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A comparative study of tree species composition of Birjoura forest beat and Tarach forest beat of Bajag forest range, Dindori district (M.P.)

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Abstract
This study designed to evaluate the ecological diversity of tree vegetation in Birjoura forest beat and Tarach forest beat of Bajag forest range, Dindori district (M.P.). Both the forest beats are very well known for their characteristics as dense forest. To screen the ecological status of these forests a stratified random quadrate method was employed in the study. A total of 51 tree species were recorded from Birjoura Forest Beat and 53 tree species were recorded from Tarach Forest Beat. The work conclude that though both the forest beats belong to same forest range, they differ in pattern of diversity in tree vegetation and specially in regard to the pattern of dominance.

Keywords: Diversity, phytosociology, IVI, community indices, dominance, codominance

1. Introduction
Forests are the principal bio-resources and repositories of natural wealth that support human well-being and ecological sustainability. The forest ecosystems provide unequal share to the world's biodiversity (Battles *et al.* 2001) [1]. Thus for the maintenance of biodiversity it is essential to attain forest sustainability (Osorio *et al.* 2009) [2]. It is undoubtedly justified that the long term sustainability of forest ecosystems is greatly concerned with plant diversity and their phytosociological attributes. Plant diversity is widely acknowledged to support many other communities of forests as well as human community. Much of the overall diversity depends on plant diversity, because plants provide both food and habitat for other organisms (Hunter, 1990) [3]. The ecological security of any country depends on the health of its forests (Khosla, 1992) [4]. Thus management and maintenance of any forest is obligatory. As the over al condition of forest depends on its plant composition, the information on composition, diversity and ecological aspects of plant species is of primary importance in the planning and implementation of forest biodiversity conservation efforts. In a typical forest knowledge of vascular plant diversity and changes that occur with disturbance may provide planning information to Biologists (Sarkar, 2015) [5]. Among the vascular plants tree species are much important as they are controlling the keystone factor, i.e., entry of light in to forest bed. Analysis and estimation of Tree diversity, in which a combination of physical habitat, vegetation, physiognomy, species composition and community relationship are useful in formulating forest management programme. The inherent variation within communities and ecosystems must be documented and used for base-line data to effectively predict the outcome of disturbances, such as regeneration harvest methods, on floristic diversity and richness (Sarkar, 2016) [6].

2. Material and Method
2.1 Description of Study Site
Bajag forest is expanded in eastern part of the Dindori district. It is 56 km. away from district headquarter and situated in Maikal hills at the side of Jabalpur-Amarkantak National highway. The height of the forest is 885 ft. minimum from msl and 1100 ft. maximum from msl.
In the east of Bajag forest, there is Karanjia range, in west & south. Samnapur range and in north Gadasarai range are situated. The Bajag range has expanded between 22° to 22.50° North latitude and 81.15 to 81.20 longitude. The present study area has been divided into 2 sites *viz.* Birjoura forest beat and Tarach forest beat.

2.2 Study of Tree vegetation composition and structure

For phytosociological studies of tree vegetation in the selected beat forest of Bajag forest range, the quadrate methods were used. In each beat forest, a total of 20 sampling sites representing various categories of natural forests and plantations were selected for vegetation sampling. At each sampling site four quadrates (20 m x 20 m) were laid to quantify various tree vegetation. The use of local name of each forest site was adopted from the knowledge of Forest guards. All the plants will be identified with the help of different monographs, published floras and revisions. For the confirmation of identification, herbarium of Botanical Survey of India (BSI), Central Circle, Allahabad (U.P.) and herbarium of Department of Botany, Pt. S.N.S. Govt. P.G. College, Shahdol will be also consulted.

For Phytosociological studies the quadrates methods will be applied and calculation will be completed by the formula suggested by Misra *et al*. (1968).

$$\text{Relative Frequency :-} \frac{\text{Number of quadrates of occurance of the plant}}{\text{Number of quadrate of occuance of all the plant species}} \times 100$$

$$\text{Relative Density:-} \frac{\text{Number of individuals of the species}}{\text{Number of individuals of all species}} \times 100$$

$$\text{Relative dominance:-} \frac{\text{Total basal area of the species}}{\text{Total basal area of all species}} \times 100$$

Importance Value Index

Importance Value Index will be calculated by addings the value of relative frequency, relative density and relative dominance.

3. Results and Discussion

The present study showed that both the forest beats are rich in tree diversity. A total of 51 tree species were recorded from Bijoura Forest Beat. Among them highest IVI was recorded for *Shorea robusta* (40.99). IVI was also good for *Diospyros malanoxylon* (25.37), *Terminalia tomentosa* (23.85), *Buchanania lanzan (23.52)* and *Bauhinia variegate* (20.85). The lowest IVI was recorded for *Casearia graveoleans* (1.3). IVI was also poor for few species like *Ficus benghalensis*, *Ficus benghalensis*, *Alangium salvifolium*, *Ficus religiosa*. (Table 1). From Tarach Beat Forest 53 tree species were recorded. Among the tree species highest IVI was recorded for *Shorea robusta* (38.03). It was also observed that a few species including *Boswellia serrata (28.23)*, *Bauhinia malabarica (27.14)*, *Bauhinia variegata* (26.35) and *Butea monosperma* (25.83) had quite good IVI (Table 2). The lowest IVI was recorded for *Aegle marmelos* (1.5).

Table 1: Shows IVI of Trees of Bijoura forest study site

S. No.	Name of species	Relative frequency	Relative density	Relative abundance	IVI
1	*Acacia nilotica*	2.33	1.09	0.07	3.49
2	*Adina cordifolia*	3.11	1.12	4.66	8.89
3	*Aegle marmelos*	1.06	0.19	1.75	3
4	*Ailanthus excelsa*	2.17	0.47	0.15	2.79
5	*Alangium salvifolium*	1.16	0.55	0.09	1.8
6	*Anogeissus latifolia*	1.03	0.48	1.62	3.13
7	*Azadirachta indica*	2.25	1.64	3.28	7.17
8	*Bauhinia malabarica*	6.98	8.74	1.01	16.73-**VIII**
9	*Bauhinia purpurea*	3.16	0.51	2.13	5.8
10	*Bauhinia racemosa*	3.45	2.68	1.17	7.3
11	*Bauhinia variegata*	5.09	7.4	8.36	20.85-**V**
12	*Bombax malabaricum*	2.33	1.07	0.59	3.99
13	*Boswellia serrata*	6.98	2.73	1.16	10.87
14	*Bridelia retusa*	2.77	2.01	1.57	6.35
15	*Buchanania lanzan*	9.3	7.1	7.12	23.52-**IV**
16	*Butea monosperma*	5.11	4.28	1.29	10.68
17	*Careya arborea*	3.01	2.3	3.72	9.03
18	*Casearia graveoleans*	0.91	0.26	0.13	1.3
19	*Cassia fistula*	1.73	0.67	0.91	3.31
20	*Delbergia paniculata*	2.17	2.06	1.58	5.81
21	*Delbergia sissoo*	1.18	1.09	2.17	4.44
22	*Diospyros malanoxylon*	9.3	7.1	8.97	25.37-**II**
23	*Emblica officinalis*	4.65	4.92	1.17	10.74
24	*Erythrina suberosa*	2.11	1.16	0.55	3.82
25	*Ficus benghalensis*	0.91	0.57	0.08	1.56
26	*Ficus glomerata*	6.3	5.22	3.71	15.23-**X**
27	*Ficus infectoria*	1.16	0.55	1.29	3
28	*Ficus religiosa*	1.03	0.89	0.07	1.99
29	*Garuga pinnata*	4.26	5.34	1.73	11.33
30	*Gmelina arborea*	1.76	1.22	2.39	5.37
31	*Lagerstroemia parviflora*	5.01	1.11	6.55	12.67
32	*Litsea glutinosa*	1.16	0.8	1.03	2.99
33	*Madhuca indica*	1.96	1.28	1.83	5.07
34	*Mangifera indica*	3.28	1.73	4.12	9.13
35	*Melia azedarach*	1.69	0.75	1.08	3.52
36	*Miliusa tomentosa*	5.78	1.18	4.73	11.69

37	*Mitragyna parvifolia*	2.16	0.55	1.92	4.63
38	*Ougenia oojeinensis*	6.61	5.86	7.05	19.52-**VII**
39	*Pongamia pinnata*	7.11	6.52	6.19	19.82-**VI**
40	*Pterocarpus marsupium*	4.92	5.61	5.38	15.91-**IX**
41	*Schleichera oleosa*	1.33	0.69	2.04	4.06
42	*Semecarpus anacardium*	4.78	2.01	1.95	8.74
43	*Shorea robusta*	12.07	10.78	18.14	40.99-**I**
44	*Soymida febrifuga*	1.11	0.5	1.01	2.62
45	*Syzygium cuminii*	3.72	2.33	1.65	7.7
46	*Tamarindus indica*	1.12	0.78	0.59	2.49
47	*Terminalia arjuna*	1.02	0.76	0.83	2.61
48	*Terminalia belerica*	2.17	0.95	0.41	3.53
49	*Terminalia chebula*	3.02	0.5	0.8	4.32
50	*Terminalia tomentosa*	9.26	8.2	6.39	23.85-**III**
51	*Zizyphus mauritiana*	2.02	0.67	1	3.69

Table 2: Shows IVI of Trees of Tarach forest study site

S. No.	Name of species	Relative Frequency	Relative density	Relative abundance	IVI
1	*Acacia nilotica*	1.43	0.46	1.38	3.27
2	*Adina cordifolia*	3.81	0.8	5.63	10.24
3	*Aegle marmelos*	1.03	0.39	0.08	1.5
4	*Ailanthus excelsa*	1.05	0.52	1.18	2.75
5	*Alangium salvifolium*	1.61	0.37	1.02	3
6	*Anogeissus latifolia*	1.44	0.48	1.26	3.18
7	*Azadirachta indica*	2.14	1.4	1.13	4.67
8	*Bauhinia malabarica*	7.21	16.65	3.28	27.14-**III**
9	*Bauhinia purpurea*	3.05	0.92	5.47	9.44
10	*Bauhinia racemosa*	4.14	3.05	5.38	12.57
11	*Bauhinia variegata*	7.87	8.12	10.36	26.35-**IV**
12	*Bombax malabaricum*	2.15	0.81	1.76	4.72
13	*Boswellia serrata*	6.87	10.15	11.21	28.23-**II**
14	*Bridelia retusa*	2.09	0.7	1.83	4.62
15	*Buchanania lanzan*	8.08	11.08	4.57	23.73-**VI**
16	*Butea monosperma*	7.58	14.81	3.44	25.83-**V**
17	*Careya arborea*	2.07	1.13	0.39	3.59
18	*Cassia fistula*	2.41	2.09	0.08	4.58
19	*Catunaregum spinosa*	1.18	0.59	1.21	2.98
20	*Delbergia paniculata*	2.36	2.04	3.14	7.54
21	*Delbergia sissoo*	1.75	1.12	1.29	4.16
22	*Diospyrus malanoxylon*	8.82	3.47	3.02	15.31
23	*Emblica officinalis*	5.4	4.37	3.18	12.95
24	*Erythrina suberosa*	1.11	1.73	0.68	3.52
25	*Ficus benghalensis*	1.03	0.7	7.12	8.85
26	*Ficus glomerata*	5.31	6.47	7.11	18.89-**X**
27	*Ficus infectoria*	1.55	0.6	1.45	3.6
28	*Ficus religiosa*	1.06	0.79	1.23	3.08
29	*Garuga pinnata*	5.08	2.14	1.75	8.97
30	*Gmelina arborea*	1.02	1.53	1.44	3.99
31	*Grewia tiliaefolia*	2.66	1.92	3.02	7.6
32	*Lagerstroemia parviflora*	5.32	1.76	7.39	14.47
33	*Litsea glutinosa*	0.78	0.6	1.03	2.41
34	*Madhuca indica*	2.69	1.19	1.41	5.29
35	*Mangifera indica*	3.11	2.08	2.15	7.34
36	*Melia azedarach*	1.5	0.97	1.08	3.55
37	*Miliusa tomentosa*	4.98	0.07	3.34	8.39
38	*Mitragyna parvifolia*	1.16	0.39	2.13	3.68
39	*Ougeinia oojeinensis*	7.16	5.28	8.09	20.53-**VII**
40	*Pongamia pinnata*	6.05	5.52	7.37	18.94-**IX**
41	*Pterocarpus marsupium*	4.29	6.21	6.97	17.47
42	*Schleichera oleosa*	6.22	3.87	3.18	13.27
43	*Semecarpus anacardium*	2.93	1.14	0.65	4.72
44	*Shorea robusta*	9.66	11.32	17.05	38.03-**I**
45	*Soymida febrifuga*	1.07	0.76	1.8	3.63
46	*Stereospermum xylocarpum*	4.06	3.75	4.18	11.99
47	*Syzygium cumini*	2.92	1.7	0.95	5.57
48	*Tamarindus indica*	1.08	0.49	1.12	2.69
49	*Terminalia arjuna*	0.72	1.05	0.96	2.73

50	*Terminalia belerica*	3.11	1.58	1.36	6.05
51	*Terminalia chebula*	2.01	0.47	0.41	2.89
52	*Terminalia tomentosa*	8.4	6.12	5.61	20.13-**VIII**
53	*Zizyphus mauritiana*	1.17	0.56	1.04	2.77

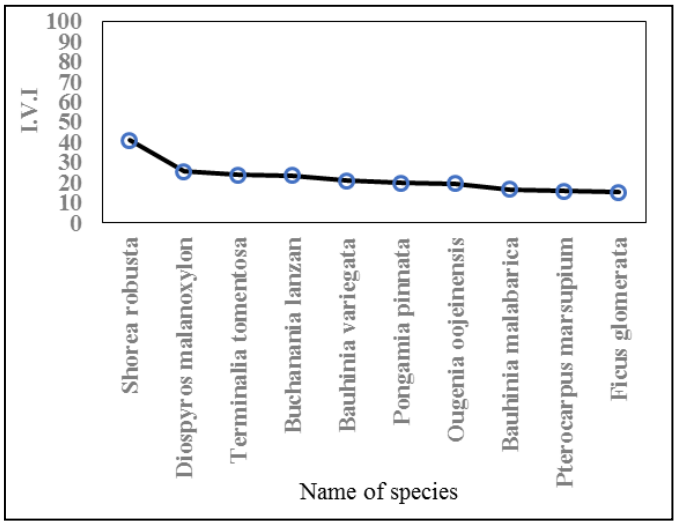

Fig 1: Ten Highest value IVI of tree species in Bijoura forest study site

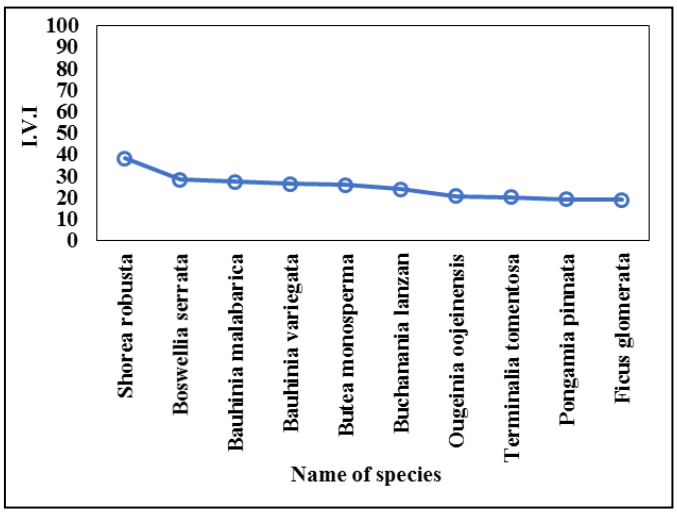

Fig 2: Ten Highest value IVI of tree species in Tarach forest study site

4. Conclusion

The paper reflects the phytosociological and ecological characters of tree vegetation in to two beat forests namely Birjoura forest beat and Tarach forest beat of Bajag forest range, Dindori district (M.P.). The structural composition of flora found in these beat forests were quite different. The differences were also noticed in the composition of tree vegetation. In both forest beat *Shorea robusta* was found as the dominant species and it had quite higher IVI then the other tree species.

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