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Diversity of forest herbs during rainy season in the reserve forest of Bhupdeopur of district Raigarh, Chhattisgarh

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Abstract
In the given study the stress is given on the study of herb layer vegetation in Bhupdeopur reserve forest of Raigarh district of Chhattisgarh because any detailed studies on herb layer in forest ecosystems was not done so far. An in depth survey has been conducted in rainy season to search out the assorted forms of forest herbs. Ninety herb species were recorded in season, their native names and numerous uses by the native inhabitants as well as healthful values were recorded throughout the survey. The parameters like frequency, density and abundance were conjointly undertaken.

Keywords: forest herbs, Bhupdeopur reserve forest, Chhattisgarh, frequency, density, and abundance

Introduction

India is recognized as a country rich in all aspects of Biodiversity and Ecosystem. For any one country in the world, it has perhaps the largest array of environmental stipulations by virtue of its tropical location. Forests are one of the most important recognized ecosystems in the biosphere and India is rich in all aspects of Biodiversity and Ecosystems. These plant strata square measure integral part of organic phenomenon for mammals and birds and management of microclimate of the location. The herb layer biomass typically plays a very important role within the utilization of nutrients. In forest system underneath level studies haven't been given a correct weightage like the tree constituents.

Hence solely a number of studies on the role of underneath level vegetation in numerous forms of plantation ecosystems is noted. Phytosociological analysis of a plant community is a very important facet of ecological study of any piece of vegetation. Species composition is one of the necessary characters of plant community. Analytical character *viz.* Frequency, density and abundance square measure terribly helpful within the composition of 2 completely different plant communities. The current study was conducted in Bhupdeopur reserve forest of district Raigarh Chhattisgarh. (Table 1)

Aim/Purpose

1. Identification of herb species of Bhupdeopur reserve forest.
2. to review the herb diversity of Bhupdeopur reserve forest.
3. Identification of vulnerable herb species that is of promising worth.
4. to review the floristic composition of Bhupdeopur reserve forest.
5. To enlist ethnobotanical uses of herbs specifically of health and sustenance security.

Materials and strategies

1. Choice of study sites: The present study was conducted in Bhupdeopur Reserve forest of district Raigarh, Chhattisgarh. The study space was divided into four circles named as Naharpali, Kerajhar, Delari and Khairpur, every circle was divided into beats and a complete of twenty beats in sixteen villages were thought for the study. The study site is in twenty five km of North West of Raigarh town. The quadrates comes underneath Raigarh forest area of Raigarh forest division in Raigarh and Kharsia body block.
2. Technique of sampling with in the given study Phytosociological diversity analysis was administrated by quadrate technique. Sampling of study space was done by Quadrat technique following Oosting, (1958) [6]. 1mtr sq. circular quadrates were used for the sampling of herb layer. On the idea of the information obtained from the quadrate samples the structural distribution of forest herbs in the season were analyzed. The parameters like proportion frequency, density, abundance were obtained and were calculated from the information as follows.

$$\%\, F = \frac{\textit{Number of sampling units in which plant species occured}}{\textit{Total number of sampling units studied}} \times 100$$

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

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

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 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) 90 Herb species of 76 genera of 33 families and 60 species belonged to 52 genera of 22 families were 72 observed during the summer, rainy and winter season respectively. 33 plant species belonged to dicotylodonae, 9 belonged to monocotyledonae and 1 belonged to pteridophyte in summer, 60 plant species belonged to dicotyledonae, 28 to monocotyledonae and 02 plant speices of pteridophyta in rainy season and 40 plant species of dicotyledonae, 19 of monocotyledonae and 01 plant species of pteridophyte in winter season were recorded. In summer season, 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-10). In rainy season, the maximum number of Herb species (12) was recorded of family Asteraceae, (11) of family Poaceae, 8 of Fabaceae, 7 each of Cyperaceae and Acanthaceae, 4 each of Lamiaceae and Euphorbiaceae, 3 each of Zingiberaceae and Solanaceae, 2 each of Lilliaceae, Amaranthaceae, Oxalidaceae, Vitaceae, Chenopodiaceae, Convolvulaceae and Malvaceae, 1 each of Dioscoreaceae, Araceae, Apiaceae, Cleomaceae, Hypoxidaceae, Commelinaceae, Onagraceae, Schizaecaceae, Sterculiaceae, Tiliaceae, Periplocaceae, Rubiaceae, Scrophulariaceae, Ophioglossaceae, Nyctaginaceae, Acoraceae and Polygonaceae. Out of 90 herb recorded during rainy season 83 were found wild and 07 were noted as wild/ cultivated (Table-11). In winter season, Poaceae and Fabaceae were found to be the dominant families. The maximum number of Herb species (08) was noted for the family Poaceae and Fabaceae while, (07) of family Cyperaceae, (06) of family Asteraceae, Acanthaceae (05) of family Malvaceae, (02) each of family Lamiaceae, Oxalidaceae, Euphorbiaceae,and Convolvulaceae. The minimum number of species (01) was recorded for (12) of the families like Apiaceae, Vitaceae, Zingiberaceae, Hypoxidaceae, Commelinaceae, Periplocaceae, Onagraceae, Schizaecaceae, Rubiaceae, Scrophulariaceae, Cleomaceae and Colchicaceae. Out of 60 herb recorded during winter season 57 species were wild and 03 were noted as wild / cultivated).

1. **% Frequency of herbs:** In rainy season,% frequency of 88 plant species in the range of 1% to 20%, 01 plant species in the range of 21% to 40%, 01 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 41% was estimated for the plant species *Hyptis suaveolens* (L.) poit and the minimum (3%) for 03 plant species like *Aloe vera* (L.) Burm. f. and *Heteropogon contortus* (L.) Beauv. Ex Roem & Schult. *Oxalis corniculata* Linn.
2. **Density of herbs:** In rainy season, density was calculated for 81 plant species in the range of 0.00 to 1.60, while none of the plant species was in the range of 1.61 to 3.00 and 4.6 to 6.00 and 01 plant species was in the range of 3.10 to 4.50.The maximum density 4.49 was calculated for the plant species *Hyptis suaveolens* (L.) Poit and the minimum density 0.07for *Andrographis echoides* Nees.
3. **Abundance of Herbs:** In rainy season, abundance of 87 plant species was calculated under the range of 0.00 to 2.00, 02 plant species in the range of 2.01 to 4.00, where as none of the plant species was in the range of 4.10 to 6.00 and 01 plant species in the range of 6.10 to 8.10. The maximum abundance 7.15 was estimated for the plant species *Hyptis suaveolens* (L.) Poit. and the minimum (0.08) for the 02 plant species *Amaranthus virdis* Hook.and*Amaranthus spinosus* Linn.
4. **Relative frequency of herbs:** In rainy season**,** relative frequency was determined for 78 plant species in the range of 0.00 to 1.5, 06 plant species in the range of 1.6 to 3.00, none of the plant species was in the range of 3.1 to 4.5 and 01 plant species in the range of 4.6 to 6.0.The maximum relative frequency 5.50 was determined for the plant species *Hyptis suaveolens* (L.) Poit. and the minimum 0.40 for the plant species. *Heteropogon contortrs* (L.) Beauv.ex Roem & Schult. and *Oxalis corniculata* Linn.
5. **Relative density of herbs:** In rainy season, Relative density was determined for 79 plant species in the range of 0.00 to 1.50, 10 plant species in the range of 1.60 to 3.00, where as none of the plant species in the range of 3.10 to 4.50 and 01 plant species in the range of 4.60 to 6.00. The maximum Relative density 5.59 was recorded for the plant species *Chlorophytum tuberosum* (Roxb.) baker and *Hyptis suaveolens* (L.) Poit. and the minimum relative density 0.08 for *Andrographis echoides* Nees.
6. **Relative Abundance of herbs:** In rainy season, Relative abundance was determined for 87 plant species in the range of 0.00 to 4.50, 02 plant species in the range of 4.51 to 9.00, where as none of the plant species in the range of 9.01 to 13.50 and 01 plant species in the range of 13.51 to 18.00. The maximum Relative abundance was 17.49 was recorded for the plant species *Hyptis suaveolens* (L.) Poit. and the minimum 0.19 for *Amaranthus viridis* Hook. and *Amaranthus spinosus* Linn.
7. **Important value index of herbs:** In rainy season, important value index was determined for 57 plant species in the range of 0.00 to 10.75, none of the plant species in the range of 10.76 to 21.50, 02 plant species in the range of 21.51 to 32.25, 01 plant species in the range of 32.26 to 43.00. The maximum important value index 42.17 was recorded for the plant species *Hyptis suaveolens* (L.) Poit. and the minimum 1.28 for the *Euphorbia hirta* Linn.

Table 1: Phytosociological study of Herbs in Bhupdeopur Reserve forest area of district Raigarh during Rainy season investigatged during the year 2009-2011.

S. no.	Botanical Name	Local / Vernacular Name	Family	Habitat	% Frequency	Density	Abundance	Relative Frequency	Relative Density	Relative Abundance	Important Value Index
1	*Acanthospermum hispidum* DC.	Cabi	Asteraceae	Wild	10	1.09	0.30	1.34	1.35	0.73	3.42
2	*Acorus calamus* L.	Bach	Acoraceae	Wild / Cultivated	4	0.43	0.10	0.53	0.53	0.24	1.30
3	*Ageratum conyzoides* Linn.	Lango	Asteraceae	Wild	11	1.20	0.50	1.47	1.49	1.22	4.18
4	*Alloteropsis cimicina* (L.) Stapf.	Cockatoo	Poaceae	Wild	20	2.19	2.35	2.68	2.72	5.75	11.15
5	*Aloe vera* (L.) Burm. f.	Ghrit kumari	Liliaceae	Wild / Cultivated	3	0.32	0.10	0.40	0.39	0.24	1.03
6	*Alysicarpus vaginalis* DC.	Latkana	Fabaceae	Wild	8	0.87	0.24	1.07	1.08	0.58	2.73
7	*Amaranthus spinosus* Linn.	Kanta Bhaji	Amaranthaceae	Wild / Cultivated	6	0.65	0.08	0.80	0.81	0.19	2.52
8	*Amaranthus viridis* Hook.	Chaulai Bhaji	Amaranthaceae	Wild / Cultivated	5	0.54	0.08	0.67	0.67	0.19	1.53
9	*Amorphophallus paeonifolius* (Dennst.) Nicolson	Jungli Suran	Araceae	Wild	4	0.43	0.10	0.53	0.53	0.24	1.30
10	*Anacyclus pyrethrum* (L.) Link	Akarkara	Asteraceae	Wild	5	0.54	0.12	0.67	0.67	0.29	1.63
11	*Andrographis paniculata* (Burm. f.) Wall. ex Nees	Bhui Neem	Acanthaceae	Wild	9	0.98	0.27	1.20	1.22	0.66	3.08
12	*Andrograhis echoides* Nees.	Kala Bhuineem	Acanthaceae	Wild	8	0.07	0.21	1.07	0.08	0.51	1.66
13	*Anisomeles indica* (Linn.) Kuntze	Van Tulsa	Lamiaceae	Wild	8	0.87	0.16	1.07	1.08	0.39	2.54
14	*Aristida adscensionis* L.	Buch Ghass	Poaceae	Wild	8	0.87	0.16	1.07	1.08	0.39	2.54
15	*Aristida depressa* Retz. Non Hook. F. & Thoms.	Kantabaheri	Poaceae	Wild	9	0.98	0.29	1.20	1.22	0.70	3.12
16	*Biophytum sensitivum* (Linn.) DC edgow & Hook. F.	Laxmana	Oxalidaceae	Wild	9	0.98	0.36	1.20	1.22	0.88	3.30
17	*Boerhavia diffusa* (L.) nom. Con F.	Punarva	Nyctaginaceae	Wild	7	0.76	0.14	0.93	0.94	0.34	2.21
18	*Cassia tora* Linn.	Charota	Fabaceae	Wild	15	1.64	0.85	2.01	2.04	2.08	6.13
19	*Cayratia carnosa* (Wall.) Gagnep.	Ram chana	Vitaceae	Wild	8	0.87	0.14	1.07	1.08	0.34	2.49
20	*Cenchrus setigerus* Vah.	Ghass	Poaceae	Wild	7	0.76	0.16	0.93	0.94	0.39	2.26
21	*Centella asiatica* (L.) Urban	Brahmi	Apiaceae	Wild	4	0.43	0.50	0.53	0.53	1.22	2.28
22	*Chenopodium album* L.	Bathuwa	Chenopodiacee	Wild	8	0.87	0.18	1.07	1.08	0.44	2.59
23	*Chenopodium murale* Linn.	Bada Bathuwa	Chenopodiacee	Wild	9	0.98	0.19	1.20	1.22	0.46	2.88
24	*Chlorophytum tuberosum* (Roxb.) Baker	Khonjhiri	Liliaceae	Wild	19	2.08	1.40	2.55	5.59	3.42	8.56
25	*Chloris virgata* (L.)Sw.	Bara Ghass	Poaceae	Wild	6	0.65	0.19	0.80	0.81	0.46	2.07
26	*Cleome viscosa* L.	Hur hur	Cleomaceae	Wild	15	1.64	1.36	2.01	2.04	3.32	7.37
27	*Corchorus acutangulus* Lam.	Nalta	Tiliaceae	Wild	5	0.54	0.33	0.67	0.67	0.80	2.14
28	*Costus speciosus*(Koenig) Sm.	Keokand	Zingiberaceae	Wild / Cultivated	7	0.76	0.15	0.93	0.94	0.36	2.23
29	*Crotalaria burhia* Buch. Ham.	Jungali san	Fabaceae	Wild	6	0.65	0.10	0.80	0.81	0.24	1.85
30	*Curculigo orchioides* Gaertn.	Kali musli	Hypoxidaceae	Wild	13	1.42	0.69	1.74	1.76	1.68	5.18
31	*Curcuma angustifolia* Roxb.	Tikhur	Zingiberaceae	Wild	7	0.76	0.12	0.93	0.94	0.29	2.16
32	*Curcuma amada* Roxb.	Jungali Haldi	Zingiberaceae	Wild	6	0.65	0.12	0.80	0.81	0.29	1.90
33	*Cyanotis axillaris* Roemschult.	Baghanulla	Commelinaceae	Wild	10	1.09	0.68	1.34	1.35	1.66	4.35
34	*Cynodon dactylon* Pers.	Dub Ghass	Poaceae	Wild	14	1.53	1.29	1.87	1.40	3.15	6.92

35	*Cyperus compressus* Linn.	Ghass	Cyperaceae	Wild	9	0.98	0.54	1.20	1.22	1.32	3.74
36	*Cyperus pilosus* vahl.	Ghass	Cyperaceae	Wild	9	0.98	0.75	1.20	1.22	1.83	4.25
37	*Cyperus bulbosus* Vahl.	Ghass	Cyperaceae	Wild	8	0.87	0.83	1.07	1.08	2.03	4.18
38	*Cyperus rotundus* L.	Nagar motha	Cyperaceae	Wild	7	0.76	0.65	0.93	0.94	1.59	3.46
39	*Cyperus scariosus* R.Br.	Nagaranustaka	Cyperaceae	Wild	9	0.98	0.75	1.20	1.22	1.83	4.25
40	*Cyperus triceps* (Roxb.) Endl. DC.	Nirbisi	Cyperaceae	Wild	4	0.43	0.37	0.53	0.53	0.90	1.96
41	*Cyperus iria* Linn.	Taraju ghass	Cyperaceae	Wild	8	0.87	0.57	1.07	1.08	1.39	3.54
42	*Desmodium triflorum* DC.	Kudaliya	Fabaceae	Wild	16	1.75	1.40	2.14	2.18	3.42	7.74
43	*Dioscoria alata* Linn.	Barakand	Dioscoreaceae	Wild	7	0.76	0.20	0.93	0.94	0.48	2.35
44	*Eclipta alba* (L.) Hassk.	Shring raj	Asteraceae	Wild	9	0.98	0.18	1.20	1.22	0.44	2.86
45	*Elephantopus scaber* Linn.	Mayor chundi	Asteraceae	Wild	8	0.87	0.20	1.07	1.08	0.48	2.63
46	*Elytraria acaulis* (L.f.)	Dasmori	Acanthaceae	Wild	5	0.54	0.15	0.67	0.67	0.36	1.70
47	*Eragrostris spicata* Vasey	Ghass	Poaceae	Wild	6	0.65	0.49	0.80	0.81	1.19	2.80
48	*Eremopogon fovelotus* (Delile) Stapf.	Pirichit	Poaceae	Wild	8	0.87	0.20	1.07	1.08	0.48	2.63
49	*Euphorbia dracunculoides* Lam. Boiss.	Banburi	Euphorbiaceae	Wild	4	0.43	0.15	0.53	0.53	0.36	1.42
50	*Euphorbia thymifolia* Linn.	Choti Dudhi	Euphorbiaceae	Wild	7	0.76	0.18	0.93	0.94	0.44	2.31
51	*Euphorbia hirta* Linn.	Dudhi	Euphorbiaceae	Wild	5	0.54	0.22	0.67	0.67	0.53	1.87
52	*Evolvulus alsinoides* Linn.	Shankha Pushpi	Convolvulaceae	Wild	12	1.31	0.21	1.61	1.63	0.51	3.75
53	*Glycirrhiza glabra* L.	Mulethi	Fabaceae	Wild	15	1.64	1.36	2.04	2.04	3.32	7.37
54	*Hemidesmus indicus* (L.) R. Br.	Anantmool	Periplocaceae	Wild	22	2.41	0.49	2.95	3.00	1.19	7.14
55	*Heteropogon contortus* (Linn.) Beauv. Ex Roem. Schult.	Shuklakanta	Poaceae	Wild	3	0.32	0.27	0.40	0.39	0.66	1.45
56	*Hyptis suaveolens* (L.) Poit.	Ban Tulsa	Lamiaceae	Wild	41	4.49	7.15	5.50	5.59	17.49	28.58
57	*Justicia procumbens* Linn.	Pit papara	Acanthaceae	Wild	9	0.98	0.24	1.20	1.22	0.58	3.00
58	*Ludwigia perennis* Linn.	Jal Dhawai	Onagraceae	Wild	7	0.76	0.21	0.93	0.94	0.51	2.38
59	*Lygodicun flexuosum* (Linn.) Sw.	Indraraj	Schizaecaceae	Wild	5	0.54	0.11	0.67	0.67	0.26	1.60
60	*Malva parviflora* Linn.	Panirak	Malvaceae	Wild	9	0.98	0.27	1.20	1.22	0.66	3.08
61	*Melochia corchorifolia* Linn.	Gobi	Sterculiaceae	Wild	6	0.65	0.28	0.80	0.81	0.68	2.29
62	*Mentha viridis* Linn.	Pudina	Lamiaceae	Wild / Cultivated	5	0.54	0.12	0.67	0.67	0.29	1.63
63	*Merremia emarginata* (Burm. F.)	Musakani	Convolvulaceae	Wild	18	1.97	1.85	2.41	2.45	4.52	9.38
64	*Microtyloma uniflorum* (Lam.) Verde.	Kulthi	Fabaceae	Wild	6	0.65	0.16	0.80	0.81	0.39	2.00
65	*Mimosa pudica* Linn.	Lajwanti	Fabaceae	Wild	4	0.43	0.14	0.53	0.53	0.34	1.40
66	*Ocimum basilicum* Linn.	Tulsi	Lamiaceae	Wild / Cultivated	7	0.76	0.18	0.93	0.94	0.44	2.31
67	*Oldenlandia corymbosa* Linn.	Pitpapara	Rubiaceae	Wild	6	0.65	0.13	0.80	0.81	0.31	1.92
68	*Ophioglossum reticulatum* L.	Jibhi	Ophioglossaceae	Wild	7	0.76	0.39	0.93	0.94	0.95	2.82
69	*Oxalis corniculata* Linn.	Khatti booti	Oxalidaceae	Wild	3	0.32	0.27	0.40	0.39	0.66	1.45
70	*Peristrophe bicalyculata* Nees.	Atrila	Acanthaceae	Wild	7	0.76	0.14	0.93	0.94	0.34	2.21
71	*Phyllanthus niruri* Hook. F.	Bhui amla	Euphorbiaceae	Wild	11	1.20	0.44	1.47	1.49	1.07	4.03
72	*Pluchea lanceolata* (DC.) Oliv & Hiem.	Rasna	Asteraceae	Wild	6	0.65	0.15	0.80	0.81	0.36	1.97
73	*Rumex dentatus* L.	Ambavati	Polygonaceae	Wild	6	0.65	0.16	0.80	0.81	0.39	2.00
74	*Rungia pectinata* (L.) Nees.	Kanghi	Acanthaceae	Wild	4	0.43	0.21	0.53	0.53	0.51	1.57
75	*Rungia repens* Nees.	Kharmar	Acanthaceae	Wild	10	1.09	0.45	1.34	1.35	1.10	3.79
76	*Scoparia dulcis* Linn.	Ghoda Tulsi	Scrophulariaceae	Wild	8	0.87	0.18	1.07	1.08	0.44	2.59
77	*Setaria glauca* Beavu.	Green Fox Tail	Poaceae	Wild	4	0.43	0.20	0.53	0.53	0.48	1.54

78	*Sida rhombifolia* Linn.	Lal Barela	Malvaceae	Wild	5	0.54	0.33	0.67	0.67	0.80	2.14
79	*Solanum xanthocarpum* Schrad. & H. Wendl.	Kantaki	Solanaceae	Wild	7	0.76	0.30	0.93	0.94	0.73	2.60
80	*Sphaeranthus indica* Linn.	Mundi	Asteraceae	Wild	4	0.43	0.10	0.53	0.53	0.24	1.30
81	*Spilanthes paniculata* Wall. ex DC.	Akarkara	Asteraceae	Wild	7	0.76	0.28	0.93	0.94	0.68	2.55
82	*Tridax procumbens* Linn.	Khargos ghass	Asteraceae	Wild	7	0.76	0.30	0.93	0.94	0.73	2.60
83	*Vernonia cinerea* Nees.	Sahdevi	Asteraceae	Wild	10	1.09	0.29	1.34	4.35	0.70	3.39
84	*Vetiveria zizanioides* Linn.	Birni	Poaceae	Wild	7	0.76	0.16	0.93	0.94	0.39	2.26
85	*Vicoa vestita* Benth. Ex Hook. F.	Pila Rasna	Asteraceae	Wild	5	0.54	0.22	0.67	0.67	0.53	1.87
86	*Vitis quadrangularis* Linn.	Hadjod.	Vitaceae	Wild	4	0.43	0.12	0.53	0.53	0.29	1.35
87	*Wendlendia exerta* DC.	Khel Papara	Solanaceae	Wild	8	0.87	0.38	1.07	1.08	0.93	3.08
88	*Withania somnifera* (Linn.) Dunal	Ashwagandha	Solanaceae	Wild	6	0.65	0.26	0.80	0.81	0.63	2.24
89	*Xanthium strumonium* Linn.	Chota gokharu	Asteraceae	Wild	4	0.43	0.10	0.53	0.53	0.24	1.30
90	*Zornia gibbosa* Spanoghe	Samarpari	Fabaceae	Wild	8	0.87	0.42	1.07	1.08	1.02	3.17

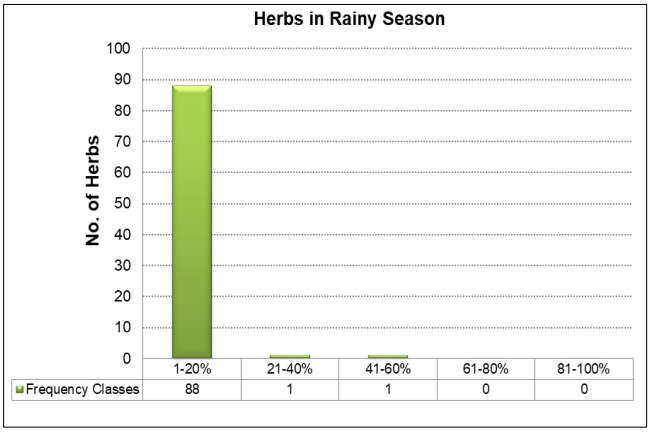

Fig 1: Seasonal Frequency of herbs determined in Bhupdeopur Reserve forest area of district Raigarh, Investigated during the year 2009-2011.

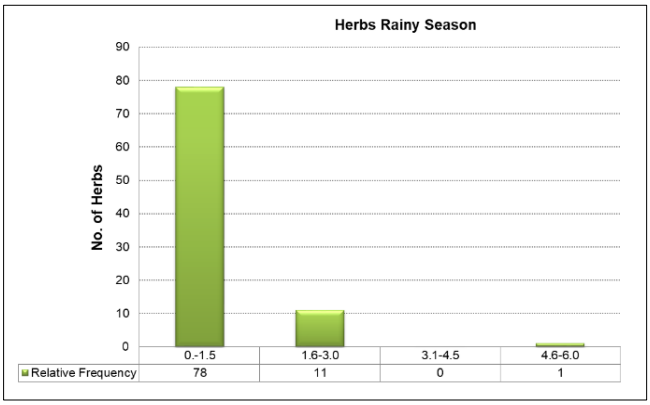

Fig 2: Seasonal Relative Frequency of herbs determined in Bhupdeopur Reserve forest area of district Raigarh, Investigated during the year 2009-2011.

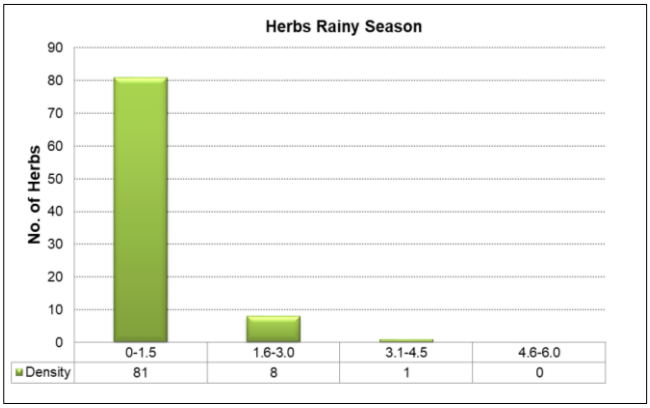

Fig 3: Seasonal Density of herbs recorded in Bhupdeopur Reserve forest area of district Raigarh, Investigated during the year 2009-2011.

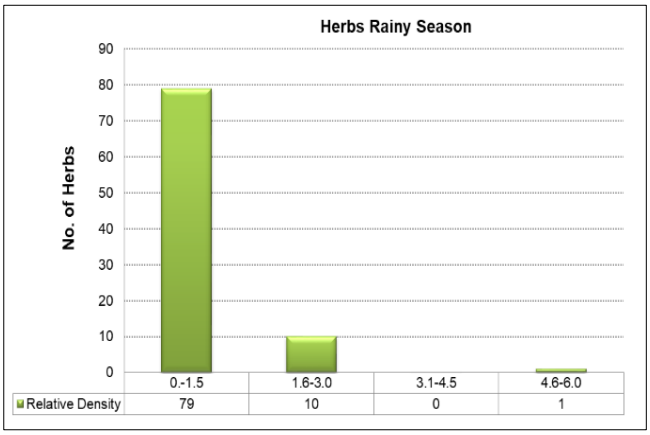

Fig 4: Seasonal Relative Density of herbs determined in Bhupdeopur Reserve forest area of district Raigarh, Investigated during the year 2009-2011.

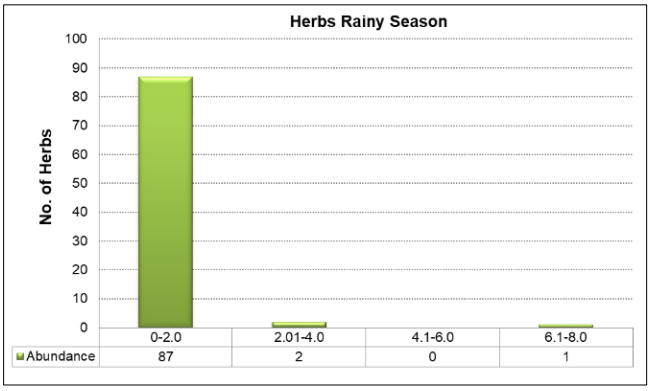

Fig 5: Seasonal Abundance of herbs determined in Bhupdeopur Reserve forest area of district Raigarh, Investigated during the year 2009-2011.

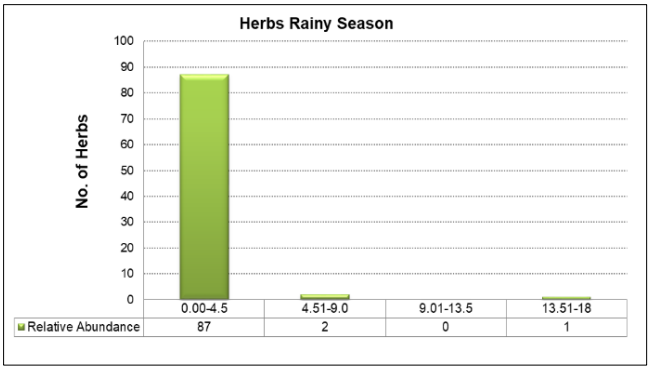

Fig 6: Seasonal relative Abundance of herbs determined in Bhupdeopur Reserve forest area of district Raigarh, Investigated during the year 2009-2011.

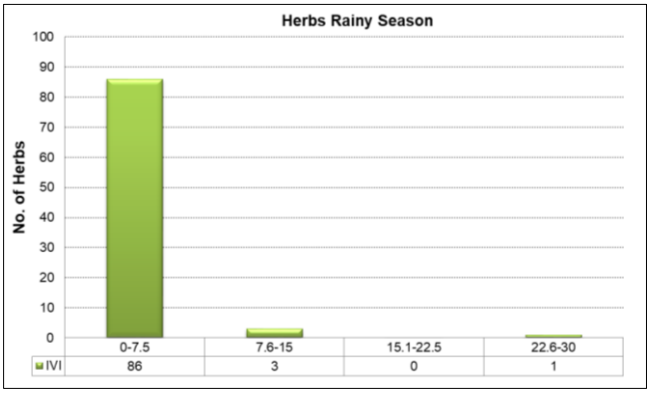

Fig 7: Seasonal Important Value Index (IVI) of herbs determined in Bhupdeopur Reserve forest area of district Raigarh, Investigated during the year 2009-2011.

Conclusion

The Phytosociological diversity analysis of herb layer vegetation throughout time of year clearly indicates that Bhupdeopur Reserve Forest is an especially necessary system by the virtue to richness of forest health and variety of herb species. The species that square measure vulnerable would like a lot of attention and care.

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