

# AN OUTLINE OF PLANT DIVERSITY IN THE ANDAMAN AND NICOBAR ISLANDS

**W. Arisdason & P. Lakshminarasimhan**

Central National Herbarium, Botanical Survey of India, Howrah.

## INTRODUCTION

The Andaman and Nicobar Islands are the Union Territory and the largest archipelago system in the Bay of Bengal, consisting of 306 islands and 206 rocks and rock outcrops (islets) and situated between  $6^{\circ}45'$ – $13^{\circ}41'$  N and  $92^{\circ}12'$ – $93^{\circ}57'$  E, covering 8,249 km<sup>2</sup> geographical area with a coastline of 1,962 km. The terrain of Andaman Islands (part of Indo-Burma Biodiversity Hotspot) that has been formed from the fragments of a continental land mass is in contrast to the Nicobar Islands (part of Sundaland Biodiversity Hotspot), which were formed due to volcanic activity. These are lying in North-South direction and simulating an arc stretching over a length of about 912 km and maximum width of 57 km.

The Andaman group of islands is having a total area of 6,408 km<sup>2</sup>, comprising a total length of 467 km and width of 52 km, while Nicobar group of Islands are having an area of 1,841 km<sup>2</sup> (length 259 km and width 58 km). This large archipelago is separated from mainland India by about 1000 km (from Chennai by sea 1190 km and by air 1330 km and Kolkata 1255 km by sea and 1303 km by air). The nearest landmass in the north is Myanmar, roughly 280 km north of Landfall Island – the northern most Island in the Andaman Group. The closest landmass to the Great Nicobar Island is Sumatra, about 145 km south. The Saddle Peak (about 720 m) and Mt. Thullier (about 670 m) are the only two highest peaks in the Andaman and the Nicobar group of Islands, respectively.

There are six aboriginal groups, viz. Great Andamanese, Onges, Jarawas, Sentinelese, Nicobarese and Shompens, of which the first four are Negrito hunter-gatherers inhabiting some of the Andaman Islands while the last two are of Mongoloid race and live in Nicobar Islands. These aboriginal people widely use plants in day to day sustenance.

## CLIMATE

As these Islands are situated in the equatorial belt and are exposed to marine impacts having warm and humid tropical climate with the temperature ranging between 18°C and 35°C. The islands receive heavy rainfall from both Southwest and Northeast monsoons, the former is from May to September and the latter is from October to December with the average annual rainfall ranging from 300 to 3500 mm. Cyclonic winds accompanied by thunder and lightning are very frequent here. During January to March a fairly dry weather with scanty rainfall occurs. The mean relative humidity is rather high and usually remains between 66 and 85% throughout the year.

## VEGETATION AND PLANT DIVERSITY OF ANDAMAN AND NICOBAR ISLANDS

Kurz (1870) published a "Report on the vegetation of the Andaman Islands", in which he outlined the various vegetation types, influence of the season upon the vegetation and peculiarities of flora of the Andaman Islands. According to Champion & Seth (1963), the vegetation of union territory may be broadly classified into (i) Beach forests, (ii) Mangrove forests, (iii) Wet evergreen forests, (iv) Semi-evergreen forests, (v) Moist deciduous forests and (vi) Grasslands. Some of the predominant components of these forests are **Baccaurea** spp., **Brueguirea** spp., **Calamus** spp., **Canarium** spp., **Ceriopsis** spp., **Clerodendron** spp., **Dipterocarpus** spp., **Leea** spp., **Mallotus** spp., **Mangifera** spp., **Rhizophora** spp. and **Thuarea involuta**.

Parkinson (1923) published "A forest flora of the Andaman Islands" providing a taxonomic account of the trees, shrubs and principal climbers of the Islands. Later, checklists and supplements or additions to checklists of plants of Andaman and Nicobar Islands were published by many (Vasudeva Rao, 1986; Lakshminarasimhan & Rao, 1996; Mathew, 1998; Dagar & Singh, 1999). Recently, Pandey & Diwakar (2008) published an integrated check-list flora of Andaman and Nicobar Islands, which reports 2654, including 228 infraspecific taxa under 1083 genera in 237 families belonging to 4 different plant groups, namely bryophytes, pteridophytes, gymnosperms and angiosperms. However, a recent analysis reveals that the Andaman and Nicobar Islands harbours a total of 2662 plant taxa, comprising 2519 species, 33 subspecies, 104 varieties and 6 forma under 1110 genera in 238 families belonging to bryophytes,

pteridophytes, gymnosperms and angiosperms (Murugan & al. in ed.). Bryophytes are represented by 58 species and 3 varieties, under 32 genera and 16 families (Lal, 2005). Pteridophytes are consisting of 129 species, 1 subspecies and 9 varieties under 62 genera belonging to 38 families (Dixit & Sinha, 2001). Gymnosperms are represented by 7 species and 2 varieties under 4 genera and 3 families. Besides, the Islands also harbour 383 species of lichens under 84 genera and 30 families, and algae are represented by 182 species belonging to 84 genera in 32 families.

Angiosperms are the predominant plant group in the Andaman and Nicobar Islands; they are represented by 2314 species, 31 subspecies, 89 varieties and 6 forma under 1011 genera in 181 families, constituting 92% of entire flora of the Andaman and Nicobar Islands. Poaceae (194 taxa), Orchidaceae (153 taxa), Rubiaceae (143 taxa), Euphorbiaceae (135 taxa), Fabaceae s.str. (110 taxa), Cyperaceae (106 taxa), Annonaceae (64 taxa), Moraceae (63 taxa), Asteraceae (49 taxa) and Arecaceae (46 taxa) are the top ten dominant families.

#### **DIVERSITY OF ENDEMIC AND THREATENED PLANTS**

Only 3 genera, namely **Nicobariodendron**, **Pseudodiplospora** and **Sphyranthera** and about 315 species belonging to 187 genera and 74 families are endemic to the union territory, constituting about 10% of the flora (Singh & al., 2014); some of them are **Anoetochilus narasimhanii**, **Ceropegia andamanica**, **Codiocarpus andamanicus**, **Cyrtandromoea nicobarica**, **Grewia indandamanica**, **Hippocratea grahamii**, **Leea grandifolia**, **Mangifera nicobarica**, **Memecylon andamanicum**, **Mesua manii**, **Milium andamanica**, **Ophiorrhiza infundibularis**, **Pterocarpus dalbergioides**, **Salacia nicobarica**, **Sonerila andamanensis**, **Sphaeropteris albo-setacea** and **Vernonia andamanica**.

The flora of Andaman and Nicobar Islands also consists of considerable number of threatened taxa. About 112 threatened vascular plant species under 74 genera and 38 families have been recorded from the islands (Singh & al., 2014). **Dendrobium tenuicaule**, **Eulophia nicobarica**, **Ginalloa andamanica**, **Malleola andamanica**, **Taeniophyllum andamanicum** and **Wendlandia andamanica** are some of the endangered taxa found in the Islands. **Cryptocarya ferrea** var. **ferrarsi**, **Garcinia cadelliana**, **Garcinia kingii**, **Mesua manii**, **Neonauclea gageana**, **Prismatomeris fragrans** subsp. **andamanica**, **Psychotria**

**pendula**, **Stephania andamanica** and **Syzygium andamanicum** are known only by their type collection. **Sphaeropteris albo-setacea** and **Sphaeropteris nicobarica** are categorised under Appendix II List of CITES. **Amorphophallus longistylus**, **Amorphophallus muelleri**, **Artabotrys nicobarianus**, **Bentinckia nicobarica**, **Calamus dilaceratus**, **Corypha utan**, **Drypetes andamanica**, **Ficus andamanica**, **Gomphandra comosa**, **Habenaria andamanica**, **Korthalsia rogersii**, **Mitrephora andamanica**, **Pinanga andamanensis**, **Pseuduvaria prainii**, **Psychotria andamanica**, **Scutellaria andamanica**, **Syzygium manii**, **Uvaria nicobarica** and **Vernonia andamanica** are found to be rare in the islands.

### **DIVERSITY OF ECONOMICALLY IMPORTANT PLANTS**

The islands also harbour a number of economically important plant species. There are about 300 non-indigenous or cultivated species. Some of them are **Abrus precatorius**, **Aristolochia tagala**, **Barringtonia asiatica**, **Barringtonia racemosa**, **Bruguiera gymnorrhiza**, **Colubrina asiatica**, **Cordia grandis**, **Duabanga grandiflora**, **Flagellaria indica**, **Garuga pinnata**, **Horsfieldia glabra**, **Leea grandifolia**, **Manilkara littoralis**, **Morinda citrifolia**, **Myristica andamanica**, **Orophea katschallica**, **Psychotria andamanica**, **Scaevola taccada**, **Xanthophyllum andamanicum**, **Ximenia americana** and **Zingiber zerumbet**. The predominant timber-yielding tree species in the islands are **Pterocarpus dalbergioides**, **Dipterocarpus griffithii**, **Diospyros marmorata**, **Lagerstroemia hypoleuca**, **Terminalia bialata** and **Tetrameles nudiflora**.

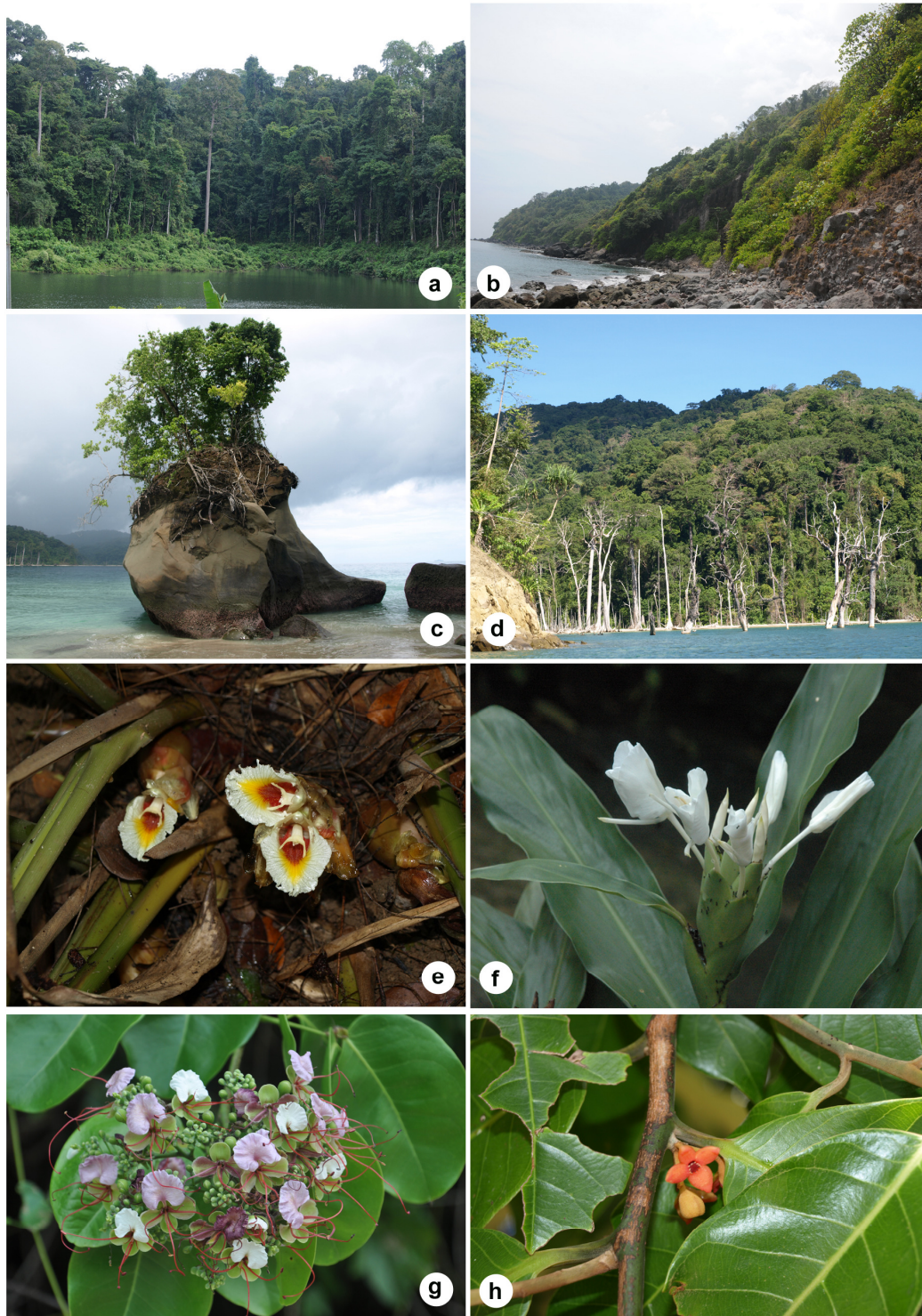
### **THREATS TO THE PLANT DIVERSITY AND CONSERVATION STRATEGIES**

Natural disasters and anthropogenic activities are the two major threats, which pose considerable damage to the plant diversity of Andaman and Nicobar Islands. Tsunami, cyclones and forest fire are the natural disasters that cause severe destruction and loss of natural habitats in the islands. Conversion of forest areas into agricultural fields and residential areas, over-exploitation of biological resources and introduction of alien species are the major anthropogenic activities that cause destruction and fragmentation of natural habitats. Climate change will also pose potential impact on the biodiversity of these Islands.

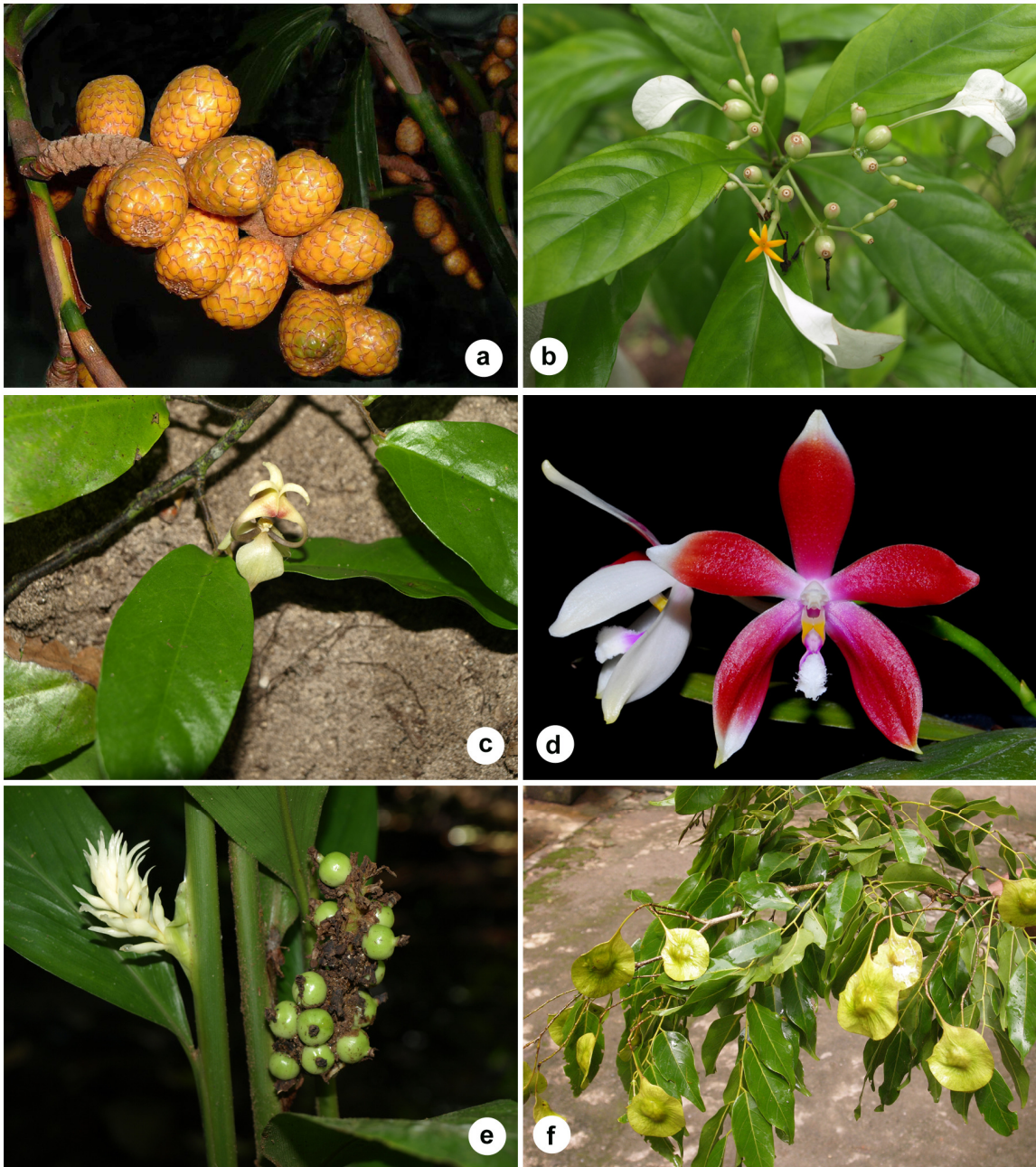
Many Protected Areas have been established in the Union Territory to conserve the existing floral and faunal diversity of the islands. There are 9 National Parks and 96 Wildlife Sanctuaries in in Andaman and Nicobar Islands (ENVIS-WII, 2012). National Parks occupy an area of 1153.94 km<sup>2</sup> and constitute 13.99% of the total geographical area of the Union Territory; seven of them are found in Andaman Islands and two in Nicobar Islands. Wildlife Sanctuaries occupy an area of 389.39 km<sup>2</sup>, which cover 4.72% of the total geographic area, of which 92 are in Andaman Islands and 4 in Nicobar Islands. Great Nicobar is the only Biosphere Reserve in the Islands that covers an area of about 885 km<sup>2</sup>. These Protected Areas should be under continuous monitoring by the Forest Department personnel to safeguard the existing biodiversity of these islands.

The Dhanikhari Experimental Garden-cum-Arboretum maintained by the Andaman and Nicobar Regional Centre of Botanical Survey of India plays a vital role in conservation of endemic and threatened plant species of Andaman and Nicobar Islands. Many in situ and ex situ conservation efforts have been undertaken in the Dhannikhari Experimental Garden cum Arboretum to conserve the endemic and threatened plant genetic diversity of Andaman and Nicobar Islands.

The ENVIS Centre on Floral Diversity, Botanical Survey of India has published the “Bibliography and Abstracts of Papers on Flora of Andaman and Nicobar Islands” (Lakshminarasimhan & al., 2011), which is a comprehensive compilation of 815 references with abstract published on flora, forestry, economic and ethnobotany of these islands, which would help those who are interested in biodiversity and conservation.



**Plate 1:** **a.** Forest of Andaman Island with *Dipterocarpus* trees in foreground; **b.** Narcondam Island Forest; **c.** Island near Little Nicobar Island; **d.** Forest of Little Nicobar Island; **e.** *Amomum aculeatum* Roxb.; **f.** *Hedychium coronarium* J. König; **g.** *Intsia bijuga* (Colebr.) Kuntze; **h.** *Knema andamanica* (Warb.) W.J. de Wilde subsp. *andamanica*



**Plate 1:** a. *Korthalsia rogersii* Becc. - Mature fruits in close up - Endemic; b. *Mussaenda wallichii* G. Don - Rare; c. *Orophea katschallica* Kurz - Endemic; d. *Phalaenopsis speciosa* Rchb.f. var. *speciosa* - Endemic; e. *Plagiostachys nicobarica* M. Sabu & al. - Endemic to Nicobar; f. *Pterocarpus dalbergioides* DC. - Endemic

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