FLORISTIC DIVERSITY ASSESSMENT IN SALGALA FOREST RESERVE, SRI LANKA

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INTRODUCTION

Sri Lanka is relatively a small island in size with only 65,610 km^2 of land and its Physical Geography is highly varied, resulting in a unique and very significant diversity in faunal and floral species. Vegetation analyses have recognized fifteen different floristic regions (Figure-1) within the country (Aston and Gunathilleke, 1987) having 3360 plants species belonging to 1070 genera and 180 families (Peeris, 1975). A remarkable feature in floristic diversity seen in Sri Lanka is that, 90% of its endemic species are confined to the rain forests found in the west zone, having a land area of 15000km^2. It is a reflection of the island's separation from the Indian subcontinent.

Although, the south western part of the island represents a significant diversity in flora, a large proportion is also found in that region in wet zone of the island. Thus, human activities altered the areas covered by forests since historic periods
through their multiple activities, include agriculture, livestock, industry, living space and recreation etc. The human activities and practices undertaken in converting natural forests exert a definite impact on the fragmentation of large forest areas and it has been decreased significantly in last few decades. Transformation into secondary forests and isolated plots duly has raised an adverse impact on the floristic richness in the island to a grater degree. Especially the extensive deforestation in the wet zone has put most of endemic species top in the extinction list.

Therefore, an assessment floristic diversity and analysis of vegetation of these isolated forests found in the wet zone has been identified as a fact of great importance and a needy investigation. Exploration of Salgala forest reserve, which is in fact an isolated floristic patch, would be of great help to disclose the phytosociological information and phytogeographical distribution, which were never been explored and made known so far. The richness of information and understanding of a particular ecosystem helps to extend innovative and environmental friendly planning and development strategies.

OBJECTIVES OF THE STUDY

Several problems arise with regard to the floristic diversity and types of vegetation in an isolated forest patch. First, the type of floral species in that forest, second what would be the abundance species in the forest, third the nature of the floristic diversity

and its spatial distribution, fourth what are the uses and advantages of forest, what would be the major consequences and threats in conservation of the forest. In this study, an attempt was made to address the first of these problems. Therefore, the objective of the study was to

i) Collect the phytosociological data of the forest reserve
ii) Find out the abundance species of the forest
iii) Identify the spatial differences of floristic diversity of the forest.

Figure-1: Floristic regions of Sri Lanka

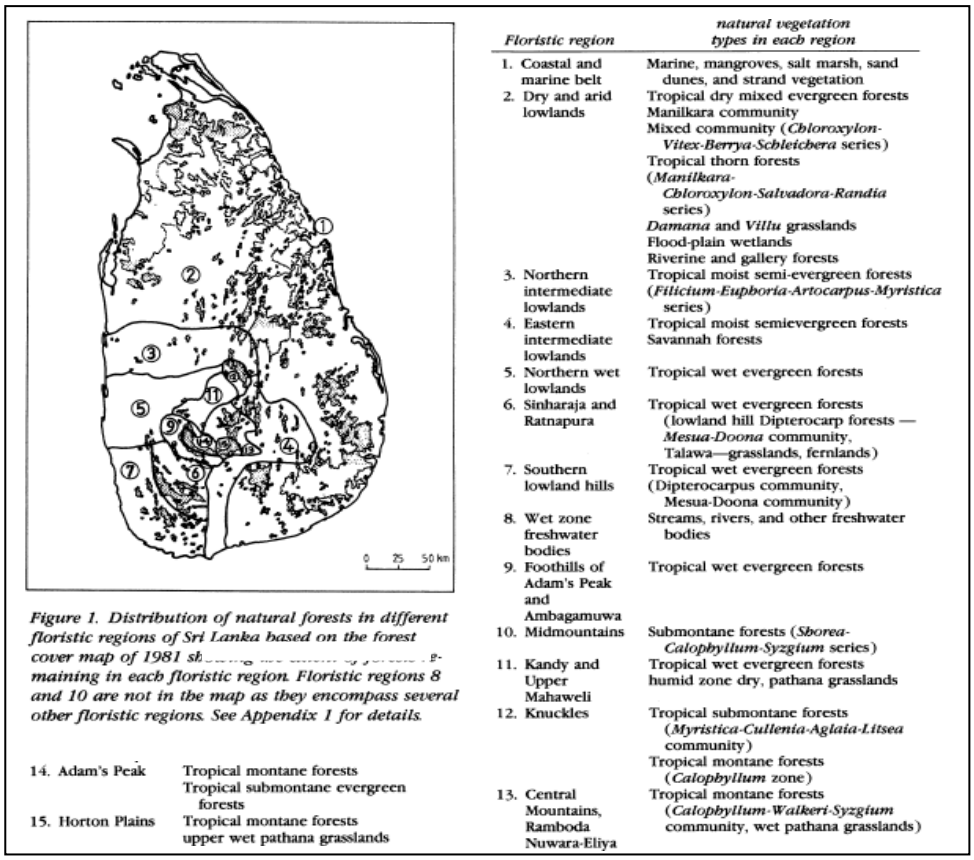


Figure 1. Distribution of natural forests in different floristic regions of Sri Lanka based on the forest cover map of 1981 sh... ...maining in each floristic region. Floristic regions 8 and 10 are not in the map as they encompass several other floristic regions. See Appendix 1 for details.

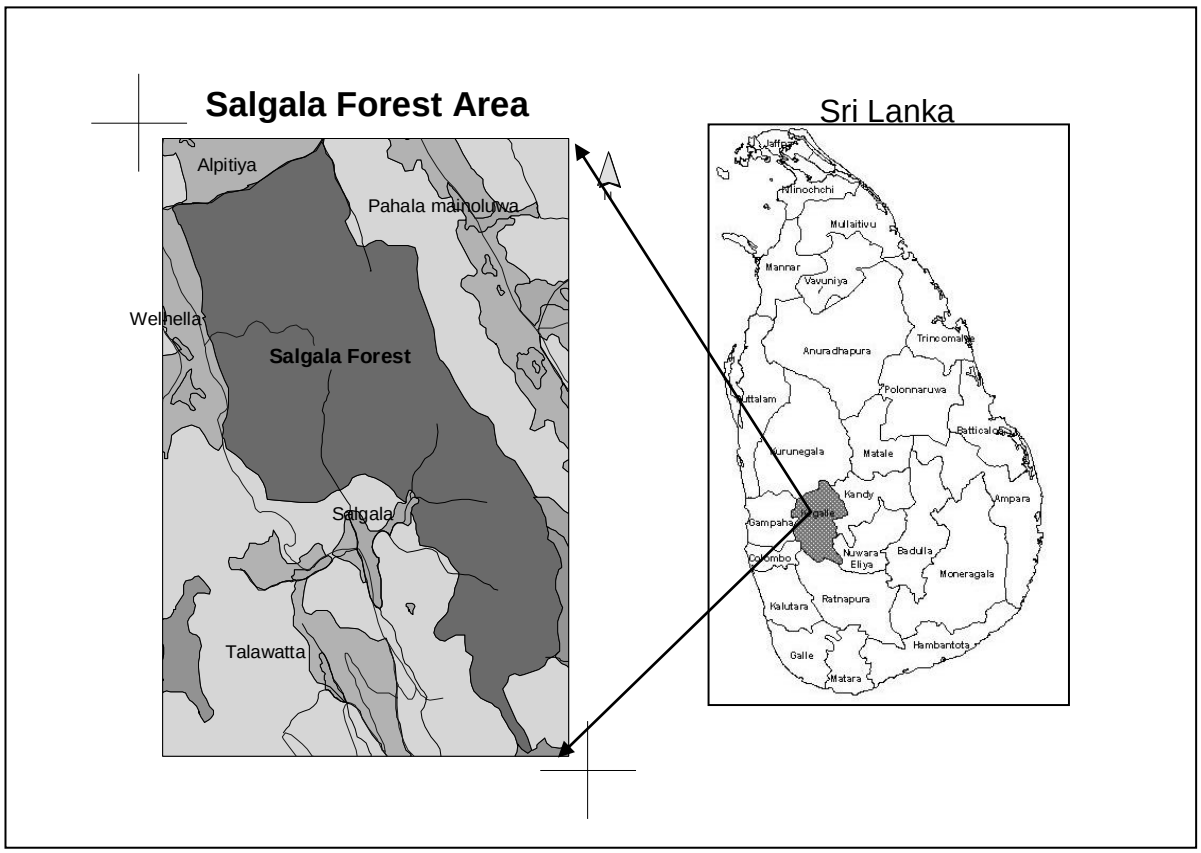
Source: Gunathileke I.A.U.N and Gunathileke C.V.S, 1990

STUDY AREA

Salgala forest reserve encompassing an extent of 127.8ha is located at Galapitamada area in the Kegalle district Sri Lanka. The forest is located between 7^0 6' 48"and 7^0 7' 84" latitude N and 80^0 14' 65" and 80^0 15' 48"longitude E. (Figure-2) It was named as a forest reserve in 1817.

Mean elevation of the study area is 250 m and there are two small hills more than 320m in height in the central and the southern parts of the forest. The maximum height of the study area is about 330m while the lowest is about 100m. The slope of the terrain varied between 5%-45% and relatively a steep slope can be seen in southern part. The rock type was Highland series (Coorey P.G, 1964) and major soil type in the area is Red Yellow Podsolic (Panabokke C.R, 1967). Average annual rainfall is 2000mm-4000mm. Mean annual temperature fluctuates between 25^{O}C – 27^{O}C which are typical climatic features of the "wet zone". Over 75% of surrounding area of the forest, is covered by Rubber, home gardens and paddy revealing the potentiality of human influence to the forest reserve.

Figure-2: Location of Salgala Forest reserve.



METHODOLOGY

The study is basically depending on primary data collected by a field survey.

The forest area was divided into three main zones; north, central and south according to the density of the forest based on the interpretation of a 1:5000 aerial photograph. Vegetation sampling was carried out in three transects within each zone. (Figure-4 and Table-1) Located sample size is 10m X 10m and the gap between each contiguous samples were 200m. 19samples were selected maintaining topographic heterogeneity. Over 10cm girth at breast height (GBH) trees were enumerated.

Following phytosociological data from each sample were collected

- Number of species.
- Local name of the species.
- Scientific name of the species.
- Endemic species
- Family.
- Life form of the species.
- Diameter at the breast height of each species.

The Shannon diversity index was calculated to find out the species and endemic species diversity and family diversity. Abundance diversity index was calculated to identify the abundance species and abundance families in the forest. A principal component analysis was done to explore the spatial differences and phytosociological factors affecting the spatial variation of floristic diversity in the forest.

Figure- 4: Flow diagram for preparation of base map for the field survey

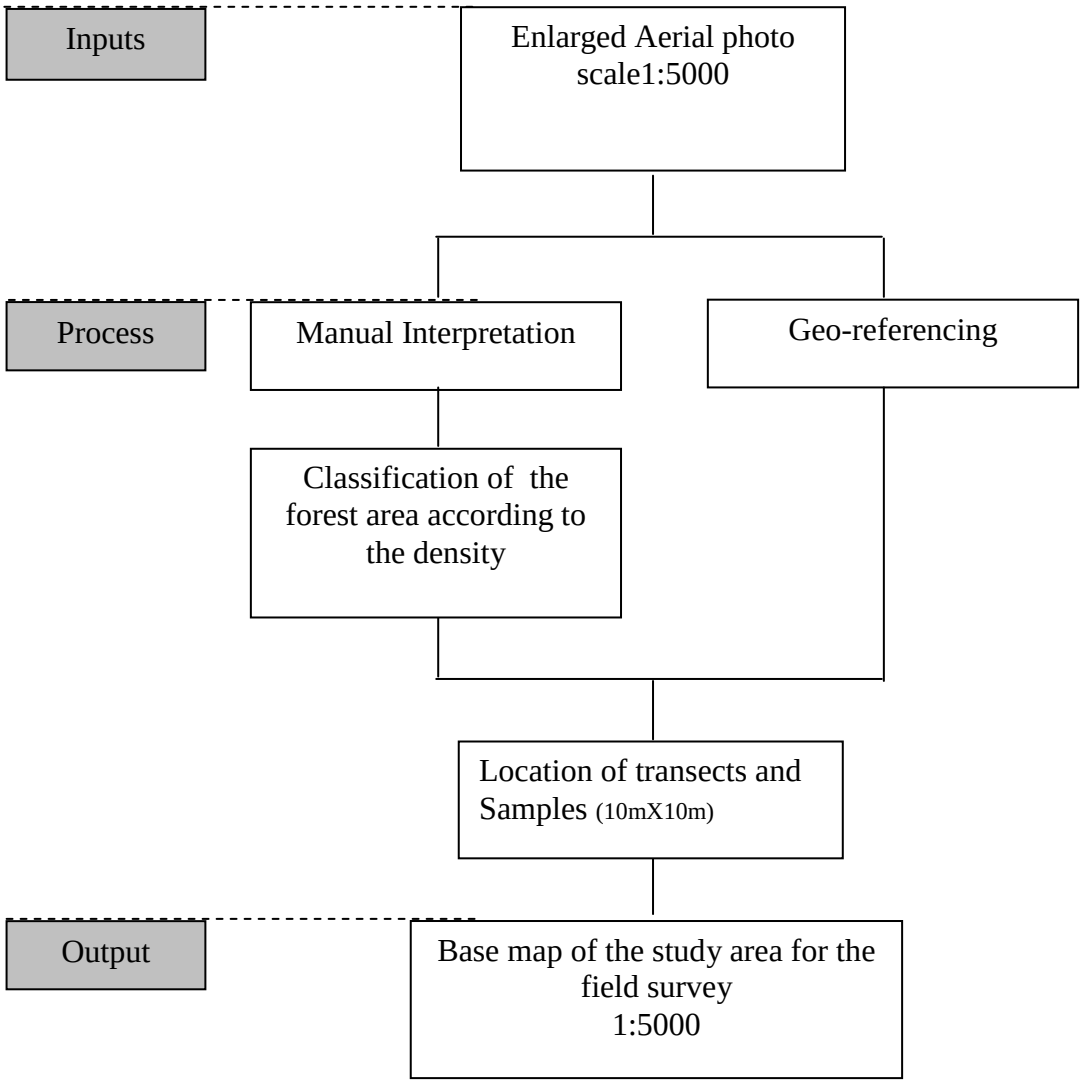


Table -1: Details of vegetation transects

ransect	Number of Samples
North	06
Central	09
South	04
Total	19

RESULTS AND DICUSSIONS

Total number of 886 tree individuals over 10cm GBH were enumerated. A total of 51 species, 29 families and 22 endemic species were recorded. (Table-2)

Table-2: Phytosociological data of the forest

Local name (sinhala)	Scientific name	Family of Species
Welipiyanna* (Z_1 & Z_2)	*Anisophyllea cinnamoides*	RHIZOPHORACEAE
Dun* (Z_1 & Z_2)	*Doona congestiflora*	DIPTEROCARPACEAE
Nataw (Z_1 & Z_2)	*Xylopia parvifolia*	ANNONACEAE
Naa* (Z_2)	*Mesua ferrea*	GUTTIFERAE
Kirihimbiliya*(Z_1 & Z_2)	*Palaquium pauciflorum*	SAPOTACEAE
Arankebella (Z_1 & Z_2)	*Aporosa lindleyana*	EUPHORBIACEAE
Wal jambu (Z_1 & Z_2)	*Syzygium spissum*	MYRTACEAE
Diyataliya* (Z_1 & Z_2)	*Mastixin tetranadra*	CORNACOAE
Kekuna* (Z_1 & Z_2)	*Canarium zeylanicum*	BURSERACEAE
Kadumberiya*(Z_1 & Z_2)	*Diospyros attenuate*	EBENACAE
Wal rambutan*(Z_1& Z_2)	*Ptychopyxis thwaitesii*	EUPHORBIACEAE
Hakarilla (Z_1 & Z_2)	*Solanum erianthum*	SOLANACEA
Eipetta (Z_1 & Z_2)	*Cyathocalyx zeylanicus*	ANNONACEAE
Badulla* (Z_1 & Z_2)	*Semecarpus nigroviridis*	ANACARDIACEAE
Wal del* (Z_1 & Z_2)	*Artocarpus nobilis*	MORACEAE
Mal laulu* (Z_1)	*Enicosanthum acuminate*	ANNONACEAE
Hampolanda* (Z_1 & Z_2)	*Terminalina parviflra*	COMBRETACEAE
Pelan* (Z_1 & Z_2)	*Putranjiva zeylenica*	EUPHORBIACEAE
Mahogani (Z_1 & Z_2)	*Swietenia macrophylla*	MELIACEAE
Path keala* (Z_1 & Z_2)	*Bridella moonii*	EUPHORBIACEAE
Hema (Z_2)	*Tetrameles nudiflora*	DATISCACEAE
Galkaranda (Z_1 & Z_2)	*Hamboldtia laurifolia*	LEGUMINOSAE
Hora* (Z_1 & Z_2)	*Dipterocarpus Zeylanicus*	DIPTEROCARPACEAE
Dawata (Z_1 & Z_2)	*Carallia brachiata*	RHIZOPHORACEAE
Malabada (Z_1 & Z_2)	*Myristica dactyloides*	MYRISTICACEAE
Goda para* (Z_1 & Z_2)	*Dillenia retusa*	DILLENIACEAE
Kahapenela (Z_1 & Z_2)	*Sapindus trifoliatus*	SAPINDACEAE
Etamba* (Z_1 & Z_2)	*Mangifera Zeylanica*	ANACARDIACEAE
Hedawaka (Z_1 & Z_2)	*Chaetocarpus castanocarpus*	EUPHORBIACEAE
Domba (Z_1)	*Calophyllum Inophyllum*	GUTTIFERAE
Dambu (Z_1)	*Syzygium gardneri*	MYRTACEAE
Makulu (Z_1)	*Hydnocarpus venerate*	FLACOURTIACEAE
Kitul (Z_1)	*Caryota urens*	PALMAE
Bokera (Z_1)	*Ochna lanceolata*	OCHNACEAE
Milla (Z_1)	*Vitex pinnata*	VERBENACEAE
Wal duriyan (Z_1)	*Cullenia ceylanica*	BOMBACACEAE
Hal* (Z_1)	*Vateria capallifera*	DIPTEROCARPACEAE
Mal kera* (Z_1)	*Ochana squarrosa*	OCHNACEAE
Mee (Z_1 & Z_2)	*Madhuca longifolia*	SAPOTACEAE
Kiriwalla* (Z_1 & Z_2)	*Holarrhena mitis*	APOCYNACEAE
Aaridda* (Z_1)	*Camphosperma zeylanica*	ANACARDIACEAE
Muna mal (Z_1 & Z_2)	*Mimusops elengi*	SAPOTACEAE
Ruk* (Z_1)	*Horsfieldia iryaghedhi*	MYRISTICACEAE
Hawarinuga (Z_2)	*Alstonia macrophylla*	APOCYNACEAE
Kenda (Z_1 & Z_2)	*Macaranga peltata*	EUPHORBIACEAE
Balu nakutu (Z_1 & Z_2)	*Stachytaepheta indica*	VERBENACEAE
Baludan (Z_1)	*Aridisia humilis*	MYRINACEAE
Goraka (Z_1)	*Garcinia quaesita*	GUTTIFERAE
Kurundu (Z_1 & Z_2)	*Cinnamomum zeylanicum*	LAURACEAE
Katu kela (Z_2)	*Erythrina fusca*	LEGUMINOSAE
Ankenda (Z_2)	*Acronychia pedunculata*	RUTACEAE

(Z_1) – Could be only seen in Zone-1

(Z_2) - Could be only seen in Zone-1

(Z_1 & Z_2) – Could be seen in both Zone-1 and Zone-1 * - Endemic species

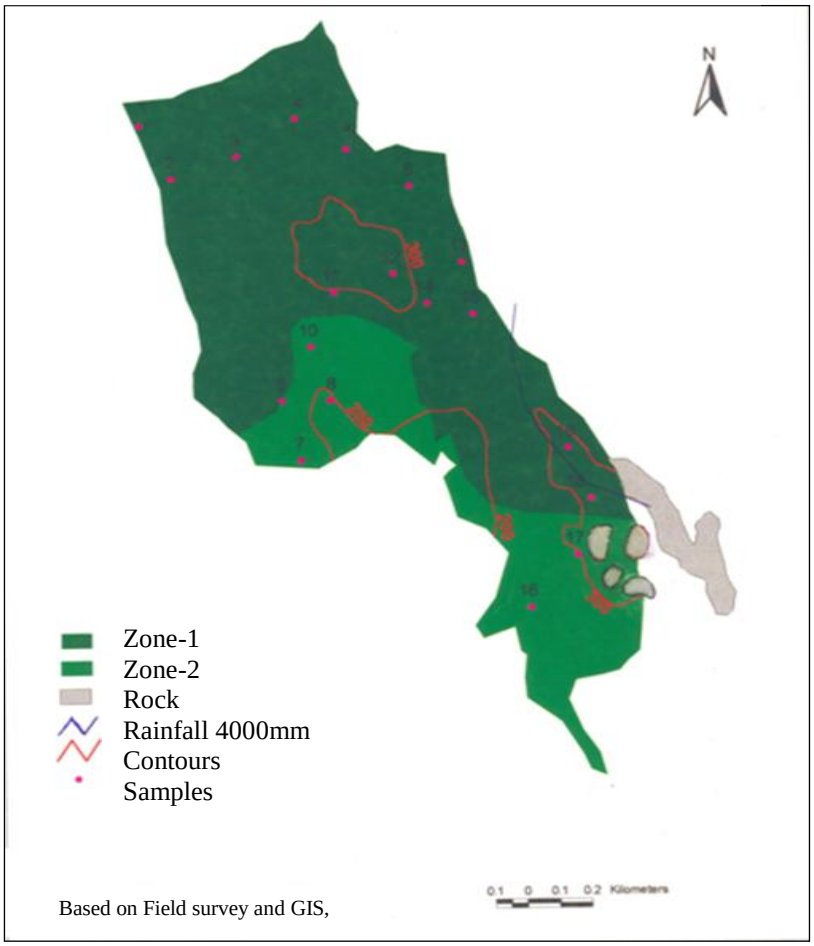
Table-3: Data on floristic families, species and endemic species at different levels of elevations.

Elevation (m)	Species *		Endemic Species **		Family ***	
	Number	%	Number	%	Number	%
181-220	26	51	14	64	17	59
221-260	37	73	15	68	26	90
261-300	38	75	18	82	26	90
301-340	29	57	13	59	21	72

* Based on total number of species 51
** Based on total number of endemic species 22
*** Based on total number of families 29

A large number of species could be seen within the elevations of 221 – 260 m and 261 – 300 m, which were 37 (73%) and 38 (75%) respectively. Relatively lower number of species were identified at the elevation of 181 – 220 m. *Mastixin tetrandra* and *Semecarpus nigroviridis* were represent 58% of the species (Table-3).
The largest number of endemic species were seen at the elevation of 261 – 300 m where 18 (82%) out of a total 22 endemic species were recognized. Other elevations were nourished with relatively lower percentage of endemic species. (Table-3)
Both 221 – 260 m and 261 – 300 m elevations claim for highest number of families, each area containing 26 (90%) out of a total of 29 families. A fever number of floristic families 17 (59%) out of 29 were identified at the elevation of 181 – 220 m, compared to the other elevations.(Table-3)

Figure Distribution of the floristic diversity of Salgala forest reserve



SPATIAL DIFFERENCES OF FLORISTIC DIVERSITY OF THE FOREST

A rich floristic diversity could be seen in the zone-1 (Z_1) (Figure-3). Total number of 46 species were identified in Z_1. 15 of the species out of 48 were restricted to the Z_1. There were 23 endemic species and 6 were confined to Z_1. There were 27 families in Z_1 and 5 families were confined to the area. *Aporosa lindleyana* was the most common species that could identified in Z_1.

Low floristic diversity could be seen in the zone-2 (Z_2) (Figure-3). Total number of 37 species were identified in Z_2. 5 of the species out of 37 were restricted to the Z_2. There were 18 endemic species and 1 was confined to Z_2. There were 24 families in zone-2 and 2 families were confined to the area. *Hamboldtia laurifolia* was the most abundant species type in the Z_2.

CONCLUSION

The best floristic richness could be seen at the elevation area of 221 – 260 m and 261 – 300 m. The least floristic richness could be seen at the area of 181 – 220 m.

The forest area could be classified into two major zones based on the Principal Component Analysis method. Highly rich floristic diversity could be find out in Zone-1 while relatively a low floristic diversity revealed in Zone-2.

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