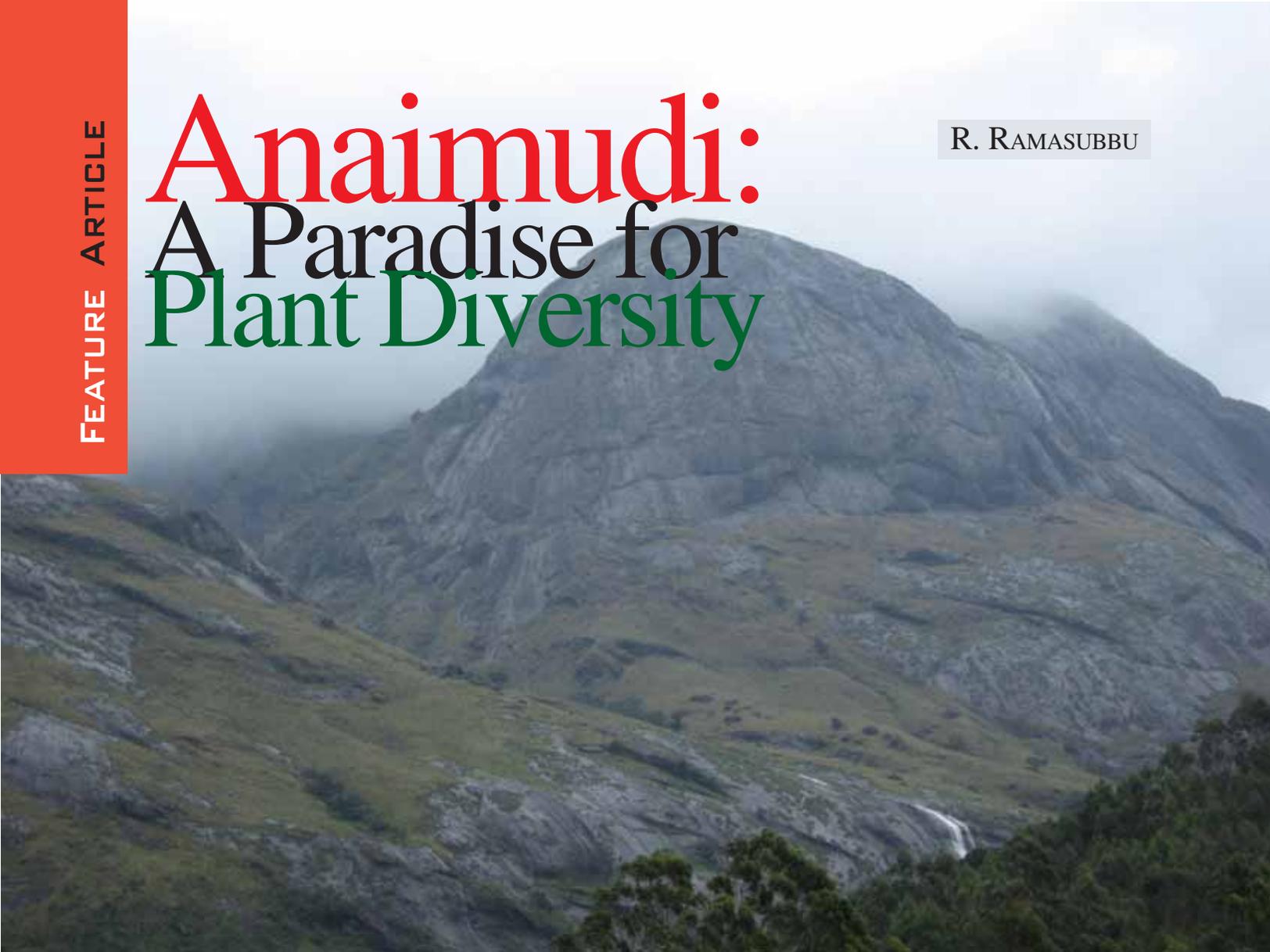


Anaimudi: A Paradise for Plant Diversity

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THE Anaimudi peak is situated in the Southern Western Ghats (Sahyadri) towering 2695 metres above sea level (masl) is the highest peak in south India among the many smaller hills that constitute the high ranges of the Western Ghats. It is situated in the Idukki district of Kerala. It is the nodal point from which three ranges radiate in three different directions: the Anaimalai in the north, the Palni hills in the north-east and the Cardamom hills in the south having deeply dissected valleys and massive peaks mostly covered with tea plantation.

The Anaimudi (locally meaning 'head of elephant') region of Kerala is well known as the land of luxuriant forests with wide variety of biodiversity. The mountainous configuration, high altitude and heavy

rainfall due to its proximity to the west coast make this region a botanically rich area of Peninsular India. No detailed study on the floristic wealth of this area has, however, been made.

Barnes who made extensive plant collections on this area and considered it to be a botanically interesting area of south India was the only botanist to have made any appreciable collections of plants from Anaimudi. He recorded 12 species of *Impatiens* or balsams endemic to the High range and found more than 30 species of them in a radius of 16 km of Munnar.

Munnar is the central town in the High range and this enchanting valley, which is 1524 masl, is aptly called the little tea town of south India. Munnar in vernacular means three rivers deriving its name due to the three tributaries of the Muthirapuzha River. This high range is also known as the Kannan Devan Hills.

Geography

The Western Ghats stretch along the western coast of Peninsular India from Tapi valley in southern Gujarat to south-west Tamil Nadu (8-20° N), covering an area of 1,60,000 sq. km and ranging from sea level

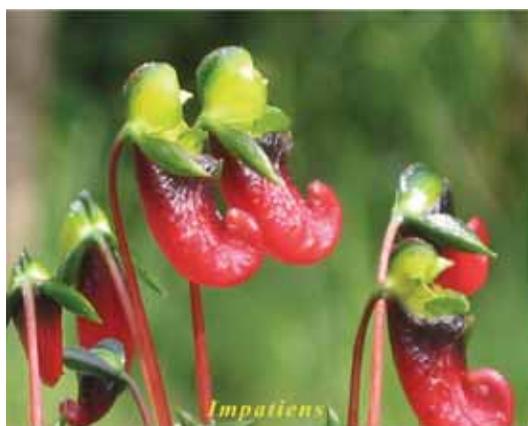
Some of the forest patches have still survived in the sheltered valleys and protected slopes. Certain pockets of remote and less accessible ravines contain original species composition where the candidate species exist at present.

to 2695 m. The northern parts and extreme southern tip are less moist, while the central and southern Western Ghats receive heavy annual precipitation of up to 6000 mm, which supports dense diverse tropical forests rich in species diversity and endemism. The mountainous configuration, high altitude, rainfall, humid climate etc. make this tract botanically one of the richest areas of India and therefore aptly designated as one among 25 globally recognized biodiversity hot-spots in the world.

The hills of southern Western Ghats have been attributed this status due to the high levels of endemic forms of biodiversity distributed in genera, species and races as well as the severe threats to such biodiversity posed by humans. It is generally accepted based on several explorations conducted by various researchers that nearly 2000 species of higher plants are endemic to the Western Ghats. But the existing number of endemic species among lower plants and microorganisms unfortunately remains unknown even today.

The underlying rock formation is the archaic igneous origin consisting of granites and gneisses. The crystalline rocks consist mainly of the minerals silica, feldspars, muscovite and biotite with small amount of accessory ferromagnesium minerals. The soil is acidic and is made up of sandy clay loam. Over the crest and along the slopes of the precipitous hills, the soil is usually shallow with no tree growth; the outcrops of rocks can be seen in many places. The climate of this area is often referred to as of temperate type on the account of the relatively low temperature prevailing during winter months.

The average temperature of this region is 24°C during the hottest months



Impatiens



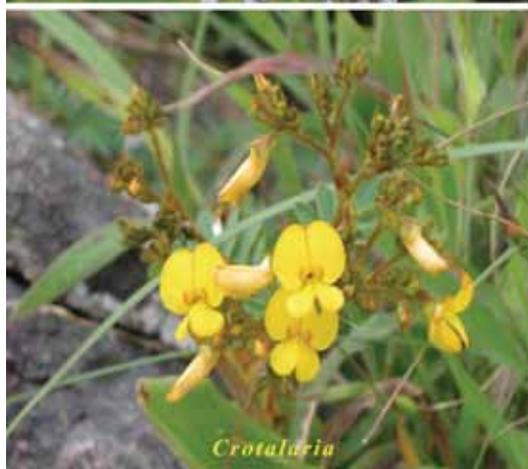
Ground Orchid



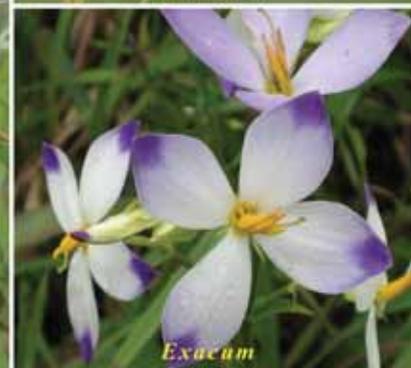
Eupatorium



Gamelina



Croton



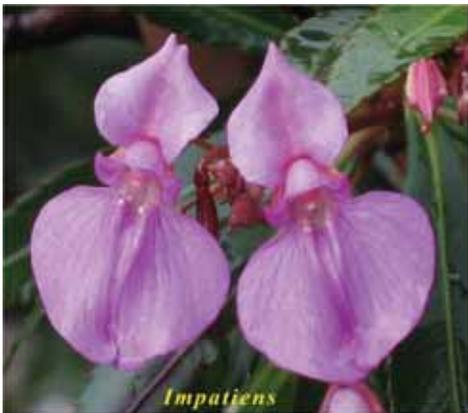
Excoecum

(March to May) and 7°C during the cold season (December to February). From the middle of November to February heavy frost occurs in Anaimudi and surrounding areas. The rainfall is heavy and bulk of the annual rainfall precipitated by the southwest monsoon is mostly from June to August. During this season the entire area is generally swathed in dense fog and strong winds are usually prevalent. Considerable rain is received in October and November also, during the retreating southwest monsoon season generally known as northeast monsoon.

Biodiversity

The vegetation of Anaimudi and adjoining areas like Umayamalai, Rajamalai etc. consists of vast expanse of grasslands interspersed with a number of isolated compact woods, locally called Sholas. These sholas are usually confined to sheltered valleys, glens, hollows and depressions where there is adequate moisture and good drainage. Roughly, the grassland constitutes about 85% of the vegetation and the shola forest 15%.

The evergreen forests are perhaps the richest in terms of the occurrence of



Impatiens



Rhodomyrtus



Sonerila



Impatiens



Impatiens



Phlebophyllum

The grasslands are extensive and include a complex of grasses, herbs, undershrubs and a few shrubs.

number of species in this area. But they have been subjected to interference continuously by man and because of that the existing forests in certain areas are in the process of attaining resilience with change of species composition to some extent. However, some of the forest patches have still survived in the sheltered valleys and protected slopes. Certain pockets of remote and less accessible ravines contain original species composition where the candidate species exist at present.

The trees comprising the sholas are evergreen and mostly short boled. The height of the trees is low, rarely exceeding 6 m and these are clothed with lichens, mosses, ferns, orchids and other attractive epiphytes. The crowns are usually dense and rounded. Marked differentiation of canopy layers is not present and there is a continuous series from undershrub to shrubs and large shola trees. These areas are also mixed with several climbers, epiphytes and thick undergrowth. Tree ferns are also common to this place.

The soil is acidic and is made up of sandy clay loam. Over the crest and along the slopes of the precipitous hills, the soil is usually shallow with no tree growth; the outcrops of rocks can be seen in many places.

There are two perennial streams flowing on either side of Anaimudi, one through Umayamalai and other through Rajamalai. The fringing forests along these watercourses are not dense and consist mostly of species that occur along the margins of sholas. Other characteristic trees in this area are *Rapanea capitellata* growing from the clefts of rocks in these rapid streams and *Impatiens tangachee* with its attractive flower. The summit of the Anaimudi peak is devoid of forests and a few isolated plants of *Gaultheria fragrantissima* and *Rhododendron nilagiricum* that are present show very stunted in growth on account of their exposure to strong winds.

In Vaguvarai and part of Umayamalai stunted rainforests are found in the transitional zone between montane woodlands and typical tropical wet evergreen forest trees ranging from 10-15 m. The shola-grassland ecosystem is a strange admixture of temperate and tropical qualities due to the combined effects of altitude as well as latitude. It is exceptionally rich in orchids and balsams. The spectacular mass flowering of the shrub neelakurunji (*Phlebophyllum kunthianum*) takes place in the grasslands in cycles of 12 years. The next neelakurunji 'outburst' is due in the year 2018.

The grasslands are extensive and include a complex of grasses, herbs, undershrubs and a few shrubs. The grasslands are dominated with species of *Brachiaria reptans*, *Chrysopogon hackellii*, *Eragrostis unioloides*, *Ischaemum mangaluricum*, *Tripogon bromoides* etc. Occasionally gregarious patches of *Didymocarpus lanuginosa* and *Rhododendron arboreum* ssp. *nilagiricum* are seen in the midst of these grasslands. The vegetation of this area consists of montane sholas and sub-tropical



Nilgiri tahr

Nilgiri tahrs are stocky goats with short, coarse fur and a bristly mane. Males are larger than the females, and have a darker colour when mature.

evergreen forests interspersed with vast expanses of grasslands.

Home for Balsams

Idukki district, a major part of the Anamalai high ranges, is a center of endemism as far as balsams are concerned. It is the type locality for more than 25 species of *Impatiens*. The high range is one of the richest areas in the Western Ghats with respect to the species of balsams. The highly undulating mountainous configuration and the formation of a well-marked upland shola forest with very high rainfall provides suitable habitat for *Impatiens* growth.

Many species of *Impatiens* are found restricted to specific altitudinal zones and most of the exclusive endemics are found restricted in isolated pockets in the high altitudes (2000 masl) in the Western Ghats. It generally occurs at high altitudes (1500 masl), where there is active monsoon (rainfall), optimum temperature (20°C) and sunlight. Anaimudi consists of areas with intermittent rain, where innumerable valleys, grassy slopes, perennial streams and water falls form an appropriate habitat for the balsams.

Extensive field trips conducted by several scientists reported nearly 60 species of balsams from this area. Some of the following recorded from this area are: *Impatiens anaimudica*, *I. campanulata*, *I. chinensis* var. *brevicornis*, *I. coelotropis*, *I. cordata*, *I. cuspidata*, *I. dasysperma*, *I. elegans*, *I. flaccida*, *I. floribunda*, *I. goughii*, *I. henslowiana*, *I. herbicola*, *I. grandis*, *I. latifolia*, *I. leschenaultii*, *I. maculata*, *I. minor*, *I. munnarensis*, *I. pandata*, *I. phoenicea*, *I. platyadena*, *I. tangachee*, *I. tomentosa*, *I. trichocarpa*, *I. verticillata*, and *I. wightiana*. Epiphytic balsams like *Impatiens acualis*, *I. jerdoniae*, *I. parasitica*, *I. viridiflora*, *I. violacea*, *I. kulamavueensis* and *I. scapiflora* were reported in and around Anaimudi region.

About 120 species of birds have been recorded which include endemics like black and orange flycatcher, Nilgiri pipit, Nilgiri wood pegeon, white bellied shortwing, Nilgiri verditer flycatcher and Kerala laughing thrush. Endemics are confined to the shola grassland ecosystem with wide variety of butterflies, moths and other insects.

The most beautiful animal in the valleys and hills is the Nilgiri tahr (*Hemitragus*

hylocrius Ogilby). This endangered animal is endemic to the southern Western Ghats. It is the nearest relative of the Himalayan tahr. It inhabits the open montane grassland at elevations from 1200 to 2600 m (generally above 2000 m). Their range extends over 400 km from north to south. Eravikulam National Park (Rajamalai) is home to the largest population.

The other significant concentration is in the Nilgiri Hills, with smaller populations in the Anamalai Hills, Periyar National Park, Palni Hills and other pockets in the Western Ghats. Nilgiri tahrs are stocky goats with short, coarse fur and a bristly mane. Males are larger than the females, and have a darker colour when mature. Adult males develop a light grey area or "saddle" on their backs and are hence called "saddlebacks".

Apart from tahr, other little known animals such as wild dogs, Nilgiri marten, small clawed otter, ruddy mongoose, and dusky striped squirrel are also found. Elephants too make seasonal visits.

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