KFRI Research Report No. 232 ISSN 0970-8103

Stand structural diversity and dynamics in natural forests of Kerala

U.M.Chandrashekara
K.Jayaraman

Kerala Forest Research Institute
Peechi-680653, Thrissur, Kerala

July 2002

Stand structural diversity and dynamics in natural forests of Kerala

(Final Report of project KFRI 344/00)

U.M.Chandrashekara
K.Jayaraman

Kerala Forest Research Institute
Peechi-680653, Thrissur, Kerala

July 2002

ABSTRACT OF PROJECT PROPOSAL

Code	KFRI/344/00
Title	Stand structural diversity and dynamics in natural forests of Kerala
Objectives	To lay out permanent plots of size 100m x 50m distributed in different ecozones, forest types of varying stocking and species composition levels so as to ♦ enumerate and monitor the growth rate of trees, shrubs and herb community in natural forests, ♦ assess the regeneration status of tree species, and ♦ generate data on structural diversity of different forest types within the sample plots
Expected outcome	The measurements will generate a database which will serve as the base for long term monitoring of the different ecosystems considered. Information will be generated on stand structural diversity, species adaptation, species association and regeneration status, an understanding of which is essential in any conservation/ management programme in respect of the specific forest types considered for the present study.
Date of commencement	April 2000
Date of completion	March 2002
Funding agency	Kerala Forestry Project (World Bank) Kerala Forest Department
Scientific personnel	U.M.Chandrashekara K.Jayaraman

CONTENTS

Tables

Figures

Abstract

Sixty permanent plots, each of 100 m x 50 m in size (0.5 ha in area), were established to represent major forest types viz. shola forest, evergreen forest, semi-evergreen forest, moist deciduous forest and dry deciduous forest in Kerala. Each 0.5 ha plot was in turn subdivided into 50 quadrats of 10 m x 10 m size, with quadrats permanently marked. Totally 21,239 trees (gbh $\geq$ 10.1 cm) representing more than 327 species were tagged and identified. Tree seedlings (girth $\leq$ 10.0 cm) were enumerated in 12 sub quadrats each of 5 m x 5 m in size in each plot.

In the shola forest plot, the estimated ratio between density of un-established seedlings and established seedlings was about 1.2**:**1.0 and the tree girth class distribution showed a negative exponential pattern. These observations indicated that the forest plot is relatively undisturbed and the tree regeneration is satisfactory.

Permanent plots established in evergreen forests are generally different from each other in terms of floristic richness and floristic composition. Same observation was made in the plots established in semi-evergreen forests and moist deciduous forests. While the forests disturbed by selective logging in the past are comparable with the relatively undisturbed plots for floristic richness, density and basal area, forests disturbed by undercropping cardamom are not. In majority of the evergreen forests, a negative exponential curve of girth class distribution was noticed.

In the semi-evergreen forest plots, about 50 to 72 percent of the tree species encountered are those seen in evergreen forests while the remaining are deciduous in nature. In some of the plots, evergreen species form the dominant population and their regeneration is also fairly high. Such plots seem to be floristically more stable due to less anthropogenic pressure at present. They have the potential to become climax evergreen forests.

In the moist deciduous forest plots, which showed signs of severe and continuous disturbance, seedling density is much lower than the tree density. In general, either occasional or continuous human-induced disturbances hinder the

recruitment of stems from lower girth classes to higher girth classes and thus the girth class distribution curves in moist deciduous forests are not L-shaped.

In the dry deciduous forests, the density of seedling is less than that of trees. However, tree regeneration by root suckers and multiple shoot production could be the reason for higher values for tree density and basal area.

Since basic data were collected and all trees were marked, long term monitoring of these permanent plots can be undertaken to understand species-wise regeneration pattern and forest recovery processes, besides inventory of flora and fauna and evaluating their diversity.

1.0 Introduction

Many areas in the tropics are undergoing rapid, wide-ranging changes in the land cover. Among these changes, tropical forest clearing is dramatic. According to a recent assessment, the average rate of deforestation between 1981 and 1986 in India, for example, is 0.2% per year (FAO-UNEP, 1981). Most of these extinctions of tropical forests can be attributed to pressures of poverty and population growth (Myers, 1988). Lack of technical and scientific infrastructure makes efforts of sustainable management of these natural resources extremely difficult. The absence of basic information on the growing stock and productivity and dynamics of forest ecosystems also often further hampers such efforts. Thus the installation and repeated inventory of permanent plots in major tropical forests are increasing day by day (Bellingham *et al.*, 1999; Phillips, 1998; Sukumar *et al.,* 1998). Such studies have indicated that monitoring the permanent plots can aid in collecting reliable scientific information on habitat composition, structure, dynamics and in evaluating existing management approaches and their impacts on forest ecosystem. Kerala, being a part of the Western Ghats, is a mega-biodiversity centre of the world. Here the forest types are diverse and each forest type is represented by different kinds of association as well as stocking levels. Though baseline plant diversity inventories and general phytosociological studies have been carried out in several forests, only one attempt has been made to monitor a few selected forest patches for changes in diversity and population density of the woody species (Chandrashekara *et al.,* 1998). Considering the vastness and variation in the forests of the State, establishment of more number of permanent plots is needed to cover as much geographical area as possible. The present study was thus aimed at establishing permanent sample plots and monitoring the growth and productivity of tree, shrub and herb communities in different forest types in the State. Although, such a project has a long-term perspective and requires observation over a number of years, the immediate concern was to establish a network of sample plots in the State and generate initial measurements to serve as a basis of long-term plan for continuous forest inventory.

2.0 Methodology

2.1 Selection of sites for the establishment of permanent sample plots

The tropical montane forest (shola forest), wet evergreen forest, semi-evergreen forest, moist deciduous forest and dry deciduous forest are the common types of forests in the State. Area under each type of forest and its proportion to the total forest area in the State are given in Table 1.

Table 1. Area under different types of forest in Kerala.

Forest types	Area (km^2)	Proportion
Evergreen and semi-evergreen forests	3450	44.69
Moist deciduous forest	4100	53.11
Dry deciduous forest	100	1.30
Shola forest	70	0.91
Total	**7720**	**100.00**

Source: Nair, 1997

Totally 60 sites were selected to represent different types of forest and also all geographical regions of the State. Number of sites in a given forest type was determined primarily based on the relative proportion of area covered by it in the State. Selection of the site also followed the purposive sampling considering accessibility to the site for regular and frequent monitoring. The sixty sites include 1 in shoal forest, 14 in evergreen forests, 21 in semi-evergreen forests, 20 in moist deciduous forest and 1 in dry deciduous forest. A list of sites selected for the study is given in Table 2.

2.2 Establishment of permanent sample plots

In order to determine the size of the plot to be established in a given type of forest, increase in the number of species with increase in the quadrat size was calculated and the species-area curves were drawn for each forest type (Fig. 1). This exercise indicated that the curve become smooth much before the size of the plot is 3500 m^2 to 4500 m^2. However to have uniform sized plots, in each forest site, a 0.5 ha plot was marked and which in turn was divided into 50 quadrats 10 m x 10 m in size (Fig. 2).

Surveying to establish quadrat corners was proceeded from the baseline of the plot. First a baseline of 100 m was established, generally in west-east direction. Ten points, each at an interval of 10 m were marked on the baseline. At each such point a stake was fixed. From each point, a distance of 10 m perpendicular to the baseline was measured. However, before fixing stakes at each new point, measurements were made to confirm that the distance between two adjacent points was 10 m and that the 2^{nd} line passing through 10 new points was horizontal to the baseline. Thus a row of ten quadrats was established. The next step was to repeat the same process by considering the new line as the baseline to establish remaining 40 quadrats. As the establishment of corners proceeded three measurements were made to ensure that the size of each quadrat was 10 m x 10 m. These measurements include the `back' measurement (from the new set up point back to the previous stake on the same line), the `check' measurement (to previously established stakes below the current line), and the `new' measurement (to set next stake on the current line).

Once the corners of all 50 quadrats were established, the quadrats were permanently marked at each of their corners with stones fixed to the ground. The portion of all corner stones well above the forest floor was painted to increase the visibility and each corner stone was labeled with a number to differentiate its location in the plot.

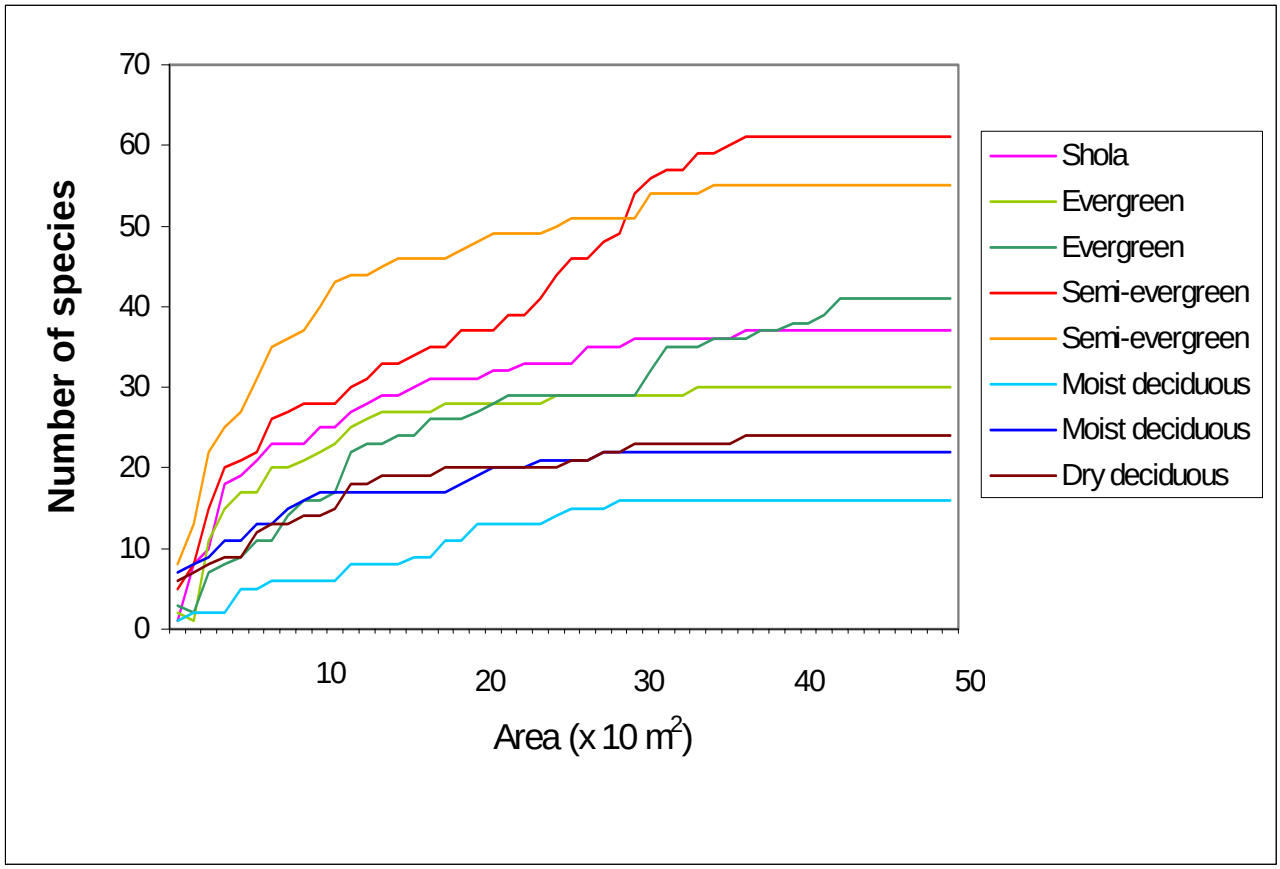


Figure 1: Species-area curve obtained from different forest types of Kerala

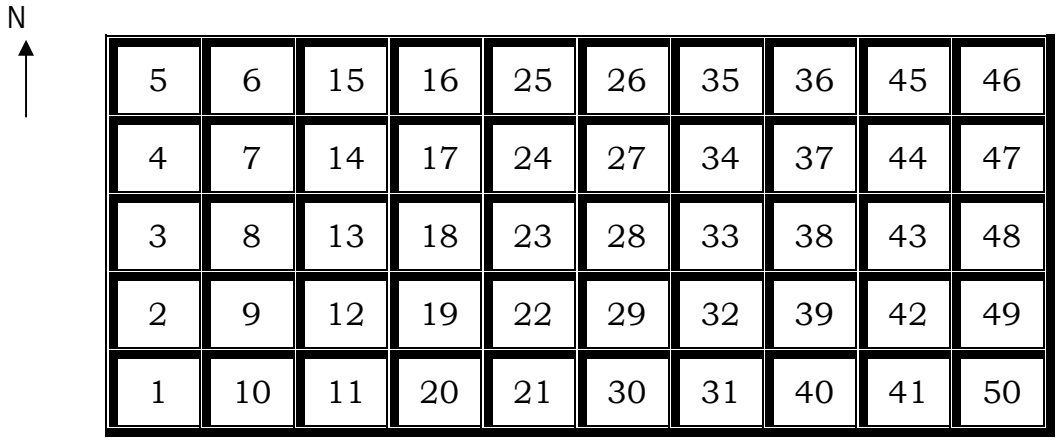


Figure 2. Schematic diagram of a 0.5 ha (100 m x 50 m in size) sample plot showing the distribution of 50 quadrats each of 10 m x 10 m.

Table 2. Forest sites selected in Kerala for the establishment of permanent sample plots

Plot Code No.	Forest type*	Locality	Forest Range	Forest Division	Altitude(m)	Longitude	Latitude
1	MDF	Athirapally	Charpa	Vazhachal	212	76.5668	10.2962
2	MDF	Randukai	Pariyaram	Chalakkudy	259	76.4664	10.3520
3	MDF	Randukai	Pariyaram	Chalakkudy	99	76.4625	10.3490
4	MDF	Konnakuzhi	Pariyaram	Chalakkudy	82	--	---
5	MDF	Thumburmuzhy	Pariyaram	Chalakkudy	79	76.4377	10.3003
6	SEG	Pandarampara	Pariyaram	Chalakkudy	243	76.4765	10.3141
7	SEG	Pandarampara	Pariyaram	Chalakkudy	149	76.4746	10.3148
8	MDF	Pandarampara	Pariyaram	Chalakkudy	146	76.4710	10.3016
9	MDF	Vaniampuzha	Nilambur	Nilambur N	149	76.2219	11.4665
10	EG	Vaniampuzha	Nilambur	Nilambur N	344	76.2056	11.4735
11	EG	Vaniampuzha	Nilambur	Nilambur N	312	76.2082	11.4704
12	MDF	Vaniampuzha	Nilambur	Nilambur N	70	76.2363	11.4518
13	MDF	Vaniampuzha	Nilambur	Nilambur N	72	76.2311	11.4618
14	EG	Pothumala	Nelliampathy	Nemmara	1096	76.6634	10.4366
15	EG	Pothumala	Nelliampathy	Nemmara	1116	76.6555	10.4443
16	EG	Pakuthipalam	Nelliampathy	Nemmara	805	76.6918	10.4510
17	MDF	Pothundy	Nelliampathy	Nemmara	155	76.6277	10.5616
18	EG	Iringole	Sacred Grove		94	76.4980	10.1089
19	MDF	Velamplavu	Ranni	Ranni	491	76.9080	9.3820
20	MDF	Velamplavu	Ranni	Ranni	503	76.9119	9.3738
21	EG	Chalikuzhy	Ranni	Ranni	543	76.9493	9.3884
22	EG	Chalikuzhy	Ranni	Ranni	567	76.9384	9.3854
23	SEG	Manakkayam	Ranni	Ranni	140	76.9479	9.3381
24	EG	Meenar	Goodrikal	Ranni	1224	77.1993	9.4199

* Shola= Shola Forests, EG= Evergreen Forests, SEG= Semi-evergreen Forests, MDF= Moist Deciduous Forests

Table 2 (cont'd). Forest sites selected in Kerala for the establishment of permanent sample

plots.

Plot Code No.	Forest type*	Locality	Forest Range	Forest Division	Altitude(m)	Longitude	Latitude
25	EG	Meenar	Goodrikal	Ranni	1225	77.1743	9.4205
26	EG	Meenar	Goodrikal	Ranni	1223	77.1710	9.4208
27	EG	Meenar	Goodrikal	Ranni	1183	77.1801	9.4212
28	MDF	Achencoil	Achencoil	Achencoil	213	77.1750	9.0867
29	MDF	Achencoil	Achencoil	Achencoil	229	77.1755	9.0869
30	SEG	10th mile	Achencoil	Achencoil	253	77.1858	9.0744
31	SEG	Kottavasal	Achencoil	Achencoil	457	77.2063	9.0714
32	EG	Kulirkadavu	Aryankavu	Thenmala	418	77.1137	9.0272
33	MDF	Kochuthalappara	Aryankavu	Thenmala	361	77.1328	9.0073
34	SEG	Kottavasal	Aryankavu	Thenmala	407	77.1622	8.9912
35	SEG	Palaruvi	Aryankavu	Thenmala	408	77.1641	8.9439
36	MDF	Vellatanku	Thenmala	Thenmala	113	77.0692	8.9623
37	SEG	Kalthuruthy	Thenmala	Thenmala	282	77.0908	8.9783
38	MDF	Kalthuruthy	Thenmala	Thenmala	255	77.0889	8.9782
39	MDF	Ottakal	Anchal	Punalur	88	77.0379	8.9752
40	MDF	Irumpupalam	Peechi	Peechi	128	76.3868	10.5681
41	SEG	Vellanipacha	Pattikkad	Thrissur	524	76.3316	10.5838
42	MDF	Chanothmoola	Pattikkad	Thrissur	204	76.3319	10.5749
43	DDF	Alampetty	Chinnar	Eravikulam	823	77.1827	10.2993
44	SEG	Neriamangalam	Neiyamangalam	Munnar	320	75.8030	10.0572
45	Shola	Vagadurai	Eravikulam	Eravikulam	1926	77.0953	10.1862
46	SEG	Nadukani	Vazhikadavu	Nilambur N	551	76.3863	11.4309
47	SEG	Nadukani	Vazhikadavu	Nilambur N	642	76.3920	11.4382
48	MDF	Aralam farm	Aralam	Aralam	95	75.7936	11.9227
49	SEG	Aralam farm	Aralam	Aralam	174	75.8222	11.9335
50	EG	Adakkathode	Aralam	Aralam	247	75.8336	11.9454
51	SEG	Chandanathode	Periya	N. Wynad	849	75.8063	11.8490
52	SEG	Campshed	Kannavam	Kannur	558	75.7896	11.8520
53	SEG	Seminari Villa	Kannavam	Kannur	372	75.7764	11.8409
54	SEG	Tribal Colony	Kannavam	Kannur	128	75.6602	11.8173
55	SEG	Sivapuram	Kottiyoor	Kannur	76	75.6161	11.9197
56	MDF	Parapa	Kasargode	Kannur	162	75.2782	12.5805
57	MDF	Vani Nagar	Kasargode	Kannur	174	75.1580	12.6199
58	SEG	Kavadikkanam	Kasargode	Kannur	335	75.2671	12.5319
59	SEG	4th mile	Thamarassery	Kozhikode	375	76.0243	11.4987
60	SEG	8th mile	Thamarassery	Kozhikode	511	76.0281	11.5040

* Shola= Shola Forests, EG= Evergreen Forests, SEG= Semi-evergreen Forests, MDF= Moist Deciduous Forests

2.3 Vegetation structure, composition and regeneration pattern in permanent plots

In the plot established, a rope was tied along the border of each quadrat. In each permanent plot, tree tagging and identification was carried out in two stages. As a first stage, all trees above 10.1 cm girth at breast height (gbh; measured with tape at 1.37 m from the ground) were considered. In each quadrat, trees were located and tagged with the numbered aluminium label facing towards the baseline. Tags were fixed above 1.37 m level to avoid interference with gbh measurement. Each tree was identified, and its number and gbh were recorded. For the trees with large buttresses, girth was measured just above the level of buttress. The line of gbh measurement was marked with paint.

Second stage of tagging and identification covered tree seedlings (girth $\leq$10 cm). This group of tree population was considered as tree seedlings. In each plot, 12 sub quadrats of 5 m x 5 m, each one in a 10 m x 10 m (Fig. 3) were marked to tagging, height measurement, labelling and identification of tree seedlings. Phyto-sociological analysis with respect to shrub and herb communities was also carried out in these sub-quadrats.

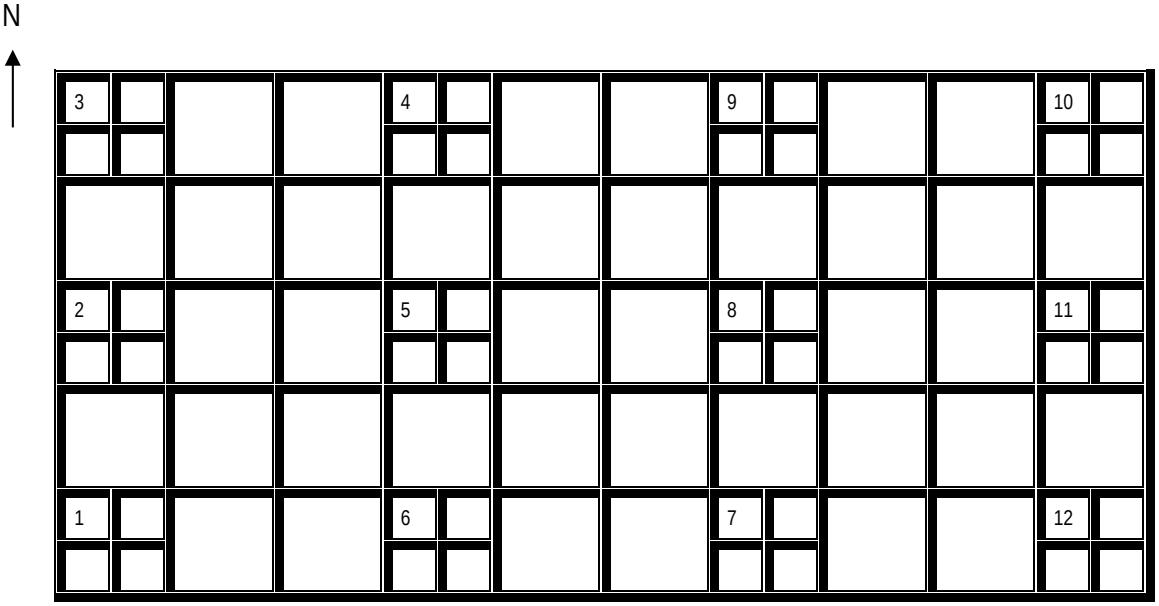


Figure 3. Schematic diagram of a sample plot showing the distribution of 12 sub- quadrats each of 5 m X 5 m in size.

Most of the tree, shrub and herb species were identified in the field while others were identified with the help regional floras and referring the herbaria.

The total number of stems per 0.5 was estimated separately for trees, tree seedlings, shrubs and herbs. Basal area of all trees and tree seedlings was also calculated. In the case of shrubs and herbs, basal area was not calculated. Formulae used for calculating the relative density, relative frequency and relative dominance and the importance value index (IVI) are given below:

$$\text{Relative density (RD)} = \frac{\text{total number of individuals of a species x 100}}{\text{total number of individuals of all species}}$$

$$\text{Frequency} = \frac{\text{number of quadrats in which a species found x 100}}{\text{number of quadrats studied}}$$

$$\text{Relative frequency (RF)} = \frac{\text{frequency of a given species x 100}}{\text{sum of frequency of all species}}$$

$$\text{Relative dominance (R Dom)} = \frac{\text{total basal area of a given species x100}}{\text{total basal area of all species}}$$

Importance value index (IVI) of a species = RD + RF + R Dom.

Since biodiversity manifests itself in two dimensions *viz*., variety and relative abundance of species (Magurran, 1988), Menhinick's index to measure species richness (Menhinick's index) and Shannon-Wiener index to measure relative abundance were calculated using following formulae:

$$\text{Species richness index (R)} = \frac{S}{\sqrt{N}}$$

where , R = Menhinick's index of species richness; S = Number of species in a collection; N = Number of individuals collected.

$$\text{Species diversity index (H)} = -\sum\left[\left(\frac{n_i}{N}\right)\log_2\left(\frac{n_i}{N}\right)\right]$$

Where H= Shannon-Wiener index calculated to the base 2 of species diversity; n_i = number of individuals of species I; N= total number of individuals of all

species in the community.

Fisher's α is yet another measure of diversity. It is calculated using a formula given below:

$$\alpha = S/\ln(1+N/\alpha)$$

Where S= number of species; N= total number of individuals of all species

The index of dominance of the community was calculated by Simpson's index (Simpson, 1949) as:

$$C = \sum \left(\frac{n_i}{N} \right)^2$$

where C= Simpson's index of dominance; n_i = number of individuals of species I; N= total number of individuals of all species in the community.

The divergence among the sample plots with respect to species composition, within each forest type, was studied through cluster analysis. The species composition of each plot was represented by the IVI values, which formed the variables for clustering. The distance between the sample plots was assessed through squared Euclidean distance. Clustering was done using average linkage method.

3.0 Results and discussion

3.1 Permanent sample plot in a shola forest

A description of vegetation in the Vagadurai shola plot is presented in Appendix 1. Among tree population *Symplocos macrophylla*, *Syzygium densiflorum* and *Neolitsea scrobiculata* were the first three dominant species. In the case of tree seedling population *Neolitsea scrobiculata* was the dominant species followed by *Mictrotropis ramiflora* and *Apollonias arnottii* (Appendix 2).

There were 39 species were recorded in tree phase and 27 species in seedling phase (Appendix 1 and 2). Twenty six species were represented both in

seedling and tree phases. Compared to a shola forest situated at Kurunjalu in Chickmagalore District, Karnataka (Swamy, 1989), where the number of species encountered was 20, the Vagadurai forest plot is richer in terms of species number. However, the plot is comparable with the Mannavan shola where 44 tree species were recorded (Chandrashekara *et al.* 1998) despite the fact that the species composition is generally different. In terms of stem density of trees (Table 3), the Vagadurai plot falls between Kurunjalu (710 individuals ha^{-1}) and Mannavan shola (1384 individuals ha^{-1}) while the total basal area of tree population in the Vagadurai plot (52.04 m^2 ha^{-1}) is comparable to that of Mannavan shola (54.53 m^2 ha^{-1}). The value for species diversity index (H to the base 2) for tree population in Kurunjalu and Mannavan shola is 3.612 and 3.583 respectively while in the Vagadurai forest plot the value is quite low. This is due to the fact that majority of the species contribute almost uniformly to the total density of trees in the plot. In contrast, species diversity value for seedlings is higher than that recorded for trees.

Table 3. Basic information on vegetation with respect to tree community* in a permanent plot established in a shola forest at Vagadurai.

	Phases	
	Trees	Seedling
Species represented	39	27
Density (individuals ha^{-1})	1094	4300
Basal area (m^2 ha^{-1})	52.04	1.0
Shannon's index of species diversity (H)	3.09	4.03
Fishers alpha of species diversity (α)	9.60	10.40
Species richness (R)	1.66	2.37
Simpson's index of species dominance (C)	0.0606	0.0967

* Trees (gbh $\geq$ 10.1 cm) and for tree seedlings (girth $\leq$10.0 cm; height $\geq$ 50 cm).

The estimated ratio between density of un-established seedlings and established seedlings was about 1.2**:**1.0. Moreover, the girth class distribution of trees (Table 4) showed a negative exponential pattern. These observations indicated that the forest is relatively undisturbed and the tree regeneration is satisfactory.

Table 4. Girth class distribution of tree community in the permanent plot (0.5 ha in

size) established in a shola forest at Vagadurai.

	Girth classes (cm)							
	girth	gbh						
Number of individuals in a 0.5 ha plot	<10.0	10.1-30.0	30.1-60.0	60.1-90.0	90.1-120.0	120.1-150.0	150.1-180.0	>180
	2150	258	93	74	51	33	16	22

In the shola forest plot, density and number of species represented in the understorey community are less. The herb population was represented only by *Elatostemma lineolatum* with 2800 individuals ha^{-1}. *Strobilanthes* sp., *Ardisia rhomboidea*, *Lasianthus accuminatus*, *Maesa indica* and *Ixora* sp. are the shrub species recorded in the plot with total density of 44400 individuals ha^{-1} and climbers were totally absent. However, further studies are required to record the seasonal variation in the understorey plant communities.

3.2 Permanent sample plots in evergreen forests

Out of 14 plots established in evergreen forests, eight were relatively undisturbed with no signs of disturbance in the recent past. Six plots represent disturbed forests, of which in three plots (nos. 14, 16 and 21) disturbance is due to selective logging in 1982, 1979, and 1980 respectively, while in the remaining three plots (nos. 25, 26 and 27) disturbance is in the form of cultivation of cardamom as undercrop.

A comparative analysis indicated that these 14 are different from each other in terms of floristic richness (Table 5; Fig. 4 and 5) and floristic composition (Table 6 and Appendix 1 and 2). Number of species encountered in tree and seedling phase was more in the Kulirkadavu plot (no. 32). Plots at Meenar (no. 25 and 26) showed comparatively less number of species in tree and seedling phases. Apart from whether the forest is undisturbed or not factors such as the aspect, altitude and edaphic conditions could be responsible for such variation in species composition and floristic richness. Cluster analysis based on IVI values indicated four distinct groups, admitting at most 40 percent of the maximum distance within any cluster. Ten dominant species in each cluster were identified by ranking the IVI values within

the clusters and the plots were assigned to different clusters (Table 7 and Figure 6).

Table 5. Basic information on vegetation with respect to tree community in permanent plots established in evergreen forests in Kerala. Values given are for trees (girth $\geq$ 10.1 cm). Values given in parentheses are for tree seedlings (girth $\leq$ 10.0cm).

Plot Code No.	Location	Number of species	Density (Individuals ha^{-1})	Basal area ($m^2 ha^{-1}$)	H*	C*	R*	α*
10	Vaniampuzha	48 (23)	756 (1433)	42.9 (0.10)	4.62 (4.14)	0.0581 (0.0741)	2.47 (3.51)	14.57 (20.11)
11	Vaniampuzha	48 (25)	768 (1900)	38.58 (0.15)	4.39 (4.42)	0.0764 (0.0545)	2.45 (3.31)	14.48 (16.99)
14	Pothumala	32 (17)	1536 (1800)	69.66 (0.36)	4.28 (3.79)	0.0637 (0.0830)	1.15 (2.31)	6.75 (8.54)
15	Pothumala	34 (15)	1194 (2433)	54.3 (1.24)	4.19 (3.45)	0.0707 (0.1098)	1.39 (1.76)	7.82 (5.72)
16	Pakuthipalam	49 (25)	1104 (2133)	48.09 (0.33)	4.32 (4.08)	0.0854 (0.0903)	2.09 (3.13)	12.99 (15.09)
18	Iringole	27 (16)	1740 (2467)	46.8 (0.68)	2.61 (3.60)	0.2160 (0.0993)	0.92 (1.86)	5.28 (6.28)
21	Chalikuzhy	31 (18)	446 (1133)	38.7 (0.23)	3.84 (3.91)	0.1079 (0.0799)	2.08 (3.09)	9.78 (15.0)
22	Chalikuzhy	36 (9)	710 (1233)	52.53 (0.42)	3.29 (2.76)	0.2176 (0.1907)	1.91 (1.48)	10.01 (3.79)
24	Meenar	34 (14)	418 (1433)	57.72 (0.46)	4.51 (3.29)	0.0553 (0.1282)	2.35 (2.14)	11.52 (7.22)
25	Meenar	24 (3)	144 (100)	44.05 (0.05)	4.03 (1.59)	0.0837 (0.3333)	2.83 (1.73)	12.61 (101.49)
26	Meenar	28 (0)	192 (0)	27.64 (0)	3.87 (0)	0.1159 (……..)	2.86 (…)	13.29 (…..)
27	Meenar	24 (15)	238 (1600)	36.91 (0.31)	3.52 (3.31)	0.1280 (0.1380)	2.20 (2.17)	9.06 (7.49)
32	Kulirkadavu	62 (31)	1014 (4400)	50.71 (1.22)	4.89 (4.32)	0.0569 (0.0708)	2.75 (2.70)	18.53 (12.77)
50	Adakkathode	44 (31)	894 (6567)	51.92 (1.18)	4.54 (3.87)	0.0608 (0.1224)	2.08 (2.21)	12.1 (10.34)

*H= Shannon's index of species diversity, α= Fishers alpha of species diversity, R= Species richness, and C = Simpson's index of species dominance

Table 6. Dominant species in tree and seedling phases in permanent plots established in evergreen forests in Kerala

Plot code No.	Locality	Dominant Species	
		Trees	Seedlings
10	Vaniampuzha	*Diospyros bourdillonii* *Polyalthia fragrans* *Otonephelium stipulaceum*	*Knema attenuata* *Diospyros bourdillonii* *Ixora nigricans*
11	Vaniampuzha	*Diospyros bourdillonii* *Otonephelium stipulaceum* *Drypetes elata*	*Drypetes elata* *Garcinia gummi-gutta* *Dimocarpus longan*
14	Pothumala	*Palaquium ellipticum* *Cullenia exarillata* *Aglaia tomentosa*	*Heritiera papilio* *Memecylon* sp. *Drypetes elata*
15	Pothumala	*Palaquium ellipticum* *Cullenia exarillata* *Drypetes wightii*	*Memecylon* sp. *Litsea floribunda* *Drypetes elata*
16	Pakuthipalam	*Aglaia lawii* *Croton malabaricus* *Cullenia exarillata*	*Aglaia lawii* *Memecylon* sp. *Aglaia tomentosa*
18	Iringole	*Vateria indica* *Hopea ponga* *Diospyros bourdillonii*	*Artocarpus hirsutus* *Diospyros bourdillonii* *Vateria indica*
21	Chalikuzhy	*Knema attenuata* *Myristica dactyloides* *Aporusa lindleyana*	*Croton malabaricus* *Actinodaphne bourdillonii* *Syzygium* sp.
22	Chalikuzhy	*Aporusa lindleyana* *Knema attenuata* *Myristica malabarica*	*Aporusa lindleyana* *Xanthophyllum arnottianum* *Diospyros bourdillonii*
24	Meenar	*Ficus amplissima* *Canthium dicoccum var. umbellatum* *Litsea laevigata*	*Litsea* sp. *Cinnamomum keralaense* *Actinodaphne bourdillonii*
25	Meenar	*Cullenia exarillata* *Palaquium ellipticum* *Heritiera papilio*	*Dimocarpus longan* Unidentified 1(25) *Diospyros* sp.
26	Meenar	*Palaquium ellipticum* *Cullenia exarillata* *Toona ciliata*	Not present
27	Meenar	*Palaquium ellipticum* *Mesua ferrea* *Cullenia exarillata*	*Actinodaphne bourdillonii* *Macaranga peltata* *Cinnamomum keralaense*
32	Kulirkadavu	*Kingiodendron pinnatum* *Xanthophyllum arnottianum* *Hopea parviflora*	*Aglaia* sp. *Garcinia gummi-gutta* *Mallotus beddomei*
50	Adakkathode	*Drypetes elata* *Syzygium gardneri* *Knema attenuata*	*Drypetes elata* *Meiogyne pannosa* *Aglaia lawii*

Table 7. Dominant species in each cluster in evergreen forests identified by ranking the IVI values within the clusters and the plots were assigned to different clusters

Clusters	Plots	Species	IVI
1	10, 11, 24, 32 and 50	*Diospyros bourdillonii*	18.92
		Drypetes elata	17.16
		Knema attenuata	15.20
		Xanthophyllum arnottianum	12.63
		Otonephelium stipulaceum	11.77
		Cinnamomum malabatrum	10.36
		Baccaurea courtallensis	10.14
		Syzygium gardneri	8.69
		Polyalthia fragrans	8.61
		Myristica malabarica	8.45
		Total	**121.95**
2	14, 15, 16, 25, 26 and 27	*Palaquium ellipticum*	46.72
		Cullenia exarillata	39.50
		Mesua ferrea	22.20
		Dimocarpus longan	8.80
		Toona ciliata	8.20
		Macaranga peltata	8.15
		Drypetes elata	7.68
		Heritiera papilio	7.32
		Artocarpus heterophyllus	6.48
		Aglaia tomentosa	6.08
		Total	**161.13**
3	18	*Vateria indica*	101.86
		Hopea ponga	58.12
		Diospyros bourdillonii	51.28
		Artocarpus hirsutus	39.01
		Polyalthia fragrans	13.36
		Holigarna arnottiana	8.01
		Hopea parviflora	5.60
		Cinnamomum malabatrum	4.23
		Macaranga peltata	2.90
		Myristica malabarica	2.63
		Total	**286.98**
4	21 and 22	*Aporusa lindleyana*	53.10
		Knema attenuata	46.21
		Polyalthia fragrans	26.63
		Myristica dactyloides	20.17
		Myristica malabarica	17.29
		Syzygium densiflorum	11.75
		Dysoxylum binectiferum	10.71
		Dysoxylum malabaricum	10.66
		Syzygium sp.	8.53
		Aporusa acuminata	7.86
		Total	**212.91**

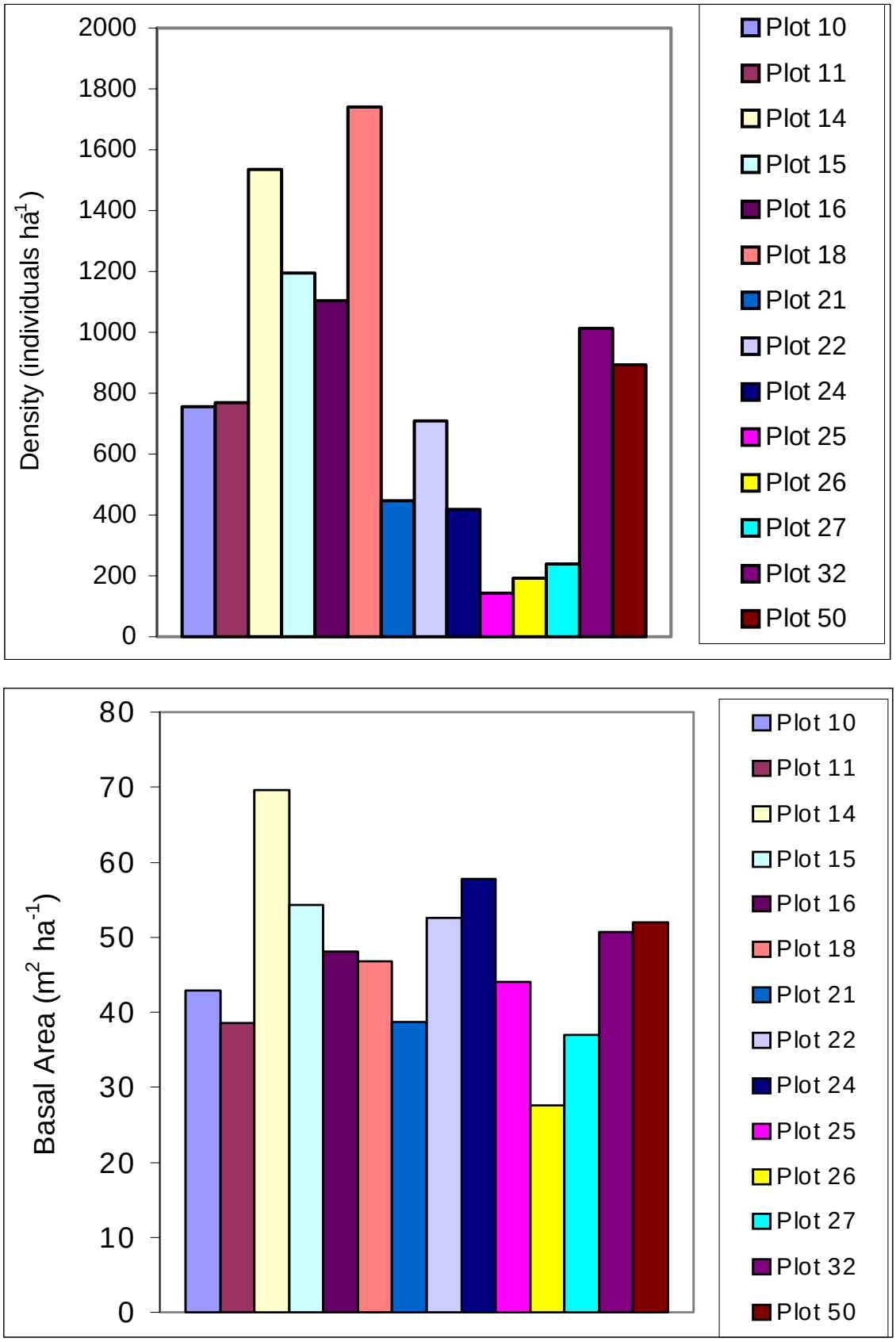
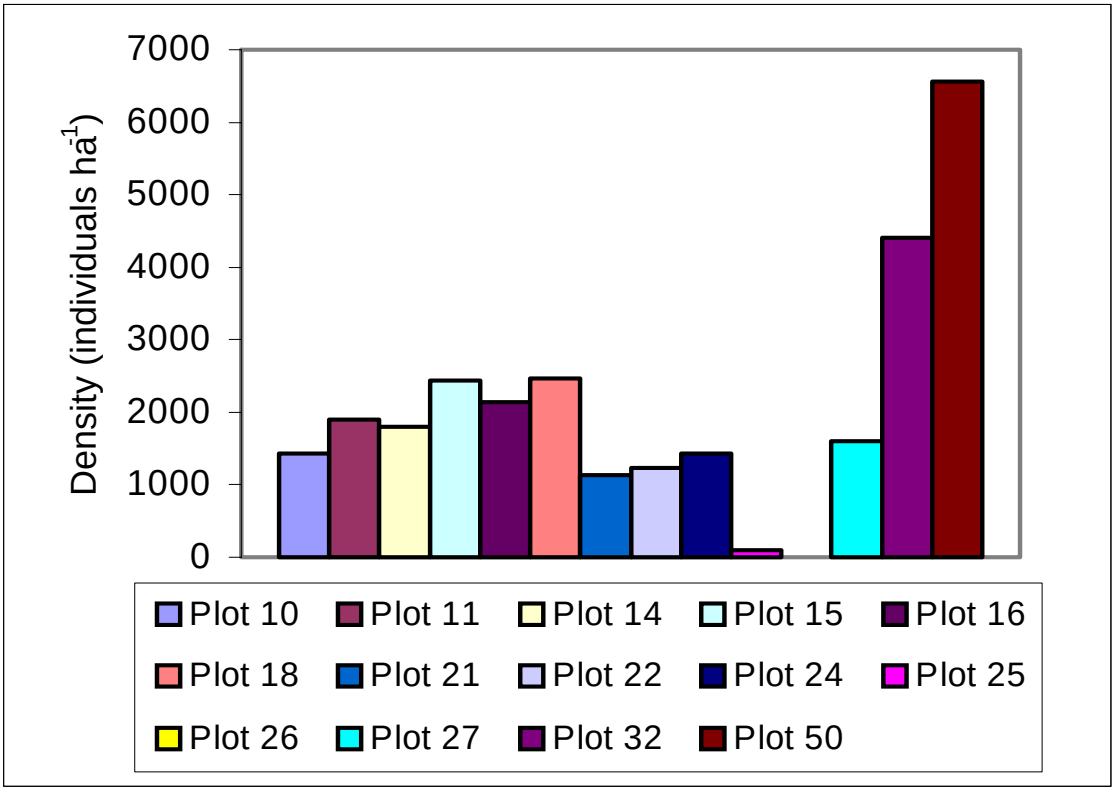


Figure 4: Density (individuals ha^{-1}) and basal area of trees (gbh $\geq$ 10.1 cm) in the evergreen forests of Kerala



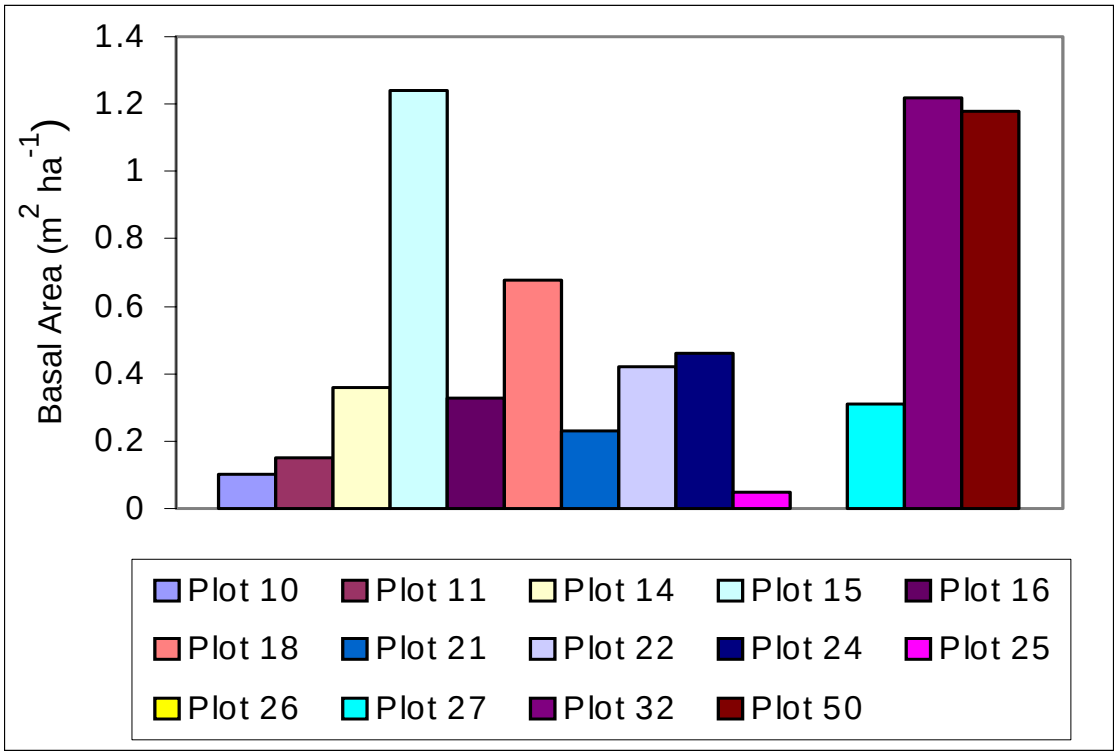


Figure 5: Density (individuals ha^{-1}) and basal area of seedlings (girth $\leq$ 10 cm) in the evergreen forests of Kerala

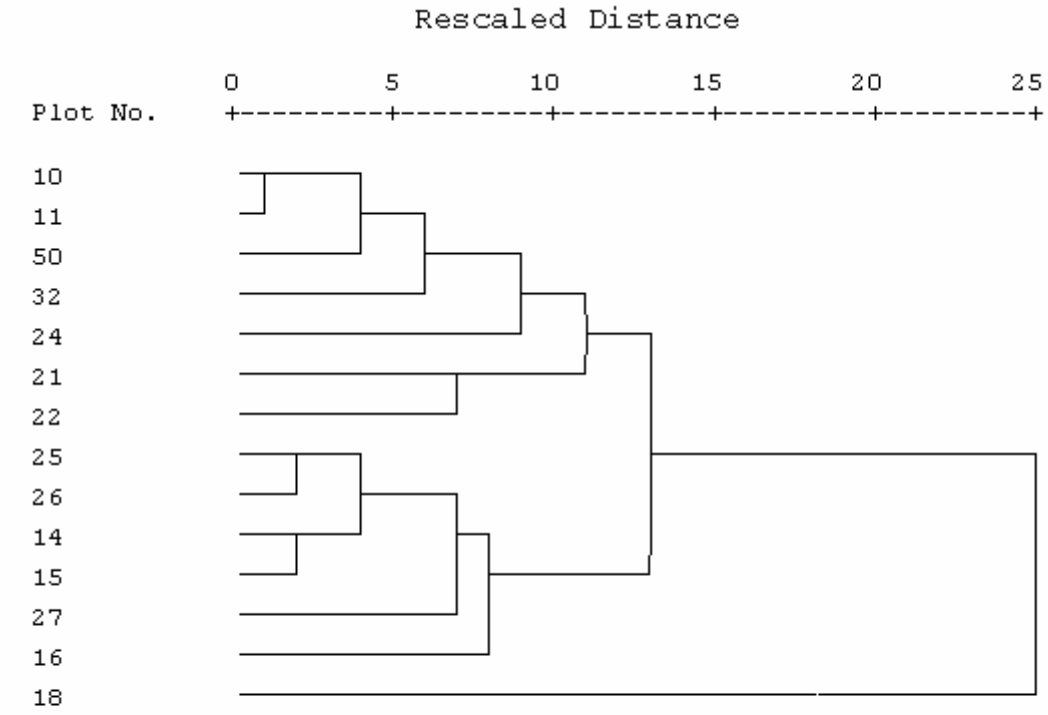


Figure 6. Dendrogram derived from cluster analysis for tree community of the permanent plots established in evergreen forests of Kerala.

Plots (no. 25, 26 and 27) established in forests where cardamom is cultivated as undercrop consist of *Cullenia exarillata*, *Mesua ferrea* and *Palaquium ellipticum* as dominant species. Dominance of these species was also recorded in the midland wet evergreen forest plots at Pothumala (plot no. 14 and 15). However, when compared to Pothumala plots, whether relatively undisturbed or selectively logged one, plots with cardamom as undercrop were poor in terms of floristic richness, density and basal area. In addition, unlike in old selectively logged plots, in these plots, contribution of late and early secondary species such as *Macaranga peltata, Mallotus philippensis, Antidesma montanum, Callicarpa tomentosa*, etc. to the total species importance value, both in seedling and tree phases, was comparatively more. Added to this, the regeneration of primary species was poor as indicated by the density and basal area of this group of trees in the seedling phase even in the plot which is not being managed since about 5 years. Such plots are likely to transform into `open moist forests' (Velu Pillai, 1919) with a mosaic of vegetation comprising relics of the initial forests and successional species which suppress the regeneration of primary species.

In majority of the plots, a negative exponential girth class distribution of trees was recorded (Table 8). However, in plots where cultivation of cardamom under the forest cover is employed, such a trend has not been observed. Further analysis of patterns of girth class distribution of individual species in such plots indicated that here the species capable of attaining only small to medium girth contribute to the total tree density.

In the permanent plots established in evergreen forests, a total of 21 herb species were recorded. Among them *Abutilon indicum*, *Ageratum conyzoides*, *Amorphophallus sp.*, *Commelina* sp., *Costus speciosus*, *Curcuma* sp., *Elatostemma lineolatum*, *Elephantopus scaber*, *Hedychium coronarium*, *Hydrocotyle javanica*, *Mimosa pudica, Oplismenus compositus, Pothos scandens, Rungia pectinata, Tragia hispida* and *Zingiber* sp. were common. Number of species per plot varied from 2 to 7 with total density from 433 to 158400 individuals ha^{-1}. In disturbed forest plots (no. 25, 26 and 27), contribution to the total herb density was more by *Oplismenus compositus, Hydrocotyle javanica, Ageratum conyzoides* and *Rungia pectinata.*

Table 8. Girth class distribution of trees in permanent plots established in evergreen forests in Kerala

Plot Code No.	Location	No. of individuals in each girth class (cm) in 0.5 ha plot							
		girth	Gbh						
		≤10.0	10.1-30.0	30.1-60.0	60.1-90.0	90.1-120.0	120.1-150.0	150.1-180.0	>180
10	Vaniampuzha	717	114	127	62	29	22	11	13
11	Vaniampuzha	950	113	128	61	43	17	10	12
14	Pothumala	900	476	164	55	18	13	11	31
15	Pothumala	1217	303	175	50	19	11	12	27
16	Pakuthipalam	1067	232	158	91	25	16	8	22
18	Iringole	1233	615	109	60	31	18	16	20
21	Chalikuzhy	567	74	39	37	33	14	7	19
22	Chalikuzhy	617	177	55	40	33	19	9	22
24	Meenar	717	78	42	21	23	11	5	29
25	Meenar	50	1	7	8	10	14	8	24
26	Meenar	0	17	15	14	17	9	7	17
27	Meenar	800	34	3	8	15	20	12	27
32	Kulirkadavu	2200	245	130	54	28	21	3	26
50	Adakkathode	3283	188	83	68	48	31	15	14

Apama siliquosa, Canthium sp*., Chasalia curviflora, Clerodendron infortunatum, Dendrocnide longifolia, Leea indica, Maesa indica, Psychotria* sp*., Strobilanthes adenophorus, Strobilanthes lawsoni* and *Tabernaemontana caudata* were some of the common among 21 shrub species recorded in the permanent plots. Majority of the plots contained 1 to 5 species and the total density was between 33 and 58000 individuals ha^{-1}. However, in Pakuthipalam (plot no.16), ten species were recorded. In the forest plot at Chalikuzhy (no.21), which represents the forest patch disturbed by selective logging, density of shrubs is as high as 58000 individuals ha^{-1} due to profuse growth of *Strobilanthes lawsonii*. In the plot at Meenar (no. 26) invasion of an exotic species *Chromolaena odorata* has also been recorded. Among 22 species of climbers observed in the permanent plots, *Piper wightii* is the most common one represented in 13 out of 14 plots. Other common species include *Acacia intsia*, *Anamirta cocculus, Piper* sp., *Strychnos colubrina* and *Ventilago bombaiensis*. In the plots which represent relatively undisturbed forests only *Piper wightii* with 40 to 1633 individuals ha^{-1} were seen. In the plots, which represent selectively logged forests, about 11 species of climbers with density ranging from 21131 to 25600 individuals ha^{-1} were recorded. On the other hand in the plots where

cardamom is cultivated as undercrop, an exotic climber *Mikania micrantha* was present and its density ranged from 100 to 1600 individuals ha^{-1}. Further detailed studies are needed to record the seasonal variation in density, species diversity and composition in the understorey plant communities.

3.3 Permanent sample plots in semi-evergreen forests

Twenty one plots were established to represent semi-evergreen forests in the State. In these forests, 18 to 72 species in the tree phase and 7 to 34 species in the seedling phase were encountered (Table 9). Analysis of the floristic composition in these plots indicated that about 50 to 72% of species are those seen in evergreen forests (Appendix 1 and 2) while the remaining are characteristic to deciduous forests. Some of the common evergreen species observed in these plots include *Myristica malabarica, Knema attenuata, Polyalthia fragrans, Xanthophyllum arnottianum, Kingiodendron pinnatum, Chionanthus malabarica* and *Diospyros bourdillonii*. The divergence among the sample plots with respect to species composition was recorded by cluster analysis. Ten dominant species in each cluster were identified by ranking the IVI values within the clusters and the plots were assigned to different clusters (Table 10 and Fig. 7).

It is interesting to note that species dominant in evergreen forests were also dominant in some of the semi-evergreen forests such as the plots at Chandanathode, Chippilithode and Palaruvi (Table 11). These plots may represent moderately degraded formations in the potential area of the climax evergreen forest from which they were derived. It may be noted here that in most of these plots, contribution by evergreen species to the total number of species in the seedling phase was almost similar to that recorded for the tree phase. This observation suggests that the plots are floristically more stable due to less anthropogenic pressure at present.

In the semi-evergreen plots, tree density varied from 270 individuals ha^{-1} to 1464 individuals ha^{-1} while the basal area was between 24.7 m^2 ha^{-1} and 54.1 m^2ha^{-1} (Table 9, Fig. 8 and 9). Here no significant correlation between density and total basal area of tree population was observed. Thus, in these plots, primarily the number of trees of higher girth classes determines the basal area. In the continuum

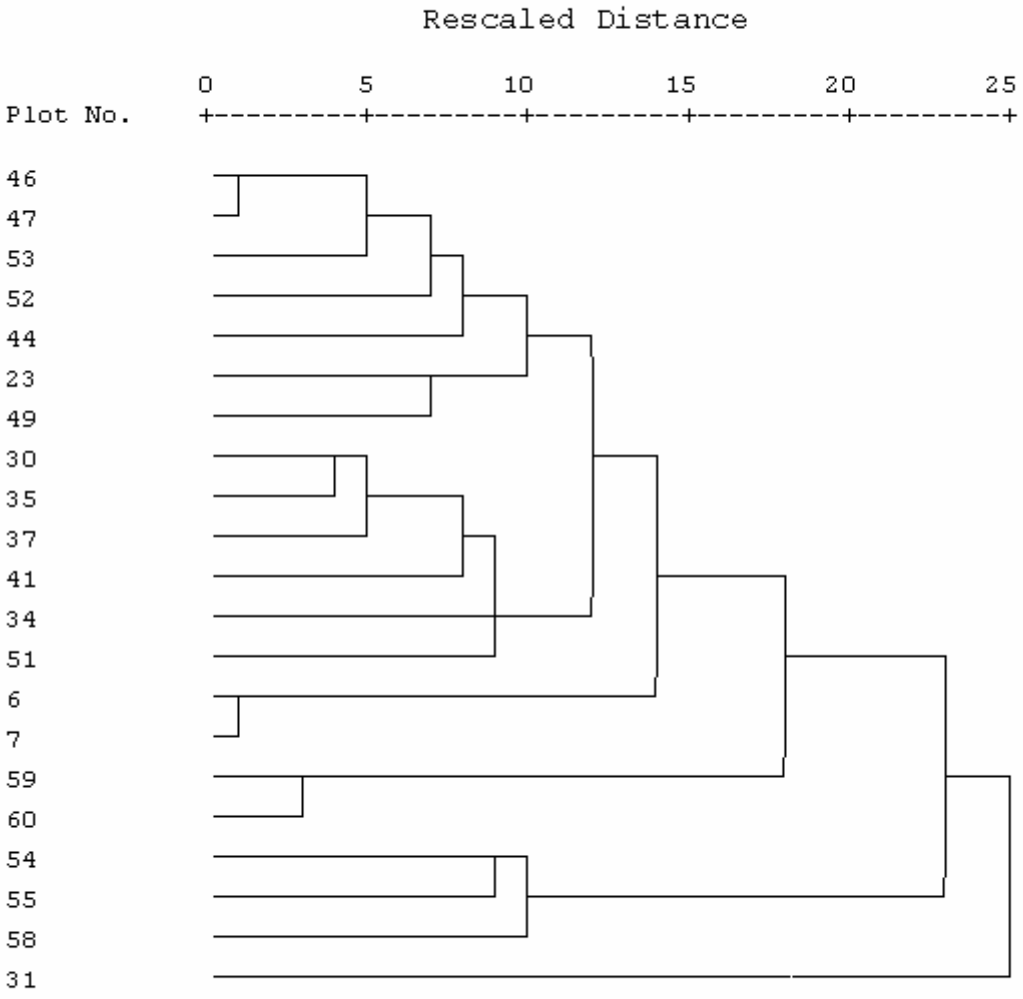


Figure 7. Dendrogram derived from cluster analysis for tree community of the permanent plots established in semi-evergreen forests of Kerala.

Table 9. Basic information on vegetation with respect to tree community in permanent plots established in semi-evergreen forests in Kerala. Values given are for trees (girth $\geq$ 10.1 cm). Values given in parentheses are for tree seedlings (girth $\leq$ 10.0cm).

Plot Code No.	Location	Number of species	Density (Individuals ha^{-1})	Basal area ($m^2 ha^{-1}$)	H*	C*	R*	α*
6	Pandarampara	35 (20)	426 (2700)	33.89 (0.04)	4.41 (3.87)	0.0667 (0.0873)	2.40 (2.22)	11.91 (8.49)
7	Pandarampara	32 (13)	580 (1633)	32.36 (0.09)	3.66 (3.30)	0.1329 (0.1304)	1.88 (1.86)	9.19 (5.78)
23	Manakkayam	41 (13)	392 (1133)	32.9 (0.16)	4.53 (3.18)	0.0670 (0.1419)	2.93 (2.23)	15.79 (7.69)
30	Achencoil	60 (34)	662 (5267)	38.31 (0.86)	5.18 (4.25)	0.0408 (0.0784)	3.30 (2.70)	21.43 (13.31)
31	Kottavasal	41 (7)	928 (767)	24.65 (0.13)	3.90 (2.15)	0.1232 (0.2892)	1.90 (1.46)	10.85 (3.43)
34	Kottavasal	50 (20)	740 (7567)	33.92 (1.13)	4.52 (2.44)	0.0724 (0.3175)	2.60 (1.33)	15.58 (5.29)
35	Palaruvi	72 (27)	1018 (3000)	40.51 (0.67)	5.20 (4.01)	0.0439 (0.0998)	3.19 (2.85)	22.78 (13.07)
37	Kalthuruthy	66 (26)	706 (1100)	30.97 (0.29)	5.03 (4.60)	0.0569 (0.0450)	3.51 (4.53)	23.95 (56.61)
41	Vellanipacha	63 (23)	1160 (2767)	30.57 (0.75)	4.84 (3.80)	0.0560 (0.1073)	2.62 (2.52)	17.98 (10.53)
44	Neriamangalam	40 (33)	564 (7500)	34.33 (1.20)	4.43 (3.83)	0.0662 (0.1104)	2.38 (2.20)	12.73 (10.66)
46	Nadukani	71 (21)	1330 (2267)	44.10 (0.50)	4.31 (3.65)	0.1046 (0.1319)	2.75 (2.55)	20.13 (10.39)
47	Nadukani	64 (24)	986 (4467)	46.88 (1.14)	4.68 (3.69)	0.0677 (0.1204)	2.88 (2.07)	19.61 (8.52)
49	Aralam	43 (13)	868 (2267)	37.56 (0.30)	3.95 (2.43)	0.1072 (0.3179)	2.06 (1.58)	11.85 (4.77)
51	Chandanathode	69 (28)	1024 (3067)	41.9 (0.44)	4.98 (4.13)	0.0563 (0.0839)	3.05 (2.92)	21.48 (13.71)
52	Campshed (Kannavam)	47 (25)	752 (3067)	54.08 (0.65)	4.23 (3.39)	0.1081 (0.2034)	2.42 (2.61)	14.18 (11.30)
53	Seminary Villa (Kannavam)	57 (26)	884 (4033)	46.86 (1.00)	4.87 (3.80)	0.0569 (0.1160)	2.71 (2.36)	17.42 (10.17)
54	Kannavam	18 (22)	270 (4833)	51.55 (1.00)	2.77 (3.89)	0.2545 (0.0904)	1.55 (1.83)	5.58 (7.22)
55	Sivapuram	29 (15)	806 (2467)	34.25 (0.60)	3.23 (3.25)	0.1906 (0.1435)	1.44 (1.74)	7.17 (5.68)
58	Kavadikkanam	52 (15)	1078 (3400)	36.2 (0.68)	3.80 (3.40)	0.1763 (0.1300)	2.24 (1.49)	14.20 (4.85)
59	Chippilithode	43 (23)	464 (4233)	45.49 (0.83)	3.88 (3.59)	0.1559 (0.1580)	2.82 (2.04)	15.53 (8.21)
60	Chippilithode	71 (23)	1464 (3000)	42.22 (0.76)	4.51 (3.82)	0.0960 (0.0993)	2.62 (2.42)	19.42 (9.98)

*H= Shannon's index of species diversity, α= Fishers alpha of species diversity, R= Species richness, and C = Simpson's index of species dominance

Table 10. Dominant species in each cluster in semi-evergreen forests identified by ranking the IVI values within the clusters and the plots were assigned to different clusters

Clusters	Plots	Species	IVI
1	6 and 7	*Myristica malabarica*	62.17
		Xanthophyllum arnottianum	33.68
		Polyalthia fragrans	22.63
		Pterospermum reticulatum	16.83
		Diospyros bourdillonii	13.59
		Aporusa lindleyana	12.93
		Sterculia guttata	11.03
		Croton malabaricus	10.82
		Baccaurea courtallensis	10.33
		Vitex altissima	8.92
		Total	**202.94**
2	23, 44, 46, 47,49, 52 and 53	*Knema attenuata*	33.48
		Xanthophyllum arnottianum	22.18
		Myristica malabarica	19.46
		Diospyros bourdillonii	14.82
		Syzygium gardneri	11.39
		Baccaurea courtallensis	10.94
		Hopea racophloea	7.28
		Polyalthia fragrans	7.06
		Artocarpus hirsutus	6.97
		Cinnamomum malabatrum	5.82
		Total	**139.41**
3	30,34,35, 37,41 and 51	*Dimocarpus longan*	15.6
		Kingiodendron pinnatum	8.13
		Bombax ceiba	7.77
		Cleidion spiciflorum	7.6
		Atlantia racemosa	6.91
		Spondias pinnata	6.56
		Macaranga peltata	6.41
		Vateria indica	6.17
		Canthium neilgherrense var. *chartacea*	5.98
		Mesua ferrea	5.65
		Total	**76.77**
4	31	*Chionanthus malabarica*	72.39
		Atlantia racemosa	39.18
		Glochidion sp.	25.64
		Dimocarpus longan	24.63
		Xanthophyllum arnottianum	17.39
		Mallotus philippensis	9.2
		Lagerstroemia lanceolata	8.1
		Trichilia connaroides	7.61
		Unidentified 3(31)	7.42
		Diospyros oocarpa	6.61
		Total	**218.16**

---cont'd----

Table 10 (cont'd). Dominant species in each cluster identified in semi-evergreen forests by ranking the IVI values within the clusters and the plots were assigned to different clusters

Clusters	Plots	Species	IVI
5	54,55 and 58	*Knema attenuata*	85.82
		Holigarna arnottiana	26.64
		Myristica malabarica	19.84
		Terminalia paniculata	14.68
		Xylia xylocarpa	10.5
		Alstonia scholaris	9.32
		Aporusa lindleyana	9.32
		Artocarpus hirsutus	8.89
		Ixora nigricans	7.76
		Pterospermum reticulatum	7.29
		Total	**200.05**
6	59 and 60	*Vateria indica*	76.13
		Myristica malabarica	32.46
		Knema attenuata	14.96
		Baccaurea courtallensis	13.31
		Fahrenheitia zeylanica	11
		Holigarna sp.1	10.02
		Humboldtia brunonis	8.73
		Terminalia bellirica	8.3
		Polyalthia fragrans	6.19
		Holigarna nigra	5.7
		Total	**186.81**

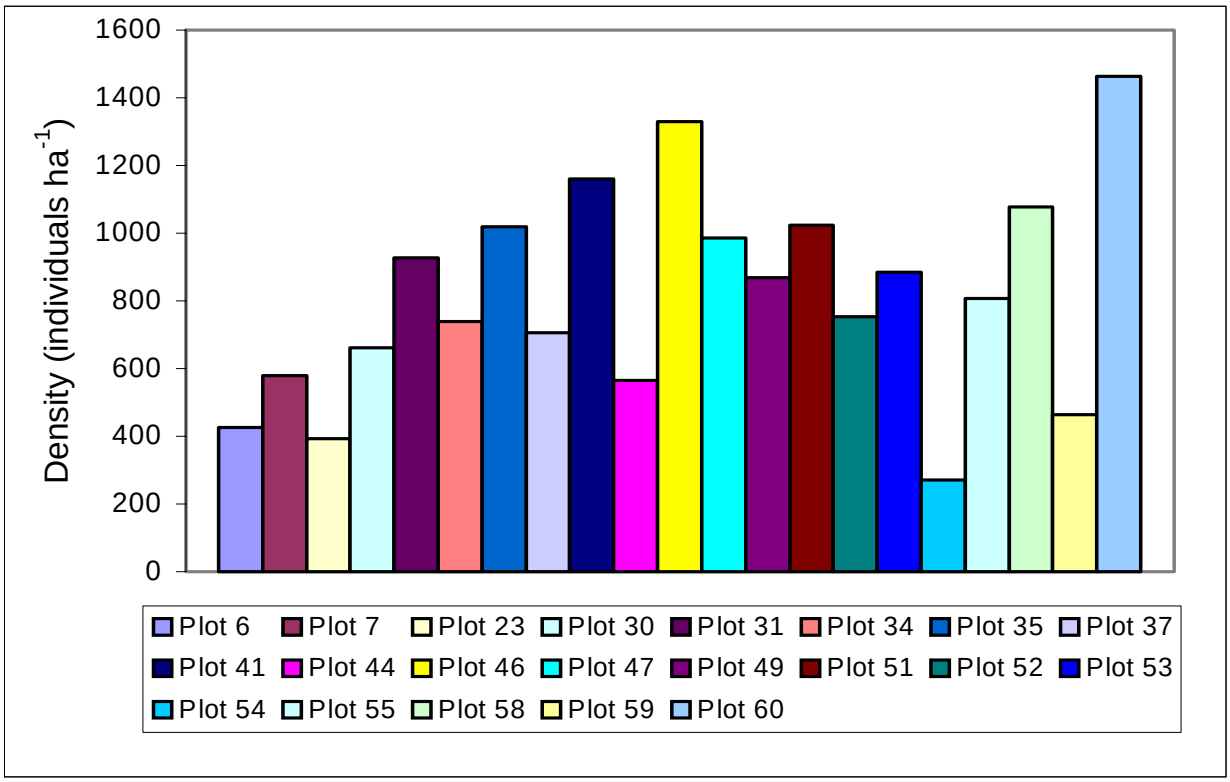
Table 11. Dominant species in tree and seedling phases in permanent plots established in semi-evergreen forests in Kerala.

Plot Code No.	Locality	Dominant Species	
		Trees	Seedlings
6	Pandarampara	*Myristica malabarica* *Xanthophyllum arnottianum* *Polyalthia fragrans*	*Polyalthia fragrans* *Mallotus philippensis* *Xylia xylocarpa*
7	Pandarampara	*Myristica malabarica* *Xanthophyllum arnottianum* *Pterospermum reticulatum*	*Polyalthia fragrans* *Xanthophyllum arnottianum* *Kingiodendron pinnatum*
23	Manakkayam	*Knema attenuata* *Xanthophyllum arnottianum* *Diospyros bourdillonii*	*Mallotus philippensis* *Diospyros bourdillonii* *Aporusa lindleyana*
30	Achencoil	*Kingiodendron pinnatum* *Dimocarpus longan* *Diospyros* sp.4	*Aglaia elagnoides* *Diospyros bourdillonii* *Syzygium hemisphericum*
31	Kottavasal	*Chionanthus malabarica* *Atalantia racemosa* *Glochidion sp.*	*Trichilia connaroides* *Atalantia racemosa* *Atalantia wightii*
34	Kottavasal	*Canthium neilgherrense var. chartacea* *Dimocarpus longan* *Bombax ceiba*	*Mallotus beddomei* Aglaia sp. *Ixora nigricans*

--cont'd----

Table 11 (cont'd). Dominant species in tree and seedling phases in permanent plots established in semi-evergreen forests in Kerala.

Plot Code No.	Locality	Dominant Species	
		Trees	Seedlings
35	Palaruvi	*Mesua ferrea* *Macaranga peltata* *Hopea racophloea*	*Aglaia* sp. *Atalantia racemosa* *Trichilia connaroides*
37	Kalthuruthy	*Cleidion spiciflorum* *Glochidion sp.* *Baccaurea courtallensis*	*Holigarna grahamii* *Diospyros bourdillonii* *Polyalthia fragrans*
41	Vellanipacha	*Aglaia* sp.2 *Aglaia lawii* *Diospyros paniculata*	*Meiogyne pannosa* *Aglaia* sp. *Memecylon umbellatum*
44	Neriamangalam	*Xanthophyllum arnottianum* *Pterygota alata* *Knema attenuata*	*Diospyros* sp. *Xanthophyllum arnottianum* *Polyalthia fragrans*
46	Vazhikadavu	*Myristica malabarica* *Knema attenuata* *Hopea racophloea*	*Knema attenuata* *Diospyros bourdillonii* *Aglaia lawii*
47	Vazhikadavu	*Syzygium gardneri* *Cullenia exarillata* *Myristica malabarica*	*Knema attenuata* *Hopea racophloea* *Myristica malabarica*
49	Aralam	*Diospyros bourdillonii* *Knema attenuata* *Myristica malabarica*	*Meiogyne ramarowii* *Antidesma alexiteria* *Myristica malabarica*
51	Chandanathode	*Cullenia exarillata* *Otonephelium stipulaceum* *Dimocarpus longan*	*Syzygium munronii* *Mesua ferrea* *Litsea* sp.
52	Seminari Villa	*Xanthophyllum arnottianum* *Syzygium gardneri* *Knema attenuata*	*Aglaia lawii* *Palaquium ellipticum* *Meiogyne pannosa*
53	Camp Shed	*Knema attenuata* *Holigarna grahamii* *Myristica malabarica*	*Aglaia lawii* *Knema attenuata* *Myristica malabarica*
54	Kannavam	*Knema attenuata* *Holigarna arnottiana* *Terminalia paniculata*	*Knema attenuata* *Polyalthia fragrans* *Ixora nigricans*
55	Sivaapuram	*Knema attenuata* *Myristica malabarica* *Holigarna arnottiana*	*Myristica malabarica* *Knema attenuata* *Symplocos racemosa var. racemosa*
58	Kavadikkanam	*Knema attenuata* *Xylia xylocarpa* *Pterospermum reticulatum*	*Knema attenuata* *Ixora nigricans* *Litsea* sp.3
59	Chippilithode	*Vateria indica* *Myristica malabarica* *Humboldtia brunonis*	*Vateria indica* *Humboldtia brunonis* *Knema attenuata*
60	Chippilithode	*Vateria indica* *Myristica malabarica* *Knema attenuata*	*Myristica malabarica* *Vateria indica* *Knema attenuata*



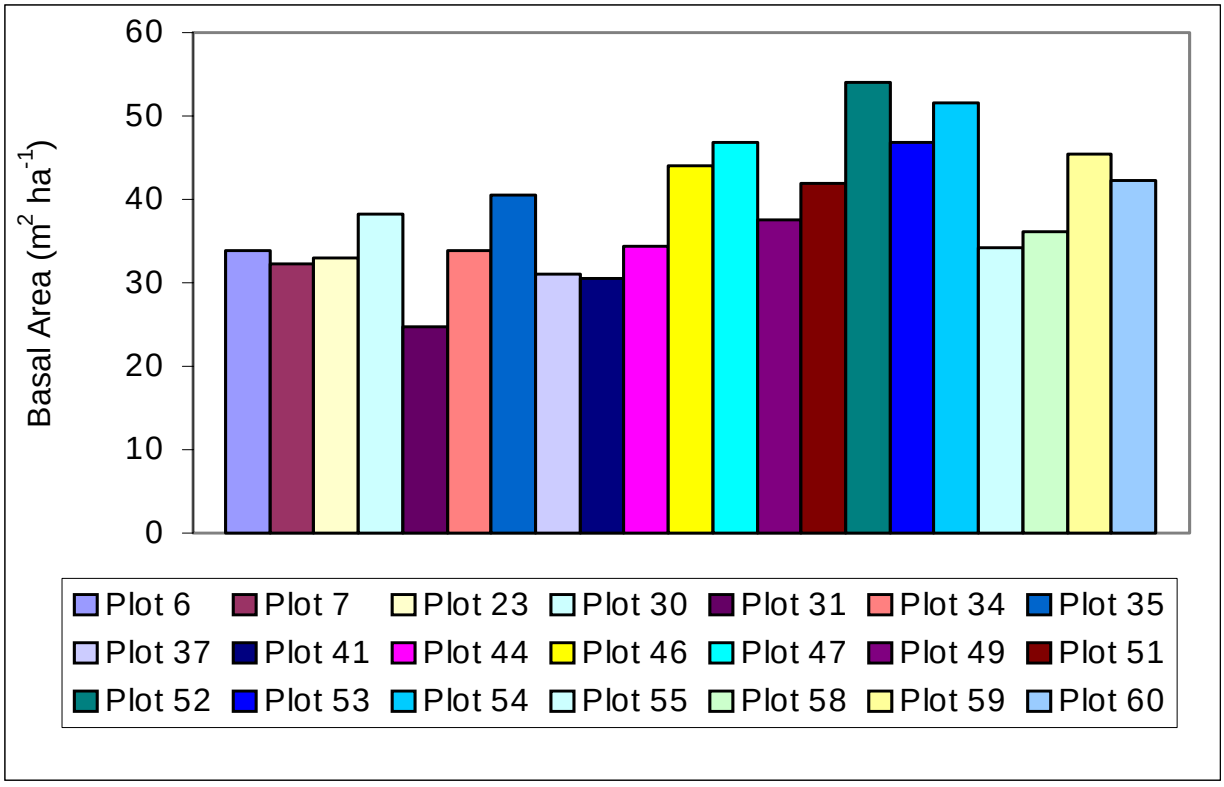
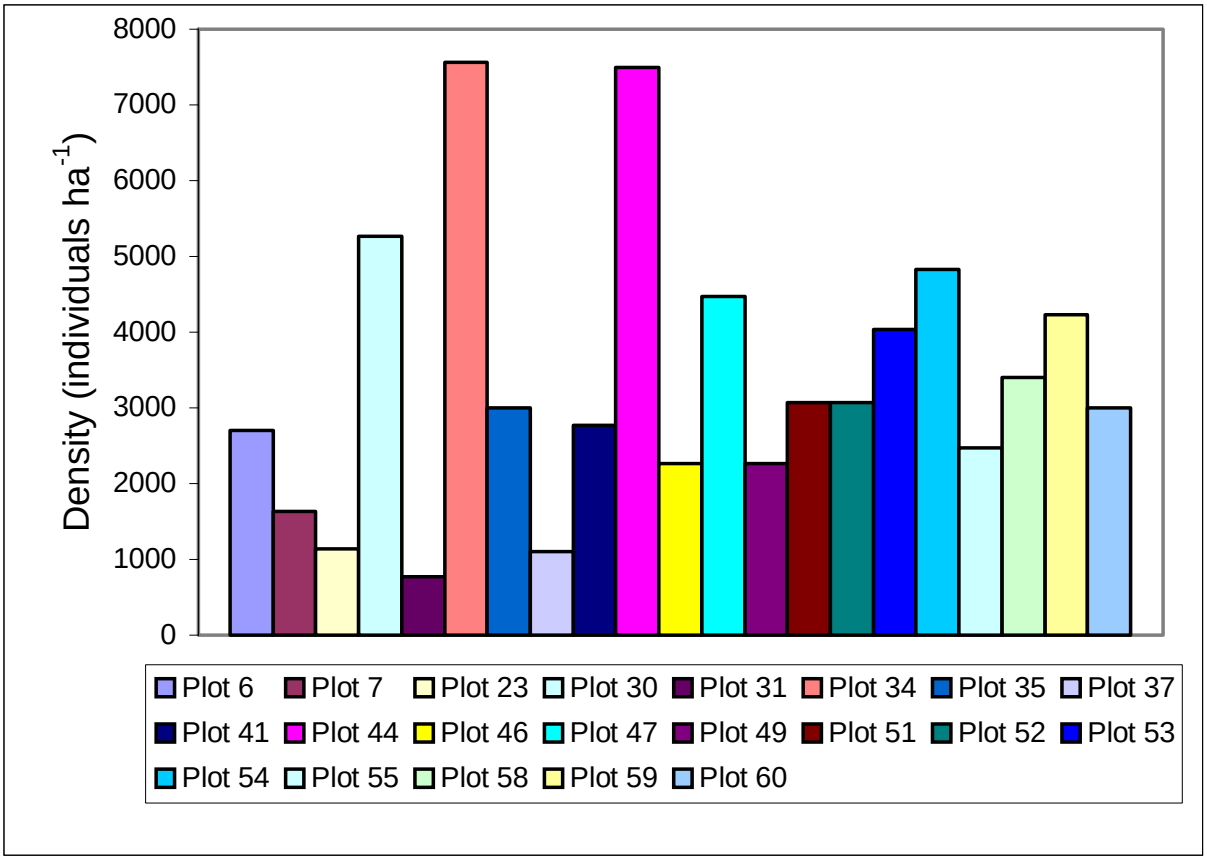


Figure 8: Density (individuals ha^{-1}) and basal area of trees (gbh $\geq$ 10.1 cm) in the semi-evergreen forests of Kerala



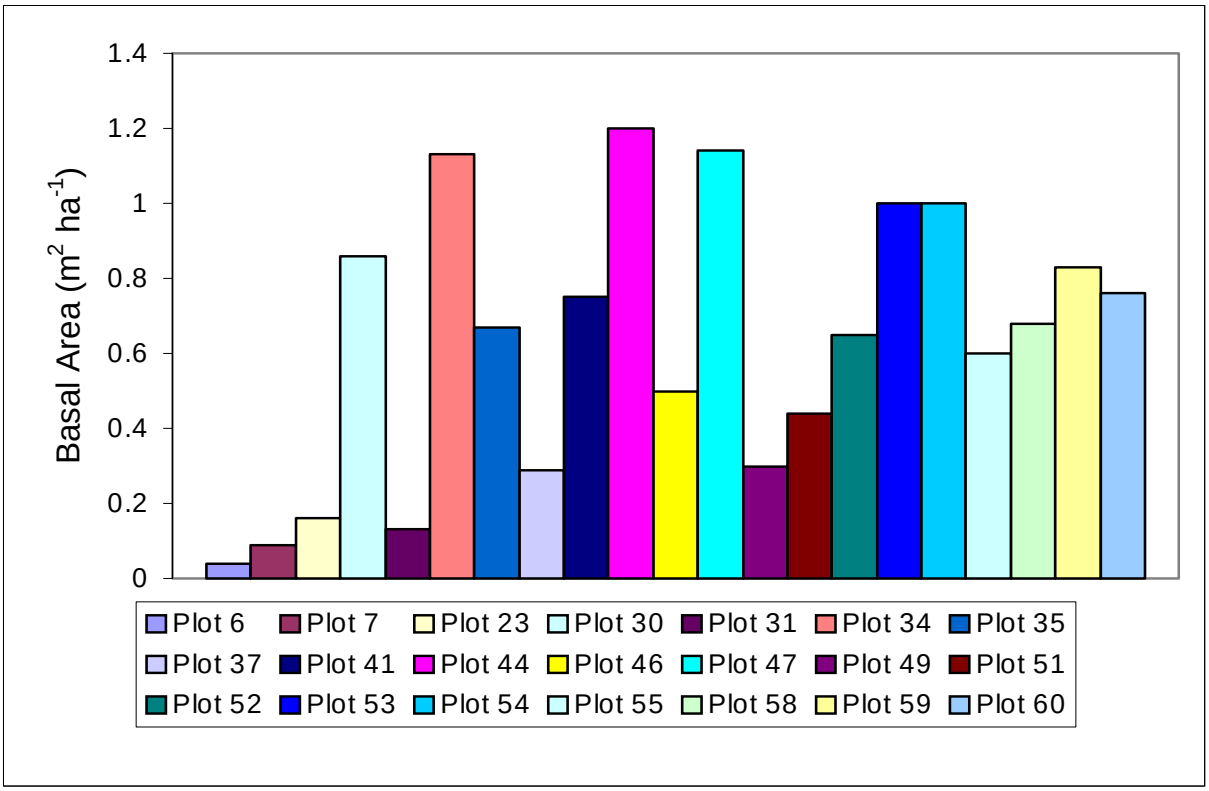


Figure 9: Density (individuals ha^{-1}) and basal area of seedlings (girth $\leq$ 10 cm) in the semi-evergreen forests of Kerala

of 21 permanent plots established in semi-evergreen forests in the State, Palaruvi (plot no. 35) (H=5.2) and Kannavam (plot no. 54) (H=2.77) represented two extremes of species diversity in tree phase. In the seedling phase, Kalthuruthy (plot no. 37) (H= 4.6) and Kottavasal (plot no. 31) (H=2.15) represented the two extremes. Similarly, species dominance was more in Kannavam (plot no. 54) (C=0.2545) and Aralam (plot no. 49) (C=0.3179) while less in Palaruvi (plot no. 35) (C=0.0439) and Kalthuruthy (plot no. 37) (C=0.0450) in the tree and seedling phase respectively.

Most of the plots showed a typical negative exponential curve for the girth class distribution (Table 12). However in some plots, trees especially those falling under middle girth classes (30.1 to 60.0 cm gbh at Pandarampara and Chippilithode plots; 30.1 to 90.0 cm gbh in plots at Kannavam; 60.1 to 90.0 cm gbh in the plot at Manakkayam) were comparatively lesser than in the adjacent higher girth classes. Such an abnormality could be attributed to the fact that these forests are subjected to disturbance in the form of illicit felling of tree poles.

Herbs were very sparse in the plots located at Seminary Villa (plot no.53) and Nadukani (plot nos. 46 and 47) where density value of 33 individuals ha^{-1}. Whereas in the plots located at Pandarampara (no. 6), Manakkayam (no.23) and Kottavasal (no. 31), the density was between 15000 and 23600 individuals ha^{-1}. In all these plots, contribution by *Curcuma neilgherrensis* and *Zinger neesanum* was more. Some other common species recorded in the herb layer include *Abutilon indicum*, *Amorphophallus* sp., *Colocasia* sp., *Commelina* sp., *Costus speciosus*, *Curculigo orchioides*, *Dracaena terniflora*, *Elatostemma lineolatum*, *Elephantopus scaber*, *Hedychium flavescens, Oplismenus compositus, Pandanus thwaitesii, Rungia pectinata* and *Urena lobata*.

Out of 27 shrub species recorded in 19 plots, *Clerodendrum infortunatum*, *Leea indica*, *Psychotria* sp., *Chasalia curviflora*, *Helicters isora* and *Glycosmis pentaphylla* were seen in 5 to 10 plots. Density was between 33 and 17291 individuals ha^{-1}. Except in plots located at Kottavasal (no. 31), Vellanipacha (no. 41) and Nadukani (nos. 46 and 47), shrub density was more than 1000 individuals ha^{-1}. *Diploclisia glaucescens*, *Piper longum*, *Piper wightii*, *Strychnos colubrina*, *Ventilago bombaiensis*, *Calamus* sp. and *Gnetum ula* are common among 30 species of climbers recorded. The climbers are few in number (33 individuals ha^{-1}) in the

Kottavasal plot (no.34) whereas the density in other plots ranged from 567 to 27600 individuals ha^{-1} mainly contributed by *Piper longum* and *Piper wightii.* More detailed studies are required to understand the dynamics of understorey plant communities in the permanent plot.

Table 12. Girth class distribution of trees in permanent plots established in semi-evergreen forests in Kerala.

Plot Code No.	Location	No. of individuals in each girth class (cm) in 0.5 ha plot							
		girth	Gbh						
		≤10.0	10.1-30.0	30.1-60.0	60.1-90.0	90.1-120.0	120.1-150.0	150.1-180.0	>180
6	Pandarampara	1350	73	34	39	21	22	11	13
7	Pandarampara	817	84	61	69	49	13	6	8
23	Manakkayam	567	79	35	21	27	12	6	16
30	Achencoil	2633	134	82	38	30	24	6	17
31	Kottavasal	383	233	121	60	26	15	5	4
34	Kottavasal	3783	176	87	32	25	21	12	17
35	Palaruvi	1500	277	133	46	26	12	5	10
37	Kalthuruthy	550	211	68	25	17	14	1	17
41	Vellanipacha	1383	361	92	64	32	14	7	9
44	Neriamangalam	3750	129	52	38	21	12	13	17
46	Nadukani	1133	277	212	88	48	19	10	13
47	Nadukani	2233	227	114	62	40	15	15	20
49	Aralam	1133	125	124	101	52	14	11	7
51	Chandanathode	1533	276	123	43	27	16	10	17
52	Kannavam	1533	186	77	37	25	12	9	30
53	Seminari Villa	2017	189	107	62	36	13	9	24
54	Kannavam	2417	21	5	20	28	28	7	26
55	Sivapuram	1233	112	118	81	61	20	7	4
58	Kavadikkanam	1700	377	58	38	29	14	7	15
59	Chippilithode	2117	32	24	67	43	31	14	21
60	Chippilithode	1500	496	59	73	47	31	14	11

3.4 Permanent sample plots in moist deciduous forests

Out of 22 plots established to represent moist deciduous forests in the State, eight were characterised by having *Xylia xylocarpa* as the first dominant species in the tree phase. This species was also dominant in seven plots in the seedling phase. However, only five plots were dominated by *Xylia xylocarpa* both in seedling and tree phases (Table 13). According to Pascal (1988), the regions with the most impoverished soil are rich in *Xylia xylocarpa*, which becomes one of the dominant species. Other dominant species recorded in the permanent plots include *Lagerstroemia microcarpa, Terminalia tomentosa, Tectona grandis, Terminalia paniculata*, and *Wrightia tinctoria*. It may be noted here that in certain plots, besides

deciduous species, some evergreen heliophytes such as *Aporusa lindleyana, Croton malabaricus, Flacourtia montana, Olea dioica, Schleichera oleosa* and *Xanthophyllum arnottianum* are the major components in tree and seedling phases. Such plots are often located near the watercourse such as streams (no. 28,29 and 36) and reservoirs (no. 39). In the case of plot located at Parapa (no. 56), *Hopea parviflora* and *Swietenia mahagoni* are the dominant species. This is due to the fact that the adjacent plantations of these two species act as seed sources. Most of the permanent plots possess quite a large number of seedlings and saplings of evergreen species such as *Artocarpus hirsutus, Actinodaphne bourdillonii, Aglaia* sp., *Cinnamomum malabatrum, Dimocarpus longan, Euodia lunu-ankenda, Litsea laevigata* and *Persea macrantha* (Appendix 1 and 2). Thus when protection is assured and if soil is not poor, the plots with reasonably better contribution by the above mentioned evergreen species to the seedling and tree density and basal area, may evolve into evergreen forests.

Floristic richness in the permanent plots was measured for tree and seedling communities. The value varies from 14 to 60 species in the tree phase and 2 to 26 species in the seedling phase (Table 14). It may be mentioned here that in case of the Irumpupalam plot (no. 40), apart from the two species present in the seedling phase, seedling density was much lower than the tree density. This suggests the fact that among all the permanent plots, Irumpupalam plot is experiencing severe and continuous disturbances. Stem density in moist deciduous forest was between 190 and 1146 trees ha^{-1} with plots at Pothundy (no.17) and Vani Nagar (no. 57) are at two extremes (Fig. 10). As already indicated, the seedling density was less (67 seedlings ha^{-1}) at Irumpupalam (plot no.40) while it was more in Vellatanku (plot no. 36; 3667 seedlings ha^{-1}) (Fig. 11). Tree basal area was in the range from 15.34 m^2 ha^{-1} (Pothundy; plot no.17) to 47.34 m^2 ha^{-1} (Parapa; plot no.56). It may be noted here that in the plots at Vaniampuzha (nos. 9 and 13), despite the fact that the seedling density was between 533 and 1200 individuals ha^{-1}, the basal area was as low as 0.05 m^2 ha^{-1}. Repeated fire in the recent past in these plots could be the reason for the prevention of seedling recruitment to higher girth classes. Plots at Athirapally (no.1), Randukai (no.3), Pothundy (no.17), Ottakal (no. 39) and Vani Nagar (no. 57) were showing generally better regeneration of trees with seedling basal area above 0.7 m^2 ha^{-1}. However, in the Athirapally and Pothundy plots

contribution by *Xylia xylorapa* for the species importance value was about 55%. On the other hand, in the Ottakal, Randukai and Vani Nagar plots, a group of evergreen species contributed more than 35% to the total species importance value while the contribution by *Xylia xylocarpa* was only around 17%. Thus these two groups of plots are expected to show different patterns of regeneration and succession.

Among 22 plots, those at Kochuthalappara (plot no. 33) and Vellatanku (plot no. 36) showed high species diversity as indicated by comparatively high value of Shannon' index of species diversity (H= 5.04 to 5.06). In the seedling phase also, the Vellatanku plot showed high species diversity. On the other hand, species diversity was poor in the Vaniampuzha (plot no.13) and Irumpupalam (plot no. 40) due to occurrence of only a few species in the plot and their representation in a given plot was almost equal.

Table 13. Dominant species in tree and seedling phases in permanent plots established in moist deciduous forests in Kerala.

Plot Code No.	Locality	Dominant Species	
		Trees	Seedlings
1	Athirappally	*Xylia xylocarpa* *Lagerstroemia microcarpa* *Grewia tiliifolia*	*Xylia xylocarpa* *Sapindus trifoliata* *Macaranga peltata*
2	Randukai	*Xylia xylocarpa* *Terminalia paniculata* *Wrightia tinctoria*	*Wrightia tinctoria* *Xylia xylocarpa* *Strychnos nux-vomica*
3	Randukai	*Xylia xylocarpa* *Pterygota alata* *Macaranga peltata*	*Polyalthia fragrans* *Xylia xylocarpa* *Macaranga peltata*
5	Thumburmuzhi	*Lagerstroemia microcarpa* *Terminalia paniculata* *Xylia xylocarpa*	*Lagerstroemia microcarpa* *Xylia xylocarpa* *Terminalia paniculata*
8	Pandarampara	*Terminalia tomentosa* *Dillenia pentagyna* *Grewia tiliifolia*	*Grewia tiliifolia* *Terminalia paniculata* *Holarrhena pubescens*
9	Vaniampuzha	*Xylia xylocarpa* *Terminalia paniculata* *Stereospermum sp.*	*Xylia xylocarpa* *Aporusa lindleyana* *Olea dioica*
12	Vaniampuzha	*Xylia xylocarpa* *Terminalia paniculata* *Stereospermum* sp.	*Xylia xylocarpa* *Strychnos nux-vomica* *Sterculia guttata*

--cont'd---

Table 13 (cont'd). Dominant species in tree and seedling phases in permanent plots established in moist deciduous forests in Kerala.

Plot Code No.	Locality	Dominant Species	
		Trees	Seedlings
13	Vaniampuzha	*Xylia xylocarpa* *Terminalia paniculata* *Stereospermum* sp.	*Xylia xylocarpa* *Artocarpus hirsutus* *Dillenia pentagyna*
17	Pothundy	*Tectona grandis* *Bombax ceiba* *Lagerstroemia microcarpa*	*Xylia xylocarpa* *Terminalia paniculata* *Tamarindus indica*
19	Velamplavu	*Xylia xylocarpa* *Terminalia paniculata* *Terminalia bellirica*	*Olea dioica* *Aporusa lindleyana* *Actinodaphne bourdillonii*
20	Velamplavu	*Xylia xylocarpa* *Terminalia paniculata* *Tabernaemontana heyneana*	*Xylia xylocarpa* *Litsea laevigata* *Swietenia mahagoni*
28	Achencoil	*Terminalia tomentosa* *Wrightia tinctoria* *Tectona grandis*	*Croton malabaricus* *Grewia tiliifolia* *Wrightia tinctoria*
29	Achencoil	*Knema attenuata* *Kingiodendron pinnatum* *Lagerstroemia microcarpa*	*Polyalthia fragrans* *Croton malabaricus* *Knema attenuata*
33	Kochuthalappara	*Terminalia paniculata* *Ixora nigricans* *Vitex altissima*	*Aglaia* sp. *Actinodaphne* sp. *Litsea laevigata*
36	Vellatanku	*Schleichera oleosa* *Tetrameles nudiflora* *Aporusa lindleyana*	*Schleichera oleosa* *Olea dioica* *Aporusa lindleyana*
38	Kalthuruthy	*Terminalia paniculata* *Olea dioica* *Litsea laevigata*	*Litsea laevigata* *Actinodaphne bourdillonii* *Persea macrantha*
39	Ottakallu	*Terminalia paniculata* *Olea dioica* *Dillenia pentagyna*	*Aporusa lindleyana* *Olea dioica* *Tabernaemontana heyneana*
40	Irumpupalam	*Wrightia tinctoria* *Macaranga peltata* *Holarrhena pubescens*	*Wrightia tinctoria* *Schleichera oleosa*
42	Chanoth	*Wrightia tinctoria* *Xylia xylocarpa* *Grewia tiliifolia*	*Xylia xylocarpa* *Wrightia tinctoria* *Grewia tiliifolia*
48	Aralam	*Dillenia pentagyna* *Xylia xylocarpa* *Chionanthus malabaricus*	*Atalantia racemosa* *Aporusa lindleyana* *Polyalthia fragrans*
56	Parappa	*Hopea parviflora* *Terminalia paniculata* *Tectona grandis*	*Hopea parviflora* *Flacourtia Montana* *Swietenia mahagoni*
57	Vani Nagar	*Holigarna arnottiana* *Flacourtia montana* *Ixora nigricans*	*Holigarna arnottiana* *Tabernaemontana heyneana* *Flacourtia Montana*

Table 14. Basic information on vegetation with respect to tree community in permanent plots established in moist deciduous forests in Kerala. Values given are for trees (girth ≥ 10.1 cm). Values given in parentheses are for tree seedlings (girth ≤ 10.0 cm).

Plot Code No.	Locality	Number of species	Density (Individuals ha^{-1})	Basal area ($m^2 ha^{-1}$)	H*	C*	R*	α*
1	Athirapally	26 (14)	664 (2400)	33.77 (0.45)	2.55 (1.89)	0.3614 (0.5104)	1.43 (1.65)	6.60 (5.18)
2	Randukai	19 (15)	296 (2167)	35.84 (0.20)	2.82 (2.78)	0.2342 (0.2478)	1.56 (1.86)	5.80 (6.11)
3	Randukai	29 (21)	216 (3067)	32.80 (0.73)	4.26 (3.57)	0.0715 (0.1177)	2.79 (2.19)	13.00 (8.50)
5	Thumburmuzhi	21 (11)	1024 (1200)	22.24 (0.04)	2.81 (2.76)	0.2365 (0.2006)	0.93 (1.83)	4.41 (5.40)
8	Pandarampara	22 (12)	410 (2133)	19.64 (0.18)	3.58 (3.28)	0.1117 (0.1216)	1.54 (1.50)	6.25 (4.36)
9	Vaniampuzha	14 (7)	370 (533)	31.06 (0.05)	2.11 (1.92)	0.3314 (0.4141)	1.03 (1.75)	3.52 (4.75)
12	Vaniampuzha	24 (16)	310 (1733)	20.62 (0.26)	3.11 (3.18)	0.2428 (0.1849)	1.93 (2.22)	7.95 (7.90)
13	Vaniampuzha	16 (13)	452 (1200)	25.07 (0.05)	1.94 (2.70)	0.4252 (0.2778)	1.06 (2.17)	3.93 (7.30)
19	Velamplavu	22 (9)	318 (733)	36.03 (0.44)	2.38 (2.90)	0.4151 (0.1529)	1.74 (1.92)	6.93 (5.69)
20	Velamplavu	27 (9)	682 (1300)	18.25 (0.46)	3.18 (2.29)	0.2064 (0.3241)	1.46 (1.44)	6.88 (3.67)
28	Achencoil	23 (15)	342 (1067)	34.75 (0.47)	3.68 (3.58)	0.1198 (0.1016)	1.76 (2.65)	7.15 (11.01)
29	Achencoil	44 (18)	420 (2300)	45.15 (0.63)	4.67 (3.57)	0.0595 (0.1090)	3.04 (2.17)	16.96 (7.92)
33	Kochuthalappara	54 (22)	578 (3433)	33.82 (0.41)	5.06 (3.53)	0.0431 (0.1494)	3.18 (2.17)	19.59 (8.57)
36	Vellatanku	60 (26)	466 (3667)	26.54 (0.57)	5.04 (4.25)	0.0478 (0.0663)	3.93 (2.48)	26.16 (10.75)
38	Kalthuruthy	31 (16)	632 (1500)	25.27 (0.38)	3.72 (3.60)	0.1179 (0.0983)	1.74 (2.39)	8.52 (8.87)
39	Ottakal	18 (12)	1024 (5433)	16.73 (1.70)	3.19 (2.11)	0.1472 (0.3233)	0.80 (0.94)	3.63 (2.98)
40	Irumpupalam	27 (2)	798 (67)	22.01 (0.40)	2.98 (1.00)	0.1950 (0.5000)	1.35 (1.41)	6.54 (101.00)
42	Chanothmoola	30 (5)	560 (367)	30.26 (0.14)	3.26 (2.04)	0.2269 (0.2893)	1.79 (1.51)	8.52 (3.54)
48	Aralam	52 (20)	912 (2867)	21.23 (0.58)	4.96 (3.02)	0.0444 (0.2426)	2.44 (2.16)	15.12 (8.19)
56	Parapa	29 (13)	572 (2800)	47.34 (0.65)	3.89 (2.90)	0.0868 (0.1947)	1.71 (1.42)	8.06 (4.30)
57	Vani Nagar	38 (16)	1146 (1833)	27.33 (0.72)	3.29 (3.38)	0.1834 (0.1471)	1.59 (2.16)	9.15 (7.58)

*H= Shannon's index of species diversity, α= Fishers alpha of species diversity, R= Species richness, and C = Simpson's index of species dominance

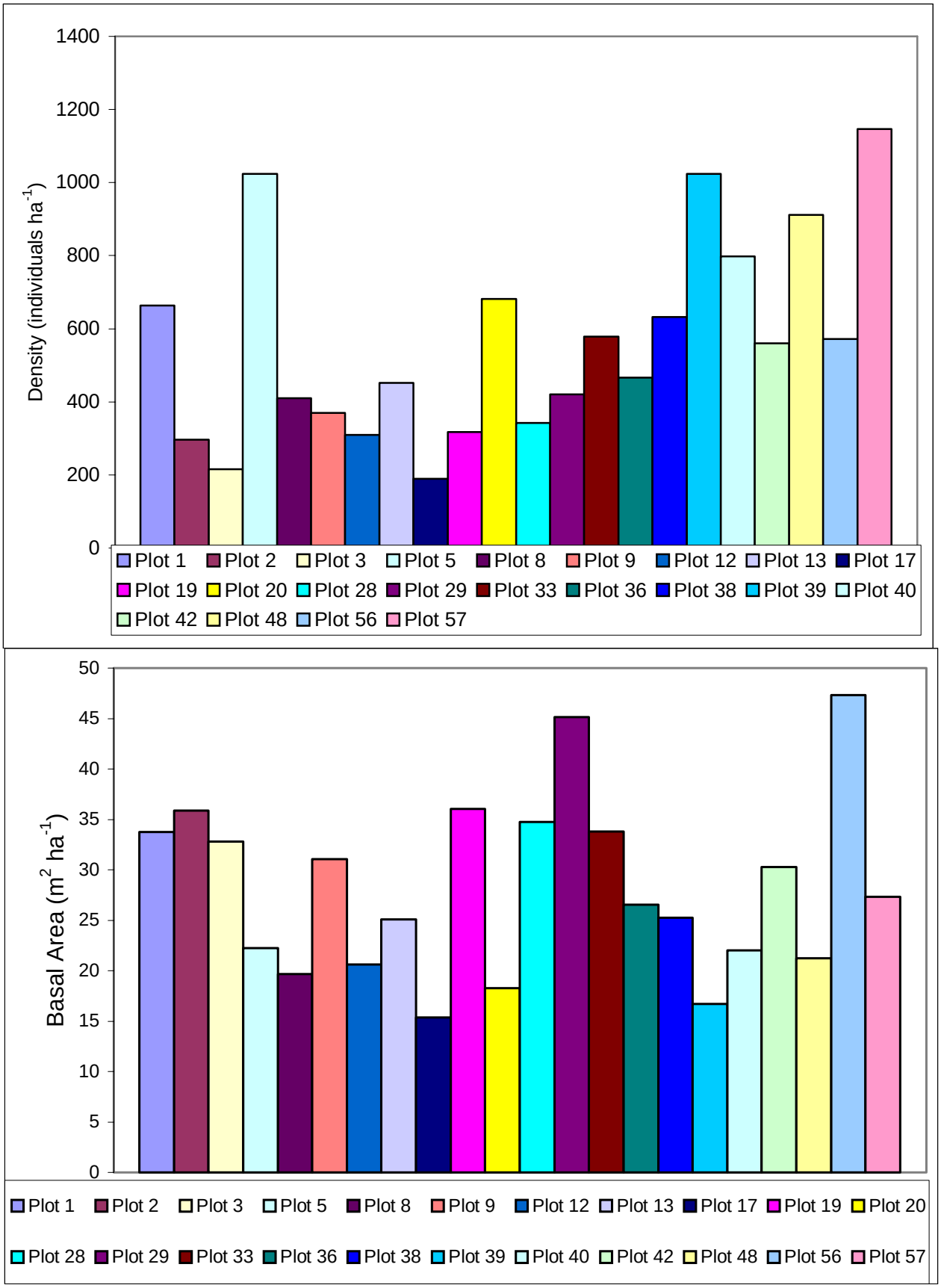
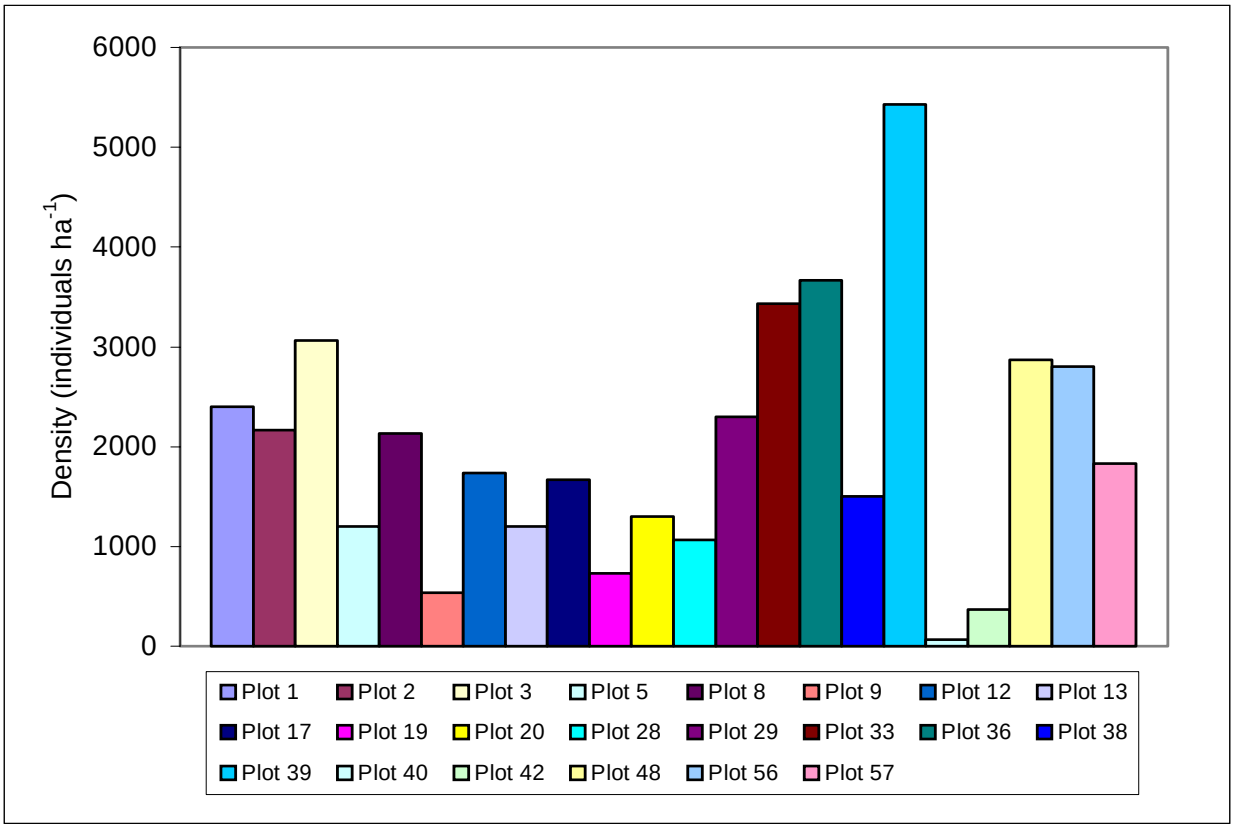


Figure 10: Density (individuals ha^{-1}) and basal area of trees (gbh $\geq$ 10.1 cm) in the moist deciduous forests of Kerala



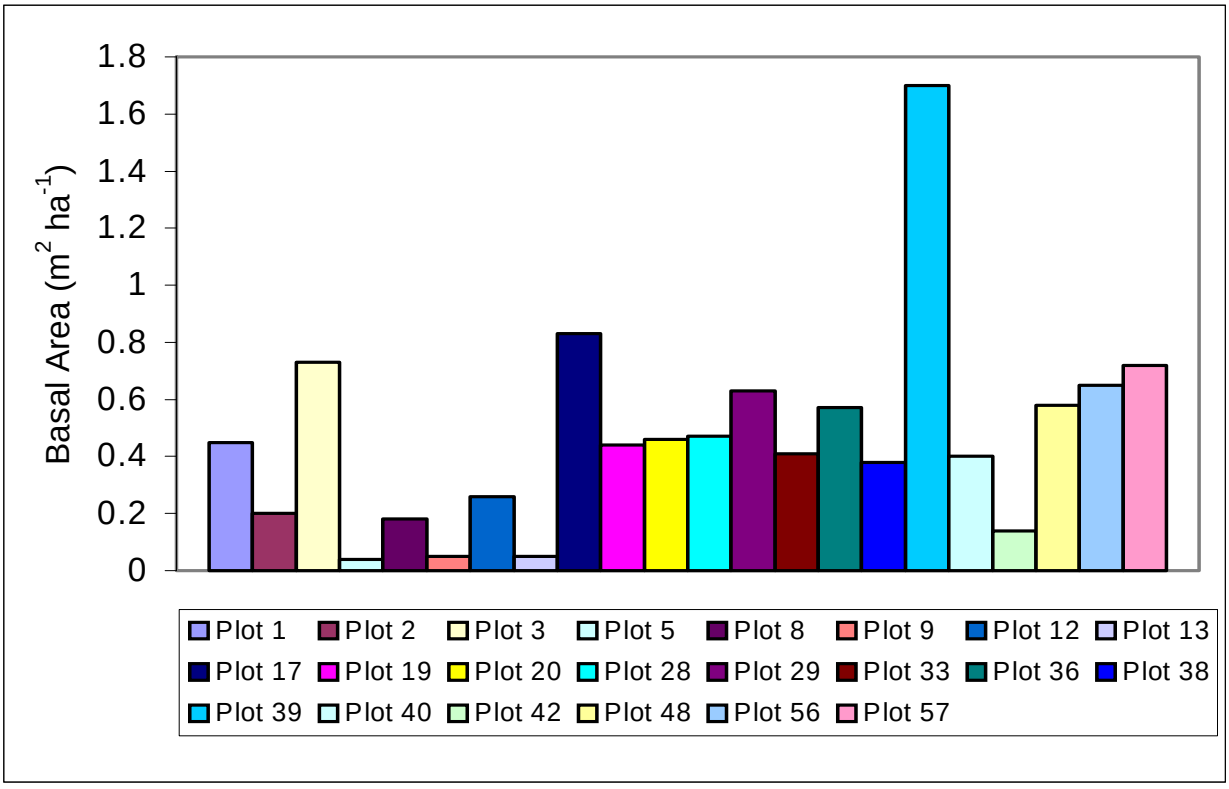


Figure 11: Density (individuals ha^{-1}) and basal area of seedlings (girth $\leq$ 10 cm) in the moist deciduous forests of Kerala

The divergence among the sample plots with respect to species composition was recorded by cluster analysis. Ten dominant species in each cluster were identified by ranking the IVI values within the clusters and the plots were assigned to different clusters (Table 15 and Figure 12).

Table 15. Dominant species in each cluster in moist deciduous forests identified by ranking the IVI values within the clusters and the plots assigned to different clusters

Clusters	Plots	Species	IVI
1	1,2,9,12,13,19 and 20	*Xylia xylocarpa*	130.85
		Terminalia paniculata	55.29
		Stereospermum sp.	12.84
		Lagerstroemia microcarpa	10.84
		Dillenia pentagyna	8.1
		Terminalia bellirica	7.48
		Bombax ceiba	6.97
		Wrightia tinctoria	6.72
		Grewia tiliifolia	6.63
		Tabernaemontana heyneana	5.26
		Total	250.98
2	3,25,33,36,48,56 and 57	*Terminalia paniculata*	20.01
		Aporusa lindleyana	15.04
		Holigarna arnottiana	14.68
		Schleichera oleosa	12.34
		Ixora nigricans	10.92
		Hopea parviflora	10.12
		Xylia xylocarpa	9.66
		Flacourtia montana	8.41
		Lagerstroemia microcarpa	6.78
		Terminalia bellirica	6.78
		Total	114.76
3	5	*Lagerstroemia microcarpa*	82.43
		Terminalia paniculata	64.35
		Xylia xylocarpa	54.42
		Unidentified 1(5)	15.04
		Miliusa tomentosa	13.68
		Cassia fistula	11.79
		Unidentified 2(5)	10.81
		Strychnos nux-vomica	10.1
		Alstonia scholaris	7.08
		Grewia tiliifolia	5.91
		Total	275.61

---cont'd----

Table 15 (cont'd). Dominant species in each cluster in moist deciduous forests identified by ranking the IVI values within the clusters and the plots were assigned to different clusters

Clusters	Plots	Species	IVI
4	8,17 and 28	*Tectona grandis*	38
		Terminalia tomentosa	34.36
		Dillenia pentagyna	28.55
		Grewia tiliifolia	18.19
		Wrightia tinctoria	17.18
		Bombax ceiba	17.17
		Terminalia paniculata	14.22
		Lagerstroemia microcarpa	14.19
		Anogeissus latifolia	12.21
		Xylia xylocarpa	11.96
		Total	206.01
5	38 and 39	*Terminalia paniculata*	94.7
		Olea dioica	34.77
		Tabernaemontana heyneana	21.81
		Dillenia pentagyna	20.45
		Aporusa lindleyana	17.46
		Terminalia tomentosa	13.97
		Litsea laevigata	12.56
		Macaranga peltata	11.49
		Phyllanthus emblica	8.1
		Careya arborea	7.79
		Total	243.1
6	40 and 42.	*Wrightia tinctoria*	70.3
		Xylia xylocarpa	34.85
		Holarrhena pubescens	29.95
		Macaranga peltata	26.18
		Terminalia bellirica	15.39
		Dillenia pentagyna	14.75
		Terminalia paniculata	14.39
		Grewia tiliifolia	14.19
		Tectona grandis	7.25
		Bombax ceiba	7.06
		Total	234.31

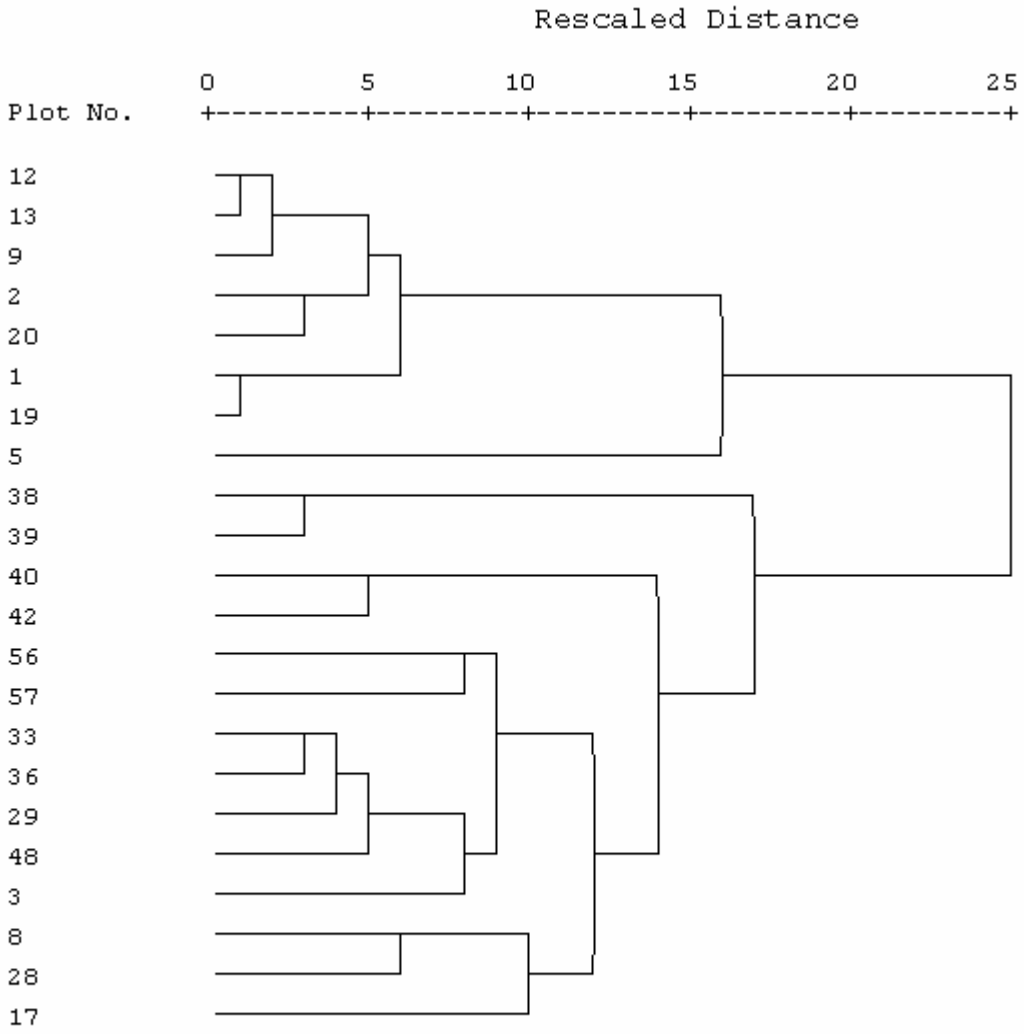


Figure 12. Dendrogram derived from cluster analysis for tree community of the permanent plots established in moist deciduous forests of Kerala.

Analysis of girth class distribution of trees in the plots indicated that the curves generally are not L-shaped. Thus no clear preponderance of stems of small girth classes was noticed (Table 16). Based on the distribution of trees into different girth classes the permanent plots can be categorised into two groups. In the first group of plots, a drastic reduction in recruitment from lower girth classes to higher classes can be seen. Examples include pots located at Athirapally (no.1), Thumburmuzhi (no.5), Pothundy (no.17) and Vani Nagar (no. 57). In the second group of plots, where majority of the plots fall, either poor representation or absence of trees in the intermediate girth classes was noticed. Illicit felling of poles and small trees could be the major reason for such a pattern.

Table 16. Girth class distribution of trees in permanent plots established in moist deciduous forests in Kerala.

Plot Code No.	Location	No. of individuals in each girth class (cm) in 0.5 ha plot							
		girth	Gbh						
		<10.0	10.1-30.0	30.1-60.0	60.1-90.0	90.1-120.0	120.1-150.0	150.1-180.0	>180
1	Athirapally	1200	253	19	9	7	8	13	22
2	Randukai	1083	51	25	10	13	17	13	19
3	Randukai	1533	40	8	6	7	12	8	26
5	Thumburmuzhi	600	422	44	5	4	7	9	14
8	Pandarampara	1067	88	48	17	21	14	11	6
9	Vaniampuzha	267	10	41	52	43	22	10	7
12	Vaniampuzha	867	31	42	29	20	18	11	4
13	Vaniampuzha	600	51	52	59	42	10	8	4
17	Pothundy	833	52	9	6	7	4	11	6
19	Velamplavu	367	35	31	22	17	16	18	20
20	Velamplavu	650	82	130	103	23	3	0	0
28	Achencoil	533	79	25	12	14	10	10	21
29	Achencoil	1150	64	53	32	19	12	9	21
33	Kochuthalappara	1717	66	87	56	39	21	9	11
36	Vellatanku	1833	123	26	24	22	13	10	14
38	Kalthuruthy	750	202	34	18	19	23	9	11
39	Ottakal	2717	344	93	43	15	12	4	1
40	Irumpupalam	33	265	86	15	4	11	9	9
42	Chanothmoola	183	207	20	5	4	11	12	21
48	Aralam	1433	250	141	33	7	15	3	7
56	Parapa	1400	100	49	35	38	19	23	22
57	Vani Nagar	917	388	85	40	26	17	7	9

Totally 42 species of herbs were recorded from the plots established in moist deciduous forests with number of species encountered per plot ranged from 2 to 15. Some of the common species seen in the plots are *Abutilon indicum*, *Andrographis*

paniculata, *Costus speciosus*, *Curculigo orchioides*, *Hemidesmus indicus*, *Naregamia alata*, *Oplismenus compositus, Rungia pectinata, Tragia hispida* and *Zingiber* sp. In the plot established at Vani Nagar (no.57) density was as low as 233 individuals ha^{-1} while in other plots its range was between 2633 and 350000 individuals ha^{-1} with *Oplismenus compositus, Rungia pectinata* and *Hemidesmus indicus* as the major contributors. Among 16 shrub species recorded, *Helicters isora* was the most common one as it was represented in 18 out of 22 plots. Other common species include *Clerodendrum infortunatum*, *Chromolaena odorata*, *Leea indica*, Canthium sp., *Glycosmis pentaphylla* and *Ziziphus nummularia*. Shrub density ranged from 1600 to 90,000 individuals ha^{-1} with *Chromolaena odorata* as the dominant species in the plots established at Randukai (no. 2), Pandarampara (no. 8), Velamplavu (no. 20) and Chanothmoola (no. 42). Among woody climbers, Acacia intsia was the common species seen in 12 plots while *Piper longum* being the most common herbaceous climber. Other important climbers include *Calycopteris floribunda, Cissus discolor*, *Cyclea peltata*, *Ichnocarpus frutescens*, *Naravelia zeylanica*, *Piper wightii* and *Strychnos colubrina*. Number of species per plot was between 1 and 11 while the density was between 1200 and 64400 individuals ha^{-1}.

3.5 Permanent sample plot in a dry deciduous forest

The dry deciduous forest plot established at Alampetty (no. 43) in the Chinnar Wildlife Sanctuary can be described as *Chloroxylon swietenia* - *Strychnos potatorum* - *Anogeissus latifolia* type as these species constituted about 67% of the stem density and with total IVI of 185.15 in the tree phase (Appendix 1). In the seedling phase, *Albizia amara* - *Strychnos potatorum* and *Pavetta indica* are the most dominant species (Appendix 2). Totally 24 tree species were recorded from the plot, of which only five species were represented in seedling phase as well. Thus the remaining 19 species showed poor regeneration. During the year 1998, in this forest patch, 674 trees ha^{-1} with basal area of 13.97 m^2 ha^{-1} were recorded (Chandrashekara *et al.* 1998). The present study indicated that tree density and basal area have increased considerably (Table 17). However, seedling density at present is slightly lower than what was recorded during the year 1998.

Table 17. Basic information on vegetation with respect to tree community* in the permanent plot established in a dry deciduous forest in Kerala.

	Phases	
	Trees	Seedling
Species represented	24	5
Density (individuals ha^{-1})	744	600
Basal area (m^2 ha^{-1})	19.36	0.12
Shannon's index of species diversity (H)	3.01	1.68
Fishers alpha of species diversity (α)	5.73	2.29
Species richness (R)	1.24	1.1785
Simpson's index of species dominance (C)	0.2080	0.4198

* Trees (gbh $\geq$ 10.1 cm) and tree seedlings (girth $\leq$ 10.0 cm and height $\geq$ 50 cm).

Species diversity index value was more for trees than for seedlings. This indicates that the resource partitioning among several species in the tree population and by only a few species in the seedling phase. However, in the tree population, the partitioning of resources is uneven as indicated by more than 70% contribution to the total tree density by four species. Thus the Simpson's index of species dominance showed higher value for tree population than for the seedling population.

In the plot, tree community as a whole showed a negative exponential distribution of stems in different girth classes (Table 18). Thus the regeneration is found to be satisfactory. However, the ratio between seedling and tree density was 1.0**:**1.24 with majority of the species not represented in the seedling phase. Capacity of a large number of species in the plot to regenerate by root suckers and to produce multiple shoots could be the reason for higher values for tree density and basal area.

Table 18. Girth class distribution of trees in the permanent plot established in a dry deciduous forest in Kerala.

	Girth classes (cm)							
	girth	gbh						
Number of individuals in a 0.5 ha plot	$\leq$10.0	10.1-30.0	30.1-60.0	60.1-90.0	90.1-120.0	120.1-150.0	150.1-180.0	>180
	300	169	111	54	25	7	4	2

Acalypha indica, *Cymbopogon citratus*, *Desmodium* sp., *Oplismenus compositus* and *Sida rhombifolia* were the herbaceous species recorded in the plot.

They contributed to the total density of 51600 individuals ha^{-1}. *Lantana camara* and *Jasminum hirsutum* represented the shrub and climber communities respectively. The estimated density of *Lantana camara* was 5200 individuals ha^{-1} and that of *Jasminum hirsutum* 13200 individuals ha^{-1}.

4.0 Conclusions and recommendations

In the present study, 60 permanent plots to cover major forest types of the State were established. In these plots, a total of 21,239 trees were marked; of those, 20,524 trees represent 327species while another 715 individuals are yet to be identified. Thus, of about 740 indigenous tree species recorded in Kerala (Sasidharan, 2000), the present study encountered about 44% tree species. Species-level basic information such as location of trees in plots, girth distribution pattern and frequency of distribution in different forest has generated. These form the baseline information for monitoring the changes in woody species composition, diversity, abundance and basal area in the plots. Growth rate of tree seedlings was not monitored due to short duration of the project**.**

As indicated by the cluster analysis, there is divergence among the habitats with respect to species composition. Even a wide variation among plots of a given forest type in terms of tree density and basal area has been recorded. Thus, the established plots, if regularly monitored, will provide reliable scientific information both in evaluating existing management approaches and evolving suitable management strategies. The interesting observation which emerged is that about 65-70 percent of the species represented in only one phase, i.e., seedling or tree phase. Absence of individuals of a given species in one of the two phases, as in the case of late and early successional, can be discussed in the light of successional stage of the plot. However, reasons for the lack of representation by dominant species in any of the two phases needs to be investigated thoroughly not only to understand the tree regeneration patterns in the tropical forests but also to evolve scientific management options.

Based on the study, following recommendations are made

1. The species enumerated from sample plots cover only 44% of the tree species found in Kerala. Besides this, the cluster analysis indicated a wide variation among plots of a given forest type in terms of species composition and diversity. Thus, for capturing larger species diversity, necessary steps need be taken to establish more number of sample plots, by selecting the appropriate representative sites in different forest types.
2. In already established sample plots, monitoring mature trees at yearly interval and tree seedlings, shrubs and herbs at monthly interval needs to be ensured to obtain long term both autecological and synecological information at plot level. Since these studies need to be continued for a long period of time all these plots should be protected.
3. Since these plots are in different forest types in the State, further research can be initiated here on diversity of microflora and microfauna, ecological functions and ecophysiology of constituent species. These studies could provide a comprehensive information on ecology and systematics of forests of the Western Ghats.

5.0 Acknowledgements

The Kerala Forest Department as part of its World Bank funded Kerala Forestry Project (KFP) supported this Project. Authors are grateful to the officials in the World Bank Cell of the Forest Department for their continuous encouragement and support to carry out the study. We extend sincere thanks to all the forest officials who have kindly permitted us to establish the permanent plots and conduct the study. We express our sincere gratitude to Dr. J.K. Sharma, Director and Dr. R. Gnanaharan, Research Coordinator for their keen interest and encouragement. We extend our sincere thanks to Dr. K. Balasubramanyan and Dr. M. S. Muktesh Kumar for their editorial comments on the final draft. Thanks are due to Mr. K.A. Sreejith, Mr. Sathian P. Joseph, Mr. Saji T. Thomas, Mr. K. Sajeevkumar, Mr. P.J. Jineesh and Mr. C. J. Santhosh for their assistance in field works. Thanks are also due to Mr. Pradosh for assisting in data processing and statistical analysis.

6.0 References

Bellingham, P.J., Stewart, G.H. and Allen, R.B. (1999). Tree species richness throughout New Zealand forests. **Journal of Vegetation Science, 10**: 825-832.

Chandrashekara, U.M., Menon, A.R.R., Nair, K.K.N, Sasidharan, N, and Swarupanandan, K. (1998). **Evaluating Plant Diversity in Different Forest Types of Kerala by Laying out Permanent Sample Plots.** KFRI Research Report 156. Kerala Forest Research Institute, Peechi, Kerala.

FAO-UNEP (1981). **Tropical Forest Resources Assessment Project.** Forest Resources of Tropical Asia. Vol.3, FAO, Rome.

Magurran, A.E. (1988). **Ecological Diversity and its Measurement**. Croom Helm Limited, London.

Myers, N. (1988). Tropical forests and their species : going, going ----? In: (ed. E.O. Wilson) **Biodiversity.** National Academy Press. Washington, DC. Pp. 28-35.

Nair, T.K.R. (1997). The Forest Wealth of Kerala. In: (eds. P.Pushpangadan and K.S.S.Nair) **Biodiversity and Tropical Forests: The Kerala Scenario.** The State Committee on Science, Technology and Environment, Kerala, Thiruvanthapuram. Pp.127-131.

Pascal, J.P. (1988). **Wet Evergreen Forests of the Western Ghats of India: Ecology, structure, floristic composition and succession**. French Institute of Pondicherry, Pondicherry, India.

Phillips, O.L. (1998). Increasing tree turnover in tropical forests as measured in permanent plots. In: (eds. Dallmeier, F. and Comiskey, J.A.) **Forest Biodiversity Research, Monitoring and Modelling: Conceptual Background and Old World Case Studies.** Parthenon Publishing, paris. Pp. 221- 245.

Sasidharan, N. (2000). **Forest Trees of Kerala**. Kerala Forest Research Institute, Peechi.

Simpson, E.H. (1949). Measurement of diversity. **Nature (London), 163**: 688.

Sukumar, R., Suresh, H. Dattaraja, H.S. and Joshi, N.V. (1998). Dynamics of a tropical deciduous forest: population changes (1988 through 1993) in a 50-hectare plot at Mudumalai, southern India. In: (eds. Dallmeier, F. and Comiskey, J.A.) **Forest Biodiversity Research, Monitoring and Modelling: Conceptual Background and Old World Case Studies**. Parthenon Publishing, Paris. Pp. 529-540.

Swamy, H.R. (1988). **Study of Organic Productivity, Nutrient Cycling and Small**

Watershed Hydrology in Natural Forests and in Monoculture Plantations in Chickmagalore District, Karnataka. Final Report submitted to Department of Environment and Forests, Government of India (Mimeo).

Velu Pillai, M. (1919). **Working Plan Report of the Malayattur Working Circle**. Government Press, Madras.

Appendix 1. Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Shola Forests				
Plot Code No. 45 - Vagadurai				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Actinodaphne bourdillonii	4	4	0.260	1.45
Aglaia apiocarpa	6	6	0.140	1.71
Apollonias arnottii	46	26	0.440	8.89
Bhesa indica	4	4	0.130	1.21
Beilschmedia wightii	24	10	1.010	5.60
Canarium strictum	6	4	0.920	2.89
Celtis sp.	2	2	0.270	0.99
Chionanthus sp.	94	46	2.650	20.47
Cinnamomum sp.	4	4	0.660	2.22
Cinnamomum wightii	42	32	2.770	13.86
Elaeocarpus recurvatus	2	2	0.190	0.84
Garcinia sp.	36	26	3.460	13.75
Glochidion neilgherrence	106	38	1.120	17.44
Gomphandra coriacea	84	58	2.610	21.25
Ilex sp.	56	28	4.140	17.17
Isonandra perrottetiana	12	12	0.050	2.96
Isonandra sp.	4	4	0.190	1.31
Litsea oleoides	10	8	0.020	2.13
Litsea sp.	16	14	0.190	3.90
Litsea sp.2	22	16	0.860	6.02
Microtropis ramiflora	20	12	1.740	6.92
Neolitsea scrobiculata	92	48	3.490	22.19
Nothapodytes nimmoniana	12	10	0.400	3.33
Persea macrantha	4	4	0.030	1.01
Psychotria sp.	6	6	0.020	1.48
Saprosma sp.	14	12	0.170	3.38
Schefflera capitata	2	2	0.500	1.44
Scolopia crenata	10	8	0.630	3.30
Symplocos macrophylla	134	64	8.390	37.75
Symplocos sp.	46	28	0.150	8.63
Syzygium densiflorum	46	42	8.140	25.97
Syzygium sp.1	8	6	0.160	1.92
Unidentified 1(45)	42	32	1.510	11.46
Unidentified 3(45)	8	8	0.180	2.26
Unidentified 4(45)	16	12	0.100	3.43
Unidentified 5(45)	6	6	0.430	2.26
Unidentified 6(45)	48	32	4.290	17.33
Vernonia sp.	2	2	0.001	0.48

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests				
Plot Code No. 10 - Vaniampuzha				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Actinodaphne anguistifolia	2	2	0.105	0.86
Aglaia lawii	16	12	0.196	4.66
Alseodaphne semecarpifolia	2	2	0.024	0.67
Alstonia scholaris	2	2	0.014	0.65
Antiaris toxicaria	6	6	7.146	18.50
Aporusa lindleyana	4	4	0.148	1.57
Artocarpus hirsutus	8	8	4.034	11.86
Baccaurea courtallensis	72	54	0.853	20.92
Callicarpa tomentosa	4	4	0.080	1.41
Canthium dicoccum var *umbellatum*	4	2	0.020	0.92
Cinnamomum malabatrum	30	18	2.353	12.59
Croton malabaricus	26	20	0.244	7.49
Dimocarpus longan	4	4	0.028	1.29
Diospyros bourdillonii	70	50	5.402	30.56
Diospyros candolleana	2	2	0.200	1.08
Diospyros foliosa	2	2	0.011	0.64
Diospyros sp.4	12	12	0.477	4.79
Drypetes elata	28	20	1.009	9.54
Elaeocarpus serratus	22	12	2.489	10.80
Ficus sp.	2	2	0.305	1.32
Garcinia gummi-gutta	2	2	0.009	0.63
Garcinia talbotii	2	2	0.095	0.83
Holigarna grahamii	2	2	0.306	1.33
Hydnocarpus pentandra	10	8	0.724	4.40
Ixora nigricans	18	14	0.312	5.55
Ixora sp.	6	6	0.092	2.05
Knema attenuata	52	40	3.031	20.91
Lepisanthes sp.	6	4	0.121	1.77
Lepisanthes tetraphylla	8	8	0.060	2.59
Litsea sp.	12	12	0.729	5.38
Macaranga peltata	8	8	0.479	3.57
Mangifera indica	2	2	0.075	0.79
Myristica malabarica	20	18	0.515	6.98
Olea dioica	4	4	0.018	1.27
Otonephelium stipulaceum	70	50	1.792	22.15
Polyalthia coffeoides	2	2	0.513	1.81
Polyalthia fragrans	66	40	3.185	23.12
Pterospermum diversifolium	2	2	0.105	0.86
Pterygota alata	74	44	1.331	20.56
Stereospermum sp.	2	2	0.035	0.70

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 10 – Vaniampuzha (cont'd).				
Symplocos sp.	6	6	0.135	2.15
Syzygium cumini	4	4	0.732	2.93
Syzygium gardneri	14	12	1.249	6.85
Syzygium hemisphericum	26	26	1.988	12.60
Tabernaemontana heyneana	6	6	0.065	1.99
Tetrameles nudiflora	6	4	0.027	1.55
Toona ciliata	2	2	0.013	0.64
Xanthophyllum arnottianum	6	6	0.025	1.90
Plot Code No. 11 – Vaniampuzha				
Aglaia lawii	26	20	0.514	8.25
Alseodaphne semecarpifolia	8	8	0.275	3.17
Alstonia scholaris	2	2	0.018	0.66
Antiaris toxicaria	6	6	3.230	10.21
Antidesma montanum	2	2	0.021	0.67
Artocarpus gomezianus	2	2	0.485	1.87
Artocarpus hirsutus	4	4	1.403	4.86
Baccaurea courtallensis	42	40	0.521	13.89
Calophyllum polyanthum	2	2	0.104	0.88
Canthium dicoccum var *umbellatum*	2	2	0.052	0.75
Cinnamomum malabatrum	20	16	1.835	10.19
Diospyros bourdillonii	128	64	6.223	44.11
Diospyros candolleana	4	4	0.008	1.25
Diospyros paniculata	4	4	0.026	1.30
Diospyros sp.1	10	8	0.556	4.16
Diospyros sp.4	10	10	0.327	3.92
Drypetes elata	72	52	2.679	25.51
Elaeocarpus serratus	10	10	0.593	4.61
Ficus sp.	2	2	0.486	1.87
Flacourtia montana	4	4	0.255	1.89
Garcinia gummi-gutta	4	4	0.021	1.28
Garcinia morella	6	6	0.012	1.87
Holigarna arnottiana	2	2	0.268	1.31
Holigarna grahamii	4	2	0.502	2.18
Hopea parviflora	6	6	0.303	2.63
Hydnocarpus pentandra	10	8	0.605	4.28
Ixora nigricans	8	8	0.144	2.83
Knema attenuata	58	40	2.621	21.41
Lepisanthes sp.	2	2	0.148	1.00
Lepisanthes tetraphylla	4	4	0.021	1.28
Litsea laevigata	6	6	0.130	2.18
Mallotus philippensis	10	8	0.314	3.53

P.T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).				
Plot Code No. 11 – Vaniampuzha (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Myristica malabarica	34	28	1.247	12.61
Neolamarckia cadamba	2	2	0.034	0.70
Otonephelium stipulaceum	108	58	1.941	29.34
Pajanelia longifolia	2	2	1.186	3.69
Polyalthia fragrans	28	22	3.064	15.47
Pterygota alata	34	28	1.443	13.11
Sapindus trifoliata	4	4	0.109	1.51
Spondias pinnata	2	2	0.059	0.77
Sterculia guttata	2	2	0.102	0.88
Syzygium cumini	2	2	0.124	0.93
Syzygium gardneri	10	8	2.790	9.95
Syzygium hemisphericum	24	22	0.262	7.69
Tabernaemontana heyneana	2	2	0.060	0.77
Unidentified 1(11)	2	2	0.582	2.12
Unidentified C5	2	2	0.657	2.32
Xanthophyllum arnottianum	30	22	0.222	8.37
Plot Code No. 14 – Pothumala				
Actinodaphne bourdillonii	8	8	0.017	1.39
Aglaia tomentosa	148	78	2.659	21.73
Antidesma montanum	12	8	0.080	1.75
Artocarpus heterophyllus	12	10	3.642	7.07
Canthium sp.	6	6	0.142	1.23
Caryota urens	8	8	0.199	1.66
Cassine glauca	46	30	0.454	6.83
Cinnamomum sp.	8	8	0.407	1.95
Cullenia exarillata	98	52	8.574	24.21
Dimocarpus longan	32	24	0.564	5.44
Diospyros assimilis	6	6	0.012	1.04
Drypetes elata	138	74	2.435	20.34
Ficus racemosa	2	2	0.290	0.76
Garcinia morella	6	4	0.038	0.87
Heritiera papilio	34	30	4.326	11.61
Holigarna arnottiana	8	8	4.488	7.81
Isonandra lanceolata	58	44	0.365	8.97
Litsea floribunda	130	70	0.991	17.32
Litsea insignis	2	2	0.004	0.35
Litsea sp.1	20	12	0.096	2.71
Litsea sp.2	142	72	1.172	18.57
Litsea sp.3	90	60	0.265	12.61
Macaranga peltata	82	32	1.513	10.91
Mastixia arborea	4	4	0.006	0.69

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 14 – Pothumala (cont'd).				
Mesua ferrea	60	48	8.707	21.50
Myristica dactyloides	40	32	1.203	7.73
Palaquium ellipticum	152	78	22.744	50.82
Polyalthia coffeoides	28	24	0.378	4.91
Syzygium sp.1	8	8	2.857	5.47
Syzygium sp.3	58	40	0.171	8.27
Unidentified 2(14)	80	52	0.841	11.94
Unidentified 1(14)	10	8	0.026	1.54
Plot Code No. 15 – Pothumala				
Actinodaphne bourdillonii	26	22	1.591	8.02
Aglaia tomentosa	78	44	0.465	13.21
Agrostistachys borneensis	78	34	1.314	13.45
Antidesma montanum	2	2	0.187	0.78
Artocarpus heterophyllus	14	12	0.773	4.18
Canarium strictum	2	2	0.184	0.77
Canthium sp.	4	4	0.179	1.19
Cassine glauca	2	2	0.101	0.62
Cinnamomum sp.	6	4	0.009	1.05
Cullenia exarillata	66	44	10.400	30.50
Dimocarpus longan	54	38	3.553	16.09
Diospyros assimilis	2	2	0.030	0.49
Drypetes elata	76	56	0.508	14.71
Drypetes wightii	146	74	2.013	25.72
Ficus exasperata	2	2	0.018	0.46
Garcinia morella	10	10	0.079	2.30
Heritiera papilio	6	6	1.917	4.83
Holigarna ferruginea	14	14	2.506	7.64
Isonandra lanceolata	54	34	0.226	9.44
Litsea sp.1	32	24	0.231	6.28
Litsea sp.2	52	32	0.384	9.29
Macaranga peltata	2	2	0.099	0.61
Memecylon sp.	6	6	0.012	1.32
Mesua ferrea	54	44	6.146	21.66
Myristica dactyloides	18	16	1.139	5.72
Palaquium ellipticum	144	78	18.558	56.55
Polyalthia coffeoides	6	6	0.061	1.41
Syzygium gardneri	2	2	0.018	0.47
Syzygium sp.1	26	22	0.051	5.18
Syzygium sp.3	54	34	0.218	9.42
Unidentified 1(15)	14	12	0.183	3.10
Unidentified 2(15)	136	68	0.735	21.74
Unidentified 2(15)	4	2	0.071	0.73
Unidentified 3(15)	2	2	0.344	1.07

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).

Plot Code No. 16 – Pothumala

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Actinodaphne bourdillonii	6	6	0.212	1.81
Aglaia lawii	122	70	6.854	34.95
Aglaia tomentosa	6	6	0.074	1.52
Agrostistachys borneensis	16	16	0.188	4.04
Antidesma montanum	10	8	0.354	2.74
Artocarpus heterophyllus	30	24	2.974	12.21
Bischofia javanica	2	2	0.002	0.46
Bridelia airy-shawii	2	2	0.295	1.07
Calophyllum polyanthum	4	4	0.061	1.04
Canarium strictum	2	2	0.020	0.50
Canthium sp.	6	6	0.008	1.39
Cassine glauca	8	8	2.886	7.83
Cinnamomum sp.	8	8	0.036	1.90
Croton malabaricus	220	86	1.247	34.37
Cullenia exarillata	64	46	10.122	33.18
Dimocarpus longan	2	2	0.085	0.63
Diospyros assimilis	22	20	0.326	5.43
Drypetes elata	6	6	0.111	1.60
Fahrenheitia zeylanica	70	48	4.052	21.38
Ficus exasperata	8	6	0.027	1.61
Ficus racemosa	6	6	0.881	3.20
Heritiera papilio	6	6	0.070	1.52
Holigarna arnottiana	4	4	0.290	1.52
Holigarna ferruginea	4	4	0.119	1.16
Isonandra lanceolata	6	6	0.040	1.45
Knema attenuata	4	4	0.057	1.03
Litsea floribunda	14	12	0.199	3.33
Litsea sp.1	16	12	0.031	3.17
Litsea sp.2	2	2	0.022	0.50
Litsea sp.3	18	18	0.502	5.15
Macaranga peltata	142	52	3.752	27.83
Mallotus beddomei	30	28	0.736	8.10
Mangifera indica	4	4	0.018	0.95
Mastixia arborea	50	34	0.409	10.06
Mesua ferrea	2	2	0.042	0.54
Myristica dactyloides	46	40	2.307	14.47
Otonephelium stipulaceum	16	14	0.475	4.37
Palaquium ellipticum	44	32	6.517	21.95
Polyalthia coffeoides	10	8	0.236	2.50
Pterospermum diversifolium	6	6	0.156	1.69
Pterygota alata	4	4	0.158	1.24
Syzygium sp.1	16	16	0.592	4.88
Syzygium sp.3	4	4	0.182	1.29

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 16 – Pothumala (cont'd).				
Tetrameles nudiflora	6	6	0.027	1.43
Toona ciliata	2	2	0.014	0.48
Unidentified 1(16)	4	4	0.034	0.98
Unidentified 2(16)	2	2	0.015	0.49
Unidentified 3(16)	2	2	0.038	0.54
Xanthophyllum arnottianum	20	16	0.240	4.51
Plot Code No. 18-- Iringole				
Adenanthera pavonina	2	2	0.006	0.52
Aporusa lindleyana	2	2	0.003	0.52
Artocarpus heterophyllus	2	2	0.003	0.52
Artocarpus hirsutus	320	86	1.694	39.01
Caryota urens	2	2	0.038	0.59
Cinnamomum malabatrum	24	14	0.039	4.23
Diospyros bourdillonii	516	94	1.425	51.28
Holigarna arnottiana	40	28	0.085	8.01
Hopea parviflora	6	4	2.089	5.60
Hopea ponga	468	92	6.102	58.12
Hydnocarpus pentandra	4	4	0.006	1.03
Lagerstroemia microcarpa	2	2	0.004	0.52
Litsea laevigata	6	6	0.020	1.57
Macaranga peltata	14	10	0.054	2.90
Mallotus philippensis	6	6	0.009	1.55
Mesua ferrea	2	2	0.003	0.52
Myristica malabarica	10	8	0.220	2.63
Olea dioica	2	2	0.004	0.52
Pajanelia longifolia	2	2	0.014	0.54
Polyalthia fragrans	46	34	1.869	13.36
Sterculia guttata	2	2	0.004	0.52
Syzygium cumini	2	2	0.003	0.52
Tabernaemontana heyneana	6	6	0.011	1.55
Theobroma cacao	2	2	0.003	0.52
Vateria indica	248	88	32.860	101.86
Vitex altissima	2	2	0.004	0.52
Xanthophyllum arnottianum	2	2	0.229	1.00
Plot Code No. 21-- Chalikuzhy				
Alseodaphne semecarpifolia	2	2	0.026	1.14
Antiaris toxicaria	2	2	0.803	3.14
Aporusa acuminata	36	16	0.134	13.39
Aporusa lindleyana	100	50	0.693	39.74
Atalantia racemosa	2	2	0.052	1.20
Bischofia javanica	16	12	0.628	8.94
Croton malabaricus	16	14	0.437	9.06
Dimocarpus longan	6	6	0.252	3.86

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).				
Plot Code No. 21 – Chalikuzhy (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Diospyros bourdillonii	2	2	0.122	1.39
Diospyros candolleana	2	2	0.081	1.28
Diospyros oocarpa	2	2	0.008	1.09
Diospyros paniculata	6	6	0.162	3.63
Dysoxylum malabaricum	14	14	5.351	21.31
Hydnocarpus pentandra	8	8	0.306	5.07
Ixora nigricans	14	12	0.458	8.05
Knema attenuata	68	44	6.784	46.44
Macaranga peltata	12	10	0.739	7.70
Myristica dactyloides	46	38	7.053	40.34
Neolamarckia cadamba	2	2	0.076	1.27
Persea macrantha	2	2	1.044	3.77
Polyalthia fragrans	44	32	7.163	38.31
Prunus ceylanica	6	6	0.126	3.53
Pterospermum reticulatum	4	4	0.477	3.37
Pterygota alata	2	2	0.519	2.41
Symplocos macrophylla sp. *rosea*	6	6	0.022	3.26
Syzygium sp.	12	12	4.121	17.07
Tabernaemontana heyneana	2	2	0.004	1.08
Toona ciliata	2	2	0.002	1.08
Unidentified 8(21)	4	4	0.908	4.49
Xanthophyllum arnottianum	2	2	0.032	1.15
Zanthoxylum rhetsa	4	4	0.119	2.45
Plot Code No. 22-- Chalikuzhy				
Alseodaphne semecarpifolia	2	2	0.014	0.79
Alstonia scholaris	8	8	0.694	4.39
Aporusa acuminata	6	6	0.014	2.33
Aporusa lindleyana	302	90	1.093	66.46
Artocarpus hirsutus	4	4	0.229	1.97
Bischofia javanica	2	2	0.676	2.05
Cinnamomum malabatrum	2	2	0.019	0.80
Croton malabaricus	6	4	0.144	2.09
Dimocarpus longan	12	12	0.283	5.14
Diospyros bourdillonii	26	20	1.425	11.23
Diospyros paniculata	6	6	0.311	2.89
Dysoxylum binectariferum	24	20	6.928	21.42
Flacourtia montana	4	4	1.211	3.84
Holigarna arnottiana	4	4	0.064	1.66
Hopea racophloea	2	2	0.349	1.43
Hydnocarpus pentandra	4	4	0.142	1.81
Ixora nigricans	8	4	0.098	2.28
Knema attenuata	108	66	7.749	45.98
Lagerstroemia microcarpa	4	4	1.031	3.50

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 22 – Chalikuzhy (cont'd).				
Litsea sp.	2	2	0.122	1.00
Meiogyne pannosa	6	4	0.119	2.04
Meiogyne ramarowii	18	18	0.039	6.98
Miliusa wightiana	2	2	0.361	1.45
Myristica malabarica	56	38	9.181	34.59
Orophea erythrocarpa	2	2	0.006	0.78
Polyalthia fragrans	24	24	3.013	14.94
Pterospermum diversifolium	10	10	2.321	8.25
Pterospermum reticulatum	4	4	1.212	3.84
Symplocos macrophylla sp. *rosea*	4	4	0.382	2.26
Symplocos racemosa	2	2	0.003	0.77
Syzygium densiflorum	8	8	10.731	23.50
Syzygium mundagam	2	2	1.105	2.87
Tetrameles nudiflora	4	4	0.582	2.64
Toona ciliata	2	2	0.110	0.98
Vitex altissima	2	2	0.466	1.65
Xanthophyllum arnottianum	28	20	0.304	9.38
Plot Code No. 24 -- Meenar				
Actinodaphne bourdillonii	30	28	3.490	20.96
Aglaia sp.1	4	4	0.718	3.31
Agrostistachys borneensis	2	2	0.002	1.03
Antidesma montanum	32	22	0.345	14.33
Bischofia javanica	8	8	0.067	4.24
Callicarpa tomentosa	16	12	0.582	8.15
Canthium dicoccum var *umbellatum*	28	22	7.466	25.71
Chionanthus malabaricus	8	8	0.315	4.67
Cinnamomum keralaense	2	2	0.477	1.86
Cinnamomum malabatrum	34	24	0.808	16.16
Diospyros sp.4	10	10	2.392	9.30
Drypetes elata	30	28	0.187	15.24
Dysoxylum malabaricum	6	6	0.021	3.13
Elaeocarpus tuberculatus	2	2	0.540	1.97
Ficus amplissima	6	6	19.758	37.32
Glochidion malabaricum	2	2	0.220	1.41
Glochidion sp.	4	4	0.153	2.33
Holigarna sp.1	8	8	1.427	6.60
Lagerstroemia microcarpa	2	2	0.190	1.36
Litsea laevigata	40	34	2.030	22.48
Litsea sp.4	4	4	0.011	2.08
Macaranga peltata	2	2	0.006	1.04
Memecylon talbotianum	14	12	0.164	6.95
Mesua ferrea	18	12	4.993	16.27
Murraya paniculata	4	4	0.015	2.09

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 24 – Meenar (cont'd).				
Myristica malabarica	10	10	0.705	6.38
Neolitsea cassia	2	2	0.038	1.10
Persea macrantha	16	14	1.296	9.94
Phoebe lanceolata	10	10	0.571	6.14
Syzygium mundagam	16	14	0.213	8.06
Syzygium sp.	6	6	4.964	11.69
Syzygium travancoricum	4	4	1.484	4.63
Unidentified 3(24)	2	2	0.534	1.96
Unidentified 4(24)	36	32	1.540	20.12
Plot Code No. 25-- Meenar				
Aglaia sp.1	6	2	1.330	11.35
Antidesma montanum	2	2	0.009	5.58
Artocarpus heterophyllus	2	2	1.495	8.95
Callicarpa tomentosa	2	2	0.180	5.96
Cinnamomum malabatrum	2	2	2.664	11.60
Cullenia exarillata	20	2	13.536	48.78
Dimocarpus longan	8	2	1.543	13.23
Diospyros sp.4	14	2	1.609	17.54
Dipterocarpus indicus	4	2	0.378	7.80
Drypetes elata	6	2	0.496	9.46
Heritiera papilio	4	2	5.221	18.80
Holigarna arnottiana	2	2	0.297	6.23
Litsea laevigata	6	2	1.144	10.93
Macaranga peltata	2	2	0.177	5.96
Memecylon heyneanum	4	2	1.307	9.91
Mesua ferrea	4	2	1.563	10.49
Myristica malabarica	2	2	0.240	6.10
Palaquium ellipticum	24	2	6.442	35.46
Phoebe lanceolata	4	2	0.409	7.87
Toona ciliata	16	2	0.274	15.90
Unidentified 69(25)	4	2	2.270	12.10
Unidentified 1(25)	2	2	0.279	6.19
Unidentified 13(25)	2	2	0.080	5.74
Unidentified 36(25)	2	2	1.111	8.08
Plot Code No. 26-- Meenar				
Actinodaphne bourdillonii	2	2	0.191	5.30
Antidesma montanum	2	2	0.066	4.85
Archidendron monadelphum	8	2	0.030	7.85
Artocarpus heterophyllus	2	2	0.012	4.66
Canthium dicoccum var *umbellatum*	2	2	0.446	6.23
Casearia ovata	8	2	1.352	12.63
Chionanthus malabaricus	2	2	0.393	6.04
Cinnamomum keralaense	2	2	0.268	5.58

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 26 – Meenar (cont'd).				
Cullenia exarillata	20	2	7.557	41.33
Dimocarpus longan	12	2	2.092	17.39
Diospyros sp.4	2	2	0.080	4.90
Euodia lunu-ankenda	2	2	0.062	4.84
Ficus amplissima	2	2	0.475	6.33
Glochidion sp.	2	2	0.024	4.70
Heritiera papilio	2	2	0.088	4.93
Holigarna sp.1	2	2	0.631	6.89
Isonandra montana	4	2	0.437	7.24
Litsea laevigata	4	2	0.492	7.43
Mesua ferrea	12	2	1.876	16.61
Myristica malabarica	4	2	0.293	6.71
Neolitsea cassia	6	2	0.893	9.93
Ochreinauclea missionis	2	2	0.196	5.32
Palaquium ellipticum	24	2	8.373	46.36
Syzygium laetum	2	2	0.048	4.79
Toona ciliata	52	2	0.731	33.30
Unidentified 1(26)	2	2	0.192	5.31
Unidentified 2(26)	4	2	0.180	6.31
Unidentified 3(26)	4	2	0.166	6.26
Plot Code No. 27-- Meenar				
Actinodaphne bourdillonii	14	14	0.090	12.73
Artocarpus heterophyllus	2	2	0.002	1.79
Bischofia javanica	2	2	0.077	1.99
Chionanthus malabaricus	4	4	0.067	3.75
Cullenia exarillata	30	28	12.244	58.98
Diospyros sp.4	2	2	0.265	2.50
Dipterocarpus indicus	6	6	0.207	5.91
Elaeocarpus munroii	2	2	0.004	1.79
Elaeocarpus serratus	32	28	0.452	27.88
Glochidion sp.	2	2	0.024	1.85
Heritiera papilio	2	2	0.171	2.25
Holigarna arnottiana	2	2	0.132	2.14
Holigarna sp.1	4	4	0.609	5.22
Isonandra montana	2	2	0.007	1.80
Litsea glutinosa	6	6	0.013	5.39
Macaranga peltata	4	4	0.005	3.58
Melia dubia	2	2	0.151	2.19
Mesua ferrea	50	42	7.974	62.42
Palaquium ellipticum	48	38	11.480	69.19
Persea macrantha	12	10	0.356	10.72
Pterospermum diversifolium	2	2	0.002	1.79
Pterospermum reticulatum	2	2	0.680	3.63

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).				
Plot Code No. 27 – Meenar (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Syzygium sp.	4	4	1.447	7.49
Unidentified (27)	2	2	0.458	3.02
Plot Code No. 32-- Kulirkadavu				
Antiaris toxicaria	2	2	0.004	0.49
Antidesma montanum	8	8	0.234	2.39
Aporusa acuminata	44	36	3.614	16.58
Aporusa lindleyana	24	20	0.097	5.40
Artocarpus hirsutus	10	10	1.788	5.93
Baccaurea courtallensis	50	38	0.562	11.44
Canarium strictum	4	4	0.088	1.14
Canthium neilgherrense var *chartacea*	6	6	0.015	1.47
Chionanthus leprocarpa var *courtallensis*	6	6	0.023	1.49
Croton malabaricus	20	16	0.410	5.05
Dimocarpus longan	56	40	1.851	14.85
Diospyros bourdillonii	32	20	0.999	7.97
Diospyros buxifolia	6	6	1.893	5.18
Diospyros paniculata	8	8	0.124	2.17
Diospyros sp.4	30	24	0.389	7.13
Dipterocarpus indicus	4	4	0.099	1.16
Drypetes elata	8	8	0.165	2.25
Drypetes oblongifolia	2	2	0.007	0.50
Dysoxylum malabaricum	4	4	1.930	4.77
Elaeocarpus serratus	2	2	0.008	0.50
Ficus sp.	2	2	0.939	2.33
Flacourtia montana	16	14	0.279	4.12
Garcinia gummi-gutta	4	4	0.084	1.13
Garcinia sp.1	6	6	0.952	3.32
Holigarna arnottiana	2	2	0.005	0.49
Hopea parviflora	20	16	7.295	18.63
Hydnocarpus pentandra	2	2	0.008	0.50
Isonandra lanceolata	10	8	2.034	6.13
Kingiodendron pinnatum	48	36	9.755	29.08
Knema attenuata	20	20	1.167	7.12
Leptonychia caudata	2	2	0.009	0.50
Litsea sp.	4	4	0.131	1.22
Macaranga peltata	20	14	1.058	6.05
Mallotus beddomei	18	14	0.111	3.98
Mallotus philippensis	6	4	0.095	1.35
Mangifera indica	6	6	0.096	1.63
Memecylon umbellatum	14	14	0.196	3.76
Myristica malabarica	24	14	1.157	6.64
Nothopegia travancorica	32	26	0.171	7.19
Polyalthia fragrans	10	10	0.085	2.57

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 32 – Kulirkadavu (cont'd).				
Psychotria macrocarpa	4	4	0.040	1.04
Pterospermum diversifolium	2	2	0.018	0.52
Pterospermum reticulatum	2	2	2.470	5.35
Pterospermum rubiginosum	8	8	0.164	2.25
Pterygota alata	2	2	0.247	0.97
Sterculia guttata	2	2	0.131	0.74
Symplocos cochinchinensis sp. *laurina*	2	2	0.054	0.59
Syzygium gardneri	6	6	1.054	3.52
Syzygium laetum	2	2	0.033	0.55
Syzygium munronii	6	6	0.082	1.61
Syzygium sp.	2	2	1.021	2.49
Terminalia bellirica	8	8	0.109	2.14
Tricalysia apiocarpa	12	10	0.472	3.53
Trichilia connaroides	56	16	0.204	8.20
Unidentified 2(32)	4	4	0.199	1.35
Unidentified 4(32)	8	8	0.113	2.15
Unidentified C4	142	52	0.624	22.62
Vateria indica	2	2	0.987	2.43
Vepris bilocularis	10	10	0.230	2.86
Vitex altissima	4	4	0.021	1.00
Walsura trifolia	6	6	0.113	1.67
Xanthophyllum arnottianum	132	64	2.396	26.83
Plot Code No. 50-- Adakkathode				
Actinodaphne anguistifolia	2	2	0.002	0.55
Aglaia lawii	86	50	3.002	23.39
Aglaia sp.1	24	18	0.915	7.32
Antiaris toxicaria	2	2	4.954	10.08
Artocarpus hirsutus	6	6	0.501	2.59
Baccaurea courtallensis	16	14	0.226	4.46
Calophyllum polyanthum	2	2	0.037	0.62
Cinnamomum malabatrum	18	16	4.314	12.88
Croton malabaricus	46	20	0.590	9.48
Dimocarpus longan	28	20	1.795	9.78
Diospyros bourdillonii	36	28	1.797	11.96
Diospyros oocarpa	32	30	2.278	12.76
Diospyros paniculata	4	4	0.005	1.10
Drypetes elata	68	50	9.179	33.27
Elaeocarpus serratus	4	4	0.217	1.50
Ficus sp.	2	2	0.994	2.46
Garcinia morella	8	8	0.050	2.27
Garcinia talbotii	22	20	0.361	6.35
Holigarna grahamii	2	2	0.249	1.02
Hopea parviflora	14	8	0.035	2.91

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).

Plot Code No. 50 – Adakkathode (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Humboldtia brunonis	2	2	0.002	0.55
Hydnocarpus pentandra	4	4	0.019	1.12
Ixora nigricans	4	4	0.005	1.10
Kingiodendron pinnatum	6	6	0.278	2.17
Knema attenuata	114	56	2.519	26.55
Macaranga peltata	8	6	0.468	2.75
Mallotus philippensis	2	2	0.025	0.59
Mangifera indica	2	2	0.418	1.35
Meiogyne pannosa	20	12	0.555	5.22
Memecylon umbellatum	4	2	0.038	0.84
Myristica malabarica	32	20	1.496	9.66
Nothopegia sp.	16	14	0.205	4.42
Otonephelium stipulaceum	30	22	0.259	7.37
Palaquium ellipticum	2	2	0.154	0.84
Polyalthia fragrans	6	6	0.138	1.89
Pterygota alata	8	8	0.067	2.30
Symplocos racemosa var *racemosa*	4	4	0.381	1.82
Syzygium gardneri	48	32	8.398	26.66
Syzygium sp.	2	2	0.088	0.71
Syzygium zeylanicum	24	22	0.083	6.36
Unidentified I(48)	2	2	0.018	0.58
Vateria indica	24	20	0.667	7.16
Vateria sp.	8	8	1.554	5.17
Xanthophyllum arnottianum	100	62	2.589	26.08

Semi-evergreen Forests

Plot Code No. 6 – Pandarampara

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Alstonia scholaris	4	4	0.010	2.16
Aporusa lindleyana	22	14	0.155	9.79
Baccaurea courtallensis	34	24	0.546	16.73
Croton malabaricus	22	20	1.578	15.77
Dimocarpus longan	4	4	0.269	2.92
Diospyros bourdillonii	8	6	0.070	3.87
Grewia tiliifolia	6	6	0.352	4.23
Holigarna arnottiana	24	14	1.674	14.74
Holigarna grahamii	2	2	0.466	2.44
Hydnocarpus pentandra	4	4	0.041	2.25
Ixora nigricans	16	16	0.484	9.95
Lagerstroemia microcarpa	2	2	1.785	6.33
Lannea coromandelica	8	8	0.307	5.16

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 6 – Pandarampara (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Lepisanthes tetraphylla	6	6	0.008	3.22
Macaranga peltata	8	6	0.013	3.70
Mallotus philippensis	14	12	0.777	9.15
Miliusa tomentosa	2	2	0.006	1.08
Myristica malabarica	68	48	7.422	52.15
Olea dioica	8	8	0.241	4.97
Polyalthia fragrans	32	22	2.248	20.69
Pterospermum reticulatum	10	6	1.406	8.28
Sapindus trifoliata	6	6	0.017	3.24
Spondias pinnata	2	2	0.177	1.59
Sterculia guttata	20	20	2.409	17.75
Strychnos nux-vomica	2	2	0.840	3.54
Terminalia paniculata	2	2	1.160	4.49
Tetrameles nudiflora	2	2	0.003	1.07
Unidentified 2 (6)	10	8	0.193	5.30
Unidentified 1(6)	2	2	0.002	1.07
Unidentified 3(6)	6	6	0.058	3.36
Unidentified C1	2	2	0.002	1.07
Vitex altissima	4	4	4.097	14.22
Wrightia tinctoria	4	4	0.028	2.21
Xanthophyllum arnottianum	44	30	2.429	26.43
Xylia xylocarpa	16	12	2.620	15.06
Plot Code No.7-- Pandarampara				
Albizia odoratissima	2	2	0.836	3.46
Alstonia scholaris	4	4	0.168	2.27
Antiaris toxicaria	4	4	3.193	11.62
Aporusa lindleyana	32	24	1.348	16.06
Artocarpus hirsutus	2	2	1.461	5.39
Baccaurea courtallensis	10	8	0.027	3.93
Croton malabaricus	16	10	0.147	5.87
Dimocarpus longan	4	4	0.037	1.87
Diospyros bourdillonii	34	24	3.583	23.32
Diospyros sp.4	10	8	0.320	4.84
Gmelina arborea	2	2	0.004	0.89
Grewia tiliifolia	2	2	0.453	2.28
Holigarna arnottiana	2	2	0.018	0.93
Hydnocarpus pentandra	8	8	0.564	5.25
Ixora nigricans	16	16	0.111	7.36
Lepisanthes tetraphylla	6	6	0.047	2.78
Mallotus philippensis	10	6	0.054	3.49
Miliusa tomentosa	6	6	0.022	2.70

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 7 – Pandarampara (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Myristica malabarica	152	72	8.682	72.19
Nothopegia sp.	20	18	1.024	11.40
Polyalthia fragrans	62	34	1.567	24.57
Pterospermum diversifolium	2	2	0.956	3.83
Pterospermum reticulatum	32	28	4.017	25.38
Schleichera oleosa	2	2	0.074	1.11
Sterculia guttata	4	4	0.827	4.31
Unidentified 4(7)	8	6	0.016	3.02
Unidentified C 1	2	2	0.073	1.10
Unidentified C 2	2	2	0.085	1.14
Unidentified C3	4	4	0.011	1.79
Unidentified 1(7)	2	2	0.136	1.30
Vitex altissima	4	4	0.605	3.62
Xanthophyllum arnottianum	114	58	1.898	40.94
Plot Code No. 23-- Manakkayam				
Aglaia sp.1	4	4	0.209	2.88
Alseodaphne semecarpifolia	4	4	0.022	2.31
Alstonia scholaris	6	4	0.021	2.81
Antiaris toxicaria	16	14	0.087	8.62
Aporusa lindleyana	26	24	1.673	19.03
Artocarpus hirsutus	10	10	1.330	9.64
Baccaurea courtallensis	2	2	0.003	1.13
Bombax ceiba	10	10	4.586	19.54
Caryota urens	4	4	0.042	2.37
Dillenia pentagyna	2	2	0.164	1.62
Dimocarpus longan	4	4	0.011	2.27
Diospyros bourdillonii	46	30	1.425	25.21
Diospyros candolleana	2	2	0.015	1.17
Dysoxylum malabaricum	6	6	0.149	3.81
Flacourtia montana	2	2	0.013	1.16
Hopea parviflora	2	2	0.396	2.32
Hydnocarpus pentandra	14	14	0.429	9.14
Ixora nigricans	10	10	0.231	6.30
Knema attenuata	60	34	3.309	35.73
Lagerstroemia microcarpa	12	10	5.796	23.72
Lagerstroemia reginae	18	16	2.670	17.58
Macaranga peltata	4	4	0.025	2.32
Mallotus philippensis	12	12	0.268	7.53
Miliusa tomentosa	4	4	0.008	2.26
Myristica malabarica	2	2	0.002	1.13
Neolamarckia cadamba	8	8	0.277	5.32

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 23—Manakkayam (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Persea macrantha	2	2	0.205	1.74
Polyalthia fragrans	4	4	0.032	2.34
Prunus ceylanica	6	6	0.328	4.36
Schleichera oleosa	10	8	1.501	9.55
Spondias *pinnata*	2	2	0.011	1.15
Sterculia guttata	4	4	0.350	3.30
*Stereo*spermum sp.	2	2	0.118	1.48
Tabernaemontana heyneana	2	2	0.006	1.14
Terminalia paniculata	6	6	3.489	13.96
Tetrameles nudiflora	2	2	1.160	4.64
Trewia polycarpa	2	2	0.138	1.54
Trichilia connaroides	2	2	0.004	1.13
Unidentified C5	4	4	1.388	6.46
Xanthophyllum arnottianum	44	38	0.990	25.82
Xylia xylocarpa	10	6	0.027	4.46
Plot Code No. 30-- Achencoil				
Aglaia sp.1	10	10	1.568	7.45
Alstonia scholaris	2	2	0.008	0.69
Antiaris toxicaria	10	8	0.056	3.13
Artocarpus hirsutus	18	16	3.177	13.96
Atalantia racemosa	20	18	0.462	7.55
Baccaurea courtallensis	34	26	0.543	11.35
Bombax ceiba	4	4	0.189	1.84
Canarium strictum	12	12	0.131	4.37
Cleidion spiciflorum	14	12	0.684	6.11
Croton malabaricus	24	24	0.331	8.92
Dimocarpus longan	44	38	2.880	21.18
Diospyros bourdillonii	10	10	1.137	6.32
Diospyros buxifolia	2	2	1.035	3.37
Diospyros foliosa	2	2	0.239	1.30
Diospyros oocarpa	2	2	0.361	1.61
Diospyros paniculata	4	4	0.556	2.79
Diospyros sp.4	26	24	3.462	17.39
Ficus exasperata	4	4	0.109	1.63
Ficus nervosa	4	4	0.328	2.20
Ficus sp.	2	2	0.753	2.64
Flacourtia montana	2	2	0.004	0.68
Garcinia gummi-gutta	2	2	0.005	0.68
Garcinia talbotii	2	2	0.002	0.68
Gmelina arborea	2	2	0.222	1.25
Grewia tiliifolia	4	4	0.241	1.97

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 30—Achencoil (cont'd).				
Holigarna grahamii	4	4	0.780	3.38
Holigarna sp.1	4	4	0.528	2.72
Hopea parviflora	14	12	0.425	5.44
Hydnocarpus pentandra	38	30	0.869	13.54
Ixora nigricans	2	2	0.066	0.84
Kingiodendron pinnatum	28	22	6.404	25.01
Knema attenuata	22	18	0.973	9.18
Lagerstroemia microcarpa	4	2	1.408	4.65
Lepisanthes tetraphylla	10	10	0.599	4.92
Litsea laevigata	8	8	0.205	3.22
Macaranga peltata	4	4	0.128	1.68
Mallotus beddomei	10	10	0.109	3.64
Mallotus philippensis	22	14	0.251	6.56
Mangifera indica	12	10	0.517	5.01
Meiogyne ramarowii	6	6	0.073	2.21
Melia dubia	4	4	0.053	1.48
Mimusops elengi	2	2	0.005	0.68
Nothopegia travancorica	2	2	0.004	0.68
Polyalthia fragrans	20	14	1.094	8.46
Prunus ceylanica	8	2	0.017	1.62
Pterospermum diversifolium	4	2	0.007	0.99
Pterospermum rubiginosum	4	4	0.624	2.97
Sapindus trifoliata	4	4	0.125	1.67
Schleichera oleosa	4	4	0.018	1.39
Spondias pinnata	4	4	0.249	1.99
Sterculia guttata	4	4	0.300	2.13
Syzygium hemisphericum	8	8	0.172	3.13
Tetrameles nudiflora	8	8	0.088	2.91
Toona ciliata	2	2	0.224	1.26
Unidentified 1(30)	4	4	1.784	6.00
Unidentified 2(30)	16	14	0.562	6.47
Unidentified C4	80	36	0.204	19.26
Vitex altissima	8	8	0.525	4.06
Xanthophyllum arnottianum	26	22	0.402	9.04
Zanthoxylum rhetsa	2	2	0.033	0.76
Plot Code No. 31—Kottavasal , Achencoil.				
Actinodaphne lawsonii	2	2	0.051	0.79
Alstonia scholaris	2	2	0.013	0.64
Aporusa lindleyana	2	2	0.022	0.67
Atalantia racemosa	186	72	1.431	39.18
Atalantia wightii	4	4	0.050	1.37

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 31—Kottavasal, Achencoil (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Baccaurea courtallensis	6	6	0.010	1.80
Canthium sp.	10	10	0.081	3.26
Careya arborea	6	4	0.334	2.74
Chionanthus malabaricus	230	76	8.266	72.39
Cinnamomum malabatrum	2	2	0.027	0.70
Dalbergia latifolia	2	2	0.011	0.63
Dillenia pentagyna	6	4	0.327	2.71
Dimocarpus longan	46	38	3.115	24.63
Dimorphocalyx beddomei	10	10	0.016	3.00
Diospyros bourdillonii	6	6	0.007	1.79
Diospyros oocarpa	8	8	1.052	6.61
Diospyros sp.1	12	12	0.151	4.13
Ficus exasperata	8	6	0.149	2.58
Ficus sp.	2	2	1.219	5.53
Glochidion sp.	90	52	1.556	25.64
Heritiera papilio	10	8	0.215	3.43
Hopea parviflora	2	2	0.192	1.36
Hydnocarpus pentandra	22	16	0.117	5.81
Ixora nigricans	2	2	0.039	0.74
Lagerstroemia microcarpa	10	10	1.274	8.10
Mallotus philippensis	22	18	0.861	9.20
Memecylon umbellatum	4	4	0.006	1.20
Nothapodytes wightiana	16	12	0.077	4.26
Phyllanthus emblica	6	4	0.222	2.29
Psychotria macrocarpa	22	14	0.070	5.25
Pterospermum diversifolium	8	6	0.050	2.18
Sapindus trifoliata	10	10	0.050	3.13
Stereospermum sp.	6	6	0.451	3.59
Syzygium hemisphericum	6	6	0.383	3.31
Trewia polycarpa	10	10	0.123	3.43
Trichilia connaroides	34	20	0.059	7.61
Unidentified 1(31)	8	8	0.248	3.35
Unidentified 2(31)	8	8	0.802	5.59
Unidentified 3(31)	18	16	0.622	7.42
Vitex altissima	2	2	0.003	0.60
Xanthophyllum arnottianum	62	38	0.905	17.39
Plot Code No. 34 -- Kottavasal (Aryankavu)				
Alstonia scholaris	4	4	0.118	1.69
Archidendron monadelphum	2	2	0.171	1.17
Atalantia racemosa	96	46	0.614	23.98
Bombax ceiba	22	18	6.023	24.33

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 34—Kottavasal, Aryankavu. (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Bridelia airy-shawii	2	2	0.198	1.25
Canthium neilgherrense var *chartacea*	126	68	1.772	35.85
Canthium travancoricum	30	16	0.182	7.79
Cassia fistula	2	2	0.009	0.70
Chionanthus malabaricus	18	16	0.117	5.98
Cinnamomum keralaense	6	6	0.130	2.39
Dalbergia latifolia	4	2	0.726	3.08
Dillenia pentagyna	4	4	0.294	2.21
Dimocarpus longan	54	46	5.211	31.86
Diospyros foliosa	12	12	0.207	4.63
Ficus nervosa	4	4	0.855	3.86
Ficus sp.	4	4	1.207	4.90
Flacourtia montana	34	26	0.947	12.59
Gomphandra tetrandra	36	26	0.374	11.17
Holigarna arnottiana	2	2	0.949	3.47
Holoptelea integrifolia	6	6	1.243	5.67
Hopea parviflora	2	2	0.081	0.91
Hunteria zeylanica	10	10	0.150	3.79
Kingiodendron pinnatum	14	12	0.112	4.62
Lagerstroemia microcarpa	12	12	2.506	11.41
Litsea laevigata	2	2	0.004	0.68
Mallotus intermedius	4	4	0.275	2.15
Mallotus philippensis	14	6	0.531	4.66
Memecylon gracile	4	4	0.079	1.57
Miliusa tomentosa	2	2	0.081	0.91
Murraya paniculata	4	4	0.179	1.87
Myristica malabarica	2	2	0.022	0.73
Nothopegia travancorica	6	4	0.013	1.65
Olea dioica	6	6	0.186	2.56
Pavetta sp.	6	6	0.106	2.32
Pterospermum reticulatum	4	4	0.265	2.12
Sapindus trifoliata	6	4	0.074	1.83
Schleichera oleosa	2	2	0.456	2.01
Scolopia crenata	2	2	0.213	1.30
Spondias pinnata	10	8	1.238	6.60
Sterculia guttata	6	6	0.823	4.44
Stereospermum sp.	22	18	2.954	15.28
Tabernaemontana heyneana	2	2	0.061	0.85
Terminalia paniculata	6	6	0.913	4.70
Trichilia connaroides	64	30	0.260	15.42
Unidentified 16(34)	6	6	0.354	3.05

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 34—Kottavasal, Aryankavu.(cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Unidentified 2 (36)	2	2	0.042	0.80
Unidentified 3 (31)	6	4	0.194	2.18
Vitex altissima	6	6	0.215	2.65
Wrightia tinctoria	2	2	0.002	0.68
Xanthophyllum arnottianum	38	10	0.190	7.69
Plo Code No. 35—Palaruvi				
Actinodaphne bourdillonii	2	2	0.006	0.49
Actinodaphne sp.	2	2	0.077	0.66
Alstonia scholaris	6	6	1.093	4.11
Antiaris toxicaria	18	14	0.077	3.88
Antidesma montanum	38	24	0.125	7.34
Artocarpus hirsutus	2	2	0.154	0.85
Atalantia racemosa	12	12	0.227	3.39
Baccaurea courtallensis	8	8	0.049	2.01
Bischofia javanica	2	2	0.005	0.48
Bombax ceiba	2	2	5.806	14.80
Caryota urens	2	2	0.183	0.92
Celtis philippensis	74	46	1.131	16.38
Chionanthus leprocarpa var *courtallensis*	6	6	0.073	1.59
Chionanthus malabaricus	2	2	0.023	0.53
Croton malabaricus	4	4	0.011	0.97
Dimocarpus longan	28	24	1.459	9.65
Diospyros bourdillonii	20	16	0.527	5.46
Diospyros candolleana	4	4	0.083	1.15
Diospyros crumenata	16	14	0.873	5.65
Diospyros foliosa	16	16	0.401	4.76
Diospyros oocarpa	2	2	0.013	0.50
Diospyros paniculata	18	14	0.197	4.18
Diospyros sp.2	32	20	1.169	8.78
Diospyros sp.4	28	24	2.016	11.02
Drypetes oblongifolia	8	8	0.254	2.51
Dysoxylum malabaricum	10	8	0.048	2.20
Ficus exasperata	6	6	0.022	1.47
Ficus nervosa	18	18	0.211	4.76
Flacourtia montana	4	4	0.176	1.38
Grewia tiliifolia	10	8	0.263	2.73
Holigarna grahamii	4	4	0.025	1.00
Hopea parviflora	4	4	0.278	1.63
Hopea racophloea	72	36	1.979	16.90
Hydnocarpus pentandra	4	4	0.335	1.77
Isonandra montana	10	10	0.034	2.44

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 35-- Palaruvi (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Ixora nigricans	18	14	0.514	4.96
Kingiodendron pinnatum	24	22	3.102	13.04
Knema attenuata	4	4	0.032	1.02
Lepisanthes tetraphylla	8	8	0.120	2.18
Litsea laevigata	8	8	0.050	2.01
Macaranga peltata	84	46	1.834	19.10
Mallotus beddomei	14	12	0.121	3.32
Mallotus ferrugineus	8	4	0.129	1.65
Mallotus intermedius	32	26	0.126	7.03
Meiogyne ramarowii	4	4	0.112	1.22
Melia dubia	4	4	0.024	1.00
Mesua ferrea	12	10	7.476	21.01
Murraya paniculata	2	2	0.051	0.60
Myristica malabarica	16	12	0.320	4.01
Nothopegia sp.	2	2	0.002	0.48
Nothopegia travancorica	2	2	0.011	0.50
Orophea erythrocarpa	4	4	0.008	0.96
Pajanelia longifolia	6	6	0.031	1.49
Poeciloneuron indicum	4	4	1.411	4.43
Polyalthia fragrans	10	8	0.709	3.83
Prunus ceylanica	2	2	0.002	0.48
Psychotria sp.	2	2	0.003	0.48
Sapindus trifoliata	2	2	0.004	0.48
Spondias pinnata	2	2	0.791	2.42
Stereospermum sp.	4	4	0.022	1.00
Symplocos macrophylla sp. *rosea*	10	8	0.014	2.11
Syzygium densiflorum	2	2	0.003	0.48
Syzygium hemisphericum	14	12	0.159	3.42
Tabernaemontana heyneana	2	2	0.011	0.50
Toona ciliata	10	8	0.039	2.18
Trema orientalis	4	4	0.102	1.19
Unidentified C 1	118	48	0.914	20.44
Unidentified 1(35)	58	28	0.326	10.35
Unidentified 2(35)	4	2	0.045	0.78
Vateria indica	18	16	2.466	10.05
Walsura trifolia	4	4	0.027	1.01
Xanthophyllum arnottianum	2	2	0.002	0.48
Plot Code No. 37-- Kalthuruthy				
Actinodaphne bourdillonii	2	2	0.003	0.64
Aglaia sp.1	2	2	2.482	8.65
Albizia odoratissima	2	2	0.004	0.65

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Plot Code No. 37-- Kalthuruthy (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Alseodaphne semecarpifolia	2	2	0.003	0.64
Alstonia scholaris	2	2	0.013	0.67
Antiaris toxicaria	8	8	0.119	2.91
Aporusa lindleyana	2	2	0.005	0.65
Artocarpus hirsutus	34	24	0.206	9.66
Atalantia racemosa	16	16	0.466	6.56
Baccaurea courtallensis	46	38	0.662	15.27
Bischofia javanica	8	6	0.203	2.83
Bombax ceiba	8	8	0.677	4.71
Canarium strictum	10	10	0.087	3.44
Cinnamomum malabatrum	2	2	0.028	0.72
Cleidion spiciflorum	128	58	3.478	39.46
Croton malabaricus	2	2	0.049	0.79
Dimocarpus longan	8	8	0.016	2.58
Diospyros bourdillonii	4	4	0.348	2.39
Diospyros paniculata	4	4	0.009	1.29
Drypetes elata	2	2	0.200	1.28
Dysoxylum malabaricum	10	10	0.244	3.94
Erythrina indica	2	2	0.005	0.65
Ficus exasperata	10	10	0.125	3.56
Ficus nervosa	16	14	0.234	5.46
Ficus sp.	2	2	3.396	11.60
Flacourtia montana	2	2	0.008	0.66
Glochidion sp.	42	36	1.106	15.79
Holigarna grahamii	38	28	1.290	14.42
Hydnocarpus pentandra	8	8	0.196	3.16
Ixora nigricans	2	2	0.002	0.64
Kingiodendron pinnatum	6	6	0.010	1.93
Knema attenuata	8	8	0.719	4.85
Lagerstroemia microcarpa	2	2	0.005	0.65
Lepisanthes sp.	8	8	0.418	3.88
Litsea insignis	22	20	0.125	7.00
Litsea laevigata	2	2	0.048	0.79
Macaranga peltata	38	30	1.018	13.89
Mallotus beddomei	14	12	0.564	5.90
Mallotus ferrugineus	2	2	0.004	0.64
Mallotus philippensis	12	12	0.029	3.88
Mangifera indica	2	2	0.011	0.67
Melia dubia	2	2	0.005	0.65
Memecylon umbellatum	2	2	0.002	0.64
Myristica dactyloides	12	12	2.923	13.23

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 37-- Kalthuruthy (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Myristica malabarica	4	4	1.346	5.61
Ochreinauclea missionis	8	8	1.322	6.80
Persea macrantha	8	8	0.056	2.71
Polyalthia fragrans	10	8	2.559	11.07
Pterospermum reticulatum	2	2	0.008	0.66
Pterospermum rubiginosum	2	2	0.002	0.64
Pterygota alata	4	4	0.150	1.75
Rinorea bengalensis	18	14	0.045	5.13
Sapindus trifoliata	4	4	0.008	1.29
Schleichera oleosa	2	2	0.004	0.64
Spondias pinnata	16	16	3.006	14.76
Sterculia guttata	4	4	0.024	1.34
Symplocos cochinchinensis sp. *laurina*	2	2	0.006	0.65
Symplocos macrophylla sp. *rosea*	2	2	0.002	0.64
Tabernaemontana heyneana	6	6	0.029	1.99
Toona ciliata	2	2	0.012	0.67
Trewia polycarpa	12	10	0.035	3.56
Unidentified C 1	10	6	0.197	3.10
Unidentified 1(37)	4	4	0.194	1.89
Unidentified C3	2	2	0.008	0.66
Vitex altissima	8	8	0.119	2.91
Xanthophyllum arnottianum	20	20	0.300	7.28
Plot Code No. 41-- Vellanipacha				
Actinodaphne hoockeriana	12	8	0.455	3.56
Aglaia lawii	130	60	1.676	24.48
Aglaia sp.2	144	72	2.467	29.83
Antidesma montanum	6	6	0.224	2.03
Aphanamixis polystachya	6	6	0.015	1.34
Atalantia wightii	26	20	0.257	5.68
Bombax ceiba	2	2	0.151	0.93
Caryota urens	4	4	0.364	2.05
Casearia rubescens	12	10	0.033	2.44
Celtis philippensis	8	8	2.208	8.95
Croton malabaricus	2	2	0.002	0.44
Cynometra travancorica	90	38	0.633	14.77
Dimocarpus longan	2	2	0.002	0.44
Dimorphocalyx beddomei	46	28	0.591	9.54
Diospyros bourdillonii	30	28	2.331	13.85
Diospyros buxifolia	8	8	0.885	4.62
Diospyros candolleana	4	4	0.241	1.65
Diospyros oocarpa	2	2	0.003	0.44

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Plot Code No. 41-- Vellanipacha (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Diospyros paniculata	100	56	2.066	22.65
Drypetes elata	2	2	0.110	0.79
Dysoxylum binectariferum	16	12	0.310	3.95
Elaeocarpus glandulosus	2	2	0.498	2.06
Erythroxylum moonii	2	2	0.008	0.46
Euonymus indicus	12	12	0.015	2.64
Garcinia talbotii	2	2	0.105	0.77
Grewia tiliifolia	2	2	0.035	0.55
Hopea parviflora	2	2	0.184	1.03
Hunteria zeylanica	68	44	1.235	15.62
Ixora nigricans	2	2	0.002	0.44
Kingiodendron pinnatum	22	16	0.057	4.16
Lagerstroemia microcarpa	4	4	0.294	1.83
Lepisanthes tetraphylla	10	10	0.052	2.33
Litsea laevigata	12	10	0.045	2.48
Litsea nigrescens	6	6	0.237	2.07
Macaranga peltata	2	2	0.531	2.17
Mallotus beddomei	16	8	0.025	2.50
Meiogyne pannosa	56	40	0.172	10.58
Meiogyne ramarowii	2	2	0.005	0.45
Memecylon umbellatum	40	28	0.182	7.68
Miliusa tomentosa	6	4	0.014	1.08
Myristica malabarica	6	6	0.616	3.31
Nothopegia sp.	24	14	0.181	4.48
Olea dioica	16	10	0.084	2.95
Persea macrantha	10	8	0.212	2.60
Polyalthia fragrans	4	4	0.115	1.24
Pterospermum reticulatum	30	26	1.628	11.29
Randia regulosa	6	6	0.053	1.47
Spondias pinnata	32	28	2.201	13.60
Sterculia guttata	2	2	0.279	1.35
Strychnos nux-vomica	2	2	1.408	5.04
Syzygium laetum	2	2	0.002	0.44
Syzygium sp.	8	6	1.837	7.48
Tetrameles nudiflora	4	4	0.732	3.26
Unidentified 1 (41)	6	6	0.009	1.32
Unidentified 169(41)	2	2	0.136	0.88
Unidentified 2(41)	12	8	0.717	4.42
Unidentified 3(41)	28	24	0.103	5.87
Unidentified 562 (41)	10	4	0.317	2.42
Vepris bilocularis	6	6	0.164	1.83

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 41-- Vellanipacha (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Vitex altissima	16	12	0.920	5.95
Walsura trifolia	4	4	0.005	0.88
Xanthophyllum arnottianum	2	2	0.010	0.46
Zanthoxylum rhetsa	8	8	0.121	2.12
Plot Code No. 44-- Neriyamangalam				
Actinodaphne lawsonii	2	2	0.136	1.18
Alstonia scholaris	2	2	0.020	0.84
Antiaris toxicaria	2	2	0.003	0.79
Aporusa lindleyana	2	2	0.002	0.79
Artocarpus hirsutus	36	28	2.337	19.25
Baccaurea courtallensis	36	34	0.336	14.72
Cinnamomum malabatrum	2	2	0.010	0.82
Croton malabaricus	8	8	0.198	3.73
Dimocarpus longan	8	8	0.236	3.84
Dimorphocalyx beddomei	2	2	0.003	0.80
Diospyros sp.1	14	12	0.679	7.06
Diospyros sp.4	2	2	0.593	2.51
Ficus exasperata	6	6	0.007	2.38
Garcinia sp.2	8	8	0.249	3.88
Haldina cordifolia	2	2	0.043	0.91
Harpullia arborea	18	12	0.908	8.43
Holigarna arnottiana	58	36	0.176	18.59
Hopea parviflora	2	2	0.574	2.46
Hydnocarpus pentandra	14	12	0.581	6.77
Knema attenuata	42	32	4.287	26.86
Lagerstroemia microcarpa	2	2	0.102	1.09
Macaranga peltata	20	18	3.512	17.67
Mallotus ferrugineus	4	4	0.385	2.70
Mangifera indica	4	4	0.058	1.74
Myristica malabarica	14	12	0.364	6.14
Olea dioica	2	2	0.002	0.79
Otonephelium stipulaceum	6	6	0.400	3.53
Persea macrantha	2	2	0.004	0.80
Polyalthia fragrans	30	26	0.850	13.42
Pterygota alata	28	28	6.291	29.35
Stereospermum sp.	2	2	0.117	1.13
Symplocos macrophylla sp. *rosea*	18	16	0.562	8.29
Tetrameles nudiflora	2	2	1.589	5.41
Unidentified 2(44)	28	20	1.946	14.96
Unidentified 3(44)	2	2	0.273	1.58
Unidentified 4(44)	4	4	1.263	5.25

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 44-- Neriyamangalam (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Unidentified 5(44)	2	2	0.176	1.30
Vateria indica	24	22	2.342	15.84
Xanthophyllum arnottianum	90	62	2.199	35.78
Zanthoxylum rhetsa	14	12	0.524	6.61
Plot Code No. 46-- Vazhikadavu				
Actinodaphne anguistifolia	8	8	0.286	2.28
Actinodaphne bourdillonii	8	8	0.472	2.71
Aglaia lawii	6	4	0.487	2.07
Aglaia sp.1	18	18	0.508	4.83
Alstonia scholaris	2	2	0.019	0.45
Artocarpus gomezianus	2	2	0.043	0.51
Artocarpus hirsutus	10	10	1.532	5.52
Artocarpus hirsutus	4	4	0.365	1.65
Baccaurea courtallensis	44	34	0.257	8.28
Bischofia javanica	6	6	1.817	5.35
Calophyllum polyanthum	20	14	2.581	9.17
Canthium sp.	2	2	0.017	0.45
Cassia fistula	2	2	0.098	0.63
Cinnamomum malabatrum	46	30	1.626	11.02
Croton malabaricus	6	6	0.307	1.92
Cullenia exarillata	4	4	0.146	1.15
Cyathocalyx zeylanica	2	2	0.002	0.41
Diospyros assimilis	2	2	0.011	0.43
Diospyros bourdillonii	10	10	0.020	2.09
Diospyros oocarpa	4	4	0.210	1.29
Diospyros paniculata	2	2	0.036	0.49
Diospyros sp.3	8	8	0.111	1.89
Drypetes elata	6	6	0.012	1.25
Drypetes oblongifolia	6	6	0.216	1.72
Fahrenheitia zeylanica	44	30	1.781	11.22
Fahrenheitia zeylanica	32	14	0.729	5.87
Ficus beddomei	2	2	0.559	1.68
Ficus drupacea var*pubescens*	2	2	0.204	0.87
Flacourtia montana	2	2	0.003	0.42
Garcinia morella	6	6	0.075	1.40
Holigarna arnottiana	12	12	1.696	6.30
Holigarna grahamii	2	2	0.252	0.98
Hopea racophloea	174	74	4.266	32.32
Hydnocarpus pentandra	16	14	0.539	4.23
Kingiodendron pinnatum	46	30	0.963	9.52
Kingiodendron pinnatum	4	2	0.007	0.58

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 46-- Vazhikadavu (cont'd).				
Knema attenuata	316	94	4.984	47.21
Lagerstroemia microcarpa	2	2	0.571	1.70
Litsea glabrata	2	2	0.030	0.48
Litsea mysorensis	4	4	0.357	1.63
Macaranga peltata	2	2	0.060	0.55
Mallotus beddomei	20	18	0.169	4.21
Mallotus stenanthus	2	2	0.002	0.41
Mangifera indica	12	8	0.675	3.47
Meiogyne pannosa	2	2	0.039	0.50
Myristica malabarica	194	90	1.420	29.43
Nothopegia racemosa	10	10	0.051	2.16
Nothopegia sp.	8	8	0.107	1.88
Orophea erythrocarpa	8	8	0.009	1.66
Otonephelium stipulaceum	2	2	0.089	0.61
Palaquium ellipticum	8	8	0.083	1.82
Polyalthia coffeoides	16	14	0.993	5.26
Polyalthia fragrans	12	10	1.033	4.54
Polyalthia fragrans	20	18	0.760	5.55
Spondias pinnata	2	2	0.528	1.61
Syzygium densiflorum	4	4	0.127	1.10
Syzygium gardneri	20	14	2.879	9.84
Syzygium mundagam	4	4	3.000	7.62
Toona ciliata	2	2	0.650	1.88
Trewia polycarpa	2	2	0.050	0.52
Unidentified 162(46)	2	2	0.187	0.83
Unidentified 174(46)	2	2	0.221	0.91
Unidentified 410(46)	2	2	0.456	1.44
Unidentified 455(46)	2	2	0.117	0.67
Unidentified 490(46)	2	2	0.179	0.82
Unidentified 591(46)	2	2	0.082	0.59
Unidentified 649(46)	2	2	0.139	0.72
Unidentified C2	2	2	0.101	0.64
Vateria indica	64	38	1.565	13.27
Vitex altissima	4	4	0.125	1.10
Xanthophyllum arnottianum	2	2	0.009	0.43
Plot Code No. 47-- Vazhikadavu				
Actinodaphne anguistifolia	16	16	0.550	5.07
Actinodaphne hoockeriana	2	2	0.075	0.65
Aglaia sp.1	30	24	0.331	7.16
Antidesma alexiteria	2	2	0.002	0.49
Antidesma montanum	12	10	0.041	2.72
Aporusa lindleyana	2	2	0.003	0.49
Artocarpus hirsutus	10	10	0.517	3.54

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Plot Code No. 47-- Vazhikadavu (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Artocarpus hirsutus	8	4	1.245	4.03
Baccaurea courtallensis	92	50	0.626	17.77
Bischofia javanica	4	4	0.094	1.17
Calophyllum polyanthum	14	14	2.363	8.45
Caryota urens	2	2	0.074	0.64
Chionanthus leprocarpa var *courtallensis*	2	2	0.123	0.75
Cinnamomum malabatrum	6	4	0.013	1.20
Croton malabaricus	2	2	0.041	0.57
Cullenia exarillata	76	46	7.598	30.45
Cyathocalyx zeylanica	2	2	0.003	0.49
Diospyros bourdillonii	4	4	0.235	1.48
Diospyros candolleana	2	2	0.200	0.91
Diospyros oocarpa	4	2	0.078	0.86
Diospyros paniculata	4	4	0.034	1.05
Diospyros sp.3	4	4	0.060	1.10
Drypetes elata	4	4	0.017	1.01
Fahrenheitia zeylanica	10	8	1.371	5.08
Flacourtia montana	6	4	0.477	2.19
Garcinia gummi-gutta	8	8	0.026	2.00
Garcinia morella	4	4	0.274	1.56
Garcinia talbotii	2	2	0.010	0.51
Goniothalamus cardiopetalus	2	2	0.006	0.50
Holigarna arnottiana	24	24	1.867	9.82
Holigarna grahamii	6	6	0.718	2.99
Hopea racophloea	72	42	2.507	18.62
Hydnocarpus pentandra	4	4	0.905	2.90
Hydnocarpus pentandra	4	4	0.210	1.42
Kingiodendron pinnatum	8	8	0.340	2.67
Knema attenuata	130	70	2.704	28.90
Leptonychia caudata	2	2	0.003	0.49
Litsea laevigata	16	14	0.427	4.52
Mallotus stenanthus	14	14	0.167	3.76
Mangifera indica	6	6	0.303	2.11
Mangifera indica	8	8	0.138	2.24
Meiogyne pannosa	12	12	0.803	4.63
Mesua ferrea	2	2	0.044	0.58
Myristica malabarica	142	72	2.427	29.80
Nothopegia sp.	6	6	0.007	1.47
Nothopegia sp.	8	6	0.041	1.75
Olea dioica	2	2	0.025	0.54
Olea dioica	2	2	0.002	0.49
Otonephelium stipulaceum	4	4	0.048	1.08
Palaquium ellipticum	16	10	0.792	4.73

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 47-- Vazhikadavu (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Polyalthia coffeoides	14	12	0.628	4.46
Polyalthia fragrans	4	4	0.003	0.98
Polyalthia fragrans	2	2	0.059	0.61
Prunus ceylanica	2	2	0.045	0.58
Psychotria macrocarpa	2	2	0.003	0.49
Pterospermum rubiginosum	2	2	0.176	0.86
Syzygium densiflorum	2	2	0.260	1.04
Syzygium gardneri	36	32	10.920	31.49
Syzygium hemisphericum	2	2	0.008	0.50
Syzygium mundagam	12	12	0.345	3.66
Terminalia bellirica	6	6	2.558	6.92
Toona ciliata	6	6	0.499	2.52
Vateria indica	12	12	0.217	3.38
Xanthophyllum arnottianum	60	46	0.203	13.05
Plot Code No. 49-- Aralam				
Aglaia sp.1	22	16	0.657	7.08
Antiaris toxicaria	10	8	0.633	4.23
Aporusa lindleyana	4	4	0.021	1.22
Artocarpus hirsutus	12	10	0.503	4.47
Atalantia racemosa	10	10	0.030	2.98
Baccaurea courtallensis	74	54	0.871	20.28
Cinnamomum malabatrum	4	4	0.033	1.25
Diospyros bourdillonii	186	90	9.949	63.65
Diospyros sp.4	6	6	0.195	2.26
Ficus nervosa	26	18	0.469	7.39
Ficus sp.	12	6	0.021	2.49
Garcinia gummi-gutta	2	2	0.005	0.59
Garcinia sp.3	2	2	0.192	1.09
Garcinia talbotii	2	2	0.002	0.58
Haldina cordifolia	4	4	0.027	1.23
Holigarna arnottiana	4	4	0.660	2.92
Hopea parviflora	4	4	0.024	1.22
Ixora nigricans	4	4	0.012	1.19
Knema attenuata	126	72	4.879	40.09
Litsea laevigata	12	8	0.242	3.43
Mallotus philippensis	2	2	0.031	0.66
Mangifera indica	4	4	0.114	1.46
Melia dubia	6	6	0.130	2.09
Memecylon umbellatum	4	4	0.022	1.22
Myristica dactyloides	6	6	0.257	2.42
Myristica malabarica	90	56	3.900	30.54
Olea dioica	2	2	0.011	0.61
Otonephelium stipulaceum	2	2	0.050	0.71

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 49-- Aralam (cont'd).				
Poeciloneuron indicum	38	34	3.427	19.44
Polyalthia fragrans	18	16	1.717	9.44
Prunus ceylanica	4	4	0.015	1.20
Psychotria sp.	2	2	0.003	0.59
Pterospermum rubiginosum	2	2	0.032	0.66
Rinorea bengalensis	12	10	0.896	5.52
Sapindus trifoliata	4	4	0.054	1.30
Sterculia guttata	2	2	0.160	1.01
Strychnos nux-vomica	4	4	1.271	4.54
Syzygium mundagam	2	2	0.099	0.84
Syzygium sp.	8	6	0.124	2.30
Unidentified C1	6	2	0.238	1.67
Vitex altissima	4	4	2.058	6.64
Xanthophyllum arnottianum	112	64	1.622	28.41
Xylia xylocarpa	8	6	1.914	7.07
Plot Code No. 51-- Chandanathode				
Actinodaphne anguistifolia	24	20	0.174	5.70
Actinodaphne lawsonii	2	2	0.003	0.50
Aglaia sp.1	12	12	0.437	3.98
Alseodaphne semecarpifolia	40	18	0.072	6.72
Antidesma alexiteria	2	2	0.003	0.50
Antidesma montanum	6	6	0.221	2.00
Aporusa lindleyana	2	2	0.003	0.50
Artocarpus heterophyllus	2	2	0.650	2.04
Baccaurea courtallensis	2	2	0.012	0.52
Bischofia javanica	4	4	0.036	1.07
Canarium strictum	2	2	0.003	0.50
Chionanthus malabaricus	12	12	0.074	3.11
Cinnamomum malabatrum	8	6	0.421	2.67
Cullenia exarillata	38	36	9.467	31.60
Dimocarpus longan	120	56	3.327	27.89
Diospyros paniculata	12	10	0.122	2.93
Dysoxylum malabaricum	2	2	0.017	0.53
Elaeocarpus tuberculatus	14	14	3.528	11.85
Elaeocarpus venustus	14	10	0.461	3.94
Ficus exasperata	6	4	0.353	2.02
Ficus nervosa	2	2	0.151	0.85
Garcinia gummi-gutta	2	2	0.144	0.83
Garcinia sp.3	8	8	0.083	2.15
Heritiera papilio	6	6	0.074	1.64
Holigarna arnottiana	14	14	3.322	11.35
Holigarna grahamii	2	2	0.019	0.54
Holigarna nigra	2	2	0.034	0.57

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Plot Code No. 51—Chandanathode(cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Hopea ponga	4	4	0.004	0.99
Isonandra lanceolata	2	2	0.005	0.50
Knema attenuata	12	10	0.042	2.74
Lagerstroemia microcarpa	2	2	0.552	1.81
Ligustrum perrottetii var *obovatum*	2	2	0.050	0.61
Litsea bourdillonii	2	2	0.063	0.64
Litsea coriacea	6	4	0.519	2.41
Litsea floribunda	2	2	0.173	0.90
Litsea ghatica	2	2	0.002	0.49
Litsea insignis	28	22	0.905	8.13
Macaranga peltata	4	4	0.266	1.61
Mallotus philippensis	12	12	0.406	3.91
Mallotus stenanthus	10	10	0.059	2.59
Mallotus stenanthus	2	2	0.120	0.78
Mangifera indica	6	6	0.174	1.88
Meiogyne pannosa	6	6	0.249	2.06
Meliosma pinnata	2	2	0.097	0.72
Memecylon malabaricum	2	2	0.006	0.50
Mesua ferrea	32	22	2.742	12.90
Myristica dactyloides	2	2	0.006	0.50
Neolitsea cassia	12	12	0.041	3.03
Nothopegia sp.	16	12	0.228	3.87
Olea dioica	18	12	0.420	4.52
Otonephelium stipulaceum	140	66	2.062	28.30
Palaquium ellipticum	18	18	1.383	7.70
Persea macrantha	16	14	0.691	5.27
Polyalthia fragrans	6	6	0.033	1.55
Symplocos macrocarpa sp. *kanara*	2	2	0.160	0.87
Symplocos racemosa var *racemosa*	2	2	0.002	0.49
Syzygium gardneri	4	4	0.098	1.21
Syzygium hemisphericum	20	18	0.189	5.05
Syzygium munronii	26	20	0.637	7.00
Syzygium sp.	54	18	0.781	9.78
Syzygium sp.4	16	4	0.229	2.70
Tabernaemontana heyneana	6	6	0.054	1.60
Taraktogenos macrocarpa	6	4	0.009	1.20
Trichilia connaroides	18	16	0.156	4.48
Unidentified 1(51)	6	4	0.309	1.91
Unidentified 2(51)	16	12	0.083	3.53
Unidentified 4(51)	12	10	0.047	2.75
Vateria indica	106	38	4.626	26.98
Xanthophyllum arnottianum	4	4	0.015	1.01

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Plot Code No. 52—Seminarivilla, Kannavam

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Actinodaphne bourdillonii	2	2	0.002	0.65
Aglaia lawii	32	26	0.916	10.86
Artocarpus hirsutus	4	4	0.080	1.43
Baccaurea courtallensis	20	20	0.315	7.02
Bischofia javanica	2	2	0.003	0.65
Calophyllum polyanthum	2	2	0.601	1.75
Canarium strictum	2	2	0.010	0.66
Cinnamomum malabatrum	16	16	1.253	7.46
Croton malabaricus	6	6	0.014	1.96
Dimocarpus longan	2	2	0.099	0.83
Diospyros bourdillonii	16	16	1.080	7.14
Diospyros candolleana	4	4	0.176	1.61
Diospyros oocarpa	4	4	1.257	3.61
Drypetes elata	16	14	4.458	13.01
Dysoxylum malabaricum	2	2	1.035	2.56
Elaeocarpus tuberculatus	2	2	0.395	1.37
Ficus nervosa	4	4	0.528	2.26
Ficus sp.	4	4	2.789	6.44
Filicium decipiens	14	14	6.669	16.84
Flacourtia montana	6	6	0.069	2.06
Garcinia morella	16	14	0.155	5.06
Garcinia talbotii	14	14	0.207	4.89
Holigarna grahamii	8	6	0.271	2.70
Holigarna nigra	10	10	0.697	4.51
Humboldtia brunonis	50	18	0.766	11.46
Kingiodendron pinnatum	2	2	0.103	0.83
Knema attenuata	68	46	3.243	23.72
Mallotus philippensis	2	2	0.026	0.69
Mangifera indica	4	4	0.087	1.45
Meiogyne pannosa	14	12	0.370	4.81
Meiogyne ramarowii	6	6	0.006	1.94
Myristica malabarica	52	40	1.620	17.46
Nothopegia beddomei	18	18	0.659	7.01
Otonephelium stipulaceum	12	12	0.432	4.66
Pajanelia longifolia	2	2	0.030	0.70
Palaquium ellipticum	36	26	2.606	14.51
Persea macrantha	2	2	1.292	3.03
Pterospermum rubiginosum	2	2	0.201	1.02
Symplocos racemosa var *racemosa*	2	2	0.003	0.65
Syzygium gardneri	30	28	15.763	38.42
Syzygium hemisphericum	12	12	0.144	4.13
Tabernaemontana heyneana	2	2	0.002	0.65
Toona ciliata	2	2	0.036	0.71

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 52—Seminarivilla, Kannavam (cont'd).				
Trichilia connaroides	8	6	0.567	3.24
Vateria indica	4	2	0.711	2.22
Vitex altissima	2	2	0.460	1.49
Xanthophyllum arnottianum	212	86	1.875	47.89
Plot Code No. 53-- Campshed, Kannavam				
Aglaia lawii	20	18	0.095	5.04
Alseodaphne semecarpifolia	4	4	0.014	1.05
Alstonia scholaris	6	6	1.354	4.43
Antiaris toxicaria	12	12	0.557	4.27
Artocarpus heterophyllus	2	2	0.165	0.86
Artocarpus hirsutus	6	6	1.599	4.95
Baccaurea courtallensis	30	26	0.130	7.40
Bischofia javanica	6	6	1.300	4.31
Caryota urens	10	8	0.137	2.57
Chionanthus malabaricus	4	4	0.021	1.07
Cinnamomum malabatrum	48	38	3.818	19.02
Croton malabaricus	6	6	0.302	2.18
Cryptocarya bourdillonii	2	2	0.009	0.53
Diospyros bourdillonii	16	16	0.027	4.16
Diospyros candolleana	4	4	0.025	1.08
Diospyros paniculata	20	20	0.213	5.58
Diospyros sp.1	8	8	0.626	3.39
Drypetes elata	16	14	0.048	3.92
Dysoxylum malabaricum	6	6	0.115	1.78
Ficus nervosa	10	8	1.561	5.61
Filicium decipiens	12	10	5.554	14.64
Flacourtia montana	8	6	0.015	1.80
Garcinia gummi-gutta	2	2	0.004	0.52
Garcinia morella	2	2	0.002	0.52
Harpullia arborea	4	4	0.224	1.50
Holigarna arnottiana	4	4	0.044	1.12
Holigarna grahamii	80	62	4.383	27.29
Holigarna sp.2	16	16	1.895	8.15
Hydnocarpus pentandra	8	8	0.035	2.13
Ixora nigricans	4	4	0.064	1.16
Knema attenuata	130	68	3.471	31.85
Lagerstroemia microcarpa	4	4	1.978	5.25
Litsea floribunda	2	2	0.116	0.76
Litsea laevigata	2	2	0.202	0.94
Mallotus philippensis	4	4	0.072	1.18
Mangifera indica	6	6	0.385	2.36
Meiogyne ramarowii	16	16	0.059	4.23
Myristica malabarica	90	54	1.785	21.73

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 53-- Camp-shed, Kannavam(cont'd).				
Nothopegia sp.	2	2	0.002	0.52
Otonephelium stipulaceum	8	6	0.176	2.14
Palaquium ellipticum	4	4	0.208	1.47
Polyalthia coffeoides	16	10	2.430	8.43
Polyalthia fragrans	24	20	6.158	18.72
Pterospermum rubiginosum	2	2	0.036	0.59
Sapindus trifoliata	18	14	1.146	6.49
Sterculia guttata	6	6	0.206	1.98
Stereospermum sp.	8	8	0.240	2.56
Symplocos racemosa var *racemosa*	10	8	2.052	6.66
Syzygium munronii	4	4	0.032	1.09
Tabernaemontana heyneana	8	8	0.031	2.12
Toona ciliata	6	6	0.030	1.60
Trichilia connaroides	42	34	1.056	11.88
Turpinia malabarica	2	2	0.039	0.60
Unidentified 1(53)	54	38	0.074	11.71
Vepris bilocularis	22	22	0.374	6.44
Vitex altissima	2	2	0.150	0.83
Xanthophyllum arnottianum	16	14	0.021	3.86
Plot Code No. 54 -- Kannavam				
Alseodaphne semecarpifolia	4	4	0.549	4.61
Alstonia scholaris	4	4	3.590	10.51
Antiaris toxicaria	4	4	1.181	5.84
Aporusa lindleyana	24	22	1.787	23.70
Artocarpus hirsutus	8	8	4.687	16.18
Holigarna arnottiana	50	28	3.406	39.56
Ixora nigricans	4	4	0.075	3.69
Knema attenuata	122	72	12.614	106.77
Lagerstroemia microcarpa	2	2	0.814	3.35
Mangifera indica	6	6	4.476	14.00
Polyalthia fragrans	2	2	0.730	3.19
Prunus ceylanica	2	2	1.493	4.67
Sapindus trifoliata	4	4	0.330	4.18
Stereospermum sp.	2	2	0.249	2.26
Tabernaemontana heyneana	6	6	0.010	5.33
Terminalia paniculata	18	16	8.236	30.89
Toona ciliata	2	2	4.781	11.05
Vepris bilocularis	6	6	2.539	10.24
Plot Code No. 55-- Sivapuram				
Actinodaphne hoockeriana	4	4	0.070	1.71
Aglaia sp.1	16	14	0.518	7.02
Alstonia scholaris	28	20	0.701	10.54
Aporusa lindleyana	10	10	0.173	4.26

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 54-- Sivapuram				
Artocarpus hirsutus	18	16	1.454	10.50
Cinnamomum malabatrum	8	8	0.560	4.64
Diospyros bourdillonii	32	20	0.197	9.57
Diospyros oocarpa	4	4	0.254	2.24
Elaeocarpus tuberculatus	14	12	1.304	8.56
Ficus nervosa	6	6	0.123	2.61
Holigarna arnottiana	82	46	4.370	34.49
Hopea parviflora	20	18	1.783	12.21
Hydnocarpus pentandra	10	10	1.256	7.42
Ixora nigricans	8	8	0.691	5.02
Knema attenuata	278	82	8.684	80.45
Lophopetalum wightianum	2	2	0.003	0.76
Mallotus philippensis	2	2	0.010	0.78
Mangifera indica	2	2	0.133	1.14
Myristica dactyloides	18	12	0.287	6.08
Myristica malabarica	188	50	7.577	58.01
Persea macrantha	2	2	0.192	1.31
Polyalthia fragrans	24	20	1.530	12.47
Prunus ceylanica	6	6	0.331	3.22
Pterospermum reticulatum	2	2	0.089	1.01
Sterculia guttata	2	2	0.017	0.80
Symplocos racemosa var *racemosa*	8	8	0.399	4.17
Syzygium sp.	6	6	1.171	5.67
Turpinia malabarica	4	4	0.334	2.48
Vitex altissima	2	2	0.042	0.87
Plot Code No.58—Kavadikkanam				
Actinodaphne anguistifolia	4	4	0.109	1.35
Aglaia sp.1	18	16	0.382	5.45
Alseodaphne semecarpifolia	6	6	0.044	1.70
Alstonia scholaris	12	12	1.358	6.91
Antiaris toxicaria	8	8	0.016	2.15
Antidesma montanum	10	4	0.028	1.69
Aporusa bourdillonii	14	14	0.212	4.27
Baccaurea courtallensis	8	6	0.009	1.79
Bombax ceiba	2	2	0.089	0.77
Casearia ovata	2	2	0.002	0.53
Celtis philippensis	2	2	0.012	0.56
Diospyros bourdillonii	2	2	0.488	1.88
Diospyros oocarpa	16	14	0.291	4.68
Diospyros sp.5	38	28	0.753	10.38
Drypetes elata	6	6	0.086	1.82
Ficus exasperata	2	2	0.004	0.54
Flacourtia montana	2	2	0.012	0.56

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 58-- Kavadikkanam				
Garcinia morella	2	2	0.037	0.63
Grewia tiliifolia	2	2	0.030	0.61
Holigarna arnottiana	2	2	1.938	5.88
Hydnocarpus pentandra	2	2	0.002	0.53
Ixora nigricans	70	38	0.575	14.57
Knema attenuata	426	94	5.313	70.23
Lagerstroemia microcarpa	4	4	1.023	3.88
Litsea laevigata	2	2	0.154	0.95
Litsea sp. 5	36	28	0.121	8.45
Macaranga peltata	54	26	0.650	11.24
Mallotus philippensis	38	26	0.150	8.38
Mangifera indica	4	4	0.028	1.13
Meiogyne ramarowii	4	4	0.010	1.08
Melia dubia	4	4	0.027	1.13
Memecylon umbellatum	2	2	0.158	0.96
Myristica malabarica	4	4	0.165	1.51
Naringi crenulata	2	2	0.003	0.54
Olea dioica	54	40	2.806	19.58
Prunus ceylanica	6	6	0.135	1.95
Pterospermum diversifolium	2	2	0.002	0.53
Pterospermum reticulatum	54	38	3.386	20.85
Sapindus trifoliata	12	12	0.042	3.28
Sterculia guttata	2	2	0.024	0.59
Symplocos racemosa var *racemosa*	6	4	0.012	1.27
Syzygium cumini	4	4	2.577	8.17
Syzygium sp.2	18	18	0.994	7.49
Tabernaemontana heyneana	2	2	0.009	0.55
Terminalia bellirica	2	2	0.018	0.58
Terminalia paniculata	14	14	3.420	13.14
Unidentified 1(58)	36	24	0.553	8.96
Unidentified 2(58)	4	4	0.017	1.10
Unidentified 3(58)	2	2	0.007	0.54
Vitex altissima	2	2	0.002	0.53
Xanthophyllum arnottianum	2	2	0.040	0.64
Xylia xylocarpa	46	32	7.884	31.51
Plot Code No.59-- Chippilithode				
Actinodaphne lawsonii	2	2	0.324	1.71
Aglaia lawii	10	8	0.777	6.11
Aglaia sp.1	2	2	0.269	1.58
Antiaris toxicaria	4	4	0.503	3.09
Antidesma alexiteria	2	2	0.002	1.00
Artocarpus hirsutus	2	2	0.002	1.00
Baccaurea courtallensis	30	24	0.606	14.54

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 59-- Chippilithode				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (m^2 ha^{-1})**	**Importance Value Index**
Calophyllum polyanthum	2	2	0.132	1.28
Canarium strictum	2	2	0.139	1.30
Cinnamomum malabatrum	10	10	1.050	7.27
Dimocarpus longan	4	4	0.331	2.71
Dimorphocalyx beddomei	2	2	0.112	1.24
Diospyros bourdillonii	2	2	0.002	1.00
Diospyros oocarpa	2	2	0.002	1.00
Diospyros sp.5	2	2	0.024	1.05
Drypetes elata	4	4	1.345	4.94
Fahrenheitia zeylanica	8	8	1.562	7.40
Ficus nervosa	2	2	0.130	1.28
Flacourtia montana	2	2	0.126	1.27
Holigarna arnottiana	2	2	0.189	1.41
Holigarna grahamii	4	4	0.879	3.92
Holigarna nigra	2	2	0.141	1.30
Holigarna sp.1	16	16	1.161	10.50
Humboldtia brunonis	32	28	1.229	17.46
Hydnocarpus pentandra	6	6	0.563	4.22
Kingiodendron pinnatum	4	4	0.617	3.34
Knema attenuata	22	22	1.096	13.33
Litsea floribunda	2	2	0.076	1.16
Macaranga peltata	4	4	0.405	2.88
Mallotus stenanthus	6	6	0.008	3.00
Mangifera indica	6	6	1.018	5.22
Meiogyne pannosa	4	4	0.101	2.21
Myristica malabarica	50	40	2.893	28.37
Otonephelium stipulaceum	2	2	0.232	1.50
Polyalthia fragrans	8	8	1.186	6.58
Scolopia crenata	2	2	0.003	1.00
Syzygium sp.	2	2	0.216	1.47
Syzygium sp.4	6	6	1.086	5.37
Terminalia bellirica	10	10	4.226	14.25
Trewia polycarpa	4	4	0.350	2.75
Unidentified 1(59)	8	8	0.345	4.73
Vateria indica	166	80	20.011	102.24
Xanthophyllum arnottianum	2	2	0.022	1.04
Plot Code No.60—Chippilithode				
Actinodaphne anguistifolia	4	4	0.499	1.94
Aglaia lawii	16	16	0.427	4.03
Aglaia sp.1	2	2	0.091	0.59
Antiaris toxicaria	2	2	0.023	0.43
Artocarpus heterophyllus	8	8	0.014	1.54
Atalantia wightii	8	8	0.065	1.66

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).

Plot Code No. 60—Chippilithode

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Baccaurea courtallensis	80	48	0.362	12.09
Bischofia javanica	4	2	0.521	1.75
Canarium strictum	24	24	0.994	6.88
Caryota urens	2	2	0.011	0.40
Cinnamomum malabatrum	12	10	0.770	3.84
Croton malabaricus	14	12	0.216	2.91
Cullenia exarillata	10	10	1.522	5.49
Dimocarpus longan	8	8	0.211	2.01
Diospyros bourdillonii	14	8	0.237	2.48
Diospyros crumenata	8	6	0.012	1.30
Diospyros oocarpa	8	8	0.747	3.28
Diospyros paniculata	8	8	0.012	1.54
Diospyros sp.5	4	4	0.060	0.89
Dipterocarpus indicus	2	2	0.003	0.38
Fahrenheitia zeylanica	42	32	3.325	14.59
Ficus beddomei	2	2	1.691	4.38
Ficus nervosa	2	2	0.176	0.79
Flacourtia montana	2	2	0.414	1.36
Garcinia gummi-gutta	14	14	0.019	2.68
Garcinia morella	8	8	0.260	2.12
Garcinia sp.	4	4	0.005	0.76
Holigarna arnottiana	32	28	1.052	8.04
Holigarna grahamii	2	2	0.269	1.01
Holigarna nigra	54	32	1.083	10.10
Holigarna sp.1	38	22	1.821	9.55
Holigarna sp.2	8	6	1.192	4.09
Hopea ponga	2	2	0.006	0.39
Hydnocarpus pentandra	4	4	0.083	0.95
Isonandra lanceolata	10	8	0.028	1.71
Ixora nigricans	2	2	0.062	0.52
Kingiodendron pinnatum	26	18	0.749	5.71
Knema attenuata	86	54	1.780	16.58
Litsea coriacea	2	2	0.842	2.37
Litsea laevigata	8	8	0.353	2.34
Macaranga peltata	2	2	0.106	0.63
Mallotus beddomei	10	8	0.673	3.24
Mallotus philippensis	2	2	0.003	0.38
Mallotus philippensis	2	2	0.013	0.41
Mangifera indica	8	8	0.834	3.48
Meiogyne ramarowii	4	4	0.005	0.77
Mesua ferrea	6	6	0.010	1.15
Myristica malabarica	266	86	3.397	36.55
Nothapodytes foetida	2	2	0.030	0.45

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Semi-evergreen Forests (cont'd).				
Plot Code No. 60—Chippilithode				
Nothopegia sp.	40	34	0.066	6.98
Nothopegia sp.2	2	2	0.117	0.65
Otonephelium stipulaceum	12	10	0.020	2.07
Palaquium ellipticum	6	4	0.221	1.41
Phaenthus malabaricus	2	2	0.002	0.38
Polyalthia coffeoides	2	2	0.213	0.88
Polyalthia fragrans	22	20	0.803	5.81
Prunus ceylanica	8	8	0.026	1.57
Rinorea bengalensis	4	4	0.018	0.80
Scolopia crenata	2	2	0.002	0.38
Sterculia guttata	2	2	0.011	0.40
Syzygium caryophyllatum	20	14	0.121	3.34
Syzygium lanceolatum	24	16	2.235	8.86
Syzygium munronii	8	8	0.017	1.55
Terminalia bellirica	2	2	0.829	2.34
Toona ciliata	4	4	1.065	3.28
Unidentified 1(60)	20	18	0.218	4.05
Unidentified 4(60)	2	2	0.077	0.56
Vateria indica	324	68	8.329	50.03
Vateria indica	20	12	0.639	4.32
Walsura trifolia	36	20	0.098	5.10
Xanthophyllum arnottianum	14	14	0.025	2.70
Moist Deciduous Forests				
Plot Code No. 1—Athirappally				
Albizia odoratissima	4	4	0.005	1.93
Aporusa lindleyana	2	2	0.002	0.96
Bauhinia racemosa	2	2	0.199	1.55
Bombax ceiba	2	2	0.952	3.78
Careya arborea	2	2	0.009	0.98
Cochlospermum religiosum	2	2	0.005	0.97
Dillenia pentagyna	24	20	1.237	13.86
Grewia tiliifolia	54	34	1.390	23.43
Holoptelea integrifolia	2	2	0.725	3.11
Lagerstroemia microcarpa	36	30	3.397	25.35
Litsea laevigata	12	12	0.042	5.88
Macaranga peltata	28	14	0.149	9.26
Mallotus philippensis	4	4	0.009	1.95
Miliusa tomentosa	2	2	0.005	0.98
Persea macrantha	2	2	0.002	0.96
Sapindus trifoliata	14	10	0.023	5.47
Schleichera oleosa	2	2	1.629	5.78
Stereospermum sp.	2	2	0.002	0.96
Strychnos nux-vomica	4	4	0.098	2.21

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests(cont'd).				
Plot Code No. 1—Athirappally(cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Tabernaemontana heyneana	6	6	0.012	2.91
Terminalia bellirica	10	10	3.570	15.37
Terminalia crenulata	22	12	1.422	11.47
Terminalia paniculata	22	20	0.778	12.20
Tetrameles nudiflora	12	10	2.986	13.94
Unidentified C1	2	2	0.015	1.00
Xylia xylocarpa	390	92	15.103	133.73
Plot Code No. 2—Randukai				
Albizia odoratissima	2	2	0.673	3.45
Alstonia scholaris	2	2	3.236	10.61
Aporusa lindleyana	2	2	0.009	1.60
Bridelia airy-shawii	2	2	0.095	1.84
Canthium sp.	2	2	0.129	1.94
Dalbergia latifolia	4	4	0.290	3.96
Dillenia pentagyna	16	16	2.238	18.86
Grewia tiliifolia	10	10	1.239	11.34
Haldina cordifolia	4	4	0.190	3.68
Holarrhena pubescens	4	4	0.076	3.37
Lagerstroemia microcarpa	14	8	3.613	18.41
Phyllanthus emblica	4	4	0.029	3.23
Pterocarpus marsupium	2	2	0.046	1.71
*Stereos*p*ermum* sp.	8	8	0.045	6.43
Strychnos nux-vomica	2	2	0.045	1.70
Tectona grandis	2	2	0.246	2.26
Terminalia paniculata	36	30	12.372	60.20
Wrightia tinctoria	56	46	1.609	44.13
Xylia xylocarpa	124	72	9.661	101.28
Plot Code No.3—Randukai				
Albizia odoratissima	4	4	0.018	4.10
Alstonia scholaris	8	8	1.224	11.83
Antiaris toxicaria	2	2	0.005	2.04
Aporusa lindleyana	6	4	0.051	5.13
Bombax ceiba	2	2	0.006	2.04
Cassia fistula	4	4	0.018	4.10
Cinnamomum sp.	2	2	0.193	2.61
Grewia tiliifolia	2	2	0.277	2.87
Haldina cordifolia	8	6	0.676	9.06
Holarrhena pubescens	2	2	0.008	2.05
Hydnocarpus pentandra	12	12	1.935	18.05
Lagerstroemia microcarpa	2	2	0.002	2.03
Lannea coromandelica	2	2	1.100	5.38
Litsea laevigata	2	2	0.002	2.03
Macaranga peltata	34	18	0.969	28.59

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No.3—Randukai				
Mallotus philippensis	2	2	0.067	2.23
Polyalthia fragrans	14	14	2.786	22.67
Pterocarpus marsupium	2	2	0.008	2.05
Pterygota alata	16	12	5.131	29.64
Schleichera oleosa	4	2	0.011	2.99
Sterculia guttata	10	10	0.745	12.39
Stereospermum sp.	14	14	3.545	24.98
Strychnos nux-vomica	2	2	0.005	2.04
Terminalia bellirica	4	4	3.350	14.26
Terminalia paniculata	6	6	0.348	7.14
Tetrameles nudiflora	4	4	3.141	13.62
Unidentified 1(3)	6	6	0.741	8.33
Unidentified 2 (3)	12	12	0.456	13.54
Xylia xylocarpa	28	20	5.985	42.20
Plot Code No. 5-- Thumburmuzhi				
Alstonia scholaris	2	2	1.433	7.08
Aporusa lindleyana	2	2	0.003	0.65
Bridelia airy-shawii	6	6	0.021	2.01
Cassia fistula	50	28	0.160	11.79
Grewia tiliifolia	16	16	0.181	5.91
Holarrhena pubescens	8	8	0.011	2.60
Lagerstroemia microcarpa	402	90	5.175	82.43
Lannea coromandelica	4	2	0.017	0.91
Macaranga peltata	10	10	0.082	3.56
Meiogyne ramarowii	4	2	0.004	0.85
Miliusa tomentosa	50	38	0.086	13.68
Santalum album	2	2	0.063	0.92
Schleichera oleosa	6	6	0.016	1.98
Stereospermum sp.	12	10	0.045	3.59
Strychnos nux-vomica	36	26	0.185	10.10
Tectona grandis	14	14	0.031	4.60
Terminalia paniculata	272	96	3.681	64.35
Unidentified 1(5)	28	16	1.950	15.04
Unidentified 2(5)	38	30	0.102	10.81
Wrightia tinctoria	8	8	0.036	2.71
Xylia xylocarpa	54	40	8.964	54.42
Plot Code No. 8-- Pandarampara				
Albizia odoratissima	2	2	0.393	3.10
Bombax ceiba	2	2	0.013	1.17
Bridelia airy-shawii	14	14	0.970	12.65
Cochlospermum religiosum	4	4	0.008	2.24
Dalbergia latifolia	8	8	0.343	6.15
Dillenia pentagyna	74	48	2.709	46.56

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 8-- Pandarampara(cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Diospyros sp.4	2	2	0.339	2.83
Grewia tiliifolia	70	46	0.642	34.45
Holarrhena pubescens	20	18	0.212	11.48
Lagerstroemia microcarpa	4	4	0.726	5.90
Lannea coromandelica	18	18	0.413	12.01
Miliusa tomentosa	14	12	0.204	8.14
Phyllanthus emblica	2	2	0.028	1.24
Pterocarpus marsupium	24	22	2.194	23.77
Schleichera oleosa	2	2	0.023	1.22
Stereospermum sp.	8	6	0.195	4.79
Tectona grandis	20	18	3.837	29.93
Terminalia crenulata	56	44	4.364	49.37
Terminalia paniculata	8	8	0.474	6.82
Unidentified 2(8)	2	2	0.505	3.67
Wrightia tinctoria	2	2	0.002	1.11
Xylia xylocarpa	54	42	1.053	31.41
Plot Code No. 9-- Vaniampuzha				
Albizia odoratissima	2	2	0.219	2.18
Aporusa lindleyana	2	2	0.062	1.68
Bauhinia racemosa	2	2	0.047	1.63
Bombax ceiba	4	4	0.205	3.61
Careya arborea	4	4	0.275	3.84
Dalbergia latifolia	4	4	0.167	3.49
Dillenia pentagyna	8	8	0.565	7.72
Miliusa tomentosa	2	2	0.032	1.58
Naringi crenulata	4	2	0.028	2.11
Neolamarckia cadamba	4	4	0.145	3.42
Stereospermum sp.	34	28	1.113	25.86
Terminalia bellirica	8	8	1.531	10.83
Terminalia paniculata	120	60	14.182	106.12
Xylia xylocarpa	172	84	12.494	125.96
Plot Code No. 12 -- Vaniampuzha				
Aporusa lindleyana	6	6	0.159	5.27
Bauhinia racemosa	6	6	0.249	5.71
Bombax ceiba	8	8	0.420	8.04
Bridelia airy-shawii	6	6	0.058	4.78
Dalbergia lanceolaria	4	4	0.302	4.46
Dalbergia latifolia	8	8	0.118	6.57
Dillenia pentagyna	6	6	1.038	9.53
Lagerstroemia microcarpa	4	4	0.103	3.50
Lagerstroemia reginae	2	2	0.184	2.39
Litsea laevigata	4	4	0.017	3.08
Macaranga peltata	4	2	0.648	5.29

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 12 – Vaniampuzha (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Naringi crenulata	4	4	0.027	3.13
Persea macrantha	4	4	0.009	3.04
Schleichera oleosa	12	12	0.207	10.00
Sterculia guttata	8	8	0.578	8.80
Stereospermum sp.	14	14	0.777	14.27
Strychnos nux-vomica	2	2	0.006	1.53
Tabernaemontana heyneana	6	6	0.044	4.71
Terminalia paniculata	48	36	3.452	47.61
Unidentified (12)	2	2	0.018	1.58
Unidentified C 2	6	6	0.098	4.98
Unidentified 1(12)	2	2	0.317	3.04
Wrightia tinctoria	2	2	0.011	1.55
Xylia xylocarpa	142	80	11.779	137.13
Plot Code No. 13-- Vaniampuzha				
Bauhinia racemosa	6	4	0.105	3.53
Bombax ceiba	14	14	1.581	15.65
Bridelia airy-shawii	2	2	0.168	2.00
Dalbergia lanceolaria	4	4	0.128	3.18
Dalbergia latifolia	4	4	0.034	2.81
Lagerstroemia microcarpa	8	6	0.058	4.68
Macaranga peltata	2	2	0.060	1.57
Naringi crenulata	4	4	0.008	2.70
Neolamarckia cadamba	2	2	0.014	1.39
Phyllanthus emblica	4	4	0.208	3.50
Stereospermum sp.	32	28	1.092	23.94
Strychnos nux-vomica	2	2	0.006	1.36
Terminalia bellirica	2	2	0.023	1.43
Terminalia paniculata	84	56	8.008	75.53
Wrightia tinctoria	2	2	0.012	1.38
Xylia xylocarpa	280	88	13.567	155.35
Plot Code No. 17-- Pothundy				
Anogeissus latifolia	6	6	1.280	14.99
Bauhinia racemosa	2	2	0.009	2.28
Bombax ceiba	22	20	3.461	45.77
Buchanania lanzan	2	2	0.006	2.25
Canthium sp.	4	2	0.008	3.32
Careya arborea	2	2	0.037	2.45
Cochlospermum religiosum	6	6	0.306	8.64
Dalbergia latifolia	4	4	0.494	7.65
Dillenia pentagyna	2	2	0.693	6.73
Grewia tiliifolia	4	4	1.029	11.14
Holarrhena pubescens	6	6	0.010	6.71
Holoptelea integrifolia	2	2	0.014	2.31

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 17-- Pothundy (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Lagerstroemia microcarpa	14	14	1.763	27.00
Lannea coromandelica	8	8	0.997	15.36
Miliusa tomentosa	8	6	0.029	7.89
Pavetta sp.	2	2	0.008	2.27
Phyllanthus emblica	14	12	0.058	14.72
*Stereos*p*ermum* sp.	2	2	0.011	2.29
Strychnos sp.	6	2	0.038	4.57
Tamarindus indica	4	4	0.007	4.47
Tectona grandis	44	38	0.561	48.91
Terminalia bellirica	4	4	3.045	24.28
Terminalia crenulata	2	2	0.009	2.27
Terminalia paniculata	4	4	0.006	4.47
Unidentified 1(17)	6	6	1.015	13.26
Unidentified 2(17)	2	2	0.247	3.83
Unidentified 3(17)	2	2	0.189	3.45
Wrightia tinctoria	2	2	0.006	2.26
Xylia xylocarpa	4	4	0.007	4.47
Plot Code No.19-- Velamplavu				
Actinodaphne bourdillonii	6	4	0.022	4.10
Bischofia javanica	2	2	0.019	1.76
Bombax ceiba	2	2	0.988	4.45
Callicarpa tomentosa	2	2	0.016	1.75
Canthium sp.	2	2	0.040	1.82
Careya arborea	4	4	0.117	3.73
Cassia fistula	2	2	0.383	2.77
Croton malabaricus	2	2	0.017	1.75
Dalbergia latifolia	4	4	0.375	4.45
Dillenia pentagyna	6	4	0.657	5.86
Grewia tiliifolia	2	2	0.276	2.47
Lagerstroemia microcarpa	10	8	2.013	13.03
Macaranga peltata	4	4	0.038	3.51
Sapindus trifoliata	2	2	0.015	1.75
Sp*ondias pinnata*	4	4	0.285	4.20
*Stereos*p*ermum* sp.	14	4	0.490	7.91
Tabernaemontana heyneana	4	4	0.012	3.44
Terminalia bellirica	18	18	3.387	24.74
Terminalia crenulata	6	6	1.808	10.13
Terminalia paniculata	18	18	6.593	33.64
Vitex altissima	2	2	0.338	2.64
Xylia xylocarpa	202	86	18.142	160.11
Plot Code No.20-- Velamplavu				
Albizia odoratissima	2	2	0.150	1.61
Aporusa lindleyana	2	2	0.003	0.81

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No.20-- Velamplavu (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Bombax ceiba	24	22	0.792	13.30
Bridelia airy-shawii	8	8	0.273	4.65
Careya arborea	16	14	0.152	6.64
Cassia fistula	6	6	0.174	3.32
Dalbergia latifolia	10	10	0.360	5.91
Dillenia pentagyna	2	2	0.015	0.87
Euodia lunu-ankenda	10	8	0.077	3.87
Ficus exasperata	4	2	0.111	1.69
Grewia tiliifolia	14	12	0.756	9.16
Lagerstroemia microcarpa	22	22	0.407	10.90
Litsea laevigata	4	4	0.070	1.96
Macaranga peltata	2	2	0.041	1.01
Mallotus beddomei	2	2	0.083	1.24
Mallotus philippensis	2	2	0.171	1.73
Neolamarckia cadamba	4	4	0.076	1.99
Olea dioica	18	18	0.348	9.00
Phyllanthus emblica	14	12	0.216	6.21
Spondias pinnata	2	2	0.011	0.85
Stereospermum sp.	22	20	0.422	10.49
Tabernaemontana heyneana	80	46	0.483	25.76
Tectona grandis	4	4	0.059	1.90
Terminalia crenulata	30	30	1.247	18.66
Terminalia paniculata	98	58	4.195	51.71
Unidentified 1(20)	4	4	0.149	2.39
Xylia xylocarpa	276	86	7.416	102.38
Plot Code No. 28-- Achencoil				
Anogeissus latifolia	24	20	2.464	21.63
Bombax ceiba	4	4	0.657	4.56
Bridelia airy-shawii	6	6	0.790	6.28
Buchanania lanzan	8	8	0.230	6.01
Careya arborea	8	8	0.072	5.55
Cochlospermum religiosum	4	4	0.006	2.69
Croton malabaricus	2	2	0.002	1.34
Dalbergia latifolia	4	4	0.271	3.45
Dillenia pentagyna	38	28	3.722	32.35
Grewia tiliifolia	14	12	0.129	8.98
Lagerstroemia microcarpa	12	10	0.833	9.66
Lannea coromandelica	6	6	0.723	6.09
Macaranga peltata	2	2	0.002	1.34
Miliusa tomentosa	18	14	0.058	10.69
Neolamarckia cadamba	2	2	0.036	1.44

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 28—Achencoil (cont'd).				
Phyllanthus emblica	6	6	0.104	4.31
Pterocarpus marsupium	2	2	0.148	1.76
Schleichera oleosa	6	4	0.386	4.37
Sterculia guttata	2	2	0.004	1.35
Tectona grandis	26	20	6.963	35.16
Terminalia crenulata	30	30	10.902	51.43
Terminalia paniculata	24	22	5.592	31.38
Wrightia tinctoria	94	50	0.652	48.16
Plot Code No. 29-- Achencoil				
Aglaia barberi	2	2	0.602	2.40
Aglaia sp.1	4	4	0.571	3.41
Alstonia scholaris	4	4	0.084	2.33
Antiaris toxicaria	2	2	0.046	1.17
Aporusa lindleyana	40	30	0.676	19.95
Artocarpus hirsutus	10	10	0.517	6.50
Baccaurea courtallensis	6	4	0.020	2.66
Bombax ceiba	4	4	0.480	3.21
Cassia fistula	2	2	0.295	1.73
Chionanthus malabaricus	16	16	0.437	9.54
Cleidion spiciflorum	28	14	0.321	11.55
Croton malabaricus	38	20	0.293	15.65
Dillenia pentagyna	4	2	0.404	2.44
Diospyros bourdillonii	10	10	0.654	6.81
Diospyros candolleana	2	2	0.016	1.11
Ficus sp.	2	2	0.979	3.24
Flacourtia montana	2	2	0.007	1.09
Hopea parviflora	2	2	0.502	2.18
Hydnocarpus pentandra	14	14	1.938	11.79
Ixora nigricans	14	12	0.173	7.29
Kingiodendron pinnatum	22	20	5.110	22.51
Knema attenuata	64	42	3.054	34.50
Lagerstroemia microcarpa	12	12	6.768	21.42
Macaranga peltata	12	8	0.112	5.49
Mallotus philippensis	10	8	0.141	5.07
Mangifera indica	6	6	2.412	8.56
Melia dubia	4	4	1.395	5.23
Myristica malabarica	2	2	0.183	1.48
Neolamarckia cadamba	6	6	0.631	4.61
Polyalthia fragrans	12	12	0.999	8.64
Pterospermum rubiginosum	4	4	0.028	2.20
Schleichera oleosa	12	8	3.980	14.05
Spondias pinnata	2	2	0.023	1.12
Terminalia bellirica	2	2	5.061	12.28

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 29—Achencoil (cont'd).				
Sterculia guttata	10	10	0.107	5.59
Stereospermum sp.	2	2	0.178	1.47
Terminalia paniculata	6	6	4.109	12.32
Tetrameles nudiflora	2	2	1.265	3.87
Toona ciliata	2	2	0.002	1.08
Trewia polycarpa	2	2	0.112	1.32
Unidentified 1(29)	2	2	0.114	1.32
Vitex altissima	4	4	0.056	2.27
Wrightia tinctoria	2	2	0.032	1.14
Xanthophyllum arnottianum	12	10	0.270	6.43
Plot Code No. 33-- Kochuthalappara				
Acronychia pedunculata	8	8	0.118	3.34
Actinodaphne sp.	10	10	0.803	6.11
Albizia odoratissima	6	6	0.399	3.42
Alstonia scholaris	10	10	0.638	5.62
Alstonia venenata	2	2	0.025	0.82
Aporusa lindleyana	8	8	0.038	3.10
Artocarpus hirsutus	10	10	0.993	6.67
Atalantia racemosa	2	2	0.019	0.80
Bombax ceiba	2	2	0.210	1.37
Bridelia airy-shawii	10	10	0.366	4.82
Canthium dicoccum var *umbellatum*	8	8	0.245	3.71
Cassia fistula	2	2	0.047	0.89
Chionanthus malabaricus	10	10	0.237	4.44
Cinnamomum malabatrum	4	4	0.120	1.85
Dillenia pentagyna	10	10	0.297	4.62
Dimocarpus longan	12	12	0.829	6.94
Diospyros buxifolia	6	6	0.073	2.46
Diospyros foliosa	12	10	0.448	5.41
Diospyros oocarpa	2	2	0.052	0.90
Erythrina indica	2	2	0.017	0.80
Ficus sp.	2	2	0.218	1.39
Flacourtia montana	16	12	0.606	6.97
Garcinia sp.1	2	2	0.500	2.23
Gmelina arborea	14	12	0.597	6.60
Grewia tiliifolia	14	12	0.651	6.76
Hopea parviflora	20	16	3.769	17.82
Ixora nigricans	64	42	0.919	22.22
Kingiodendron pinnatum	16	14	0.580	7.29
Knema attenuata	2	2	0.067	0.95
Lagerstroemia microcarpa	12	12	2.145	10.83
Lannea coromandelica	16	16	1.098	9.23
Litsea laevigata	18	14	0.352	6.97

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No. 33-- Kochuthalappara (cont'd).				
Mallotus philippensis	4	4	0.077	1.72
Mangifera indica	6	6	0.465	3.62
Mitragyna tubulosa	34	28	0.420	12.75
Nothopegia travancorica	2	2	0.026	0.82
Octotropis travancorica	2	2	0.134	1.14
Olea dioica	2	2	0.112	1.08
Phyllanthus emblica	4	4	0.016	1.54
Psychotria macrocarpa	2	2	0.057	0.92
Pterocarpus marsupium	4	4	0.036	1.60
Pterospermum diversifolium	2	2	0.046	0.88
Pterospermum reticulatum	8	8	0.385	4.13
Pterospermum rubiginosum	4	4	0.092	1.77
Sapindus trifoliata	2	2	0.022	0.81
Schleichera oleosa	28	24	2.332	16.56
Sterculia guttata	6	6	0.494	3.70
Stereospermum sp.	10	10	0.306	4.64
Terminalia paniculata	52	32	7.514	37.64
Unidentified 1(33)	2	2	0.081	0.99
Unidentified 2(33)	6	4	0.215	2.48
Vitex altissima	34	30	2.490	19.27
Xanthophyllum arnottianum	30	28	1.025	13.84
Xylia xylocarpa	2	2	0.002	0.75
Plot Code No. 36-- Vellatanku				
Aglaia lawii	2	2	0.394	2.41
Albizia odoratissima	2	2	0.571	3.08
Alstonia scholaris	2	2	0.006	0.95
Antidesma montanum	2	2	0.007	0.96
Aporusa lindleyana	42	34	0.840	20.68
Artocarpus hirsutus	2	2	0.369	2.32
Baccaurea courtallensis	2	2	0.006	0.95
Bombax ceiba	4	4	0.247	2.79
Bridelia airy-shawii	2	2	0.004	0.94
Cassia fistula	4	4	0.051	2.05
Cinnamomum malabatrum	2	2	0.002	0.94
Dillenia pentagyna	4	4	0.024	1.95
Dimocarpus longan	14	14	1.320	11.48
Diospyros bourdillonii	4	4	0.389	3.32
Diospyros paniculata	2	2	0.194	1.66
Diospyros sp.4	2	2	0.310	2.10
Dysoxylum malabaricum	2	2	0.205	1.70
Erythrina indica	4	4	0.174	2.51
Ficus exasperata	2	2	0.004	0.95
Ficus nervosa	2	2	0.532	2.93

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Plot Code No.36—Vellatanku (cont'd).				
Flacourtia montana	4	4	0.296	2.97
Grewia tiliifolia	6	4	0.019	2.36
Harpullia arborea	2	2	0.202	1.69
Hopea parviflora	4	4	0.402	3.37
Hydnocarpus pentandra	2	2	0.123	1.39
Ixora nigricans	6	6	0.228	3.65
Ixora sp.	2	2	0.166	1.55
Knema attenuata	4	4	0.651	4.31
Lagerstroemia microcarpa	8	8	1.100	7.86
Lannea coromandelica	2	2	0.005	0.95
Macaranga peltata	8	6	0.177	3.89
Mallotus beddomei	32	26	0.135	13.87
Mallotus philippensis	6	6	0.007	2.81
Mangifera indica	2	2	0.899	4.32
Melia dubia	2	2	0.004	0.94
Mesua ferrea	4	4	0.940	5.40
Neolamarckia cadamba	14	10	0.023	5.59
Nothopegia travancorica	4	4	0.015	1.92
Olea dioica	16	12	0.039	6.58
Phaenthus malabaricus	2	2	0.085	1.25
Phyllanthus emblica	2	2	0.005	0.95
Polyalthia fragrans	6	6	0.721	5.50
Pterospermum reticulatum	2	2	0.062	1.16
Pterospermum rubiginosum	4	4	0.257	2.83
Rinorea bengalensis	2	2	0.010	0.96
Sapindus trifoliata	20	18	0.412	10.34
Schleichera oleosa	44	38	1.210	23.50
Sterculia guttata	4	4	0.674	4.40
Stereospermum sp.	2	2	0.543	2.97
Syzygium sp.	4	4	1.485	7.45
Tabernaemontana heyneana	50	30	0.328	19.46
Terminalia bellirica	6	4	1.059	6.28
Terminalia paniculata	10	10	1.167	9.04
Tetrameles nudiflora	18	14	3.816	21.74
Unidentified 1(36)	4	4	0.584	4.06
Unidentified 2(36)	10	8	0.089	4.48
Unidentified 3(36)	2	2	0.205	1.70
Vitex altissima	12	10	0.908	8.50
Wrightia tinctoria	4	4	0.006	1.88
Xanthophyllum arnottianum	28	26	1.838	19.43
Plot Code No. 38-- Kalthuruthy				
Actinodaphne bourdillonii	38	28	0.049	12.57
Actinodaphne tadulingamii	2	2	0.029	0.88

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 38—Kalthuruthy (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Albizia odoratissima	6	6	0.850	5.68
Alstonia scholaris	20	20	0.782	10.81
Anogeissus latifolia	4	4	0.678	4.22
Antiaris toxicaria	6	6	0.011	2.36
Aporusa lindleyana	30	24	0.241	11.15
Bauhinia racemosa	2	2	0.026	0.87
Bombax ceiba	2	2	0.146	1.35
Cassia fistula	4	4	0.107	1.97
Dillenia pentagyna	14	14	1.467	11.20
Ficus exasperata	10	10	0.019	3.93
Gmelina arborea	2	2	0.564	3.00
Lagerstroemia microcarpa	6	6	0.207	3.13
Lannea coromandelica	4	4	0.739	4.47
Litsea laevigata	88	46	0.189	25.13
Macaranga peltata	10	10	0.077	4.16
Mallotus beddomei	10	10	0.026	3.96
Neolamarckia cadamba	20	16	0.193	7.56
Olea dioica	106	56	0.421	31.17
Persea macrantha	10	8	0.288	4.54
Phyllanthus emblica	6	6	0.496	4.27
Psychotria truncata	8	8	0.009	3.12
Sapindus trifoliata	6	6	0.010	2.35
Spondias pinnata	2	2	0.004	0.79
Sterculia guttata	2	2	0.008	0.80
Tabernaemontana heyneana	62	42	0.361	20.78
Terminalia paniculata	142	86	17.162	109.92
Trewia polycarpa	2	2	0.003	0.78
Unidentified C3	4	2	0.007	1.11
Wrightia tinctoria	4	4	0.104	1.95
Plot Code No. 39-- Ottakallu				
Alstonia scholaris	2	2	0.004	0.60
Anogeissus latifolia	2	2	0.110	1.24
Aporusa lindleyana	102	60	0.387	23.77
Buchanania lanzan	20	16	0.254	6.54
Canthium sp.	62	34	0.206	13.80
Careya arborea	28	26	1.315	15.57
Cassia fistula	4	4	0.035	1.36
Dillenia pentagyna	50	38	2.934	29.70
Macaranga peltata	82	42	0.461	18.81
Miliusa tomentosa	4	4	0.006	1.19
Olea dioica	178	70	1.269	38.37
Phyllanthus emblica	26	26	0.738	11.93
Pterocarpus marsupium	4	4	0.462	3.92

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 39-- Ottakallu (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Tabernaemontana heyneana	102	52	0.487	22.84
Tectona grandis	6	6	0.101	2.34
Terminalia crenulata	62	44	2.253	27.95
Terminalia paniculata	288	90	5.706	79.47
Wrightia tinctoria	2	2	0.005	0.61
Plot Code No. 40-- Irumpupalam				
Adenanthera pavonina	2	2	0.042	0.93
Bombax ceiba	14	12	0.493	6.89
Careya arborea	2	2	0.065	1.03
Cassia fistula	6	4	0.012	1.77
Cochlospermum religiosum	12	10	0.021	4.01
Dalbergia latifolia	2	2	0.085	1.12
Dillenia pentagyna	20	20	3.736	24.31
Ficus exasperata	2	2	0.077	1.08
Grewia tiliifolia	14	12	0.718	7.92
Haldina cordifolia	2	2	0.245	1.85
Holarrhena pubescens	174	74	0.887	43.71
Lannea coromandelica	2	2	0.419	2.64
Macaranga peltata	186	76	2.146	51.41
Mallotus philippensis	2	2	0.004	0.75
Miliusa tomentosa	14	14	0.098	5.58
Olea dioica	2	2	0.412	2.61
Oroxylum indicum	4	4	0.020	1.56
Phyllanthus emblica	2	2	0.205	1.67
Schleichera oleosa	2	2	0.007	0.76
Sterculia guttata	14	12	0.757	8.09
Stereospermum sp.	2	2	0.098	1.18
Strychnos nux-vomica	4	4	0.021	1.56
Terminalia bellirica	10	10	3.621	20.12
Terminalia paniculata	32	22	2.026	18.53
Tetrameles nudiflora	4	4	0.007	1.50
Wrightia tinctoria	236	88	3.524	66.84
Xylia xylocarpa	32	26	2.267	20.59
Plot Code No. 42-- Channoth				
Albizia odoratissima	8	8	1.205	7.70
Bauhinia racemosa	2	2	0.006	0.95
Bombax ceiba	12	12	0.499	7.22
Bridelia airy-shawii	10	10	1.104	8.29
Callicarpa tomentosa	4	4	0.023	1.93
Canthium sp.	2	2	0.016	0.98
Dalbergia latifolia	4	4	0.525	3.59
Dillenia pentagyna	2	2	1.292	5.20
Ficus exasperata	4	4	0.131	2.29

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 42-- Channoth (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Ficus sp.	4	4	1.268	6.05
Grewia tiliifolia	36	28	1.825	20.46
Holarrhena pubescens	40	30	0.143	16.19
Lagerstroemia microcarpa	10	10	1.413	9.31
Lannea coromandelica	6	6	0.688	5.06
Macaranga peltata	2	2	0.007	0.95
Mallotus philippensis	34	22	0.187	12.97
Miliusa tomentosa	12	12	0.028	5.66
Naringi crenulata	8	6	0.017	3.20
Oroxylum indicum	4	4	0.011	1.89
Sapindus trifoliata	4	2	0.008	1.31
Schleichera oleosa	12	12	0.019	5.63
Sterculia guttata	2	2	0.004	0.94
Stereospermum sp.	2	2	0.006	0.95
Tectona grandis	12	12	2.703	14.51
Terminalia bellirica	2	2	2.942	10.65
Terminalia paniculata	14	12	1.310	10.26
Tetrameles nudiflora	2	2	2.793	10.16
Unidentified 1(42)	6	6	0.010	2.82
Wrightia tinctoria	252	84	1.440	73.76
Xylia xylocarpa	48	42	8.636	49.11
Plot Code No. 48- Aralam				
Actinodaphne anguistifolia	2	2	0.005	0.53
Alseodaphne semecarpifolia	2	2	0.010	0.56
Antiaris toxicaria	4	4	0.425	3.02
Aporusa lindleyana	70	46	0.883	18.48
Artocarpus hirsutus	26	26	0.540	9.15
Atalantia racemosa	42	24	0.557	10.70
Baccaurea courtallensis	36	22	0.182	7.98
Caryota urens	2	2	0.216	1.53
Chionanthus malabaricus	98	46	0.975	21.98
Cinnamomum malabatrum	8	8	0.121	2.60
Dillenia pentagyna	16	16	3.979	22.80
Diospyros sp.4	14	12	0.126	3.86
Drypetes elata	28	22	0.240	7.38
Dysoxylum malabaricum	8	8	0.030	2.18
Elaeocarpus serratus	4	4	0.036	1.19
Euodia lunu-ankenda	8	8	0.076	2.39
Ficus exasperata	66	34	0.729	15.58
Flacourtia montana	2	2	0.005	0.53
Garcinia gummi-gutta	4	4	0.017	1.10
Garcinia morella	4	4	0.012	1.07
Garcinia rubro-echinata	2	2	0.004	0.53

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 48- Aralam (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Holigarna arnottiana	26	22	3.039	20.34
Hopea parviflora	2	2	0.004	0.53
Hopea ponga	28	22	0.187	7.13
Hydnocarpus pentandra	16	12	0.220	4.52
Ixora brachiata	20	20	0.082	5.47
Knema attenuata	6	6	0.017	1.60
Lagerstroemia microcarpa	2	2	0.183	1.37
Lagerstroemia reginae	4	4	0.253	2.21
Leptonychia caudata	4	4	0.025	1.13
Litsea laevigata	44	38	0.181	11.17
Macaranga peltata	4	4	0.299	2.42
Mallotus philippensis	60	40	0.689	15.60
Mangifera indica	16	14	0.164	4.55
Meiogyne pannosa	2	2	0.019	0.60
Naringi crenulata	12	12	0.327	4.59
Nothopegia sp.	8	6	0.017	1.82
Olea dioica	24	22	0.117	6.36
Persea macrantha	18	16	0.478	6.54
Polyalthia fragrans	26	20	0.072	6.08
Pongamia pinnata	4	4	0.024	1.13
Sapindus trifoliata	18	16	0.242	5.42
Schleichera oleosa	4	4	0.367	2.74
Stereospermum sp.	6	6	0.101	2.00
Strychnos nux-vomica	2	2	0.008	0.54
Symplocos racemosa var *racemosa*	4	4	0.006	1.05
Syzygium sp.	12	8	0.130	3.08
Terminalia paniculata	4	4	1.542	8.28
Trewia nudiflora	16	16	0.370	5.81
Unidentified 1(48)	20	16	0.065	4.81
Xanthophyllum arnottianum	14	12	0.077	3.63
Xylia xylocarpa	40	34	2.766	22.33
Plot Code No.56-- Parappa				
Actinodaphne anguistifolia	2	2	0.084	1.02
Alseodaphne semecarpifolia	4	4	0.268	2.25
Aporusa lindleyana	32	22	1.070	13.25
Chionanthus malabaricus	4	4	0.032	1.75
Dalbergia latifolia	2	2	0.457	1.81
Dillenia pentagyna	2	2	1.050	3.06
Ficus sp.	2	2	1.329	3.65
Flacourtia montana	42	26	0.440	14.64
Holigarna arnottiana	46	32	2.625	21.43
Holoptelea integrifolia	4	4	0.204	2.11
Hopea parviflora	86	54	8.841	46.95

P. T. O

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No.56-- Parappa (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($m^2 ha^{-1}$)**	**Importance Value Index**
Hydnocarpus pentandra	2	2	0.084	1.02
Ixora nigricans	38	24	0.429	13.43
Lagerstroemia microcarpa	2	2	0.158	1.17
Lannea coromandelica	4	4	1.041	3.88
Mallotus philippensis	2	2	0.202	1.27
Miliusa tomentosa	28	26	2.745	17.07
Naringi crenulata	2	2	0.004	0.85
Olea dioica	48	40	1.089	20.50
Phoebe lanceolata	2	2	0.025	0.89
Schleichera oleosa	20	20	2.561	13.81
Strychnos nux-vomica	10	10	0.102	4.42
Swietenia mahagoni	82	20	0.136	19.52
Tabernaemontana heyneana	6	6	0.035	2.59
Tectona grandis	32	32	8.696	31.81
Terminalia bellirica	6	6	1.304	5.27
Terminalia crenulata	2	2	0.376	1.63
Terminalia paniculata	56	50	11.649	46.65
Xylia xylocarpa	4	4	0.303	2.32
Plot Code No. 57-- Vani Nagar				
Alseodaphne semecarpifolia	2	2	0.126	1.02
Aporusa lindleyana	66	50	2.513	24.72
Artocarpus gomezianus	4	4	0.222	1.94
Atalantia wightii	4	4	0.007	1.15
Canthium sp.	46	26	0.166	9.70
Careya arborea	4	4	0.061	1.35
Cassia fistula	2	2	0.011	0.60
Celtis philippensis	4	4	0.981	4.72
Dillenia pentagyna	10	10	1.962	10.00
Ficus talbotii	2	2	0.378	1.95
Flacourtia montana	200	52	1.389	32.69
Holigarna arnottiana	404	80	2.768	61.00
Ixora nigricans	160	68	0.721	29.88
Lagerstroemia microcarpa	6	6	0.302	2.80
Lannea coromandelica	2	2	0.296	1.65
Macaranga peltata	2	2	0.006	0.59
Mallotus philippensis	2	2	0.002	0.57
Mangifera indica	8	6	0.031	1.98
Memecylon umbellatum	2	2	0.002	0.57
Miliusa tomentosa	4	4	0.723	3.77
Mimusops elengi	6	6	0.009	1.73
Naringi crenulata	2	2	0.002	0.57
Neolamarckia cadamba	2	2	0.298	1.65
Schleichera oleosa	10	10	2.708	12.73

P. T. O.

Appendix 1 (cont'd). Plot-wise details of trees (gbh ≥ 10.1cm) in the permanent plots established in different forest types of Kerala

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($m^2 ha^{-1}$)	Importance Value Index
Moist Deciduous Forests (cont'd).				
Plot Code No.57-- Vani Nagar (cont'd).				
Olea dioica	22	18	0.890	8.69
Phoebe lanceolata	4	4	0.022	1.21
Sterculia guttata	4	4	0.248	2.04
Stereospermum sp.	8	8	1.695	8.46
Strychnos nux-vomica	16	14	0.814	7.11
Syzygium sp.	2	2	0.112	0.97
Tabernaemontana heyneana	40	28	0.092	9.29
Terminalia bellirica	12	12	1.638	9.38
Terminalia crenulata	34	26	2.661	17.78
Terminalia paniculata	36	30	2.731	18.99
Trewia polycarpa	2	2	0.257	1.50
Unidentified C2	2	2	0.003	0.58
Vitex altissima	8	8	0.382	3.66
Xanthophyllum arnottianum	2	2	0.108	0.96
Dry Deciduous Forests				
Plot Code No.43-- Alampetty				
Albizia amara	82	48	2.044	33.76
Anogeissus latifolia	74	42	2.881	35.48
Bauhinia racemosa	4	4	0.253	2.86
Carissa carandas	4	4	0.011	1.61
Celtis timorensis	2	2	0.032	0.94
Chloroxylon swietenia	286	92	8.517	105.78
Commiphora caudata	16	14	0.160	6.53
Dalbergia lanceolaria	12	8	0.143	4.38
Dichrostachys cinerea	6	6	0.006	2.36
Ficus sp.	4	4	1.167	7.58
Givotia rottleriformis	2	2	0.194	1.78
Grewia sp.	6	6	0.066	2.67
Gyrocarpus asiaticus	4	4	0.037	1.75
Hardwickia binata	4	4	0.025	1.68
Ixora arborea	16	14	0.290	7.20
Lannea coromandelica	14	14	0.322	7.10
Pavetta indica	16	16	0.159	7.03
Phyllanthus emblica	2	2	0.062	1.10
Premna tomentosa	22	22	0.268	9.92
Pterocarpus marsupium	4	4	0.209	2.63
Strychnos potatorum	138	62	1.859	43.89
Tectona grandis	8	8	0.404	5.19
Wrightia tinctoria	16	10	0.251	5.99
Ziziphus oenoplia	2	2	0.002	0.79

Appendix 2. Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Shola Forests				
Plot Code No. 45 - Vagadurai				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (cm^2 ha^{-1})**	**Importance Value Index**
Apollonias arnottii	333	58	976.64	27.22
Beilschmiedia wightii	100	17	201.67	7.10
Canarium strictum	33	8	31.69	2.47
Chionanthus sp.	67	17	101.88	5.32
Cinnamomum sp.	67	17	68.36	4.98
Cinnamomum wightii	100	17	422.45	9.34
Garcinia sp.	200	17	568.33	13.14
Glochidion neilgherrence	33	8	9.43	2.24
Gomphandra coriacea	133	25	242.79	9.67
Ilex sp.	67	8	179.40	4.73
Isonandra perrottetiana	33	8	37.71	2.53
Litsea oleoides	200	33	681.21	17.02
Litsea sp.	133	33	107.38	9.67
Microtropis sp	367	50	1362.95	30.53
Neolitsea scrobiculata	1067	75	1800.60	55.34
Nothapodytes nimmoniana	67	8	554.45	8.53
Psychotria sp.	233	33	651.62	17.50
Saprosma sp.	33	8	51.33	2.66
Scolopia crenata	233	25	541.88	15.02
Symplocos macrophylla	67	17	110.26	5.41
Symplocos sp.	133	25	324.24	10.49
Syzygium densiflorum	300	33	624.38	18.77
Unidentified 4(45)	33	8	37.71	2.53
Unidentified 1(45)	133	33	115.50	9.75
Unidentified 3(45)	33	8	37.71	2.53
Unidentified 5(45)	67	8	30.64	3.23
Unidentified 6(45)	33	8	16.76	2.31
Evergreen Forests				
Plot Code No. 10 - Vaniampuzha				
Actinodaphne sp.	40	25	7.86	9.27
Artocarpus hirsutus	120	30	59.48	20.19
Baccaurea courtallensis	40	10	20.11	6.76
Cinnamomum malabatrum	40	10	14.11	6.17
Dimocarpus longan	40	10	11.31	5.90

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).				
Plot Code No. 10 – Vaniampuzha (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Diospyros bourdillonii	200	50	99.16	33.65
Holigarna arnottiana	40	10	5.03	5.29
Ixora nigricans	120	20	171.91	28.69
Knema attenuata	280	40	87.14	34.66
Macaranga peltata	40	10	13.28	6.09
Miliusa tomentosa	40	10	20.11	6.76
Myristica malabarica	120	30	43.37	18.62
Phaenthus malabarica	40	10	20.11	6.76
Polyalthia fragrans	160	40	96.17	28.56
Pterygota alata	40	10	45.26	9.21
Sapindus trifoliata	40	10	13.28	6.09
Symplocos macrophylla	40	10	20.11	6.76
Syzygium gardneri	80	20	27.97	12.32
Unidentified 12(10)	40	10	31.43	7.86
Unidentified 2(11)	40	10	31.43	7.86
Unidentified 6(10)	40	10	31.43	7.86
Unidentified 7(10)	40	10	101.83	14.73
Unidentified 8(10)	40	10	53.11	9.98
Plot Code No.11 – Vaniampuzha				
Artocarpus hirsutus	120	38	15.71	13.89
Bischofia javanica	120	20	41.88	12.18
Canarium strictum	120	10	59.40	11.38
Cinnamomum malabatrum	80	20	19.17	8.85
Dimocarpus longan	160	40	154.63	25.75
Diospyros bourdillonii	80	20	42.74	10.48
Diospyros sp.2	40	10	11.31	4.55
Flacourtia montana	40	10	15.40	4.83
Garcinia gummi-gutta	240	30	193.60	29.94
Ixora nigricans	80	20	78.57	12.96
Knema attenuata	80	20	21.14	8.99
Mallotus philippensis	80	10	105.91	12.84
Mangifera indica	40	10	17.68	4.99
Myristica malabarica	80	20	40.23	10.31
Pterygota alata	40	10	6.36	4.20
Sterculia guttata	80	20	28.68	9.51
Syzygium gardneri	40	10	20.11	5.16
Syzygium sp.	120	30	38.03	13.92
Unidentified 5(11)	80	20	46.83	10.77

P. T. O

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).				
Plot Code No. 11 – Vaniampuzha (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Unidentified 1(11)	40	10	90.83	10.04
Unidentified 2(11)	120	30	53.43	14.99
Unidentified 3(11)	240	50	283.49	40.18
Unidentified 4(11)	40	10	25.46	5.52
Unidentified 6(11)	80	20	20.43	8.94
Xanthophyllum arnottianum	40	10	15.40	4.83
Plot Code No. 14 - Pothumala				
Aglaia lawii	160	38	343.20	24.19
Aglaia tomentosa	40	10	11.31	4.10
Cassine glauca	40	10	70.71	5.75
Cullenia exarillata	80	20	172.54	12.36
Dimocarpus longan	160	40	218.11	21.20
Drypetes elata	240	50	357.74	30.72
Heritiera papilio	280	60	826.57	47.53
Isonandra lanceolata	80	20	63.49	9.33
Litsea floribunda	200	50	346.66	28.56
Litsea insignis	160	40	222.20	21.31
Litsea sp.2	120	30	166.89	15.99
Mastixia arborea	40	10	11.31	4.10
Memecylon sp.	280	70	644.60	44.41
Mesua ferrea	40	10	25.46	4.49
Myristica dactyloides	40	10	61.60	5.50
Palaquium ellipticum	80	20	16.34	8.02
Persea macrantha	120	30	38.66	12.43
Plot Code No. 15 - Pothumala				
Aglaia lawii	200	50	365.51	25.18
Cullenia exarillata	40	10	31.43	4.09
Dimocarpus longan	440	60	240.74	32.56
Drypetes elata	280	50	896.34	40.02
Garcinia gummi-gutta	40	10	31.43	4.09
Heritiera papilio	160	20	106.54	11.91
Isonandra lanceolata	40	10	101.83	5.69
Litsea floribunda	480	70	615.69	44.47
Litsea insignis	120	20	324.66	15.51
Litsea sp.2	280	60	378.71	30.22
Mastixia arborea	80	20	46.83	7.81
Memecylon sp.	480	60	818.71	47.10
Mesua ferrea	40	10	15.40	3.72
Myristica dactyloides	80	20	254.26	12.53
Persea macrantha	160	30	159.34	15.11

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).				
Plot Code No. 16 - Pakuthipalam				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area (cm^2 ha^{-1})**	**Importance Value Index**
Aglaia lawii	600	100	381.54	52.51
Aglaia tomentosa	240	40	181.03	21.86
Agrostistachys borneensis	80	20	46.59	8.04
Bischofia javanica	80	20	56.89	8.35
Coffea sp.	40	10	20.11	3.92
Dimocarpus longan	120	30	61.91	11.82
Drypetes elata	40	10	20.11	3.92
Drypetes wightii	120	30	89.57	12.66
Fahrenheitia zeylanica	40	10	15.40	3.78
Litsea floribunda	200	50	74.49	18.84
Litsea insignis	40	10	25.46	4.09
Litsea sp.2	40	10	25.46	4.09
Mastixia arborea	40	10	20.11	3.92
Melia dubia	80	20	83.29	9.15
Memecylon sp.	40	10	1540.00	49.85
Mesua ferrea	120	30	51.54	11.51
Miliusa wightiana	40	10	25.46	4.09
Myristica dactyloides	160	40	86.43	15.88
Sp*ondias pinnata*	40	10	20.11	3.92
Syzygium sp.	80	20	51.54	8.19
Unidentified 1(16)	120	30	111.57	13.32
Unidentified 2(16)	40	10	38.03	4.47
Unidentified 3(16)	40	10	138.60	7.50
Unidentified 4(16)	80	20	91.14	9.39
Unidentified 5(16)	40	10	53.11	4.92
Plot Code No. 18 - Iringole				
Antidesma menasu	360	60	358.29	28.11
Artocarpus hirsutus	560	90	1171.97	52.11
Cinnamomum malabatrum	280	50	666.60	28.12
Diospyros bourdillonii	360	70	1120.43	41.03
Garcinia sp.	40	10	53.11	3.91
Holigarna arnottiana	240	50	594.31	25.72
Hopea parviflora	160	30	176.31	13.34
Hopea ponga	40	10	11.31	3.30
Hydnocarpus pentandra	160	40	242.63	16.09
Macaranga peltata	160	10	142.37	9.27
Mallotus philippensis	80	20	78.57	7.42
Memecylon sp.	160	40	251.11	16.22
Myristica malabarica	40	10	342.26	8.14
Olea dioica	40	10	38.03	3.69

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).				
Plot Code No. 18 – Iringole (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Polyalthia fragrans	80	20	70.71	7.31
Vateria indica	200	40	1529.31	36.23
Plot Code No. 21 Chalikuzhy				
Actinodaphne bourdillonii	100	43	279.19	34.63
Antiaris toxicaria	33	14	58.93	10.07
Aporusa acuminata	33	14	358.55	22.97
Aporusa lindleyana	33	14	31.69	8.90
Artocarpus hirsutus	33	14	21.21	8.45
Calophyllum polyanthum	33	14	44.26	9.44
Croton malabaricus	167	40	580.38	52.56
Diospyros sp.2	33	10	37.71	7.78
Dysoxylum malabaricum	33	10	115.50	11.13
Hydnocarpus pentandra	67	20	42.95	14.16
Macaranga peltata	100	17	71.24	17.25
Mallotus philippensis	33	8	21.21	6.53
Olea dioica	33	8	51.33	7.83
Persea macrantha	67	17	103.19	15.69
Pterygota alata	100	8	127.29	16.98
Syzygium sp.	133	33	97.95	26.70
Tabernaemontana heyneana	67	17	235.71	21.39
Unidentified 3(21)	33	8	44.26	7.53
Plot Code No. 22 Chalikuzhy				
Aglaia sp.	67	33	61.02	21.13
Aporusa lindleyana	433	58	1686.40	100.01
Baccaurea courtallensis	100	17	189.10	19.72
Bischofia javanica	33	8	104.76	8.75
Diospyros bourdillonii	167	25	329.21	32.01
Litsea sp.	67	17	118.38	15.35
Meiogyne pannosa	100	17	268.98	21.61
Polyalthia fragrans	67	17	158.45	16.29
Xanthophyllum arnottianum	200	42	1312.93	65.12
Plot Code No. 24 - Meenar				
Actinodaphne bourdillonii	167	71	350.95	40.95
Cinnamomum keralaence	300	58	477.45	49.04
Dimocarpus longan	67	17	69.40	11.22
Drypetes elata	33	8	205.33	9.34
Litsea sp.	267	50	871.10	52.78
Litsea sp.	33	8	302.76	11.46
Myristica malabarica	33	8	67.05	6.32
Neolitsea cassia	200	33	688.02	39.08

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).				
Plot Code No. 24 – Meenar (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Persea macrantha	67	17	243.05	15.01
Psychotria sp.	33	8	251.69	10.35
Syzygium sp.	33	8	126.76	7.62
Unidentified 2(24)	133	25	451.52	26.74
Unidentified 5(24)	33	8	339.43	12.26
Unidentified 8(24)	33	8	136.15	7.82
Plot Code No. 25 - Meenar				
Dimocarpus longan	44	11	357.59	140.12
Garcinia sp.	44	11	100.92	87.40
Unidentified 1(25)	44	11	28.29	72.48
Plot Code No. 27 - Meenar				
Actinodaphne bourdillonii	473	73	1497.43	101.36
Aglaia sp.	36	9	41.14	6.64
Antidesma menasu	73	18	97.14	13.76
Cinnamomum keralaence	218	18	263.43	27.48
Cullenia exarillata	109	27	98.86	19.13
Dimocarpus longan	36	9	28.57	6.23
Garcinia sp.	36	9	41.14	6.64
Litsea sp.	109	27	160.57	21.12
Macaranga peltata	291	27	189.71	32.48
Persea macrantha	146	18	364.29	26.58
Symplocos sp.	36	9	64.29	7.39
Syzygium sp.	73	9	64.29	9.47
Unidentified 1(27)	36	9	64.29	7.39
Unidentified 2(27)	36	9	73.14	7.68
Unidentified 3(27)	36	9	41.14	6.64
Plot Code No. 32-- Kulirkadavu				
Actinodaphne bourdillonii	100	22	39.02	6.37
Aglaia sp.	767	67	802.21	42.12
Antidesma menasu	100	25	88.52	7.69
Aporusa lindleyana	33	8	44.26	2.83
Baccaurea courtallensis	100	25	147.71	8.76
Croton malabaricus	167	33	201.21	12.52
Diospyros bourdillonii	167	25	194.33	11.12
Diospyros buxifolia	33	8	31.69	2.60
Drypetes elata	33	8	21.21	2.41
Garcinia gummi-gutta	333	42	782.23	28.09
Hopea parviflora	100	17	96.90	6.57
Kingiodendron pinnatum	67	17	29.60	4.59
Knema attenuata	67	8	57.88	3.83

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Evergreen Forests (cont'd).				
Plot Code No. 32 – Kulirkadavu (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Mallotus beddomei	433	33	513.60	24.23
Mallotus philippensis	33	8	9.43	2.20
Meiogyne ramarowii	267	42	348.60	18.73
Nothopegia travancorica	67	17	136.19	6.52
Palaquium ellipticum	100	8	64.17	4.71
Poeciloneuron indicum	367	50	302.24	21.43
Polyalthia fragrans	33	8	58.93	3.10
Pterospermum reticulatum	33	8	9.43	2.20
Symplocos macrophylla sp. *rosea*	33	8	21.21	2.41
Trichilia connaroides	200	33	243.05	14.03
Unidentified 6(32)	67	8	96.64	4.54
Unidentified 7(32)	33	8	138.55	4.54
Unidentified 1(32)	167	33	493.95	17.81
Unidentified 12(32)	133	17	113.93	7.64
Unidentified 2(32)	33	8	14.73	2.30
Unidentified 4(32)	33	8	37.71	2.71
Vateria indica	67	8	88.52	4.39
Xanthophyllum arnottianum	233	42	296.28	17.02
Plot Code No. 50-- Adakkathode				
Aglaia lawii	733	92	1495.48	36.27
Aglaia sp.	300	25	382.38	11.20
Aglaia sp.2	100	17	115.50	4.77
Antidesma alexiteria	100	25	201.40	6.63
Artocarpus hirsutus	67	17	15.98	3.42
Canthium sp.	33	8	21.21	1.82
Cinnamomum malabatrum	133	25	121.26	6.46
Croton malabaricus	167	17	502.33	9.04
Diospyros bourdillonii	33	8	138.55	2.81
Diospyros oocarpa	367	42	405.43	14.68
Drypetes elata	1900	58	2282.50	56.12
Garcinia gummi-gutta	33	8	67.05	2.21
Garcinia morella	33	8	31.69	1.91
Garcinia talbotii	100	25	365.10	8.01
Holigarna arnottiana	33	8	67.05	2.21
Hopea parviflora	100	25	84.60	5.64
Hydnocarpus pentandra	133	17	218.43	6.14
Knema attenuata	67	17	37.98	3.61
Meiogyne pannosa	700	75	2175.12	39.21
Memecylon umbellatum	67	17	281.02	5.66
Myristica malabarica	67	17	327.38	6.05

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($cm^2 ha^{-1}$)	Importance Value Index
Evergreen Forests (cont'd).				
Plot Code No. 50 – Adakkathode (cont'd).				
Nothopegia sp.	33	8	16.76	1.79
Polyalthia fragrans	133	25	449.95	9.23
Pterospermum diversifolium	33	8	51.33	2.08
Pterygota alata	67	17	152.95	4.58
Syzygium gardneri	233	8	597.93	9.73
Syzygium hemisphericum	33	8	51.33	2.08
Syzygium sp.3	133	17	91.14	5.07
Syzygium zeylanicum	167	17	233.10	6.77
Vateria indica	67	17	277.88	5.63
Xanthophyllum arnottianum	400	58	609.98	19.18
Semi-evergreen Forests				
Plot Code No. 6 - Pandarampara				
Actinodaphne tadulingamii	40	25	4.59	6.55
Aporusa lindleyana	120	50	16.41	15.89
Beilschmiedia wightii	40	11	3.85	3.99
Cinnamomum malabatrum	40	11	2.57	3.71
Croton malabaricus	160	40	31.75	18.68
Dichapetalum gelanoides	80	20	5.65	7.14
Grewia tiliifolia	120	30	7.33	10.47
Holarrhena pubescens	80	10	23.01	9.13
Holigarna arnottiana	80	20	2.84	6.54
Macaranga peltata	120	20	24.70	12.46
Mallotus philippensis	360	60	37.53	29.55
Miliusa tomentosa	200	40	21.02	17.61
Naringi crenulata	80	20	4.74	6.95
Polyalthia fragrans	600	50	158.07	61.10
Pterospermum reticulatum	200	20	9.35	11.64
Sapindus trifoliata	320	50	15.10	21.78
Sterculia guttata	200	30	11.20	13.77
Stereospermum sp.	40	10	1.80	3.35
Wrightia tinctoria	40	10	39.00	11.33
Xylia xylocarpa	320	50	45.76	28.35
Plot Code No. 7 - Pandarampara				
Aporusa lindleyana	40	11	23.19	8.74
Artocarpus hirsutus	40	11	0.51	4.80
Cinnamomum malabatrum	120	33	10.36	15.93
Croton malabaricus	40	11	10.32	6.50
Dimocarpus longan	80	11	11.85	8.81
Kingiodendron pinnatum	160	44	34.69	24.87
Mallotus philippensis	80	22	3.61	10.04

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 7 – Pandarampara (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Myristica malabarica	120	22	61.96	22.23
Polyalthia fragrans	520	80	686.92	98.27
Pterospermum reticulatum	160	40	9.63	19.44
Schleichera oleosa	200	40	17.35	22.82
Sterculia guttata	120	30	39.88	20.26
Xanthophyllum arnottianum	280	60	49.45	37.29
Plot Code No. 23 - Manakkayam				
Actinodaphne sp.	36	100	14.00	23.82
Antiaris toxicaria	36	100	10.29	23.59
Aporusa lindleyana	218	100	169.14	48.08
Artocarpus hirsutus	36	25	18.29	9.07
Bischofia javanica	36	20	34.57	9.07
Dimocarpus longan	36	9	92.57	10.46
Diospyros bourdillonii	218	36	421.43	50.87
Diospyros buxifolia	36	9	23.14	6.19
Knema attenuata	73	18	55.14	12.92
Mallotus philippensis	291	36	457.71	58.99
Persea macrantha	36	9	41.14	7.29
Pterospermum reticulatum	36	9	18.29	5.89
Xanthophyllum arnottianum	146	27	268.57	33.76
Plot Code No. 30 - Achencoil				
Aglaia elaeagnoidea	867	73	984.50	37.93
Antiaris toxicaria	67	18	35.62	4.21
Atalantia racemosa	67	18	44.52	4.32
Baccaurea courtallensis	333	36	327.12	15.17
Canarium strictum	33	9	26.19	2.20
Cleidion spiciflorum	100	18	78.31	5.34
Croton malabaricus	67	18	54.48	4.43
Dimocarpus longan	33	9	37.71	2.34
Diospyros bourdillonii	633	67	664.78	28.98
Diospyros oocarpa	33	8	26.19	2.10
Elaeocarpus serratus	33	8	58.93	2.47
Garcinia gummi-gutta	67	8	248.55	5.29
Hopea parviflora	67	17	37.98	4.03
Ixora nigricans	67	17	130.95	5.10
Kingiodendron pinnatum	67	17	26.19	3.89
Knema attenuata	333	42	314.29	15.76
Kydia sp.	33	8	58.93	2.47
Macaranga peltata	67	8	125.98	3.88
Mallotus philippensis	267	50	544.76	18.31

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 30 – Achencoil (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Mangifera indica	33	8	58.93	2.47
Meiogyne pannosa	67	8	134.62	3.98
Meiogyne ramarowii	100	17	86.17	5.22
Melia azederach	33	8	3.21	1.83
Nothopegia travancorica	200	33	177.83	10.49
Polyalthia fragrans	467	25	584.44	19.07
Pterospermum reticulatum	67	17	151.90	5.34
Syzygium hemisphericum	33	8	2121.43	26.21
Unidentified (30)	633	83	845.49	33.38
Unidentified 1(30)	100	17	287.31	7.53
Unidentified 10(30)	33	8	21.21	2.04
Unidentified 4(30)	67	8	47.40	2.97
Unidentified 8(30)	100	8	216.33	5.55
Vepris bilocularis	100	17	128.33	5.70
Plot Code No. 31 - Kottavasal (Achencoil)				
Atalantia racemosa	300	36	317.43	94.27
Atalantia wightii	67	8	134.62	26.16
Mallotus philippensis	33	8	51.33	15.31
Nothopegia sp.	33	8	21.21	12.96
Trichilia connaroides	267	42	613.90	117.47
Unidentified 1(31)	33	8	58.93	15.91
Unidentified 2(31)	33	8	84.86	17.93
Plot Code No. 34 - Kottavasal (Aryankavu)				
Aglaia sp.	3933	92	3630.33	101.48
Atalantia racemosa	1200	83	2765.12	56.13
Diospyros buxifolia	100	25	269.57	8.46
Diospyros foliosa	100	8	429.00	6.69
Ixora nigricans	67	8	39.02	2.81
Kingiodendron pinnatum	33	8	419.05	5.73
Litsea laevigata	33	8	31.69	2.31
Mallotus intermedius	33	8	75.69	2.70
Mallotus philippensis	333	67	376.36	20.42
Meiogyne ramarowii	100	17	326.07	7.37
Memecylon gracile	67	8	63.90	3.03
Olea dioica	33	8	37.71	2.36
Pterospermum reticulatum	100	25	55.79	6.58
Trichilia connaroides	1033	83	1985.43	47.05
Unidentified 1(34)	67	17	89.05	4.84
Unidentified 10(34)	33	8	94.55	2.86
Unidentified 111(34)	33	8	115.50	3.05

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 34 – Kottavasal, Aryankavu (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Unidentified 5(34)	33	8	9.43	2.11
Unidentified 7(34)	133	8	164.48	4.80
Xanthophyllum arnottianum	100	25	354.88	9.22
Plot Code No. 35 - Palaruvi				
Aglaia sp.	300	50	417.02	27.74
Antiaris toxicaria	67	17	289.40	10.37
Antidesma menasu	33	8	302.76	7.54
Atalantia racemosa	100	25	111.57	10.76
Baccaurea courtallensis	67	8	141.69	6.25
Diospyros bourdillonii	167	17	213.19	12.57
Diospyros foliosa	33	8	75.69	4.16
Diospyros sp.	33	8	220.26	6.31
Grewia tiliifolia	67	8	279.19	8.30
Ixora nigricans	200	33	262.49	18.26
Kingiodendron pinnatum	67	8	170.24	6.68
Litsea laevigata	33	8	14.73	3.25
Mallotus beddomei	333	33	1027.71	34.09
Meiogyne ramarowii	67	17	221.31	9.36
Phaenthus malabarica	100	17	78.31	8.34
Polyalthia fragrans	33	8	67.05	4.03
Sterculia guttata	67	17	153.21	8.35
Trichilia connaroides	100	17	642.45	16.74
Unidentified (35)	733	42	1063.99	49.89
Unidentified 10(35)	33	8	419.05	9.27
Unidentified 14(35)	33	8	58.93	3.91
Unidentified 15(35)	33	8	67.05	4.03
Unidentified 5(35)	33	8	26.19	3.42
Unidentified 6(35)	33	8	150.86	5.28
Vateria indica	133	25	148.04	12.42
Vepris bilocularis	67	8	67.11	5.14
Vitex altissima	33	8	31.69	3.51
Plot Code No. 37 - Kalthuruthy				
Actinodaphne bourdillonii	36	9	18.29	7.10
Aglaia sp.	36	9	240.29	14.68
Antidesma menasu	36	9	34.57	7.66
Artocarpus hirsutus	73	9	101.50	12.97
Atalantia racemosa	36	9	28.57	7.45
Baccaurea courtallensis	36	9	240.29	14.68
Cleidion spiciflorum	73	9	127.14	13.85
Dimocarpus longan	36	9	73.14	8.97

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 37 – Kalthututhy (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Dimorphocalyx beddomei	36	9	240.29	14.68
Diospyros bourdillonii	109	18	153.71	21.23
Diospyros sp.2	36	9	73.14	8.97
Dysoxylum malabaricum	36	9	208.29	13.59
Holigarna grahamii	73	18	254.29	21.63
Ixora nigricans	36	9	44.64	8.00
Kingiodendron pinnatum	36	9	52.07	8.26
Knema attenuata	36	9	23.14	7.27
Lepisanthes tetraphylla	36	9	34.57	7.66
Mallotus philippensis	36	9	114.29	10.38
Meiogyne ramarowii	36	9	56.00	8.39
Memecylon umbellatum	36	9	14.00	6.96
Myristica dactyloides	73	18	127.14	17.30
Phaenthus malabarica	36	9	82.57	9.30
Polyalthia fragrans	73	9	272.29	18.80
Pterospermum reticulatum	36	9	126.00	10.78
Sterculia guttata	36	9	126.00	10.78
Unidentified 4(37)	36	9	64.29	8.67
Plot Code No. 41 - Vellanipacha				
Actinodaphne hoockeriana	33	100	12.83	21.70
Aglaia lawii	200	20	433.45	17.07
Aglaia sp.	467	45	668.38	35.01
Atalantia wightii	167	27	453.62	17.61
Cinnamomum malabatrum	33	9	419.05	8.63
Cynometra travancorica	100	18	154.52	9.37
Dimocarpus longan	133	9	246.45	9.95
Diospyros bourdillonii	67	18	113.40	7.62
Diospyros sp.2	167	18	250.90	13.06
Drypetes elata	67	18	63.38	6.95
Hopea parviflora	33	9	44.26	3.64
Kingiodendron pinnatum	33	9	37.71	3.55
Litsea sp.	33	9	177.05	5.41
Meiogyne pannosa	633	73	1948.57	63.62
Memecylon umbellatum	200	25	1009.64	25.76
Nothopegea sp.2(41)	100	8	628.05	13.67
Persea macrantha	67	17	303.81	9.84
Pterospermum diversifolium	33	8	58.93	3.68
Syzygium laetum	33	8	67.05	3.79
Unidentified 1(41)	33	8	177.05	5.26
Unidentified 2(41)	67	17	88.26	6.97

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 41 – Vellanipacha (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Unidentified 2(41)	33	8	115.50	4.44
Vepris bilocularis	33	8	37.71	3.40
Plot Code No. 44 - Neriyamangalam				
Aglaia sp.	33	8	21.21	1.65
Antiaris toxicaria	100	25	592.17	9.06
Antidesma menasu	67	17	44.52	3.32
Aporusa lindleyana	67	17	248.55	4.91
Artocarpus hirsutus	167	42	89.83	8.13
Baccaurea courtallensis	233	42	1078.52	16.71
Bauhinia racemosa	67	17	11.79	3.06
Cinnamomum sp.	33	8	84.86	2.15
Croton malabaricus	133	17	325.81	6.40
Diospyros sp.	1367	92	1833.33	43.94
Elaeocarpus serratus	33	8	37.71	1.78
Garcinia gummi-gutta	100	8	55.26	2.80
Harpullia arborea	33	8	37.71	1.78
Holigarna sp.	33	8	31.69	1.73
Holigarna sp.2(44)	133	17	189.88	5.34
Hopea parviflora	33	8	104.76	2.30
Knema attenuata	233	42	353.57	11.07
Litsea sp.	33	8	6.55	1.54
Macaranga peltata	33	8	9.43	1.56
Memecylon sp.	67	8	52.90	2.34
Myristica malabarica	33	8	75.69	2.07
Nothopegia sp.	33	8	44.26	1.83
Otonephelium stipulaceum	100	25	117.86	5.38
Palaquium ellipticum	67	8	42.95	2.26
Polyalthia fragrans	967	58	2468.98	39.39
Pterygota alata	567	75	799.60	23.15
Unidentified 1(44)	100	17	116.81	4.33
Unidentified 2(44)	67	8	151.90	3.11
Unidentified 3(44)	67	17	69.40	3.51
Unidentified 5(44)	33	8	31.69	1.73
Vateria indica	867	58	1699.04	32.06
Vepris bilocularis	167	25	191.19	6.83
Xanthophyllum arnottianum	1433	75	1836.28	42.77
Plot Code No. 46 - Vazhikadavu				
Aglaia lawii	233	33	212.67	22.03
Aporusa bourdillonii	100	33	199.31	15.87
Baccaurea courtallensis	67	22	118.38	10.28

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 46 – Vazhikadavu (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Cinnamomum malabatrum	33	11	37.71	4.70
Diospyros bourdillonii	200	67	329.21	30.31
Diospyros sp.2	33	11	58.93	5.13
Holigarna grahamii	33	11	31.69	4.57
Knema attenuata	700	73	1725.95	82.46
Meiogyne ramarowii	133	33	227.86	17.93
Memecylon umbellatum	67	17	72.55	8.11
Myristica malabarica	133	25	256.40	16.68
Pterygota alata	67	17	529.05	17.51
Syzygium gardneri	33	8	37.71	4.09
Toona ciliata	33	8	51.33	4.37
Unidentified 1(46)	100	17	43.48	8.98
Unidentified 3(46)	33	8	94.55	5.26
Unidentified 4(46)	33	8	75.69	4.87
Unidentified 6(46)	33	8	31.69	3.96
Unidentified 8(46)	67	17	172.07	10.16
Unidentified 9(46)	33	8	58.93	4.52
Vateria indica	100	17	492.64	18.23
Plot Code No. 47 - Vazhikadavu				
Aglaia lawii	400	40	444.98	20.10
Artocarpus hirsutus	33	10	31.69	2.83
Baccaurea courtallensis	133	36	645.07	15.24
Cullenia exarillata	200	25	573.83	14.05
Diospyros sp.	67	17	81.98	5.23
Garcinia morella	100	17	419.83	8.95
Hopea racophloea	633	33	1432.88	32.82
Hydnocarpus pentandra	167	17	501.81	11.16
Knema attenuata	1200	83	2670.64	65.44
Mallotus philippensis	33	8	138.55	3.47
Meiogyne ramarowii	200	42	463.83	16.09
Memecylon umbellatum	333	58	610.76	23.39
Myristica malabarica	300	42	1436.55	26.89
Nothopegia sp.	67	8	42.43	3.37
Polyalthia fragrans	133	33	930.55	17.20
Syzygium gardneri	133	8	107.64	5.44
Toona ciliata	33	8	58.93	2.77
Unidentified 1(47)	33	8	67.05	2.84
Unidentified 2(47)	33	8	51.33	2.70
Unidentified 3(47)	33	8	235.71	4.33
Unidentified 4(47)	33	8	58.93	2.77

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 47– Vazhikadavu (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Unidentified 5(47)	33	8	150.86	3.58
Unidentified 6(47)	33	8	150.86	3.58
Vepris bilocularis	100	17	55.79	5.74
Plot Code No. 49 - Aralam				
Antidesma alexiteria	367	67	207.69	45.41
Antidesma menasu	33	17	6.55	7.29
Artocarpus hirsutus	33	17	9.43	7.38
Atalantia racemosa	33	11	44.26	6.66
Canthium sp.	33	9	37.71	5.76
Cinnamomum malabatrum	33	9	44.26	5.98
Diospyros sp.2	100	9	126.76	11.63
Knema attenuata	100	9	97.17	10.66
Meiogyne ramarowii	1200	100	1947.00	150.47
Memecylon umbellatum	33	8	16.76	4.82
Myristica malabarica	100	17	346.24	21.38
Xanthophyllum arnottianum	67	17	75.95	11.04
Xylia xylocarpa	133	8	86.43	11.52
Plot Code No. 51 - Chandanathode				
Actinodaphne anguistifolia	100	50	109.48	15.90
Antidesma alexiteria	33	8	75.69	4.49
Antidesma menasu	33	8	21.21	3.26
Atalantia racemosa	33	8	26.19	3.37
Bischofia javanica	33	8	21.21	3.26
Cullenia exarillata	33	8	26.19	3.37
Dimocarpus longan	167	33	268.71	18.28
Dysoxylum malabaricum	33	8	104.76	5.14
Flacourtia montana	33	8	37.71	3.63
Garcinia gummi-gutta	33	8	37.71	3.63
Holoptelia integrifolia	33	8	44.26	3.78
Litsea bourdillonii	33	8	16.76	3.16
Litsea coriacea	167	25	386.31	19.23
Litsea laevigata	33	8	26.19	3.37
Litsea sp.	167	25	454.14	20.76
Mallotus philippensis	33	8	51.33	3.94
Memecylon malabaricum	67	17	111.05	8.07
Mesua ferrea	400	42	214.76	26.36
Otonephelium stipulaceum	267	17	208.21	16.78
Persea macrantha	100	17	155.57	10.16
Sterculia guttata	33	8	37.71	3.63
Symplocos racemosa var. *racemosa*	167	25	101.36	12.81

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($cm^2 ha^{-1}$)	Importance Value Index
Semi-evergreen Forests (cont'd).				
Plot Code No. 51 – Chandanathode (cont'd).				
Syzygium gardneri	67	8	111.31	6.38
Syzygium hemisphericum	33	8	251.69	8.46
Syzygium munroii	600	75	849.36	53.98
Syzygium sp.3	67	8	81.98	5.72
Trichilia connaroides	100	17	117.86	9.31
vateria indica	167	17	484.79	19.76
Plot Code No. 52 - Seminari Villa, Kannavam				
Aglaia lawii	1300	33	1507.79	76.21
Alseodaphne semicarpifolia	33	8	37.71	4.30
Antidesma menasu	67	8	37.98	5.39
Canarium strictum	33	8	628.83	13.43
Cinnamomum malabatrum	67	8	391.02	10.85
Diospyros bourdillonii	167	17	185.17	13.56
Drypetes elata	33	8	21.21	4.05
Garcinia gummi-gutta	33	8	58.93	4.63
Garcinia morella	33	8	16.76	3.98
Garcinia talbotii	100	17	316.90	13.42
Hopea sp.	33	8	104.76	5.34
Knema attenuata	33	8	37.71	4.30
Mallotus ferrugineus	33	8	94.55	5.18
Meiogyne pannosa	200	25	781.26	26.49
Melia dubia	33	8	94.55	5.18
Nothopegia beddomei	67	17	35.88	7.99
Otonephelium stipulaceum	267	8	383.69	17.25
Palaquium ellipticum	167	33	916.40	30.12
Polyalthia fragrans	67	8	48.45	5.55
Syzygium hemisphericum	33	8	58.93	4.63
Syzygium munroii	33	8	285.21	8.12
Syzygium sp.3	67	17	68.36	8.49
Trichilia connaroides	33	8	115.50	5.50
Vepris bilocularis	33	8	205.33	6.89
Xanthophyllum arnottianum	100	17	40.07	9.14
Plot Code No. 53 - Camp Shed, Kannavam				
Aglaia lawii	1100	75	2550.43	65.11
Alseodaphne semicarpifolia	100	17	109.74	6.29
Antiaris toxicaria	33	8	150.86	3.70
Antidesma alexiteria	400	58	792.00	27.35
Artocarpus hirsutus	33	8	37.71	2.56
Baccaurea courtallensis	133	8	402.81	8.71
Cinnamomum malabatrum	167	42	150.33	12.40

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 53 – Campshed, Kannavam(cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Diospyros bourdillonii	100	25	113.40	7.67
Diospyros paniculata	33	8	285.21	5.05
Drypetes elata	200	50	254.83	15.63
Dysoxylum malabaricum	33	8	235.71	4.55
Garcinia gummi-gutta	167	42	153.21	12.43
Garcinia talbotii	33	8	163.69	3.83
Holigarna arnottiana	33	8	75.69	2.94
Hopea sp.	67	17	58.93	4.95
Hydnocarpus pentandra	33	8	302.76	5.23
Knema attenuata	467	67	1684.83	39.34
Myristica malabarica	267	42	1547.60	28.95
Palaquium ellipticum	100	25	39.02	6.93
Polyalthia fragrans	167	8	193.55	7.43
Pterygota alata	33	8	67.05	2.85
Syzygium gardneri	33	8	104.76	3.23
Syzygium munroii	33	8	104.76	3.23
Trichilia connaroides	200	42	294.90	14.68
Unidentified 1(53)	33	8	44.26	2.62
Zanthoxylum rhetsa	33	8	16.76	2.35
Plot Code No. 54 - Kannavam				
Actinodaphne anguistifolia	67	17	41.12	4.29
Aglaia sp.1	200	42	163.17	12.01
Alseodaphne semicarpifolia	233	25	363.79	12.19
Aporusa lindleyana	133	25	361.43	10.10
Artocarpus hirsutus	167	25	187.26	9.06
Celtis philippensis	100	25	462.00	10.41
Cinnamomum malabatrum	33	8	37.71	2.31
Croton malabaricus	100	25	198.00	7.79
Diospyros bourdillonii	400	42	747.48	21.96
Flacourtia montana	33	8	26.19	2.20
Holigarna arnottiana	267	25	325.81	12.51
Ixora nigricans	400	67	1055.48	28.77
Knema attenuata	967	92	3033.64	63.91
Mallotus philippensis	167	33	419.83	12.62
Melia azederach	167	33	63.90	9.08
Memecylon umbellatum	33	8	75.69	2.69
Olea dioica	67	17	279.19	6.66
Polyalthia fragrans	600	58	781.26	28.93
Prunus zeylanica	400	42	1155.00	26.01
Sterculia guttata	33	8	12.83	2.07

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 54 – Kannavam (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Tabernaemontana heyneana	100	8	141.95	4.73
Vepris bilocularis	167	33	124.40	9.69
Plot Code No. 55 - Sivapuram				
Antidesma alexiteria	167	33	170.76	22.30
Aporusa lindleyana	100	22	96.64	14.12
Artocarpus hirsutus	33	11	31.69	6.10
Diospyros oocarpa	133	18	386.05	18.85
Elaeocarpus tuberculatus	33	9	320.83	10.24
Holigarna arnottiana	67	18	305.90	14.79
Hopea parviflora	167	9	83.35	11.62
Hydnocarpus pentandra	33	9	104.76	6.58
Knema attenuata	333	42	433.45	36.67
Myristica dactyloides	33	8	104.76	6.29
Myristica malabarica	700	25	2723.55	84.07
Olea dioica	200	25	234.93	21.58
Polyalthia fragrans	33	8	220.26	8.25
Symplocos racemosa var. *racemosa*	367	17	604.74	31.45
Vitex altissima	67	8	71.76	7.08
Plot Code No. 58 - Kavadikkanam				
Aglaia lawii	233	29	261.64	17.92
Aglaia sp.	333	42	387.62	26.01
Diospyros bourdillonii	167	8	187.52	9.75
Diospyros oocarpa	233	33	310.88	19.84
Ixora nigricans	333	50	1114.93	38.75
Knema attenuata	967	75	2292.45	80.91
Litsea sp.	33	8	16.76	3.33
Litsea sp.3	200	42	849.62	28.84
Meiogyne ramarowii	167	17	415.12	15.19
Melia dubia	67	8	42.95	4.70
Nothopegia sp.(58)	33	8	339.43	8.05
Pterospermum diversifolium	67	8	34.05	4.57
Pterospermum reticulatum	233	25	128.33	15.06
Syzygium cumini	267	25	427.95	20.42
Xylia xylocarpa	67	17	32.74	6.66
Plot Code No. 59 - Chippilithode				
Aglaia lawii	100	43	80.67	10.37
Antidesma menasu	100	43	179.73	11.57
Baccaurea courtallensis	67	20	142.74	6.58
Dimocarpus longan	167	20	183.14	9.43
Diospyros bourdillonii	133	17	499.52	11.91

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Semi-evergreen Forests (cont'd).				
Plot Code No. 59 – Chippilithode (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Drypetes elata	33	8	14.73	2.33
Fahrenheitia zeylanica	67	17	311.40	8.07
Garcinia gummi-gutta	33	8	75.69	3.07
Holigarna arnottiana	300	50	327.90	19.25
Holigarna grahamii	100	25	305.38	10.15
Holigarna nigra	200	33	162.38	12.15
Humboldtia brunonis	200	33	928.78	21.39
Hydnocarpus pentandra	100	25	85.12	7.49
Knema attenuata	200	42	639.38	19.27
Mallotus stenanthus	333	17	406.67	15.51
Melia dubia	33	8	23.64	2.44
Myristica malabarica	33	8	9.43	2.27
Nothopegia sp.1(59)	100	25	112.36	7.82
Nothopegia sp.2(59)	33	8	16.76	2.36
Polyalthia fragrans	133	25	258.50	10.37
Prunus zeylanica	67	17	198.26	6.70
Syzygium sp.3	167	33	234.73	12.24
vateria indica	1533	83	3098.65	87.26
Plot Code No. 60 - Chippilithode				
Aglaia lawii	33	20	16.76	5.21
Antidesma alexiteria	167	45	330.00	18.73
Baccaurea courtallensis	33	8	150.86	4.72
Dimocarpus longan	100	17	80.14	7.62
Diospyros candolleana	33	8	51.33	3.41
Diospyros sp.	33	8	104.76	4.11
Diospyros sp.2	133	8	317.69	10.25
Elaeocarpus serratus	33	8	21.21	3.01
Fahrenheitia zeylanica	67	17	203.76	8.14
Garcinia gummi-gutta	100	25	505.21	14.85
Garcinia morella	33	8	75.69	3.73
Holigarna arnottiana	133	25	210.05	12.07
Holigarna nigra	133	33	399.40	16.18
Knema attenuata	500	50	1101.83	40.91
Mallotus stenanthus	33	8	44.26	3.31
Melia dubia	33	8	37.71	3.23
Myristica malabarica	433	67	1980.26	53.51
Nothopegia sp.1(59)	100	25	92.45	9.40
Otonephelium stipulaceum	33	8	26.19	3.07
Polyalthia fragrans	33	8	94.55	3.98
Syzygium caryophyllatum	67	17	89.05	6.63

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Species	Density (individuals ha^{-1})	Frequency	Basal Area ($cm^2 ha^{-1}$)	Importance Value Index
Semi-evergreen Forests (cont'd).				
Plot Code No. 60 – Chippilithode (cont'd).				
Syzygium sp.3	200	33	152.69	15.15
vateria indica	533	58	1491.02	48.77
Moist Deciduous Forests				
Plot Code No. 1- Athirappally				
Cochlospermum religiosum	40	13	32.57	6.17
Diospyros buxifolia	40	13	12.71	5.73
Gmelina arborea	40	13	8.14	5.63
Grewia tiliifolia	80	25	280.24	17.10
Lagerstroemia microcarpa	80	25	168.06	14.62
Macaranga peltata	120	25	362.25	20.29
Persea macrantha	40	13	45.94	6.47
Polyalthia fragrans	40	13	39.00	6.31
Sapindus trifoliata	160	30	248.11	20.79
Schleichera oleosa	80	20	39.73	10.16
Spondias *pinnata*	40	10	6.22	4.78
Strychnos nux-vomica	40	10	50.93	5.76
Terminalia crenulata	40	10	229.96	9.72
Xylia xylocarpa	2040	90	3007.07	166.47
Plot Code No. 2 - Randukai				
Aporusa lindleyana	40	11	12.71	5.41
Dalbergia latifolia	40	11	10.32	5.26
Dillenia pentagyna	120	11	139.86	16.66
Gmelina arborea	40	11	14.02	5.50
Grewia tiliifolia	80	22	23.03	10.67
Holarrhena pubescens	80	22	28.11	11.00
Macaranga peltata	40	11	28.66	6.44
Mallotus philippensis	40	11	19.86	5.87
Spondias *pinnata*	80	11	36.70	8.49
Sterculia guttata	40	11	14.02	5.50
Strychnos nux-vomica	120	30	125.51	20.93
Terminalia paniculata	200	30	67.03	20.25
Unidentified 1(2)	40	10	28.66	6.13
Wrightia tinctoria	1160	90	655.61	111.49
Xylia xylocarpa	480	70	850.15	60.40
Plot Code No. 3 - Randukai				
Albizia odoratissima	40	50	318.22	8.32
Bombax ceiba	80	20	32.58	5.61
Cinnamomum malabatrum	320	67	197.67	21.65
Grewia tiliifolia	40	13	30.55	3.41
Haldina cordifolia	40	50	28.66	8.80

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 3 – Randukai (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Lagerstroemia microcarpa	40	13	53.52	3.79
Macaranga peltata	600	80	1654.69	43.84
Mallotus philippensis	120	30	95.84	9.21
Miliusa tomentosa	40	10	318.22	2.53
Olea dioica	40	10	61.60	3.57
Persea macrantha	80	20	19.65	5.40
Polyalthia fragrans	600	80	1707.59	56.53
Pterospermum reticulatum	80	20	258.63	9.40
Schleichera oleosa	280	40	314.65	18.67
Sterculia guttata	160	40	226.49	13.93
Strychnos nux-vomica	200	30	551.25	19.02
Terminalia paniculata	40	10	229.96	6.39
Tetremeles nudiflora	40	10	50.93	3.39
Unidentified 2(3)	40	10	219.21	6.21
Unidentified 3(3)	40	10	79.55	3.87
Xylia xylocarpa	760	80	848.65	46.46
Plot Code No. 5 - Thumburmuzhi				
Blepharistemma membranifolia	40	100	12.71	34.96
Cassia fistula	80	13	27.42	15.20
Grewia tiliifolia	40	13	1.35	6.75
Holarrhena pubescens	40	13	36.79	14.47
Lagerstroemia microcarpa	400	63	196.74	89.04
Macaranga peltata	80	10	21.82	13.25
Miliusa tomentosa	40	10	25.85	11.35
Terminalia paniculata	200	30	89.94	42.31
Unidentified 1(5)	40	10	4.21	6.64
Unidentified 2(5)	40	10	10.90	8.09
Xylia xylocarpa	440	70	31.18	57.94
Plot Code No. 8 - Pandarampara				
Bridelia airy-shawii	80	33	50.91	12.63
Grewia tiliifolia	520	80	452.96	60.94
Holarrhena pubescens	320	60	115.50	30.89
Pterocarpus marsupium	120	30	86.43	15.43
Sapindus trifoliata	80	20	19.17	8.21
Schleichera oleosa	80	20	10.06	7.72
Stereospermum sp.	120	30	115.97	17.02
Tectona grandis	120	20	350.51	27.63
Terminalia crenulata	200	40	134.91	23.19
Terminalia paniculata	440	60	160.84	38.02

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 8 – Pandarampara (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Unidentified 1(8)	160	40	263.45	28.56
Xylia xylocarpa	320	60	94.76	29.77
Plot Code No. 9 - Vaniampuzha				
Aporusa lindleyana	40	100	53.11	62.23
Bombax ceiba	40	10	7.86	12.35
Holarrhena pubescens	40	10	25.46	15.84
Macaranga peltata	40	10	13.28	13.43
Mallotus philippensis	40	10	7.86	12.35
Olea dioica	40	10	101.83	30.98
Xylia xylocarpa	400	70	295.21	152.82
Plot Code No. 12 - Vaniampuzha				
Artocarpus hirsutus	120	50	105.91	21.57
Bridelia airy-shawii	40	25	31.43	8.99
Dalbergia latifolia	120	33	38.03	15.04
Dillenia pentagyna	40	11	229.11	13.39
Holarrhena pubescens	80	22	19.17	9.79
Lagerstroemia reginae	40	11	15.40	5.12
Macaranga peltata	40	11	45.26	6.28
Mitragyna tubulosa	40	11	38.03	6.00
Naringi crenulata	80	22	141.11	14.51
Schleichera oleosa	200	30	58.14	18.89
Sterculia guttata	200	30	177.57	23.51
Strychnos nux-vomica	40	10	528.31	24.71
Terminalia paniculata	40	10	15.40	4.86
Unidentified 1(12)	160	40	188.89	24.37
Unidentified 2(12)	40	10	181.03	11.27
Xylia xylocarpa	800	100	771.02	91.71
Plot Code No. 13 - Vaniampuzha				
Albizia amara	89	17	4.54	11.69
Artocarpus hirsutus	178	57	35.97	36.67
Bauhinia racemosa	44	14	28.29	13.46
Bombax ceiba	44	14	0.35	7.24
Dalbergia latifolia	89	29	22.70	19.39
Dillenia pentagyna	44	14	68.44	22.41
Lagerstroemia microcarpa	44	14	12.57	9.96
Macaranga peltata	44	14	5.59	8.41
Mitragyna tubulosa	89	14	18.16	13.99
Persea macrantha	44	13	3.14	7.32

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 13 – Vaniampuzha Cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Schleichera oleosa	44	13	0.35	6.69
Terminalia paniculata	44	13	17.11	10.43
Xylia xylocarpa	800	100	231.87	132.35
Plot Code No. 17 - Pothundy				
Bauhinia racemosa	40	20	31.43	7.14
Cleistanthus collinus	80	20	76.06	9.68
Dalbergia latifolia	160	40	755.86	26.66
Dillenia pentagyna	40	10	31.43	4.76
Grewia tiliifolia	80	20	186.37	11.01
Holarrhena pubescens	160	40	1447.60	35.02
Lagerstroemia microcarpa	40	10	363.31	8.77
Phyllanthus emblica	40	10	985.60	16.29
Strychnos sp.	80	20	479.29	14.55
Tamarindus indica	360	60	865.54	42.75
Terminalia paniculata	360	70	1719.14	55.44
Unidentified 1(17)	80	10	30.49	6.75
Unidentified 2(17)	40	10	11.31	4.52
Xylia xylocarpa	440	80	1291.37	56.65
Plot Code No. 19 - Velamplavu				
Actinodaphne bourdillonii	133	30	380.02	45.24
Aporusa lindleyana	133	33	774.71	56.31
Coffea sp.	33	8	26.19	10.25
Euodia lunu-ankenda	67	17	292.55	25.99
Lagerstroemia microcarpa	33	8	190.93	14.01
Olea dioica	167	33	1029.55	66.69
Tabernaemontana heyneana	33	8	911.69	30.50
Wrightia tinctoria	33	8	44.26	10.66
Xylia xylocarpa	100	17	721.81	40.35
Plot Code No. 20 - Velamplavu				
Actinodaphne bourdillonii	67	17	453.62	23.69
Aporusa lindleyana	133	25	99.79	25.47
Artocarpus hirsutus	33	8	58.93	8.19
Dalbergia latifolia	33	8	21.21	7.37
Litsea laevigata	100	25	279.45	26.82
Macaranga peltata	33	8	51.33	8.03
Persea macrantha	67	17	106.07	16.13
Swietenia mahagoni	133	17	357.50	26.73
Xylia xylocarpa	700	67	3168.79	157.57

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 28 - Achencoil				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Croton malabaricus	133	100	515.95	58.78
Dalbergia latifolia	33	8	26.19	6.62
Grewia tiliifolia	200	42	628.05	46.83
Macaranga peltata	33	8	37.71	6.87
Mallotus philippensis	33	8	26.19	6.62
Miliusa tomentosa	33	8	378.19	14.12
Polyalthia fragrans	67	17	207.95	16.56
Pterocarpus marsupium	67	8	169.78	12.81
Sapindus trifoliata	33	8	21.21	6.52
Schleichera oleosa	133	17	256.14	23.84
Sterculia guttata	33	8	94.55	8.08
Tectona grandis	67	17	735.95	27.80
Terminalia crenulata	33	8	462.00	15.90
Terminalia paniculata	33	8	205.33	10.44
Wrightia tinctoria	133	17	931.60	38.22
Plot Code No. 29 - Achencoil				
Antiaris toxicaria	33	8	235.71	7.59
Aporusa lindleyana	167	33	172.60	19.53
Artocarpus hirsutus	33	8	26.19	4.25
Chionanthus malabaricus	33	8	16.76	4.10
Cleidion spiciflorum	133	25	101.88	14.57
Croton malabaricus	300	50	438.69	34.33
Diospyros bourdillonii	33	8	31.69	4.34
Hydnocarpus pentandra	100	25	75.69	12.70
Ixora nigricans	167	42	98.21	20.72
Kingiodendron pinnatum	100	8	55.79	7.62
Knema attenuata	333	25	464.88	29.06
Litsea sp.	33	8	12.83	4.04
Mallotus philippensis	233	33	222.10	23.21
Polyalthia fragrans	467	33	3152.81	80.15
Pterospermum reticulatum	33	8	44.26	4.54
Sapindus trifoliata	33	8	44.26	4.54
Sterculia guttata	33	8	942.86	18.88
Unidentified 1(29)	33	8	126.76	5.85
Plot Code No. 33 - Kochuthalappara				
Actinodaphne sp.	133	100	894.40	46.41
Aglaia sp.	1133	58	770.13	63.78
Antidesma menasu	67	17	60.57	6.90
Aporusa lindleyana	33	8	37.71	3.63
Atalantia racemosa	67	17	33.52	6.26

P. T. O

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 33 – Kochuthalappara (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Grewia tiliifolia	33	8	14.73	3.08
Hopea parviflora	33	8	37.71	3.63
Ixora nigricans	167	17	105.61	10.90
Litsea laevigata	467	50	457.42	35.10
Mallotus philippensis	167	17	123.95	11.34
Meiogyne ramarowii	300	33	426.45	25.99
Melia dubia	67	8	70.45	5.39
Ochreinauclea missionis	67	17	71.76	7.17
Olea dioica	133	25	200.62	13.96
Persea macrantha	33	8	94.55	5.00
Pterospermum reticulatum	100	17	40.92	7.40
Sterculia guttata	67	8	93.24	5.93
Terminalia bellirica	33	8	9.43	2.95
Terminalia paniculata	33	8	12.83	3.03
Unidentified 1(33)	167	17	212.99	13.48
Unidentified 3(33)	33	8	67.05	4.34
Xanthophyllum arnottianum	100	17	328.95	14.32
Plot Code No. 36 - Vellatanku				
Aglaia sp.	200	27	123.42	11.95
Antidesma alexiteria	33	9	21.21	2.73
Antidesma menasu	167	45	97.69	13.49
Aporusa lindleyana	300	45	826.90	29.90
Artocarpus hirsutus	100	18	71.24	6.87
Bridelia airy-shawii	67	18	26.19	5.17
Citrus sp.	100	9	97.95	5.89
Dimocarpus longan	67	9	41.12	3.98
Ixora nigricans	167	27	72.81	10.16
Kingiodendron pinnatum	33	9	268.19	7.05
Litsea sp.	233	36	246.78	16.47
Macaranga peltata	100	18	163.69	8.49
Mallotus beddomei	167	45	371.51	18.28
Mallotus philippensis	33	9	58.93	3.39
Meiogyne ramarowii	100	27	137.76	9.48
Olea dioica	400	55	830.30	34.13
Pterospermum reticulatum	67	18	120.74	6.83
Pterospermum rubiginosum	33	9	31.69	2.91
Pterygota alata	33	9	37.71	3.02
Schleichera oleosa	533	50	965.64	39.41
Sterculia guttata	200	33	353.57	16.95
Tabernaemontana heyneana	100	17	246.45	9.70

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 36 – Vellatanku (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Terminalia paniculata	33	8	9.43	2.40
Unidentified 1(36)	167	33	200.62	13.36
Unidentified 6(36)	33	8	44.26	3.01
Vitex altissima	200	33	242.26	15.00
Plot Code No. 38 - Kalthuruthy				
Actinodaphne bourdillonii	200	42	346.24	34.04
Aporusa lindleyana	167	42	263.21	29.64
Ficus sp.1	33	8	37.71	5.54
Lagerstroemia microcarpa	33	8	150.86	8.50
Litsea laevigata	233	50	893.10	52.92
Macaranga peltata	100	25	509.14	26.99
Mallotus beddomei	33	8	268.19	11.58
Meiogyne ramarowii	33	8	84.86	6.77
Melia dubia	33	8	51.33	5.89
Olea dioica	133	33	290.71	25.81
Persea macrantha	200	50	185.23	32.14
Pterospermum reticulatum	33	8	31.69	5.38
Stereospermum sp.	33	8	26.19	5.23
Tabernaemontana heyneana	133	33	248.55	24.71
Terminalia paniculata	67	17	289.40	16.68
Unidentified 1(38)	33	8	138.55	8.18
Plot Code No. 39 - Ottakkallu				
Alstonia scholaris	33	17	44.26	5.46
Aporusa lindleyana	1967	91	6882.92	101.76
Careya arborea	33	9	44.26	3.37
Dalbergia latifolia	33	9	115.50	3.79
Garcinia gummi-gutta	167	18	591.64	11.55
Litsea laevigata	67	18	61.02	6.59
Macaranga peltata	100	18	293.60	8.57
Olea dioica	2333	92	5697.54	101.73
Tabernaemontana heyneana	333	33	1593.95	24.69
Terminalia crenulata	67	8	290.45	5.23
Terminalia paniculata	267	42	1322.88	24.16
Unidentified 1(39)	33	8	31.69	3.09
Plot Code No. 40 - Irumpupalam				
Schleichera oleosa	50	17	1414.29	143.14
Wrightia tinctoria	50	13	2514.29	156.86
Plot Code No. 42 - Channoth				
Grewia tiliifolia	114	50	155.35	62.01
Macaranga peltata	57	25	64.65	30.06

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 42 – Chanoth (cont'd).				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Miliusa tomentosa	57	25	88.00	31.75
Wrightia tinctoria	114	25	460.20	67.85
Xylia xylocarpa	286	29	610.16	108.33
Plot Code No. 48 - Aralam				
Aporusa lindleyana	200	67	295.17	28.98
Artocarpus hirsutus	33	10	94.55	5.32
Atalantia racemosa	1333	75	2008.02	99.95
Cinnamomum malabatrum	67	17	83.81	8.00
Drypetes elata	33	8	21.21	3.64
Ficus exasperata	67	17	81.98	7.97
Hydnocarpus pentandra	233	33	328.95	22.25
Litsea sp.	33	8	44.26	4.04
Mallotus philippensis	33	8	58.93	4.29
Neolitsea cassia	33	8	205.33	6.80
Nothopegia sp.	33	8	358.55	9.42
Olea dioica	33	8	9.43	3.44
Persea macrantha	100	17	319.00	13.19
Polyalthia fragrans	200	17	998.12	28.30
Sapindus trifoliata	100	25	269.24	14.45
Sterculia guttata	33	8	75.69	4.58
Strychnos nux-vomica	33	8	37.71	3.93
Xanthophyllum arnottianum	33	8	150.86	5.86
Xylia xylocarpa	200	33	333.67	21.16
Zanthoxylum rhetsa	33	8	67.05	4.43
Plot Code No. 56 - Parappa				
Actinodaphne anguistifolia	33	13	12.83	4.58
Albizia odoratissima	67	25	23.31	9.13
Aporusa lindleyana	200	38	399.14	22.91
Flacourtia montana	467	67	1605.48	58.59
Holigarna arnottiana	100	25	621.50	19.59
Hopea parviflora	1033	75	1777.29	83.62
Ixora nigricans	33	8	94.55	4.78
Mallotus philippensis	100	25	170.24	12.59
Melia dubia	33	8	4.19	3.38
Olea dioica	167	33	260.60	18.50
Pterospermum rubiginosum	233	17	216.33	15.94
Swietenia mahagoni	300	50	1249.81	42.86
Tabernaemontana heyneana	33	8	12.83	3.52

P. T. O.

Appendix 2. (cont'd). Plot-wise details of seedlings (girth ≤10cm and height ≥ 50cm) in the permanent plots established in different forest types of Kerala

Moist Deciduous Forests (cont'd).				
Plot Code No. 57 - Vani Nagar				
Species	**Density (individuals ha^{-1})**	**Frequency**	**Basal Area ($cm^2 ha^{-1}$)**	**Importance Value Index**
Antidesma menasu	36	50	34.57	13.65
Aporusa lindleyana	109	40	178.86	17.03
Atalantia wightii	109	40	74.86	15.58
Flacourtia montana	182	29	289.14	19.61
Holigarna arnottiana	655	82	3042.64	93.73
Ixora nigricans	109	18	486.00	16.36
Litsea sp.	36	9	528.29	11.25
Memecylon umbellatum	73	18	82.86	8.92
Miliusa tomentosa	36	9	164.57	6.18
Olea dioica	146	18	325.14	15.93
Persea macrantha	109	27	153.71	13.79
Schleichera oleosa	36	9	138.29	5.81
Stereospermum sp.	109	27	400.29	17.23
Syzygium sp.	36	9	25.79	4.24
Tabernaemontana heyneana	182	45	1206.57	36.23
Vitex altissima	36	9	41.14	4.46
Dry Deciduous Forests				
Plot Code No. 43 - Alampetty				
Albizia amara	367	67	721.88	174.42
Commiphora caudata	33	8	80.21	18.89
Ixora arborea	33	8	26.19	14.40
Pavetta indica	67	17	143.52	36.37
Strychnos potatorum	100	25	231.79	55.92