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STRUCTURAL ASPECTS OF SHORIGAL AREA OF SHOLAYAR RESERVE FOREST, SOUTHERN WESTERN GHATS OF INDIA

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Abstract: Trees are dominant species of a forest ecosystem. For proper implementation of biodiversity conservation strategies it is necessary to understand the diversity and distribution pattern of tree species. This study deals with the tree species diversity of Shorigal area of Sholayar reserve forest, Southern western Ghats of India. During the present ecological study 46 species of 38 genera and 24 families (Angiosperms) were observed in the study area. A total of 626 individuals were documented during the field study.

Index Terms - Biodiversity, phytosociological studies

I. INTRODUCTON

Forests are characterized by a variety of vegetation types due to climatic, edaphic and biogeographic factors. According to Richards, (1952), the moist forests in Southeast Asia are among the oldest types of forests in the world. For understanding biodiversity of any vegetation, ecological studies are very helpful. Tree species are mainly analyzed on ecological studies of forest ecosystems. Because tree species diversity is very important in forest ecosystem biodiversity. Tree diversity data are very useful for planning and managing forest biodiversity. By setting permanent plots in disturbed forest we can estimate the changes in tree species diversity, composition and dynamics in relation to the degree and frequency of disturbance (Coates, 2002). Western Ghats is a global biodiversity hotspot, the need of protection and sustainable managements of forests of the Western Ghats have already been highlighted (Collins and Sayer, 1991). Tropical rainforests are considered as treasures of biodiversity. They cover only 7% of the land area. But have more than half of all living species (Galley, 2014). The current rate of tropical forest loss and disturbances will result in 5- 10 percentage loss of all tropical species per decade during next quarter century (McNeely *et.al.*1990). The rich and diverse vegetation wealth of India is obviously due to the varying climatic and geographical conditions and ecological habitats of our country. It is necessary to have a fair assessment of flora and fauna of biodiversity for the proper utilization of resources.

The current study has been carried out in evergreen forest of Shorigal area in Sholayar reserve forest, Western Ghats of India. Sholayar region lies between 10^o 15 and 10^o25 N altitude and 76^o40 and 76^o55E longitude in central part of Kerala. It is coming under Vazhachal forest division in Thrissur District, Kerala. The main objective of the present study was to determine species diversity, density, frequency and IVI of tree species (Curtis and Mc-Intosh, 1951) in the study area.

II. RESEARCH METHODOLOGY

Stratified random sampling methods has adopted for the present study. 1ha. quadrates has been established in the study area. The tree species having >30 cm GBH (girth at breast height) were measured and recorded (Chandrasekhara, 1998). To determine the dominance and ecological success of different species the Importance Value Index (IVI) was worked out (Curtis and Mc-Intosh, 1951). The ratio of abundance to Frequency (AB/F) was also carried out for the interpretation of distribution pattern of species ((Curtis and Cottom 1956). Binomial names of different tree species were determined by scientific literatures, floras and monographs and also by consulting with specialists (Fyson 1915-20, Gamble and Fischer 1967, Matthew 1983, Sasidharan, 2004). Identified species were classified by using Red data list according to their conservation status.

III. RESULTS AND DISCUSSION

3.1 Vegetation status of Shorigal area in Sholayar reserve forest.

Table1

No.Sps -Number of Individuals, D-Density, F-Frequency, BA-Basal area, RBA-Relative basal area, RD-Relative density, RF-Relative frequency, AB-Abundance, IVI-Importance Value Index, and Q.O- Number of Quadrats of occurrence. MI-Maturity Index

Species	D	F	RD	RF	AB	BA	RBA	AB/F	IVI	No.Sps	Q.O	MI
<i>Actinodaphne malabarica</i>	20	20	0.32	1.09	1.00	183.27	0.66	0.050	2.07	2	2	
<i>Aglaiabarberi</i>	30	20	0.48	1.09	1.50	574.72	2.07	0.075	3.64	3	2	
<i>Aglaiaperviridis</i>	80	60	1.28	3.26	1.33	687.99	2.48	0.022	7.02	8	6	
<i>Aglaiatomentosa</i>	340	60	5.44	3.26	5.67	228.68	0.82	0.094	9.53	34	6	
<i>Agrostistachys borneensis</i>	1080	80	17.28	4.35	13.50	263.00	0.95	0.169	22.58	108	8	
<i>Albizia odoratissima</i>	20	20	0.32	1.09	1.00	172.00	0.62	0.050	2.03	2	2	
<i>Alseodaphne semecarpifolia</i>	500	90	8.00	4.89	5.56	281.42	1.01	0.062	13.91	50	9	
<i>Artocarpus integrifolius</i>	10	10	0.16	0.54	1.00	378.72	1.37	0.100	2.07	1	1	
<i>Calophyllum polyanthum</i>	70	50	1.12	2.72	1.40	1018.29	3.67	0.028	7.51	7	5	
<i>Canarium strictum</i>	60	40	0.96	2.17	1.50	502.75	1.81	0.038	4.95	6	4	
<i>Chukrasia tabularis</i>	40	20	0.64	1.09	2.00	521.90	1.88	0.100	3.61	4	2	
<i>Croton malabaricus</i>	50	30	0.80	1.63	1.67	195.69	0.71	0.056	3.14	5	3	
<i>Cullenia exarillata</i>	460	100	7.36	5.43	4.60	2265.47	8.17	0.046	20.96	46	10	
<i>Cyathocalyx zeylanica</i>	260	80	4.16	4.35	3.25	768.76	2.77	0.041	11.28	26	8	
<i>Dillenia pentagyna</i>	20	10	0.32	0.54	2.00	435.59	1.57	0.200	2.43	2	1	
<i>Diospyros sylvatica</i>	60	40	0.96	2.17	1.50	494.35	1.78	0.038	4.92	6	4	
<i>Dipterocarpus indicus</i>	10	10	0.16	0.54	1.00	198.86	0.72	0.100	1.42	1	1	
<i>Diospyros paniculata</i>	10	10	0.16	0.54	1.00	140.32	0.51	0.100	1.21	1	1	
<i>Drypetes malabarica</i>	270	40	4.32	2.17	6.75	344.56	1.24	0.169	7.74	27	4	
<i>Drypetes venusta</i>	180	80	2.88	4.35	2.25	311.83	1.12	0.028	8.35	18	8	
<i>Dysoxylum malabaricum</i>	10	10	0.16	0.54	1.00	1262.86	4.55	0.100	5.26	1	1	
<i>Elaeocarpus serratus</i>	10	10	0.16	0.54	1.00	1603.95	5.78	0.100	6.49	1	1	
<i>Elaeocarpus tuberculatus</i>	100	50	1.60	2.72	2.00	459.45	1.66	0.040	5.97	10	5	
<i>Entada scandens</i>	10	10	0.16	0.54	1.00	103.09	0.37	0.100	1.08	1	1	
<i>Garcinia gummi-gutta</i>	140	90	2.24	4.89	1.56	415.64	1.50	0.017	8.63	14	9	
<i>Holigarna arnottiana</i>	30	30	0.48	1.63	1.00	357.08	1.29	0.033	3.40	3	3	
<i>Hydnocarpus pentandra</i>	10	10	0.16	0.54	1.00	2245.09	8.09	0.100	8.80	1	1	
<i>Knema attenuata</i>	80	30	1.28	1.63	2.67	1036.04	3.74	0.089	6.65	8	3	
<i>Macaranga peltata</i>	20	10	0.32	0.54	2.00	567.97	2.05	0.200	2.91	2	1	
<i>Persea macrantha</i>	40	20	0.64	1.09	2.00	483.95	1.74	0.100	3.47	4	2	
<i>Mangifera indica</i>	20	10	0.32	0.54	2.00	465.52	1.68	0.200	2.54	2	1	
<i>Melicope lunu-ankenda</i>	140	80	2.24	4.35	1.75	706.07	2.55	0.022	9.13	14	8	
<i>Memecylon deccanense</i>	10	10	0.16	0.54	1.00	140.32	0.51	0.100	1.21	1	1	
<i>Mesua ferrea</i>	160	80	2.56	4.35	2.00	1532.75	5.53	0.025	12.43	16	8	
<i>Mesua thwaitesii</i>	10	10	0.16	0.54	1.00	147.08	0.53	0.100	1.23	1	1	
<i>Myristica beddomei</i>	140	70	2.24	3.80	2.00	327.27	1.18	0.029	7.22	14	7	
<i>Myristica malabarica</i>	10	10	0.16	0.54	1.00	2036.36	7.34	0.100	8.05	1	1	
<i>Otonophelium stipulaceum</i>	20	20	0.32	1.09	1.00	164.68	0.59	0.050	2.00	2	2	
<i>Palaquium ellipticum</i>	600	100	9.60	5.43	6.00	812.51	2.93	0.060	17.96	60	10	
<i>Polyalthia fragrans</i>	10	10	0.16	0.54	1.00	114.86	0.41	0.100	1.12	1	1	

<i>Psydrax umbellata</i>	110	60	1.76	3.26	1.83	517.22	1.86	0.031	6.89	11	6	
<i>Syzygium Lanceolatum</i>	30	20	0.48	1.09	1.50	556.83	2.01	0.075	3.57	3	2	
<i>Syzygium mundagam</i>	30	30	0.48	1.63	1.00	634.81	2.29	0.033	4.40	3	3	
<i>Toona ciliata</i>	20	10	0.32	0.54	2.00	161.08	0.58	0.200	1.44	2	1	
<i>Vateria indica</i>	670	100	10.72	5.43	6.70	604.35	2.18	0.067	18.33	67	10	
<i>Xanthophyllum arnottianum</i>	250	80	4.00	4.35	3.13	310.92	1.12	0.039	9.47	25	8	40

In the West coast tropical evergreen forests of Sholayar at Shorigal area, 626 individual trees /ha exist among which *Agrostistachys borneensis* (22.58) shows highest IVI. *Cullenia exarillata* (20.96) is at second position followed by *Vateria indica* (18.33) and *Palaquium ellipticum* (17.96). These species are most dominant at this particular area. During the present ecological study 46 species of 38 genera and 24 families (Angiosperms) were observed in the study area. Out of 46 species documented, *Agrostistachys borneensis* (1080) is showing highest density. Other major four species showing high density are in the descending order of their density values are as follows, *Vateria indica*(670), *Palaquium ellipticum*(600), *Alseodaphne semecarpifolia*(500) and *Cullenia exarillata*(460). Meliaceae(7sps), Clusiaceae(4), Lauraceae(3) and Euphorbiaceae(3) are dominant families. Annonaceae, Anacardeaceae, Mimosaceae, Ebenaceae, Dipterocarpaceae, Elaeocarpaceae, Anacardiaceae, Myristicaceae and Myrtaceae have 2 species each. The most representative genera were *Aglaiia*, *Drypetes*, *Diospyros*, *Elaeocarpus*, *Mesua* and *Syzygium*. According to the Red data list, three species viz., *Actinodaphne malabarica*, *Aglaiia barberi*, and *Drypetes malabarica* are classified under rare category. *Aglaiia perviridis* and *Myristica malabarica* are vulnerable species. The frequency index was maximum for *Cullenia exarillata*(100), *Palaquium ellipticum* (100) and *Vateria indica*(100) followed by *Alseodaphne semecarpifolia*(90), *Garcinia gummi-gutta*(90), *Agrostistachys borneensis* (80), *Drypetes venusta* (80), *Cyathocalyx zeylanica*(80), *Melicope lunu-ankenda*(80), *Mesua ferrea*(80) and *Xanthophyllum arnottianum*(80). On the same time result of abundance index, density, relative dominance indicated that *Agrostistachys borneensis*, *Cullenia exarillata*, *Alseodaphne semecarpifolia*, *Palaquium ellipticum* and *Vateria indica* were highly dominant in Shorigal area of Sholayar forest. Less number of tree species have good IVI values. 45.36% (284) of tree species are endemic to Western Ghats. 5.11% (32) are rare species. 1.43% (9) are vulnerable in the present study. The Shannon diversity index is 3.0043 for the study area. It is greater than the value reported by Sundarapandian and Swamy (2000) for the Tropical forest of Kodayur in the Western Ghats of Southern India. The following values are reported for the evergreen forests of other regions of Kerala viz.: Silent valley - 3-3.9 (Basha, 1988), Nelliampathy - 3-3.7 (Chandrasekhara, 1991), Achankoil - 1.5-2.2 (Sankar and Sanal Kumar, 1997), Agasthyavanam Biological Park - 2.8 (Vargheese, 1997) and New Amarambalam- 3.29 (Jayakumar, 2003). The Goodricial West coast tropical evergreens showed 4.410 (Abhilash and Menon, 2007).

IV. SUMMARY AND CONCLUSION

The phyto-sociological observation of this study indicates that most dominant species is *Agrostistachys borneensis* in Shorigal which had maximum important value index (22.58). The co-dominant species were, *Palaquium ellipticum*, *Alseodaphne semecarpifolia*, *Cullenia exarillata* and *Vateria indica*, representing 53% of the total species present, constitute more than 30 percentage of the total IVI and 15% of the total basal area. Some studies in Western Ghats showed higher stand density in the evergreen forest area, such as 635 trees/ha by Pascal and Pelissier, 1996 and in Parambikulam - 881 trees/ha by Sankar and Sanal Kumar, 1997. May be the anthropogenic activities and disturbances in the ecosystem are the causal factors of comparatively low stand density (626 trees/ha) in the Shorigal area. Necessary action for the proper conservation and management of endemic, endangered and threatened species should be taken by the concerned authorities to protect our biodiversity.

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