

Floristic Diversity and Vegetation Analysis of Plants from Various Forest Types in Hosur Forest Division, Tamil Nadu, Southern India

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Abstract

The study deals with the floristic diversity assessment and vegetation composition analysis in various forest types from Hosur Forest division situated in Eastern Ghats of Southern India, in the state of Tamil Nadu. The study recorded 468 species of plants belonging to 283 genera and 91 families, including Angiosperms (464 species), Pteridophytes (3 species) and Bryophytes (1 species). Of the total, 94 species are trees, 12 are lianas, 70 are shrubs, 34 species are climbers, 194 species are herbs, sedges 7, grasses 21, ferns 3 and 1 species of moss. The five most abundant families in Hosur Forest Division were Fabaceae (45 spp.), Poaceae (34 spp.), Acanthaceae (30 spp.), Euphorbiaceae (28 spp.) and Rubiaceae (25 spp.). The quantitative features such as density and important value index (IVI) varied greatly among forest and in different forest types. In the present study, the diversity index of shrubs and herbs were found to be higher than that of trees. The maximum species diversity was recorded in Southern dry mixed deciduous forest (SDMDF) followed by Southern Thorn Forest (STF) and Southern Thorn Scrub (STS). The species diversity (H) was recorded the highest for SDMDF (5.61) followed by STF (5.18) and the lowest for STS (5.12). The presence of large number of higher girth class tree species and low number of sapling and seedling indicates that the present forests investigated are old and exhibiting low regeneration.

Keywords: Eastern Ghats; native; rarity; tropical forest

Introduction

Forests provide the basic life support system to all the living entities of mother nature, including mankind; these ecosystems provide fresh air, water resources, fertile soil, biodiversity and environment. Vast sections of rural society, including a majority of the tribal groups, are directly reliant on forests for their livelihood. Forest degradation will have adverse impact on these life supporting systems. It is known that for the biodiversity conservation in the state of Tamil Nadu the protected areas account only 4.2% of its total geographical areas, against the national average of 4.82%. Thus, there is need of increasing the PAN (Protected Area Network) in the state to achieve the target and thus will also help to conserve biological diversity for future.

India is a signatory to three international conventions namely Convention on Biological Diversity (CBD), the Convention on Wetlands of International Importance (Ramsar Convention) and the United Nations Framework Convention on Climate Change (UNFCCC) (Anderson, 2002). Biodiversity conservation has been strongly

emphasized since Agenda 21 of the Rio Summit 1992. Hence, it is essential to address the important thrust area for the conservation of biological diversity in the country. Tropical forest constitutes the most diverse plant communities on Earth and it covers 7% of the land surface, while harboring more than half of the world's species (Wilson, 1988). Never the less, they are currently vanishing at an overall rate of 0.8-2% per year (May and Stumpf, 2000; Sagar *et al.*, 2003). The vanishing of tropical forests comes at a time when our data on their structure and dynamics is sadly not enough (Hubbell and Foster, 1992). Several authors like Jayakumar *et al.* (2002), Pragasan and Parthasarthy (2010) say that the pressure on forests by the ever-increasing population is logarithmic and well predicted. Due to heavy dependency on forest and rapidly dwindling biodiversity levels, species loss could sooner or later lead to ecosystem collapse (Naem and Wright, 2003); a decade of research has highlighted generally a positive relationship (Hooper *et al.*, 2005; Balvanera *et al.*, 2006). Across the world, 35 biodiversity hotspots have been identified on the basis of the species endemism and degree of threat through

habitat loss (Myers *et al.*, 2000) and India is one of the 12 mega diversity countries in the world. Among the rich biodiversity hotspots in India are included the Eastern and Western Ghats, Western and Eastern Himalayas and Andaman islands. The present study site falls within the Eastern Ghats.

Conservation of biological diversity has become a major concern, for a large part of the society and many government agencies at all levels (Kaya and Raynal, 2001; Tiwari and Ravikumar, 2018). Documenting basic patterns of biodiversity are fundamental for showing potential areas for conservation and management action (Villasenor *et al.*, 2007). The Eastern Ghats of India is a broken chain of hills that runs almost parallel with the East coast of India covering five states viz. Odisha, Telangana, Andhra Pradesh, Tamil Nadu and Karnataka. Floristic diversity and threat status of plants study of Dharmapuri forest Division was done by Tiwari and Ravikumar (2018) and the present study is the extension of that work to another forest division in order to assess plant biodiversity and vegetation analysis in different forest types of Hosur Forest Division.

Materials and Methods

Study area

Hosur Forest Division (HFD) lies between the latitudes 12°7' & 12°44' N and 77°30' & 78°27' E (an area of 155,253 ha.). It is bounded on the North and West by the Karnataka State and a portion of Krishnagiri range that adjoins Andhra Pradesh in the North-Eastern portion of the division. The river Cauvery that flows between Karnataka and Tamil Nadu States forms the South-Western boundary of the division. The Melagiris are a group of hills lying nestled between the Cauvery and Chinnar rivers, to the South-East of Hosur taluk in Tamil Nadu, India. The Melagiris form part of an almost unbroken stretch of forests connecting Bannerghatta National Park (which forms its North-Western boundary) to the forests of Cauvery Wildlife Sanctuary (which forms its southern boundary, separated by the river Cauvery) and further to Biligirirangan hills and Sathyamangalam forests. The northern and western parts are comparatively plain and are part of the Mysore plateau.

The average elevation in this region is 500-1,000 m. Ground sinks to 300 m in the valley of the Cauvery and the highest point is the peak of Guthereyan at 1,395.11 m. Red sandy loam is the most common soil type found in this region. Small deposits of alluvium are found along Cauvery and Chinnar rivers and Kaoline is found in some areas near Javalagiri. The temperature ranges between 10-35 °C. South-West monsoon is fairly active, mostly in the northern areas, but North-East monsoon is distinctly more effective in the region. Average rainfall is 62 -360 mm, but some pockets in Denkanikottai range receive up to 1,000 mm rainfall.

The Hosur division exhibits considerable variation in composition, quantity and condition. The bulk of the forest is predominantly either of the Southern Dry Mixed Deciduous Type (5A/C3). Southern Tropical Riverine Forests (5/B1) form a narrow strip along Cauvery and Chinnar rivers. Southern Tropical Dry Evergreen Forests (7/C1) are found in some sheltered pockets in

Denkanikottai range where rainfall is around 1,000 mm and elevation is between 800-1,315 m.

Southern Tropical Dry Deciduous Scrub Forests (5A/DS1) are seen mostly near forest borders and Southern Tropical Riverine Forest (5/B1). *Hardwickia binata*, *Terminalia arjuna*, *Tamarindus indicus*, *Garcinia gummigutta*, *Shorea roxburghii*, *Santalum album* and bamboo are some of the important flora found in the area. According to the revised survey of the forest types of India by Champion and Seth (1964), the division is represented by 14 different forest types (Fig. 1). The study area is dominated by Southern Tropical Dry Mixed Deciduous Forest, *Hardwickia* subtype, Secondary Dry Deciduous Forest, Dry Deciduous Scrub, Dry Tropical Riverine Forest, Southern Thorn Forest, Southern Thorn Scrub Forest, Dry Bamboo Brake, Carnatic Umbrella Thorn Forest, Southern Euphorbia Scrub Forest and Tropical Dry Evergreen Forest.

Survey, sampling, data compilation and analysis

Survey was conducted during 2013-2015 covering all aspects and different seasons. For the study of plant biodiversity, the division was divided based on 12 different forest types. These forest types were further separated depending on topography and altitude. Intensive field survey adopting 0.1% of the total area of each forest types was carried out following quadrat technique. For the quantitative assessment, a plot of 31.62 x 31.62 m (65 nos.) quadrats were laid for trees, bamboos and lianas, and all the individuals were measured at GBH in the sample plots; quadrats of 5 x 5 m (130 nos.) were established for shrubs, saplings and climbers and 1 x 1 m (260 nos.) quadrats for herbs and seedlings. For the collection of data from these quadrats and analysis, standard ecological methods were followed (Domboise and Ellenberg, 1974). A species list of all the identified species was prepared with the help of flora guides and nearby area studied (Hooker, 1872-1897; Gamble and Fischer, 1915-1939; Henry *et al.*, 1987; Henry *et al.*, 1989; Matthew, 1981-1984; Ahmedulla and Nayar, 1987; Sanjappa, 1992; Nayar, 1996; Jagtap and Singh, 1999; Singh, 2002; Balakrishnan and Chakrabarty, 2007; Ansari, 2008; Tiwari and Ravikumar, 2018). Each sampled sites were marked with a Global Positioning System (GPS).

Quadrat data were used for computation of analytical features such as density, frequency, basal cover and important value index (IVI), following standard phytosociological methods as given by Curtis and McIntosh (1950). Diameter at breast height of the trees with > 20 cm circumference in each quadrat was measured and recorded for each species. The important value index (IVI) for the tree species was determined as the sum of the relative density, relative frequency and relative dominance (Curtis, 1959). The species diversity among forest types was determined by using Shannon Wiener information function (H') (Shannon and Wiener, 1963). Similarity index was determined by as per formula given by Sorenson (1948). For the calculation of dominance, the basal area was determined by using following formula:

$$\text{Basal area} = \pi r^2$$

The index of diversity was computed by using Shannon Wiener Diversity Index (Shannon and Wiener, 1963) as:

$$H = - \sum (ni/n) \times \ln (ni/n)$$

Where, H is Shannon Wiener Diversity index; S is number of species.

The data on vegetation collected through quadrat study was quantitatively analysed for abundance, density and

frequency. Species diversity and evenness index was calculated by using the Shannon-Wiener Diversity Index (1963) and Evenness Index, respectively.

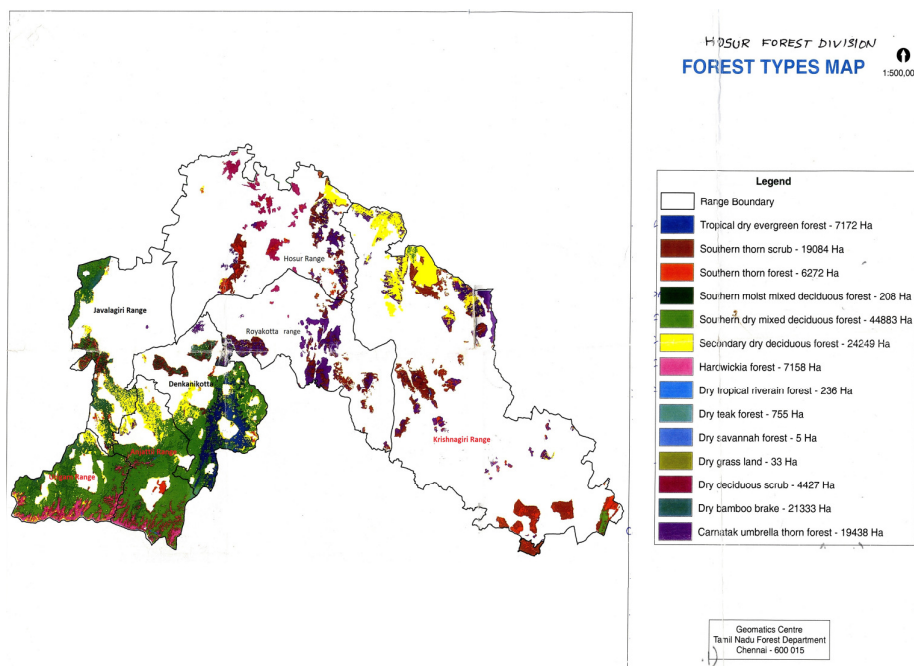


Fig. 1. Hosur Forest Division (Source: GIS cell Chennai, TNFD, Tamil Nadu)

Results

Floristic diversity and threatened status

The study recorded 468 species of plants, of 283 genera belonging to 91 families (Appendix-1) i.e. Angiosperms (464 species), Pteridophytes (3 species) and Bryophytes (1 species) (Table 1). Of the total species, 94 species were trees, 12 species were lianas, 70 species of shrubs, 34 species of

climbers, 194 species of herbs, sedges 7, grasses 21, ferns 3 species and 1 species of moss. Among these recorded species, based on Ravikumar and Ved (2000) (Appendix-1), one (01) species was labelled as Endangered; six (6) species as Vulnerable; one (01) species as Near Threatened; sixteen (16) species are Endemic to Southern India; and 01 Data deficient for the division.

Table 1. Floristic diversity in various forest types of Hosur Forest Division (HFD)

Habits	CUTF	DBB	DDS	HwkF	RvF	SDDF	SDMDF	SDS	SMMD	STF	STS	TDEF	HFD
Tree	17	34	3	7	9	16	56	5	17	19	18	23	94
Liana	8	6	2	1	0	1	7	2	1	5	4	1	12
Shrub	19	21	17	10	4	31	42	9	11	28	31	22	70
Climber	16	9	7	5	1	18	22	6	2	15	14	10	34
Herb	60	30	38	23	7	56	11	13	24	93	81	23	194
Grass	13	8	4	6	0	10	11	2	1	8	10	2	21
Sedges	3	0	1	0	0	3	3	0	1	1	2	1	7
Fern	1	2	0	0	0	0	2	0	0	0	1	0	3
Moss	0	0	1	0	0	1	0	0	0	0	0	0	1
Total species	141	111	78	62	24	137	272	38	55	178	167	85	468
Number Genera	111	96	66	49	21	90	188	36	50	124	123	70	283
Number of Family	48	40	34	24	18	45	72	27	31	55	53	39	91
EN	0	1	0	0	0	0	0	0	0	0	0	0	1
Endemic (SI or PI)	5	5	3	1	0	4	5	0	0	5	1	1	16
NT	0	0	0	0	0	0	1	0	1	0	0	0	1
Least concern	0	0	0	0	0	2	2	0	0	1	2	1	4
Vu	1	2	0	1	0	2	3	0	2	3	2	2	6
DD	0	0	0	0	0	0	0	0	0	0	0	1	1

CUTF: Carnatic Umbrella Thorn Forest; DBB: Dry Bamboo Brake; DDS: Dry Deciduous Forest ; HwkF: Hardwickia Forest; RvF: Riverain Forest ; SDDF: Secondary Dry Deciduous Forest; SDMD: Southern Dry Mixed Deciduous; SDS: Southern Dry Scrub; SMMD: Southern Moist Mixed Deciduous Forest; STF: Southern Thorn Forest; STS: Southern Thorn Scrub; TDEF: Tropical Dry Evergreen Forest; HFD: Hosur Forest Division; EN: Endangered; SI or PI: Southern or Peninsular India; NT: Near Threatened; VL: Vulnerable.

*Compositional features**Southern tropical dry mixed deciduous forest*

This is the most conspicuous type of deciduous forest in the division spreading over almost all the reserved forests of Anchetty, Urigam, Denkanikottai ranges. Sandal and Bamboo, the two economically most valuable species are found exclusively in this forest. The species forming the upper and lower canopy are almost deciduous. Some of the predominant trees that are found to occur in this forest type are: *Anogeissus latifolia*, *Chloroxylon swietenia*, *Psydrax dicoccus*, *Albizia amara*, *Cassia fistula*, *Holoptelea integrifolia*, *Phyllanthus emblica*, *Premna tomentosa*, *Vitex altissima*, *Cassine glauca*, *Diospyros ferrea*, *Strychnos nuxvomica*, *Shorea roxburghii* and *Ficus* spp. *Shorea roxburghii* though occurs profusely in this sub type, but only in patches. The most common climbers/liana/straggler in this forest were: *Cissus quadrangularis*, *Cocculus hirsutus*, *Scutia myrtina*, *Cryptolepis grandiflora*, *Jasminum* spp., etc. The common herbs here were *Orthosiphon aristatus*, *Evolvulus alsinoides*, *Oplismenus compositus*, etc.

Tree layer: in this forest type, *Albizia amara* had the highest density (63.31 ha⁻¹) and IVI (56.76) was recorded; it was followed by *Chloroxylon swietenia* (D = 27.8 ha⁻¹ and IVI = 17.90) and *Psydrax dicoccus* (D = 18.34 ha⁻¹ and IVI = 16.53).

Sapling and seedlings: in sapling (of tree species), *Albizia amara* was dominant among all other species present in this forest type, followed by *Psydrax dicoccus* and *Acacia pinnata*.

Shrub layer: *Lantana camara* (D = 2,875 ha⁻¹, IVI = 21.16), *Tarenna asiatica* (D = 2,037.5 ha⁻¹, IVI = 14.35), *Chromolaena odorata* (D = 1,462.5 ha⁻¹, IVI = 11.09) and *Clausena dentata* (D = 987.5 ha⁻¹, IVI = 8.79) were noted. The highest frequency was recorded for *Lantana camara* (f = 59.38%), followed by *Tarenna asiatica* (f = 25%). The frequency ranged between 3-60%.

Herb layer: the density ranged from 6.63/m² to 0.03/m², whereas grasses exhibited 26.25% of each plots. Among grasses, *Setaria pumila* (D = 4.88/m²), *Aristida setacea* (D = 1.53/m²), *Aristida adscensionis* (D = 0.59/m²) were followed by *Oplismenus composites* (D = 0.47/m²). *Evolvulus alsinoides* exhibited the maximum density (D = 8.63/m²) and f = 65.63%, followed by *Ageratum conyzoides* (D = 5.08/m² and f = 50%), *Sida cordifolia* (D = 4.41/m² and f = 68.75%) and *Pavonia odorata* (D = 3.52/m² and f = 43.75%). The highest frequency was recorded for *Sida cordifolia* (68.75%) and lowest for many species with 1.56%.

Hardwickia subtype: Under Dry Deciduous forest, this subtype was very distinct. This classification is based on the abundant presence of *Hardwickia binata*. This tree occurs gregariously and often occupies the slopes that drain into the Cauvery, Chinnar and Anaibiddahalla on the West and Hosur valley in the East. This forest type is dominated along Cauvery River in Urigam (Bernapalli, Mallahalli beats), Anchetty (Naframpalayam and Pudur beats) ranges. Since this species is of evergreen nature, it stands out conspicuously in this subtype. Some of the other associated species are: *Grewia flavescens*, *Atlantia recemosa*, *Dichrostachys cinerea*, *Chloroxylon swietenia*, *Erythroxylum monogynum* and *Pterolobium hexapetalum*.

Tree layer: in this forest type the climax species was *Hardwickia binata* with the highest density (59.96 ha⁻¹) and IVI (101.65), followed by *Albizia amara* (D = 34.71 ha⁻¹ and IVI = 67.65) and *Chloroxylon swietenia* (D = 25.25 ha⁻¹ and IVI = 36.63).

Sapling and seedlings: in sapling (of tree species) stage *Hardwickia binata* was dominant among all other species present in this forest type, followed by *Atlantia recemosa* and *Chloroxylon swietenia*.

Shrub layer: *Solanum pubescens* (D = 1,333.33 ha⁻¹, IVI = 35.15), *Opuntia dillenii* (D = 1,333.33 ha⁻¹, IVI = 46.16), *Dichrostachys cinerea* (D = 1,266.67 ha⁻¹, IVI = 44.39) and *Jatropha gossypifolia* (D = 1,000 ha⁻¹, IVI = 28.71) were noted. The highest frequency was recorded for *Solanum pubescens*, *Jatropha gossypifolia* and *Cardiospermum canescens* (f = 50%). The frequency ranged from 16-50%.

Herb layer: the density ranged from 0.08/m² to 12.50/m², grasses exhibited 18% of each plot. Among grasses, *Setaria pumila* (D = 2.9/m²) and *Aristida setacea* (D = 1.5/m²) were more abundant. *Sida cordifolia* exhibited the maximum density (D = 4.75/m²) and f = 66.67%, followed by *Evolvulus alsinoides* (D = 3.75/m² and f = 66.67%), *Peristrophe bicalyculata* (D = 3.58/m² and f = 41.67%) and *Spermacoce stricta* (D = 3.00/m² and f = 33.33%). The highest frequency was recorded for *Sida cordifolia* and *Evolvulus alsinoides* (66.67%) and lowest for 17 species with 8.33%.

Secondary Dry Deciduous Forest (SDDF): this forest type dominated in Krishnagiri (Veppanapalli, Naralapalli, Poonguruthi and Thattakal beats) and Anchetty (Panai east and Kondukottai beats) ranges. Basically, this is a mixed deciduous forest, but due to continuous exploitation and biotic interferences it is converted into secondary serial forest type. This forest was dominated by *Albizia amara* and other associate species such as: *Pterolobium hexapetalum*, *Azadirachta indica*, *Annona squamosa*, *Euphorbia tortilis*, *Chloroxylon swietenia*, *Capparis zeylanica*, *Grewia flavescens*, *Ziziphus oenopolia*, *Grewia orientalis*, *Holoptelea integrifolia*, *Bauhinia racemosa*, *Acalypha fruticosa*, *Tarenna asiatica*, *Cassia glauca*, *Grewia tenax*, *Dioscorea pentaphylla*, *Solanum pubescens*, *Gymnema sylvestre*, *Jasminum* spp. *Pachygone ovata*, *Gyrocarpus americanus*, *Cordia monoica*, *Fluggea leucopyrus*, *Ziziphus trinervia*, *Dichrostachys cinerea* and *Moringa concanensis* etc. In this forest type the climax species was *Albizia amara* which had the highest density (167.71 ha⁻¹) and IVI (70.29), followed by *Pterolobium hexapetalum* (D = 25.70 ha⁻¹ and IVI = 14.36), *Annona squamosa* (D = 22.99 ha⁻¹ and IVI = 6.08), *Azadirachta indica* (D = 21.64 ha⁻¹ and IVI = 13.69) and *Euphorbia tortilis* (D = 21.64 ha⁻¹ and IVI = 6.87).

Sapling and seedlings: in sapling (of tree species) *Albizia amara* and *Acacia pinnata* were dominant among all other species present in this forest type, followed by *Chloroxylon swietenia* and *Azadirachta indica*.

Shrub layer: *Lantana camara* (D = 2,742.86 ha⁻¹, IVI = 32.48), *Solanum pubescens* (D = 1,771.43 ha⁻¹, IVI = 23.77), *Fluggea leucopyrus* (D = 1,371.43 ha⁻¹, IVI = 19.63), *Catunaregam spinosa* (D = 1,228.57 ha⁻¹, IVI = 18.29) and

Opuntia dillenii (D = 1,085.71 ha⁻¹, IVI = 16.53) were noted. The highest frequency was recorded for *Lantana camara* and *Flueggea leucopyrus* (f = 57.14%) followed by *Opuntia dillenii* (f = 50%). The frequency ranged from 7.14-57.14%.

Herb layer: the density ranged from 0.04/m² to 8.79/m², grasses exhibited 4% of each plot. Among the dominant species, there were *Mitracarpus hirtus* (D = 8.79/m²), *Aristida adscensionis* (D = 5.25/m²), *Sida cordifolia* (D = 2.71/m²), followed by *Sida acuta* (D = 2.50/m²). *Sida cordifolia* exhibited the maximum frequency of 46.43%, followed by *Aristida adscensionis* (f = 42.86%), *Sida acuta* and *Spermacoce stricta* (f = 21.43%) and lowest frequency for 11 species with 3.57%.

Dry Deciduous Scrub Forest (DDS): this forest type is common in Hosur (Kodasadhanpalli and Carubeler beats) range. Due to persistent felling and removal of useful species this forest type was subjected to a high degree of degradation over a prolonged period of time, by which all the tall trees eventually disappeared, resulting into stunted growth of few scattered trees seen in open forest. Some of the common species composition were *Euphorbia antiquorum*, *Wrightia tinctoria*, *Albizia amara*, *Chloroxylon swietenia*, *Dichrostachys cinerea*, *Diospyros* spp., *Cipadessa baccifera*, *Ehretia pubescens*, *Atalantia monophylla*, *Annona squamosa*, *Butea monosperma*, *Feronia elephantum*, *Dodonaea viscosa*, *Catunaregam spinosa*, *Pavetta indica*, *Lantana camara*, *Ziziphus mauritiana*, *Gymnema sylvestre*, *Cassia montana*, *Azadirachta indica*, *Hemidesmus indicus*, *Ichnocarpus frutescens*, *Secamone emetic*, etc. In this forest type the climax species was *Euphorbia antiquorum*, with the highest density (99.40 ha⁻¹) and IVI (137.54) recorded and was followed by *Toddalia asiatica* var. *gracilis* (D = 56.80 ha⁻¹ and IVI = 20.26), *Wrightia tinctoria* (D = 47.3 ha⁻¹ and IVI = 78.51), *Albizia amara* (D = 14.2 ha⁻¹ and IVI = 28.96) and *Cassia fistula* (D = 4.7 ha⁻¹ and IVI = 20.25).

Sapling and seedlings: among sapling (of tree species) *Diospyros montana* was dominant among all other species present in this forest type, followed by *Wrightia tinctoria*, *Ehretia pubescens* and *Flacourtia indica*.

Shrub layer: *Acalypha fruticosa* (D = 2100 ha⁻¹, f = 50%, IVI = 29.56), *Flueggea leucopyrus* (D = 1,700 ha⁻¹, f = 75%, IVI = 24.66), *Cassia montana* (D = 1,500 ha⁻¹, f = 75%, IVI = 22.69), *Catunaregam spinosa* (D = 1,500 ha⁻¹, f = 75%, IVI = 22.69), *Lantana camara* (D = 1,400 ha⁻¹, f = 25%, IVI = 26), *Dodonaea viscosa* (D = 1,000 ha⁻¹, f = 50%, IVI = 16.83). The lowest density, frequency and IVI were recorded for *Coccinia grandis* and *Ziziphus oenoplia* (D = 100 ha⁻¹, f = 25%, IVI = 4.30). The frequency ranged from 25-75%.

Herb layer: the density ranged from 0.25/ m² to 17.75/ m², grasses exhibited 10% of each plot. *Spermacoce articularis* (D = 17.75/m², f = 37.5%), *Spermacoce ocymoides* (D = 15/m², f = 25%), *Cyanotis tuberosa* (D = 6.13/m², f = 87.5%) *Brachiaria distachya* (D = 4.38/m², f = 12.5%), *Oropetium thomaeum* (D = 4.38/m², f = 25%), were followed by *Glossocardia bosvallia* (D = 3.57/ m², f = 12.5%).

Dry Tropical Riverain forests: This forest type was particularly noticeable along Cauvery River in Urigam and

in Anchetty (Bilikundull beat) ranges. The most principal and unique tree species of this type was *Terminalia arjuna* mixed with *Syzygium cumini*, *Pongamia pinnata*, *Madhuca longifolia*, *Barringtonia acutangula*. Other life forms such as *Crinum asiaticum*, *Homonoia retusa*, *Benkara malabarica*, *Catenorum parvifolia* and *Cyperus* sp. and *Citrullus colocynthis* were also seen in this forest type. In this forest type the climax species was *Syzygium cumini* with the highest density (75.74 ha⁻¹) and IVI (43.05) recorded, followed by *Barringtonia acutangula* (D = 66.27 ha⁻¹ and IVI = 54.94), *Terminalia arjuna* (D = 56.8 ha⁻¹ and IVI = 25.11), *Pongamia glabra* (D = 37.87 ha⁻¹ and IVI = 30.04) and *Madhuca longifolia* (D = 9.46 ha⁻¹ and IVI = 77.98).

Sapling and seedlings: in sapling (of tree species) stage *Pongamia glabra* was dominant among all other species present in this forest type, followed by *Barringtonia acutangula*, *Syzygium cumini* and *Terminalia arjuna*.

Shrub layer: *Homonoia retusa* (D = 3,400 ha⁻¹, f = 100%, IVI = 134.45), *Catenorum parvifolia* (D = 1,200 ha⁻¹, f = 100%, IVI = 61.83), *Alangium salvifolium* (D = 200 ha⁻¹, f = 50%, IVI = 20.74), *Benkara malabarica* (D = 200 ha⁻¹, f = 50%, IVI = 20.74) and *Cassine glauca* (D = 200 ha⁻¹, f = 50%, IVI = 20.74).

Herb layer: the density ranged from 0.25/ m² to 5.75/ m². Maximum density was recorded for *Crinum arisatica* (D = 5.75/m², f = 25%), *Crotalaria paniculata* (D = 0.5/m², f = 25%), *Citrullus colocynthis*, *Crotalaria sedicagenes*, *Merremia tridentata*, *Mimosa pudica* and *Phyllanthus simplex* (D = 0.25/m², f = 25%).

Southern Thorn Forests (STF): This type of forest occurs mostly in the southern-eastern part of the division covering entire Jawalagiri, Roykottai and Krishnagiri ranges. Floristically it is dominated by *Albizia amara*, *Euphorbia antiquorum*, *Pterolobium hexapetalum*, *Wrightia tinctoria*, *Ziziphus oenoplia*, *Cassia siamea*, *Azadirachta indica*, *Acacia chundra*, *Maytenus emarginatus*, *Acacia* spp., *Scutia myrtina*, *Ziziphus xylopyrus*, *Capparis zeylanica*, *Catunaregam spinosa*, *Ipomoea staphylinia*, *Hemidesmus indicus*, *Commiphora berryi* and *Azadirachta indica*. This forest type was dominated by *Albizia amara* (D = 56.80 ha⁻¹, f = 60%, IVI = 35.44), followed by *Euphorbia antiquorum* (D = 35.98 ha⁻¹, f = 60%, IVI = 19.39), *Pterolobium hexapetalum* (D = 32.19 ha⁻¹, f = 60%, IVI = 14.57), *Wrightia tinctoria* (D = 30.30 ha⁻¹, f = 40%, IVI = 10.28), *Ziziphus oenoplia* (D = 28.4 ha⁻¹, f = 60%, IVI = 15.23), *Cassia siamea* (D = 13.25 ha⁻¹, f = 20%, IVI = 6.99) and *Azadirachta indica* (D = 11.36 ha⁻¹, f = 40%, IVI = 6.88).

Sapling and seedlings: in sapling (of tree species) *Albizia amara* was dominant among all other species present in this forest type, followed by *Pterolobium hexapetalum*, *Wrightia tinctoria* and *Azadirachta indica*.

Shrub layer: *Lantana camara* (D = 4,240 ha⁻¹, f = 90%, IVI = 29.11), *Dodonaea viscosa* (D = 1,760 ha⁻¹, f = 30%, IVI = 15.31), *Flueggea leucopyrus* (D = 1,560 ha⁻¹, f = 60%, IVI = 13.65), *Flacourtia indica* (D = 1,520 ha⁻¹, f = 20%, IVI = 15.23) and *Catunaregam spinosa* (D = 1,160 ha⁻¹, f = 50%, IVI = 10.95). Eleven (11) species had the lowest density, frequency and IVI (D = 40 ha⁻¹, f = 10%, IVI = 1.34). The frequency ranged from 10-90%.

Herb layer: the density ranged from 0.05/m² to 15.60/m², dominant species were *Sida cordifolia* (D = 15.60/m², f = 35%), *Spermacoce ocyroides* (D = 4.45/m², f = 20%), *Alloteropsis cimicina* (D = 3.85/m², f = 15%), *Oropetium thomaeum* (D = 3.80/m², f = 20%), *Evolvulus alsinoides* (D = 3.45/m², f = 50%), followed by *Glossocardia bosvallia* (D = 3.40 m², f = 20%).

Southern Thorn Scrub (STS): when the thorn forests are repeatedly hacked at higher intensity these forests are reduced to a mere scrub land consisting of thorny bushes and stunted tree growth averaging 2-3 meters in height. Impenetrable thorny thickets are also commonly met within this type of forests. This forest is usually represented by species like *Albizia amara*, *Chloroxylon swietenia*, *Azadirachta indica*, *Psydrax dicoccus*, *Toddalia asiatica* var. *gracilis*, *Pterolobium hexapetalum*, *Erythroxylon monogynum*, *Dodonaea viscosa*, *Acacia caesia*, *Acacia chundra*, *Acacia ferruginea*, *Ziziphus xylopyrus*, *Dichrostachys cinerea*, *Lantana camera* and *Caralluma adscendens* var. *attenuata*. This forest type is dominated by *Albizia amara* (D = 66.27 ha⁻¹, f = 66.67%, IVI = 71.16), followed by *Acacia chundra* (D = 34.71 ha⁻¹, f = 16.67%, IVI = 20.77), *Azadirachta indica* (D = 34.71 ha⁻¹, f = 83.33%, IVI = 32.85), *Canthium coromandelicum* (D = 20.51 ha⁻¹, f = 16.67%, IVI = 12.69) and *Pterolobium hexapetalum* (D = 14.20 ha⁻¹, f = 50%, IVI = 14.14), *Annona squamosa* (D = 12.62 ha⁻¹, f = 33.33%, IVI = 10.10) and *Chloroxylon swietenia* (D = 12.62 ha⁻¹, f = 16.67%, IVI = 7.94).

Sapling and seedlings: in sapling (of tree species) *Chloroxylon swietenia*, *Canthium coromandelicum*, *Acacia chundra* were dominant among all other species present in this forest type, followed by *Pterolobium hexapetalum*, *Albizia amara*, *Grewia orientalis*, *Sarcostemma acidum*, *Phoenix pusilla* and *Derris scandens*.

Shrub layer: *Lantana camara* (D = 4,033.33 ha⁻¹, f = 83.33%, IVI = 27.79), *Dodonaea viscosa* (D = 3,133.33 ha⁻¹, f = 50%, IVI = 21.76), *Acacia leucophloea* (D = 2,833.33 ha⁻¹, f = 8.33%, IVI = 35.01), *Catunaregam spinosa* (D = 1,766.67 ha⁻¹, f = 66.67%, IVI = 15.65), *Flueggea leucopyrus* (D = 1,333.33 ha⁻¹, f = 58.33%, IVI = 12.84) and *Cassia montana* (D = 1,100 ha⁻¹, f = 16.67%, IVI = 10.52). Seventeen (17) species were recorded with low density, frequency and IVI for the forest type. The frequency ranged between 8.33-83.33%.

Herb layer: the density ranged from 1.5/m² to 47.25/m², grasses exhibited 15% of each plots. Maximum density was recorded for *Cymbopogon flexuosus* (D = 47.25/m², f = 100%), *Tephrosia tinctoria* (D = 24.5/m², f = 75%), *Alloteropsis cimicina* (D = 20.5/m², f = 75%), *Evolvulus alsinoides* (D = 6/m², f = 50%), *Justicia tranquebariensis* (D = 4.75/m², f = 75%), followed by *Ageratum conyzoides* (D = 4.75/m², f = 50%).

Carnatic Umbrella Thorn Forest (CUTF): this forest type is very common in Royakottai, Denkanikottam and Krishnagiri ranges. Vegetation is of open thorny forests with scattered *Acacia planifrons* and *Albizia amara* that are characterized by umbrella-shaped crowns. Other floristic elements seen in this forest type are: *Acalypha fruticosa*, *Holoptelea integrifolia*, *Dodonaea viscosa*, *Solanum pubescens*,

Cocculus hirsutus, *Cissus quadrangularis*, *Cryptolepis grandiflora*, *Abutilon crispum*, *Sarcostemma acidum*, *Sida* spp., *Dioscorea* spp., *Corallocarpus epigaeus*, *Cardiospermum canescens*, *Barleia longiflora*, *Gymnema sylvestre*, etc. In CUTF forest a total of 141 species were recorded.

Tree layer: in this forest type 17 tree species and 8 lianas were recorded; the dominating species in this forest were *Acacia planifrons* (D = 160.95 ha⁻¹, f = 100%, IVI = 112), *Albizia amara* (D = 40.57 ha⁻¹, f = 85.71%, IVI = 31), *Azadirachta indica* (D = 21.64 ha⁻¹, f = 42.86%, IVI = 15.8), *Pterolobium hexapetalum* (D = 20.29 ha⁻¹, f = 42.86%, IVI = 12.8), *Annona squamosa* (D = 18.93 ha⁻¹, f = 42.86%, IVI = 12.8), *Euphorbia antiquorum* (D = 17.58 ha⁻¹, f = 42.86%, IVI = 14.4), *Euphorbia tortilis* (D = 13.52 ha⁻¹, f = 14.29%, IVI = 10.7), *Diospyros montana* (D = 10.82 ha⁻¹, f = 14.29%, IVI = 6.29) and *Wrightia tinctoria* (D = 8.11 ha⁻¹, f = 28.57%, IVI = 6.8).

Shrub layer: in this forest type, 19 species of shrubs and 16 species of climbers were recorded, among these dominant species were *Acalypha fruticosa* (D = 8,000 ha⁻¹, f = 50%, IVI = 56.62), *Lantana camera* (D = 6,314.29 ha⁻¹, f = 57.14%, IVI = 45.37), *Solanum pubescens* (D = 1,885.71 ha⁻¹, f = 35.71%, IVI = 18.20), *Flueggea leucopyrus* (D = 1,828.57 ha⁻¹, f = 64.29%, IVI = 19.18), *Gymnema sylvestre* (D = 1,040 ha⁻¹, f = 40%, IVI = 12.7), *Tarenna asiatica* (D = 880 ha⁻¹, f = 26.67%, IVI = 10.5), *Jasminum angustifolium* and *Jatropha gossypifolia* (D = 600 ha⁻¹, f = 21.43%, IVI = 8.36).

Herb layer: among herbaceous species, grasses were dominant in ground cover in this forest type. Were noted *Sida acuta* (D = 3.36 ha⁻¹, f = 17.86%), *Digitaria bicornis* (D = 3.07 ha⁻¹, f = 107.1%), *Evolvulus alsinoides* (D = 2.93 ha⁻¹, f = 28.57%), *Digitaria ciliaris* (D = 2.14 ha⁻¹, f = 10.71%), *Sida cordifolia* (D = 28.57 ha⁻¹, f = 7.5%), *Kyllinga monocephala* (D = 2.11 ha⁻¹, f = 17.86%), *Cynotis cristata* (D = 1.96 ha⁻¹, f = 14.29%), *Ocimum americanum* (D = 1.96 ha⁻¹, f = 25%), *Blepharis repens* (D = 1.75 ha⁻¹, f = 17.86%) and *Dipteracanthus prostratus* (D = 1.68 ha⁻¹, f = 25%).

Southern Euphorbia Scrub (SES): this is an extremely degraded type of forest, seen in pockets along the fringes of the Carnatic umbrella Thorn Forests. No noteworthy tree growths are seen here. The vegetation comprises mostly of *Euphorbia antiquorum*, *Euphorbia tortilis* with *Albizia amara*, *Azadirachta indica* and *Annona squamosa*. Some of the worthy species to be mentioned in this forest type are: *Coccinea indica*, *Caralluma* spp., *Rhynchosia minima*, *Sida* spp., *Commiphora berryi*, *Dioscorea* spp., *Cardiospermum halicacabum*, *Barleria buxifolia*, etc.

Southern Dry Scrub (SDS): this is an also extremely degraded type of forest and was seen in few pockets in the division. Some of the plants found in this forest type were *Albizia amara*, *Azadirachta indica*, *Pterolobium hexapetalum*, *Holoptelea integrifolia*, *Celastrus paniculatus*, *Strychnos nux-vomica*, *Wrightia tinctoria*, *Cassia montana*, *Cassia auriculata*, *Gymnema sylvestre*, *Cryptolepis grandiflora*, *Annona squamosa*, *Lantana camara*, *Cissus quadrangularis*, *Cymbopogon flexuosus*, *Tephrosia tinctoria*, *Alloteropsis cimicina*, *Evolvulus alsinoides*, *Justicia tranquebariensis*, *Ageratum conyzoides*, *Aristida setacea*,

Corchorus aestuans, *Pavonia odorata*, *Mitracarpus hirtus*, *Apluda mutica* and *Cyanotis tuberosa* etc.

Dry Bamboo Brake (DBB): both the species of bamboos viz. *Bambusa bambos* and *Dendrocalamus strictus* occur in this division almost in equal extent and sometimes both species were found mixed in the same locality. Some of the other associated trees found in this type were: *Pterocarpus marsupium*, *Dalbergia lanceolaria*, *Cassia fistula*, *Holoptelea integrifolia*, *Cassine glauca*, etc. Some of the economically important species like *Embelia tjerium-cottam* and *Asparagus racemosus* were also found in Ayur RF.

Southern Moist Mixed Deciduous Forest (SMMD): this forest type is found at little higher elevation in Denkanikottam range. The vegetation is characterized by *Strychnos potatorum*, *Erythroxylum monogynum*, *Canthium sp.*, *Memecylon kollimalayana*, *Buchanania axillaris*, *Ochna obtusata var. gamblei*, *Acacia pennata*, *Cassine glauca*, *Ixora pavetta*, *Phyllanthus indofischeri*, *Pterolobium hexapetalum*, *Vitex altissima*, *Acalypha alnifolia*, *Chromolaena odorata*, *Flacourtia indica*, *Ixora arborea*, *Cajanus scarabaeoides*, *Argyrea cuneata*, *Erythroxylum monogynum*, *Decaschistia crotonifolia*, *Desmodium pulchellum*, *Gardenia gummifera*, *Curculigo orchioides*, *Cyanotis tuberosa*, *Crotalaria medicaginea*, *Mariscus dubius*, *Vernonia cinerea*, *Byttneria herbacea*, *Galactia tenuiflora*, *Andrographis serpyllifolia*, *Spermacoce articularis*, *Allmania nodiflora*, *Tephrosia tinctoria*, *Phyllanthus virgatus*, *Vernonia albicans*, *Chamaecrista pumila*, *Euphorbia cristata* etc.

Tropical Dry Evergreen Forest (TDEF): these forests occupy limited extent in patches in sheltered pockets and folds of Melagiri hill near Gutrayan of Denkanikottam forest range. The vegetation is characterized by *Mamecylon edule*, *Manilkara hexandra*, *Eugenia alternifolia*, *Syzygium gardneri*, *Litsea wightiana*, *Diospyros montana*, *Alseodaphne semecarpifolia*, *Pleurostylia wightii*, *Alphonsea sclerocarpa*, *Artabotrys odoratissima*, *Syzygium cumini*, *Memecylon kollimalayanum*, *Benkara malabarica*, *Anogeissus latifolia*, *Phyllanthus polyphyllus*, *Garcinia gummi-gutta*, *Dioscorea ovalifolia*, *Psydrax dicoccos*, *Miliusa montana*, *Chionanthus mala-elengi*, *Mangifera indica*, *Alseodaphne semecarpifolia*, *Canthium coromandelicum*, *Vitex altissima*, *Bambusa*

bambos, *Chionanthus malabaricus*, *Diospyros melanoxyylon*, *Flacourtia montana*, *Gymnosporia ovata*, *Scutia myrtina*, *Tetrastigma lanceolarium*, *Euphorbia susan-holmesiae*, *Tarenna asiatica*, *Cipadessa baccifera*, *Ixora arborea*, *Elaeagnus indica*, *Gymnosporia ovata*, *Secamone emetica*, *Diospyros montana*, *Litsea deccanensis*, *Phyllanthus polyphyllus*, *Dioscorea oppositifolia*, *Ebretia microphylla*, *Catunaregam spinosa*, *Nothopegia colebrookiana*, *Dioscorea pentaphylla*, *Ixora parviflora*, *Ichnocarpus frutescens*, *Cyrtococcum trigonum*, *Oplismenus compositus*, *Cajanus scarabaeoides*, *Digitaria ciliaris*, *Justicia glauca*, *Acalypha ciliata*, *Curculigo orchioides*, *Asparagus racemosus*, *Justicia prostrata*, *Scleria lithosperma*, *Phyllanthus virgatus*, *Justicia glabra*, *Actiniopteris radiata*, *Adiantum sp.*, *Hedyotis puberula*, *Andrographis alata*, *Pachygone ovata*, *Dipteracanthus prostratus*, *Celosia polygonoides*, *Dioscorea pentaphylla*, *Orthosiphon glabratus* etc.

Species diversity and similarity among different forest types

The species diversity in different forest types are depicted in Table 2. The maximum species diversity was recorded in Southern dry mixed deciduous forest (SDMDF), followed by Southern Thorn Forest (STF) and Southern Thorn Scrub (STS). The species diversity (H) was recorded highest for SDMDF (5.61), followed by STF (5.18) and the lowest for STS (5.12). SDMDF has the maximum tree species, followed by DBB and lowest were reported from HwkF. Among shrubs, SDDF and STS has maximum number of species representation and the lowest has been reported in Riverain (RvF). Maximum number of herbaceous species diversity was in STF and the lowest within RvF.

Maximum number of floristic compositional similarities was observed between STF and STS (38%), followed by STF and SDDF (32%) and the minimum was observed between *Hardwickia* and Riverain forest and Riverain and DDS (Table 3). By comparison, maximum number of species were shared between SDMDF and STF forest (393 sp.), followed by SDMDF and STS (385 nos.) and minimum number of common species was observed between SMMD and Riverine forest (Table 4).

Table 2. Species diversity in different forest types of HFD

	CUTF	DBB	DDS	HwkF	RvF	SDDF	SDMDF	SDS	SMMD	STF	STS	TDEF
Taxa_S	141	111	78	62	24	137	272	38	55	178	167	85
Dominance_D	0.01	0.01	0.01	0.02	0.04	0.01	0.00	0.03	0.02	0.01	0.01	0.01
Simpson_1-D	0.99	0.99	0.99	0.98	0.96	0.99	1.00	0.97	0.98	0.99	0.99	0.99
Shannon_H	4.95	4.71	4.36	4.13	3.18	4.92	5.61	3.64	4.01	5.18	5.12	4.44

Table 3. Similarities percentage (%) among different forest types

	CUTF	DBB	DDS	HwkF	RvF	SDDF	SDMDF	SDS	SMMD	STF	STS	TDEF
CUTF	0	18	33	15	4	32	28	14	7	32	32	15
DBB	18	0	13	23	5	23	22	10	11	19	18	19
DDS	33	13	0	11	3	21	18	17	9	24	23	12
HwkF	15	23	11	0	2	17	13	11	6	14	14	11
RvF	4	5	3	2	0	5	4	5	7	5	5	6
SDDF	32	23	21	17	5	0	27	18	9	32	34	15
SDMDF	28	22	18	13	4	27	0	10	13	28	18	19
SDS	14	10	17	11	5	18	10	0	9	15	15	10
SMMD	7	11	9	6	7	9	13	9	0	10	10	32
STF	32	19	24	14	5	32	28	15	10	0	38	13
STS	32	18	23	14	5	34	18	15	10	38	0	51
TDEF	15	19	12	11	6	15	19	10	32	13	51	0

Table 4. Number of species common among different forest types

	CUTF	DBB	DDS	HwkF	RvF	SDDF	SDMDF	SDS	SMMD	STF	STS	TDEF
CUTF	0	213	165	172	159	202	311	156	182	231	222	197
DBB	213	0	167	141	128	201	362	142	157	264	255	165
DDS	165	167	0	125	99	195	322	107	128	229	220	146
HwkF	172	141	125	0	84	183	313	95	114	224	214	133
RvF	159	128	99	84	0	157	290	61	77	198	186	103
SDDF	202	201	195	183	157	0	361	161	184	272	260	193
SDMDF	311	362	322	313	290	361	0	296	308	393	385	299
SDS	156	142	107	95	61	161	296	0	89	201	191	112
SMMD	182	154	128	114	77	184	308	89	0	222	212	106
STF	231	264	229	224	198	272	393	201	222	0	291	232
STS	222	255	220	214	186	260	385	191	212	291	0	167
TDEF	197	165	146	133	103	208	328	118	131	246	237	0

CUTF: Carnatic Umbrella Thorn Forest; DBB: Dry Bamboo Brake; DDS: Dry Deciduous Forest; HwkF: Hardwickia Forest; RvF: Riverain Forest; SDDF: Secondary Dry Deciduous Forest; SDMD: Southern Dry Mixed Deciduous; SDS: Southern Dry Scrub; SMMD: Southern Moist Mixed Deciduous Forest; STF: Southern Thorn Forest; STS: Southern Thorn Scrub; TDEF: Tropical Dry Evergreen Forest.

Native, rarity and endemic species

As per the data collected and literature surveyed it was found that sixteen (16) species are endemic to peninsular India and twenty three (23) species were recorded as rare for Peninsular India, all recorded within Hosur Forest Division (HFD). Among threatened and near threatened category, one (01) species are endangered (EN) and six (6) species are vulnerable in the HFD. SDMD forest represents maximum numbers (11 nos.) of threatened species viz endemic, endangered, rare and vulnerable followed by STS (05 nos.) (Table 1). Other forest types signify less number of threatened species.

Discussion

The biodiversity on earth provides a large number of services to humankind. Biodiversity not only helps in the regulation of soil and water, but it also provides food and shelter for survival of a large number of species. Increase in human population has resulted in demand of more and more biological resources (Daily, 1995; Singh, 2002). In the last 20 decades it has been observed that biological diversity is rigorously vulnerable by anthropogenic disturbances, whereas most of the rural people in India are fully dependent on forest products such as timber, livestock grazing, fuel wood consumption and fodder. An affluent species richness habitat is mainly governed by some of the environmental factors, which always influence the composition of that place. If anthropogenic disturbance is more than the richness of that habitat, the biodiversity will always be less, whereas less human intervention in any kind of habitat will contain good type of diversity.

The resources of any ecosystem are limited and for the sustainable exploitation of these resources we have to formulate some strategies. Such activities are impairing and destroying the ecosystems. For the conservation and management of these species in wild an attempt has been made to assess and identify the status of diversity in junction of Eastern and Western Ghats. During the survey period it has been observed that most of the areas were under tremendous pressure due to high percentage of livestock grazing and collection of fuel wood. The growth in human population over the years had both the positive and negative impact on the overall quality of the environment. As the

demand for energy has increased, the potential for electrical energy production has also been tapped to a great extent. The assessment was done by using quantitative and qualitative attributes.

If we compare tree species richness among nearby forested area such as Bannerghatta forest with 41 tree species (Verma *et al.*, 2009; Gopalakrishna *et al.*, 2015), Mudumalai with 63 tree species (Condit *et al.*, 2000), Dharmapuri FD with 51 tree species (Tiwari and Ravikumar, 2018), was noted in the present study for HFD there were 94 tree species, which is the highest number among the nearby forested area. The five most abundant families in HFD were Fabaceae (45 nos.), Poaceae (34 nos.), Acanthaceae (30 nos.), Euphorbiaceae (28 nos.) and Rubiaceae (25 nos.), while Tiwari and Ravikumar (2018) found Fabaceae and Acanthaceae to be most dominant families in Dharmapuri Forest Division, which is an adjutant forest division; Panda *et al.* (2013) had recorded Euphorbiaceae and Moraceae to be the most dominant families in northern portion of Eastern Ghats, while the southern portion of Eastern Ghats in Bannerghatta forest is dominated by families Fabaceae, Caesalpiniaceae and Rubiaceae (Gopalakrishna *et al.*, 2015; Puttookame *et al.*, 2015). Mimosaceae, Rubiaceae, Apocynaceae were the most dominant families in Piranmalai Forest (Pitchairamu *et al.*, 2008), whereas Euphorbiaceae and Rubiaceae were most dominant in Shervarayan hill (Kadavul and Parthasarthy, 1999).

It is a well-known fact that forests provide the basic life support system to all living entities of earth including mankind. These ecosystems provide fresh air, water resources, fertile soil and agriculture, bio-diversity and environment, and in country like India vast sections of rural society, including a majority of the tribes, are directly dependent on forests for their livelihood. If these forests degrade it will have a serious adverse impact on these life sustaining systems. Forests are increasingly considered as a natural resource, from which communities will derive ecological services rather than economic returns. In sight of this thought, the floristic diversity of Hosur forests will help forest department to develop management plans for these tropical dry forests of Eastern Ghats. The quantitative biodiversity data of Eastern Ghats will be useful in forest

management and conservation.

During the study period it was observed that all forested area of this division was subjected to continuous biotic pressure, resulting into rapid degradation. With the help of JFM concept these areas can slowly be restored for recouping the vegetation. Due to perpetual grazing as observed in many areas, the new seedlings and saplings of important species like bamboo, medicinal plants and other NTFP species are often subjected to continuous damage. Management of grazing is very important for the conservation of natural vegetation. This will help to increase in availability of biomass for fodder, fuelwood in forest areas.

In-situ conservation of plant or animal species uses diversified genetic resources in its natural condition. Both *in-situ* and *ex-situ* conservation are suitable for protecting the endangered species that are distributed across varied ecological conditions. To undertake these conservation programs effectively and efficiently some of the important methods that could be taken up are: (1) conduct the representative sampling for the populations of CR/EN/VL species; (2) collection and maintenance for seedlings/propagules/seeds of CR/EN/VL species; (3) utilization for *in-situ* actions will be used as a tool for efficiently solving specific conservation problems.

Conclusions

In analysis of the present study, it is shown the tree density in forests along with the rare and endemic species of the forest division. As far as CR/EN/DD taxa concerned, only few individuals (3 Nos.) of *Decalepis hamiltonii* were noticed in one plot. A good population of *Memecylon bremeri*, an endemic species to Tamil Nadum was recorded in the study area. With the help of such studies it has been identified the specific localities of each CR/EN/VL species for this division and these localities can be further monitored to know their population dynamics and based on this, a special conservation plan can be made and it should also be included in the working plan for their conservation in the respective habitats. To accomplish the success of such a complex program, a nursery can be raised close to the well identified forest area and these CR/EN/VL plants can be grown there and shall later be transferred to the specific natural habitats. A demo garden can be established along with the interpretation centre which should reflect the mini composition of the entire forest division in respect to rare, endemic, threatened plants of taxonomical, medicinal, trade, cultural and conservation significance.

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