

A Review on the Floral Composition of Kanneliya - Dediyaagala - Nakiyadeniya (KDN) Forest Complex in Sri Lanka

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Abstract: Kanneliya - Dediyaagala - Nakiyadeniya (KDN) forest complex is an international biosphere reserve belongs to the lower wet bio-climatic zone. The area is significant for exceptional plant endemism. Due to the selective logging, exotic species like *Alstonia macrophylla* and *Swetinia macrophylla* have become pioneers of the forest area. This study is a literature-based review on the plant species in KDN forest complex with the objective to assess the floristic richness of KDN forest complex. Available studies from 1985 up to 2017 reported various information on the floral composition, diversity and abundance, ecological sensitivity and conservation providing a more distinct view on KDN forest complex. Calculating Important Value Index for plant families, most studies have identified Kanneliya as the core area among the three reserves than Dediyaagala and Nakiyadeniya. The topography of the Kanneliya forest reserve area made it as the core area while Nakiyadeniya also reported for high floristic richness. The floristic richness recorded from Dediyaagala forest reserve is lower, compared to other two reserves. Kanneliya also identified as a prominent lower wet zone forest for moss flora where species belonging to 13 families and 21 genera recorded. This shows the necessity of conservation of plant species in KDN forest complex.

Keywords: Conservation, Endemism, Exotic Species, Floristic richness, KDN forest complex

1. Introduction

Sri Lanka is a tropical island located in the Indian Ocean, with a total land area of 65610km². The forest cover in Sri Lanka has been continuously and rapidly declined during the last several decades. The total forest cover in 1999 was 2.02 million hectares, representing approximately 30.5 per cent of the total land area. However, the remaining natural forest cover in 2003 was 1.46 million hectares which were around 22.4 per cent of the land area [1]. The only aseasonal ever wet region in the whole of South Asia is the well-known southwestern region of Sri Lanka [2], [3]. This wet zone of Sri Lanka along with the Western Ghats of India (Figure 1) is designated as one of the world's biodiversity hotspots (Figure 1), in demand of extensive conservation investment [4], [5].

Once, Sri Lanka was a part of the ancient Gondwanaland and was located adjacent to the African continent. The Deccan plate which comprised of India and Sri Lanka (Figure 2 a.), broke away from the Gondwanaland, drifted northwards and collided with the Asian plate around 55 million years ago (Figure 2 b.). Later on, Sri Lanka separated from the Indian mainland due to submersion of the land bridge between India and Sri Lanka about 20 million years ago. Accordingly, these zoogeographic, climatic, topographic and edaphic factors have affected the floral assemblages seen in Sri Lanka.



Figure 1: Biodiversity hotspots in the world [4]

2. Kanneliya–Dediyaagala-Nakiyadeniya forests complex

The Kanneliya – Dediyaagala – Nakiyadeniya (KDN) forest complex is located in the Southwestern part of Sri Lanka, at 6° 09' - 6° 18' North and 80° 19' – 80° 27' East (Figure 3). The total area of the KDN complex was 10,139 hectares (KDN forest complex-conservation management plan, 1995) and the extent was rapidly decreased to 6114.4 hectares [6]. Kanneliya is the largest forest of the three conjoined forests which has been identified as a Man and Biosphere reserve. The entire KDN complex has been subjected to selective logging for seventeen years, from 1970 to 1987. As a result, a number of native plants species have removed from the forest complex and new plant species like *Alstonia macrophylla* and *Swetinia macrophylla* were introduced to the forest complex.

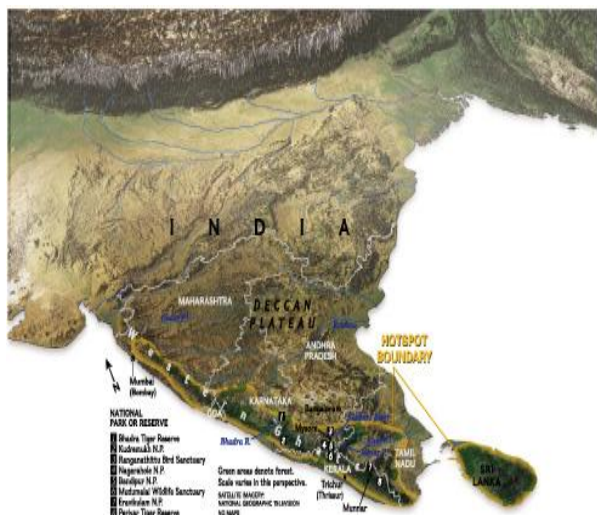


Figure 2 (a): The Western Ghats and Sri Lanka (Hotspot number 34)

Source: National geographic society adopted from <https://sites.google.com/site/there4iroam/nature-wildlife/westernghats>

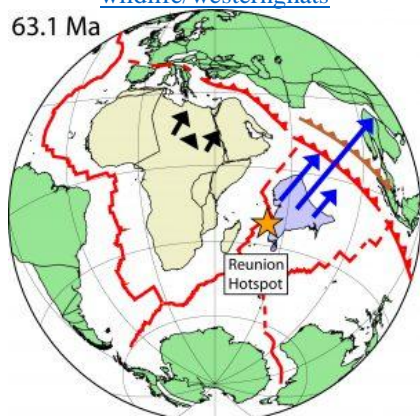


Figure 2 (b): Reunion of hotspot

Source: Scripps Institute of Oceanography adopted from Ding, 2017

The natural vegetation of the KDN complex is a lowland wet evergreen forest which is a climax forest formation. The floristic region where the KDN complex is located is considered an area of exceptional endemism, as 17 per cent of the wet zone lowland endemic flora is confined to this range of forests. Being a core area of the biodiversity hotspot, and also, as a proposed conservation forest under the Forest Department of Sri Lanka, it is essential to assess the floristic richness of KDN forest complex. The current study is a literature-based review on the plant species with the objective to assess the floral richness of KDN forest complex in the conservation of plant species.

3. Floristic richness of KDN forest complex

In 1996 Singhakumara [7] recorded the floral composition of the KDN forest complex in order to fulfil the objective of the ecological assessment of KDN forest, to identify the ecologically critical areas for conservation and core areas within the critical areas. Forest Department of Sri Lanka has

carried out a study for the period of 1991-1996 with the technical collaboration of International Union for Conservation of Nature (IUCN) and the financial collaboration under United Nations Development Programme (UNDP) which was cited in a recent study on Dediyaigala forest [8]. Gunathilaka-1985 [9], Kostermans-1992 [10], Ranil *et al*-2004 [11], Sirisena and Singhekumara-2005 [12], Biodiversity Monitoring Survey (BMS)-2008 [13], Fernando-2011 [14], Ruklani and Rubasinghe-2015 [15] and Maduwanthi-2017 [8] were the few published studies which were addressed floral species composition in KDN forest complex in different aspect.

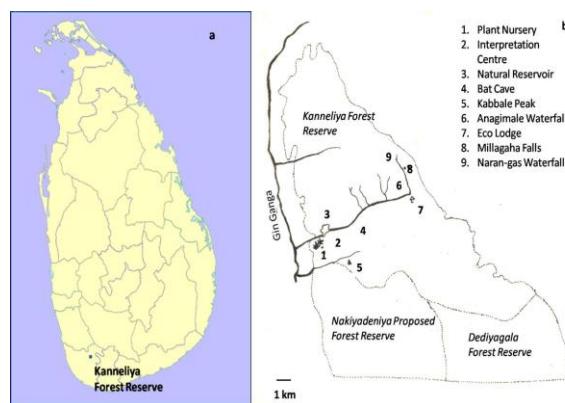


Figure 3: (a) Map of Sri Lanka showing the location of Kanneliya Forest Reserve (b) Detailed map of Kanneliya Forest Reserve Area

Source: Adapted from <http://www.traveljournals.net>

The study carried out by Singhakumara in 1996 [7] have shown that most of the areas of the forest complex have been degraded, in turn, regenerating fast and most heavily logged areas were colonized by *Alstonia macrophylla*, which is an exotic pioneer; light demander or secondary species now became naturalized in the wet zone in the country. The areas identified as moderately logged have reported a mixture of the plant species. The species recorded in de Rosario's *Dipterocarpus* and *Shorea-Mesua* communities had found by the investigation. Further, de Rosayro [16] has identified four major plant communities in Kanneliya forest reserve in 1950. They are, 1) *Mesua-Doona-Shorea* community 2) *Dipterocarpus* community 3) *Vitex-Wormia-Chaetocarpus-Anisophyllea-Dilleni* community and 4) *Gleichenia linearis fernland-Imperata* grassland community. In the study carried out by Singhakumara [7] *Dicranopteris linearis* (Kekilla fern) and *Schizostigma hirsute* (grass or shrub species) identified along the logging roads and partially covered by these species. The diversity of plant species had no significant difference found between the three reserves by Singhakumara's study. Among the three reserves, Kanneliya was the greatest of endemic species, individuals, the total number of species and basal areas. Singhakumara cited on National Conservation Review (NCR) work; covered a total of 52 forests, including KDN complex where found Nakiyadeniya as the most diverse forest among three reserves (Table 1).

Table 1: Diversity of woody plants according to NCR extracted from Sinhakumara, 1996

Forest reserve	Families	Genera	Species	Unique	Endemic	Threatened	
						Nationally	Globally
Kanneliya	147	149	233	2	140	26	16
Dediyagala	126	126	189	1	112	18	10
Nakiyadeniya	161	164	237	5	117	24	11

Further, NCR has reported Kanneliya as the second highest number of endemic plants along with the highest number of threatened woody plants nationally (26) and globally (16). In addition, NCR study concerned on species uniqueness and ranked forest reserves based on their uniqueness. Sinhakumara’s study [7] noted this as an unsuitable method for selecting conservation areas in the wet zone (Table 2). In this study Sinhakumara [7] identified Kanneliya as the core area of the complex, calculating Important Value Index (IVI) where contained areas of greater ecological sensitivity than Dediyagala and Nakiyadeniya, and, proposed as a Totally Protected Area (TPA) with a buffer zone.

Table 2: NCR's unique species and other recorded localities extracted from Sinhakumara (1996)

Forest	NCR (1992)	Other localities	Recorded in
Kanneliya	<i>Gardenia latifolia</i>	Colombo and Kalutara	Revised flora vol. IV
	<i>Hiptage benghalensis</i>	7 districts	Revised flora vol. VII
Dediyagala	<i>Madhuca moonii</i>	Kanneliya	Present survey
Nakiyadeniya	<i>Ficus asperrima</i>	Kandy	Revised flora vol. III
	<i>Ixora thwaitesii</i>	Maliboda	Peak wilderness survey
	<i>Rhynchoetichum permolle</i>	3 districts	Revised flora vol. III
	<i>Sygygium turbinatum</i>	Maskeliya	Peak wilderness survey
	<i>Wrightia angustifolia</i>	8 districts	Revised flora vol. IV

In 1985 Gunathilaka [9] carried out a study on three lowland wet zone forest reserves and two proposed forest reserve. A total of 125 plant species reported belonging to 34 families and 77 genera. It is significant that 34 plant families mentioned in this study belonged to 77 genera. *Dipterocarpaceae*, *Clusiaceae* and *Bombacaceae* were the dominant plant species while calculated IVI values identified *Mesua nagassarium*, *Cullenia zeylanica* and *Shorea worthingtonii* as dominant woody plant species. These three species are native species in Sri Lanka. The vertical distribution of the forest also addressed by the study which was cited in Karunarathnes’ in 2016 [17] where the author identified five characteristics of the vertical plant distribution of Kanneliya. They are,

- Main canopy
Bhesa ceylanica
Myristica dactyloides
Carallia calycina
- Sub-canopy
Diospyros insignis

- Strombosia nana*
- Garcinia echinocarpa*
- Ostodes zeylanica*
- Xylopia championii*
- Symplocos cuneate*
- Understory
Memecylon grande
- Ground vegetation
Herbaceous species
Seedlings of woody species
- Epiphyllous flora

‘A handbook of the *Dipterocarpaceae* of Sri Lanka’ in 1992 [10] provides a detailed description of plant species *Dipterocarpaceae* family. There are 9 genera of *Dipterocarpaceae* family in the country including, *Dipterocarpus*, *Sunaptea*, *Vateria*, *Vateria*, *Hopea*, *Shorea*, *Doona*, *Balanocarpus* and *Stemonoporus*. Among them, *Doona* and *Stemonoporus* genera are restricted only to Sri Lanka throughout the world. Accordingly, 7 genera of *Dipterocarpaceae* have recorded in the Kanneliya forest conserve (Table 3). It is significant to record all species belonging to the genera *Dipterocarpus* and *Shorea* in the Kanneliya forest reserve while four species of *Dipterocarpus* and six species of *Shorea* inhabited in the Kanneliya forest reserve.

Table 3: *Dipterocarpaceae* species recorded in Kanneliya reserve

Genera	Species
Dipterocarpus	<i>Dipterocarpus glandulosus</i>
	<i>Dipterocarpus hispidus</i>
	<i>Dipterocarpus insignis</i>
	<i>Dipterocarpus zeylanicus</i>
Sunaptea	<i>Sunapteascabriuscula</i>
Vateria	<i>Vateria copallifera</i>
Hopea	<i>Hopeadiscolor</i>
	<i>Hopeajucunda</i>
	<i>Hopeamodesta</i>
Shorea	<i>Shorea dyeri</i>
	<i>Shorea lissophylla</i>
	<i>Shorea oblongifolia</i>
	<i>Shorea pallescens</i>
	<i>Shorea stipularis</i>
Doona	<i>Shorea hulandida</i>
	<i>Doona affinis</i>
	<i>Doona congestiflora</i>
	<i>Doona macrophylla</i>
	<i>Doona ovalifolia</i>
Stemonoporus	<i>Doona venulosa</i>
	<i>Stemonoporus bullatus</i>
	<i>Stemonoporus kanneliyensis</i>

Source: Kostermans, 1992

Except *Hopeacordifolia* other three species belonging to the genera, *Hopea* recorded in the Kanneliya reserve. The second largest of *Dipterocarpaceae* family is *Doona*, with

10 plant species. 50 per cent out of them inhabited in the Kanneliya reserve is a particular characteristic proving the floristic richness. *Stemonoporus* is the greatest of the *Dipterocarpaceae* family. *Stemonoporus bullatus* and *Stemonoporus kanneliyensis* are significant in the reserve. Carrying out a study in 1995 on the germination of seedlings and saplings in the KDN complex Wickramasinghe which was cited in Karunarathne [17], has given a detailed description of the floristic composition of KND complex after selective logging. As cited, Wickramasinghe identified seedlings and saplings of important plant species distributed in one hectare of the forest. The results indicated that the *Dipterocarpus zeylanicus* has been influenced highly due to the selective logging. The other species influenced due to the disturbance was recorded as *Doona congestiflora* and *Myristica ceylanica* (Table 4).

Table 4: Seedlings and saplings of important plant species distributed in one hectare

Plant species	Percentage (%)
<i>Doona zeylanica</i>	27
<i>Calophyllum moonii</i>	11
<i>Bhesa ceylanica</i>	11
<i>Mesua nagaasarium</i>	09
<i>Palaquiam grande</i>	08
<i>Shorea dyeri</i>	07
<i>Chaetocarpus castanocarpus</i>	06
<i>Alstonia macrophylla</i>	05
<i>Cullenia ceylanica</i>	05
<i>Anisophyllea cinnomomoides</i>	03
<i>Myristica ceylanica</i>	01
<i>Doona congestiflora</i>	02
<i>Dipterocarpus zeylanicus</i>	01
Other species	04

Source: Wickramasinghe, 1995

Ranil *et al* [11] and Ruklani and Rubasinghe [15] have studied on Pteridophyta in 2004 and bryophytes in 2015 respectively. Both studies have stressed seedless plant species belonging to non-vascular and vascular groups in Kanneliya forest reserve. In the study done by Ranil *et al* in 2004 [11] identified a total of 70 pteridophyte species (Table 5). Out of them, 62 were fern group and 8 were fern allies. 21 per cent of fern species in Kanneliya reserve are native to Sri Lanka while 22 per cent identified as threatened species and three rare species. This study recorded two fern species, particularly which were recorded after 53 years. They were, *Ctenopteris blechnoides* and *Cyathea sinuate*. *Asplenium decorum* recorded twice only for 110 years. The rare fern species were included *Asplenium gardneri*, *Microgonium motley* and *Taenitsblechnoides*. Except for Sri Lanka, *Asplenium gardneri* recorded only in Sumatra Island. The identified *Microgonium motley* is the smallest fern species found in Sri Lanka and is a very sensitive species.

Table 5: Pteridophyta diversity in Kanneliya reserve

Group	Fern	Fern allies	Total
Number of families	18	02	20
Number of genera	42	03	45
Number of species	62	08	70
Number of native species	12	03	15
Number of rare species	03	-	03
Number of threatened species	12	04	16
Number of introduced species	01	-	01

Source: Ranil *et al*, 2004

Ruklani and Rubasinghe in 2015 [15] have identified 13 families of mosses belonging to 21 genera (Table 6). Five habitats of mosses were identified in this study (Table 7) showing the habitat diversity of mosses in Kanneliya reserve. Pterobryaceae, Calymperaceae, Meteoraceae and Sematophyllaceae were reported with high generic and species numbers in this study. Among these moss families, Calymperaceae, Hypnaceae and Sematophyllaceae were the dominant mosses recorded in Kanneliya forest.

Table 7: Habitat diversity of mosses within the Kanneliya reserve extracted from Ruklani and Rubasinghe (2015)

Habitat	Number of taxa of mosses
Soil	09
On tree trunks (epiphytic)	30
On leaves (epiphyllous)	0
On wet rock (epilithic)	27
Other (on walls)	2

Table 6: List of moss species found in Kanneliya forest reserve extracted from Ruklani and Rubasinghe, 2015

Family	Genera	Species
Bryaceae	<i>Bryum</i>	<i>Bryum</i> sp.
Calymperaceae	<i>Calymperes</i>	<i>Calymperes</i> sp.
	<i>Leucophanes</i>	<i>Leucophanes glaucum</i> (Schwägr.) Mitt.
	<i>Mitthyridium</i>	<i>Mitthyridium repens</i> (Harv.) H. Rob. <i>Mitthyridium fasciculatum</i> Hook. & Grev. H. Rob.
	<i>Syrrhopodon</i>	<i>Syrrhopodon gardneri</i> (Hook.) Schwägr.
Dicranaceae	<i>Leucoloma</i>	<i>Leucoloma amoene-virens</i> Mitt.
Fissidentaceae	<i>Fissidens</i>	<i>Fissidens serratus</i> Müll. Hal.
Hookeriaceae	<i>Hookeria</i>	<i>Hookeria acutifolia</i> Hooker & Greville
Hypnaceae	<i>Ectropothecium</i>	<i>Ectropothecium</i> sp.
	<i>Hypnum</i>	<i>Hypnum cupressiforme</i> Hedw.
	<i>Pseudotaxiphyllum</i>	<i>Pseudotaxiphyllum distichaceum</i> (Mitt.) Z. Iwats.
Leucobryaceae	<i>Campylopus</i>	<i>Campylopus</i> sp.
	<i>Leucobryum</i>	<i>Leucobryum bowringii</i> Mitt.
Meteoraceae	<i>Aerobryidium</i>	<i>Aerobryidium filamentosum</i> (Hook.) M. Fleisch.
Neckeraceae	<i>Homaliodendron</i>	<i>Homaliodendron javanicum</i> (Müll. Hal.) M. Fleisch.
Polytrichaceae	<i>Pogonatum</i>	<i>Pogonatum marginatum</i> Mitt.
Pterobryaceae	<i>Pterobryopsis</i>	<i>Pterobryopsis</i> sp.
Pylaisiadelphaceae	<i>Taxithelium</i>	<i>Taxithelium</i> sp.
Sematophyllaceae	<i>Papillidiopsis</i>	<i>Papillidiopsis</i> sp.
	<i>Sematophyllum</i>	<i>Sematophyllum</i> sp.
	<i>Trichosteleum</i>	<i>Trichosteleum boschii</i> (Dozy & Molk.) A. Jaeger

Sirisena and Singhakumara in 2005 [12] studied on three selected lowland wet zone forests including Kanneliya reserve. The plant survey was carried out according to the

toposequence is a special character in this study. The most common plant family in the understory in the forest is Euphorbiaceae and also rich in Ebenaceae and Fabaceae. A total of 15 most common understory species have found in this study (Table 8), among them, 47 per cent were native to Sri Lanka.

Table 8: Most common understory species found in Kanneliya extracted from Sirisena and Singhakumara, 2005

Plant species	Plant family	Height (meters)
<i>Humboldtia laurifolia</i>	Fabaceae	2.5
<i>Garcinia hermonii</i> *	Clusiaceae	3.2
<i>Diospyros insignis</i>	Ebenaceae	5.0
<i>Aporosa lanceolata</i> *	Euphorbiaceae	3.2
<i>Ixora jucunda</i> *	Rubiaceae	2.8
<i>Goniothalamus thwaitesii</i>	Annonaceae	2.5
<i>Diospyros acuminata</i> *	Ebenaceae	4.3
<i>Mallotus fuscescens</i>	Euphorbiaceae	3.1
<i>Thottea siliquosa</i>	Aristolochiaceae	1.7
<i>Quassia indica</i>	Combretaceae	3.2
<i>Psychotria nigra</i>	Rubiaceae	2.5
<i>Memecylon rostratum</i> *	Melastomataceae	2.1
<i>Nargedia macrocarpa</i> *	Rubiaceae	4.2
<i>Cleistanthus acuminatus</i>	Euphorbiaceae	2.0
<i>Scolopia acuminata</i>	Flacourtiaceae	2.0

*Endemic plant species

Comparing the NCR in 1992 (which of the information has reviewed from the published article in 1993) [18] and Biodiversity Monitoring Survey in 2008 [13] revealed the rapid decrease of plant species in Kanneliya forest reserve. A number of plant species recorded were 211 and 139 endemic species representing 66 per cent. BMS [13] study also addressed the succession of disturbed forests in Kanneliya reserve while Fernando in 2011[14]stressed that BM survey was carried out to detect the changes of NCR recordings. The growth of invasive *Clidemia hirta* identified in this study apart from woody plants. Fernando in 2011[14] provides a detailed description of KDN forest complex, however, there is a contradiction of the findings of stratification between Gunathilakas' in 1985[8] and Fernando's in 2011 [14] regarding the Kanneliya reserve.

The emergent layer consists of *Dipterocarpus zeylanicus* and *Doona zeylanica* while the canopy layer demonstrates *Mesua ferrea*, *Cullenia ceylanica*, *Mangifera zeylanica*, *Anisophyllea cinnamomoides*, *Doona congestiflora*, *Palaquium grande*, *Camposperma zeylanicum* and *Calophyllum thwaitesii*[14]. *Aporosa cardiosperma*, *Semecarpus* spp, *Xylopiya championii*, *Garcinia echinocarpa*, *Chaetocarpus castanocarpus* dominate in the first sub-canopy of the Kanneliya forest. In the year 2011 Fernando [14] stated *Cryptocarya wightiana*, *Memecylon ellipticum*, *Gyrinops walla*, *Acronychia pedunculata* and *Diospyros insignis* as second sub-canopy species. Densely grown undergrowth consists of *Diospyros* spp, *Mallotus tetracoccuc*, *Memeylon* spp, *Trema orientalis* and *Ochlandra stridula*. The field layer signifies with fern species, epiphytes, orchids and lichens.

The study carried out in Dediyaigala forest reserve (2017) [8] has focused the diversity of vegetation across the topographic gradient has shown that the floristic richness was disturbed heavily due to the land utilization activities of the human domain. A total of 63 species belonging to 48

genera (Table 9) and 32 families (Table 10) were recorded in this study. 25 endemic plant species also have recorded in Dediyaigala forest.

Table 9: Richness of plant genera in Dediyaigala extracted from Maduwanthi, 2017

Genera	Total	Genera	Total
<i>Anisophyllea</i>	30	<i>Chrysophyllum</i>	8
<i>Gyccosmis</i>	26	<i>Horsfieldia</i>	8
<i>Semecarpus</i>	25	<i>Shorea</i>	7
<i>Terminalia</i>	25	<i>Axinandra</i>	6
<i>Ficus</i>	24	<i>Cinnamomum</i>	6
<i>Encossanthum</i>	21	<i>Cullenia</i>	6
<i>Syzygium</i>	20	<i>Dimorphocalyx</i>	6
<i>Calophyllum</i>	18	<i>Caryota</i>	4
<i>Dipterocarpus</i>	17	<i>Dichapetalum</i>	4
<i>Chaetocarpus</i>	15	<i>Gomphia</i>	4
<i>Neolitsea</i>	15	<i>Hunteria</i>	4
<i>Doona</i>	14	<i>Diospyrus</i>	3
<i>Alstonia</i>	13	<i>Goniothelermus</i>	3
<i>Wormia</i>	12	<i>Hydnocarpus</i>	3
<i>Bhesa</i>	11	<i>Macaranga</i>	3
<i>Canthium</i>	11	<i>Symplocos</i>	3
<i>Cryptocariya</i>	11	<i>Vitex</i>	3
<i>Garcinia</i>	11	<i>Aporosa</i>	2
<i>Campnosperma</i>	10	<i>Mastixia</i>	2
<i>Dillenia</i>	9	<i>Melstoma</i>	2
<i>Dimocarpus</i>	9	<i>Ptychopyxis</i>	2
<i>Mangifera</i>	9	<i>Artocarpus</i>	1
<i>Vateria</i>	9	<i>Carallia</i>	1
<i>Bridelia</i>	8	<i>Eleocarpus</i>	1

Table 10: Richness of plant families in Dediyaigala extracted from Maduwanthi, 2017

Family	Total	Family	Total
Dipterocarpaceae	49	Melastomataceae	8
Rhizophoraceae	41	Myristicaceae	8
Euphorbiaceae	36	Sapotaceae	8
Anacardiaceae	33	Bombacaceae	6
Lauraceae	32	Arecaceae	4
Clusiaceae	28	Dichapetalaceae	4
Combretaceae	25	Ochnaceae	4
Rutaceae	25	Ebanaceae	3
Annonaceae	24	Flacourtiaceae	3
Moraceae	24	Symplocaceae	3
Dilleniaceae	21	Verbenaceae	3
Myrtaceae	20	Cornaceae	2
Apocynaceae	17	Burseraceae	1
Celastraceae	11	Calophyllaceae	1
Rubiaceae	10	Elaeocarpaceae	1
Sapindaceae	9	Thymelaeaceae	1

Further, this study has shown that high richness of plant species favours moderate elevation. The floristic diversity has represented at the areas of 141-190 and 91-140 meters. Considering the disturbance towards floristic richness, this study has suggested demarcating the forest area along with strong conservation measures.

4. Management and conservation of plant species in KDN forest complex

The zoning system has adopted to manage KDN forest complex which was based on the resources. The forest resources have classified according to their need for protection, a requirement for management interventions and the ability to accommodate community use. This management zones were the Protection Zone (PZ) to fulfill the objective of conservation, research, education and recreation; Traditional Use Zone (TUZ) for research, traditional use, rehabilitation and recreation; Cultural Zone (CZ) for preservation of religious and cultural values and Buffer Zone (BZ) for physical, biological and social. Apart from the zoning system, conservation of globally threatened species and medicinal plants project was carried out by participatory forest management. The studies addressed on KDN forest complex have stressed the necessity of strong conservation measures and demarcation of forest area to control the anthropogenic disturbances.

5. Conclusion

The floristic richness of KDN forest complex has shown the importance of conservation of plant species found in the forest complex. Among the studies discussed here, Kanneliya forest reserve has obtained more attention and identified as the core area, regarding the floristic richness. Nakiyadeniya and Dediya gala forest reserves were not focused for a taxonomic survey on moss flora, therefore, it is timely important to assess the floristic richness of plant species in KDN forest complex including moss flora to conserve the particular KDN forest complex.

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