

MONTANE RAIN FORESTS OR THE CLOUD FORESTS OF SRI LANKA

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As one moves from the hot, humid lowlands to the cool central highlands, there is a change in the structure and composition of the forest communities. The lowland wet evergreen rainforests have a three tiered or three-storied structure of tall, straight trees with moderately large leaves. The mid-elevational zone supports a two storied submontane rain forest. Most of these submontane forests have been cleared to establish coffee, cardamon and tea plantations. Some good patches of sub-montane rain forests are still found covering Gongala and on the wetter slopes of the Knuckles Range. At elevations above 4500 ft (1,385 m) one encounters the montane rain forests or cloud forests. These cloud forests are found at higher elevations mainly in the Peak Wilderness Area, the Hakgala and Horton Plains Reserves, and the upper reaches of the Knuckles mountain range. Patches of montane rain forests or cloud forests also occur above Dunsinand, Hope, Frotoft, Ramboda and other well known upcountry tea estates and also along the trail to Sri-Lanka's highest mountain, Pidurutalagala (2524 m). Most of the early descriptions of the montane forests were by De Rosayro (1985). More recently Greller et al. (1987), Werner (1982), Wijesundera and Gunatilleke (unpublished data) and our group at IFS have studied the structure and floristic composition of these ecologically and hydrologically very important forest ecosystems of Sri Lanka.

While the average annual temperatures along the coasts and lowlands of Sri Lanka are in the neighbourhood of 27°C, the mean annual temperature of the hill station of Nuwara Eliya (1900 m elevation) is around 15.5°C. During the cool dry months of January and February day temperatures at Horton Plains are around 25°C while the night temperatures drop to values below 5°C. On some occasions the temperatures drop to values even below zero. During these cold months of January and February frosts may occur in the early morning hours but these frosts appear to be confined to the open grasslands and tea plantations. Similar weather patterns prevail at Ootacamund (Uthagamandalam) and other hill stations of the Nilgiris in Southern India. The montane forests of the Nilgiri and Palani mountains are called "Sholas" and they show striking structural and floristic similarities to our montane rain forests. At present, forests are largely confined to sheltered areas and large areas have been greatly modified by man's activities. Mosaics of montane forests and grasslands occur as we see it on Horton Plains and other locations. Annual precipitation ranges from about 5000 mm on the western parts of the upper montane zone to about 2000 mm on the eastern parts bordering the Uva basin. Besides heavy rainfall, dense mist or fog settles over the forests and grasslands during most months of the year in the early afternoon. Strong winds are prevalent during May to August. These forceful winds tend to dwarf the forests, especially on ridge tops forming the so called elfin forests

Unlike lowland wet evergreen rain forests, trees of the montane rain forests or cloud forests reach heights of about 10-15 m. On :

exposed ridges the short stature forests may only be waist high (1 - 1.5 m). Such forests are seen clearly on Totapola Kande and in Knuckles area. Boles of trees are rather short, slanting and the branches and twigs tend to be twisted and crooked giving the trees a gnarled appearance. The top of the crowns are flat or hemispherical (umbrella shaped). Leaves are rather thick and leathery and somewhat brittle. Most tree species have very small leaf areas (eg. Syzygium rotundifolium, Ilex walkeri etc.) and are classified according to the Raunkiaer's system as microphylls ~~or~~ nanophylls. Understorey trees and shrubs have somewhat larger leaf areas eg. Actinodaphne speciosa, Psychotria spp. etc. The undersurface of leaves of many tree species have powdery white deposits or blooms. The lower surface of some leaves are however covered with cottony white hairs, eg. Rhododendron arboreum, Rhodomyrtus tomentosa. Besides the low-stature trees and the somewhat tall shrubs, the montane rain forests are rich in a range of epiphytic orchids, ferns, mosses, leafy liverworts and lichens. The bryophytes and lichens form festoons covering stems and branches of trees and shrubs. Climbing plants are not as abundant as in the lowland rain forests. Toddalia asiatica, Eleagnus latifolia are woody climbers or scramblers. Species of Senecio and Rubia cordifolia are weak-stem climbers of these forests.

The shrub species characteristic of the montane cloud forests belong to the families Acanthaceae (Strobilanthes spp.), Balsaminaceae (Impatiens spp.), Bambusaceae (Indocalamus spp.) and Rubiaceae (Hedyotis spp., Psychotria spp.). More light penetrates through

the canopy of cloud forests as compared to the situation prevailing in lowland wet evergreen rain forests. At Horton Plains irridiscent species of Selaginella, Hydrocotyle javanica and herbaceous members of the family Urticaceae (Elatostema sp. etc.) form the major components of the ground flora. One of the most striking and dominant tree species of the montane rain forests or cloud forests of Sri Lanka is Calophyllum walkeri called Keena or Kina. Other species of Calophyllum eg. C. trapezifolium, C. cuneifolium are found in the montane forest of the Peak Wilderness and Knuckles Area. Garcinia echinocarpa or Madol belongs to the same family as the genus Calophyllum (Guttiferae or Clusiaceae) and is a common tree species of the montane forests. Trees of the families Lauraceae (Cinnamomum ovalifolium, Neolitsea fuscata, Actinodaphne speciosa, Litsea spp.); Myrtaceae (Syzygium revolutum, Syzygium rotundifolium, S. sclerophyllum, Eugenia mabaeoides etc.); Symplocaceae (Symplocos major, S. spicata, S. elegan etc.) and Theaceae (Adinandra lasiopetala, Gordonia ceylanica, Eurya japonica etc.) are common in the montane rain forests of Sri Lanka. Other widespread woody species are Elaeocarpus montanus, Euonymus revolutus (treelet), Meliosma wightii, Michelia nilagirica (wana sapu) Olea polygama, Rhododendron arboreum and Vaccinium symplocifolium. Temperate herbaceous genera such as Ranunculus, Valleriana, Galium are found in wet meadows and other microhabitats in the vicinity of montane forests. Structurally and floristically the montane rain forests of Sri Lanka are very different from the majestic wet evergreen rainforests of the hot, humid lowlands.

Like the lowland rain forests, the montane rain forests also harbour a large number of endemic species of ferns and flowering plants. Preservation of these two forest types are important in conserving our endemic species of plants and animals. Like other forest ecosystems they intercept, store and release rain and other forms of precipitation. The montane forest ecosystems are especially very important as water sheds for our river systems. Most of our major rivers originate in the central highlands and radiate towards coasts.

The soils beneath the forests are acidic, rich in humus and have a higher cation exchange capacity compared to the yellow-brown podzolic soils or ultisols of the lowland wet rain forest. Precipitation easily infiltrates and percolates through these soils and is stored as ground water and seeps into the many springs and small streams of the mountains. These soils support a rich microflora of bacteria and fungi which play an important role in litter decomposition and nutrient cycling. Removal of the natural forest brings about rapid deterioration of the soil. These complex natural forests are better suited than man-made forest plantations as water sheds especially at higher elevations and on very steep slopes.

The natural montane forests have the added advantage of supporting a rich and varied wild life. Many of Sri Lanka's interesting lizards and avifauna are found in the forest habitats of the central highlands. The natural montane forest like other natural ecosystems have multifaceted functions. The life supporting ecological processes

of these forest ecosystems are indispensable for human survival, agricultural and many related activities. Since our natural forest cover has greatly diminished during the past thirty years, we must endeavour to preserve what little is left of it and undertake to upgrade the large areas of degraded wastelands by soil amendments (addition of organic matter - carbon pool for soil fertility maintaining microbes and soil fauna) and soil manipulations (inoculating soil with nitrogen fixing rhizobia and mycotrophic fungi). These kekilla and patana lands can be re-developed to support self sustaining man-made forest plantations of quick growing trees. While preserving our natural forests we must re-develop our degraded lands into forest plantations to supply the timber and fuelwood needs of the people. Conservation of natural forests cannot be achieved without meeting the needs of the people of the area. Rural people require land for cultivation. They need timber for building and fuelwood for cooking. Human settlements need water for domestic consumption and for irrigation. These interrelated needs can be met by developing mixed agroforestry systems like those proposed and tried out by the National Agricultural Diversification Settlement Authority (NADSA). Conceptually, this was an excellent scheme. But, it needs to be revamped and given a good thrust if we are to save our remaining natural forest ecosystems and also meets the needs of a growing population especially in the mid-country and hill country areas of Sri Lanka. People's awareness of these problems and their participation are essential for these ventures to be successful. Today's Schools Science Programme attempts to show you the importance of ecology and conservation for our welfare and national development. The green mantle of Sri Lanka is a fragile and extremely

valuable resource. We need to protect and sustain it for our well being and for our future generations. Mismanagement of natural ecosystems can lead to serious environmental degradation and dessertification. The Green Mantle of Sri Lanka has earned it the epithet of being called the Emerald Isle and we must strive to maintain it and prevent it turning into a parched, brown, Garnet Isle.