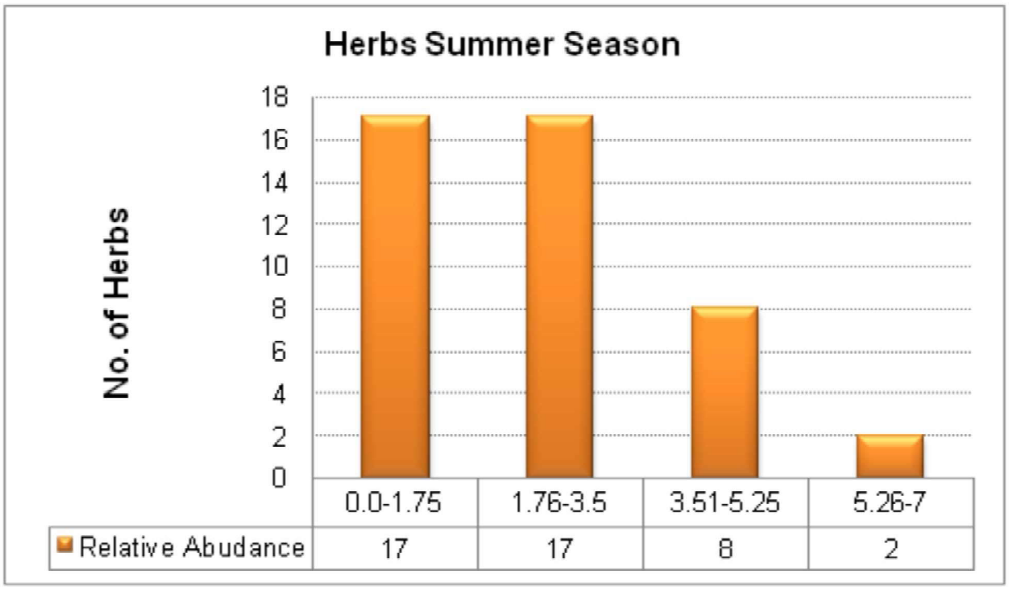

Fig. 6 : Relative Abundance of Herbs determined in Bhupdeopur Reserve forest.

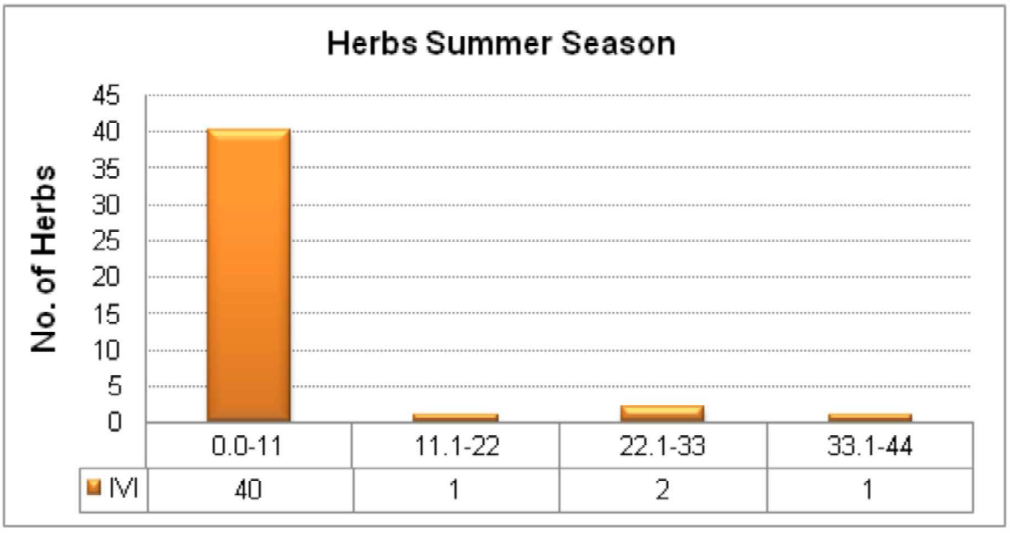

Fig. 7: Important Value Index (IVI) of Herbs determined in Bhupdeopur Reserve forest area.

7. Important value index of herbs- Important value index of 40 plant species was in the range of 0.00 to 11.00, 01 plant species in the range of 11.10 to 22.00, 02 plant speices in the range of 22.10 to 33.00 and 01 in the range of 33.10 to 44.00. The maximum important value Index 43.15 was recorded for the plant species *Hyptissua veolens* and the minimum 0.77 for the *Crotalaria pallida* (Table-1, Fig.7).

Conclusion

The Phytosociological studies clearly indicate that Bhupdeopur Reserve Forest is an extremely important ecosystem by the virtue to richness of forest health and diversity of herb species. The species which are threatened need more attention and care.

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