



## Diversity and Status of Endemic and Threatened Angiosperm Flora of Coastal Ecosystems of The Central Kerala

Amitha Bachan K H<sup>1</sup> and Sreehari S Nair<sup>2</sup>

<sup>1</sup>Assistant Professor and Research Guide, <sup>2</sup> Research Scholar, Department of Botany, MES Asmabi College, P. Vemballur, Thrissur, Kerala 680671  
Corresponding author: amithabmes@gmail.com

### Abstract

Biodiversity is the variety and variability of life forms and each organism contribute to the ecological balance. In India, Western Ghats is a hotspot rich in highly endangered and endemic plants and majority within Kerala state. Kerala is also having rich coastal and midland areas with sand dunes, wetland and sacred groves which are threatened due to the urbanisation. This study enumerates the threatened plant species within Kerala based on secondary information and try to bring out significant threatened taxa within the coastal areas of central Kerala. About 21 plant taxa found to have distribution in central Kerala and which have been assessed based on IUCN criterion based on the secondary information. Recommendations were made for detailed assessment especially those restricted to the vanishing coastal ecosystems.

### Introduction

Biodiversity is the diversified species in form and function, closely integrated through a multiple network of interdependencies. The total number of angiosperm species is estimated to be around 450,000, of which 10–20% is still unknown to science (Pimm & Joppa, 2015). In India, there are 17,527 species, 296 subspecies, 2215 varieties, 33 subvarieties

and 70 forma, altogether 20,141 taxa of angiosperms under 2991 genera and 251 families, representing approximately 7% of the described species in the world (Karthikeyan, 2009). There are over 15,000 species of flowering plants in India which account for 6% of all plant species in the world (Cheeluvu, 2016). Over 47500 species of plants belonging to various groups have been documented from India. About 28% of plants that occur in India are endemic to the country (ENVIS, 2016). The Western Ghats of Peninsular India has been recognized as one of the 34 hotspot areas in world in terms of species and endemism. About 2100 endemic flowering plants have been reported from out of 5800 flowering plant species in this mega endemic area (Rao, 1984; Yoganarasimhan, 2000; Nair & Henry, 1983). The state harbours 5094 taxa under 1537 genera and 221 families of flowering plants (Sasidharan, 2012).

In India there are about 5725 endemic taxa of angiosperms (33.5% of Indian flora) which are located in 25 hot spots. There are about 1272 species of endemic angiosperms out of 3800 species occurring in Kerala (33.5% of Kerala flora) which represent 22.6% of Indian endemics. Seventy percent of the 1272 species of endemics have the major areas of distribution in Kerala with spill overs in



adjacent regions. Roughly 1/4 of all plant species in the world are at risk of being endangered or going extinct (Cheeluv, 2016). The present study aims to prepare a checklist and to assess the status of the threatened angiosperm species in Central Kerala.

### Materials and Methods

An updated Checklist on Threatened plants species were prepared based on IUCN, Regional Assessments such as Nayar (1997), Sasidharan (2004), KFRI (2014) and other publications (15 publications) on new species and distribution records. An updated status of the threatened species was prepared. The checklist includes information such as the family, status assessed, vegetation and endemism of these threatened plants.

### Study Area

The study focusses mainly on the plants endemic to the Coastal areas of Central Kerala. Kerala is one of the smallest Indian States lies on the south-west corner of the Peninsula between 8° 18' and 12° 48' N latitude and 74° 54' and 77° 12' E longitude. The total area is 38, 863 sq km, which is only about 1.8% of the

total geographical area of India. The cool and moist climate, high rainfall, and variety of microclimates brought about by differences in elevation and exposure supports lush and diverse forests; 35% of the plant species are endemic to the ecoregion. Moist evergreen montane forests are the predominant habitat type. The other major habitat type in the ecoregion is the shola-grassland complex, found at elevations of 1,900 to 2,220 m and are interspersed with montane grasslands.

### Result and Discussion

An updated checklist of the endemic and threatened plants of Central Kerala was prepared. A total of 511 plants were studied. Out of the total 511 taxa, 413 plants fall under the class dicotyledons and 98 plants are monocotyledons. Out of the 511 species studied, 22 species (4.3 %) of the species had non forest distribution. They were distributed in the Coastal areas, Coastal Wet Lands (CWL), Sacred Grooves (SG) and also in the Swamps (SWMP). 4 species were distributed in the Coastal areas, 3 in the Coastal Wet Lands, 5 in the Sacred Grooves and 10 species in the Swamps (Fig. 1)

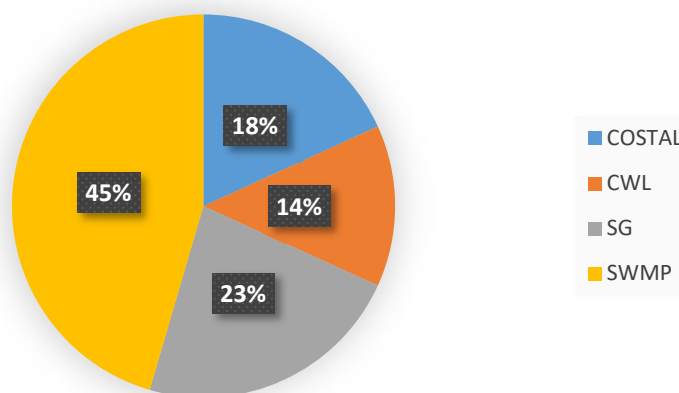


Fig.1. Habitat status of plant species in the central Kerala



16 species of the plants were endemic species. 9 species were endemic to Southern Western Ghats, 4 species were endemic to

Western Ghats, 1 each was endemic to Peninsular India, South India and Kerala part of South India. 6 species were non endemics (Fig 2).



Fig. 2: Endemism of plants

15 plants were in the threatened category according to the assessment by IUCN, M.P. Nayar and Sasidharan. 3 species were in Endangered category (EN), 2 species each were in the Data Deficient (DD), Least

Concern (LC), Not Evaluated (NE), and Vulnerable (V) category, 1 species each was in Near Threatened (NT), Rare and Threatened (R&T) and Threatened (T) category (Fig 3). 7 species were not included in the status.

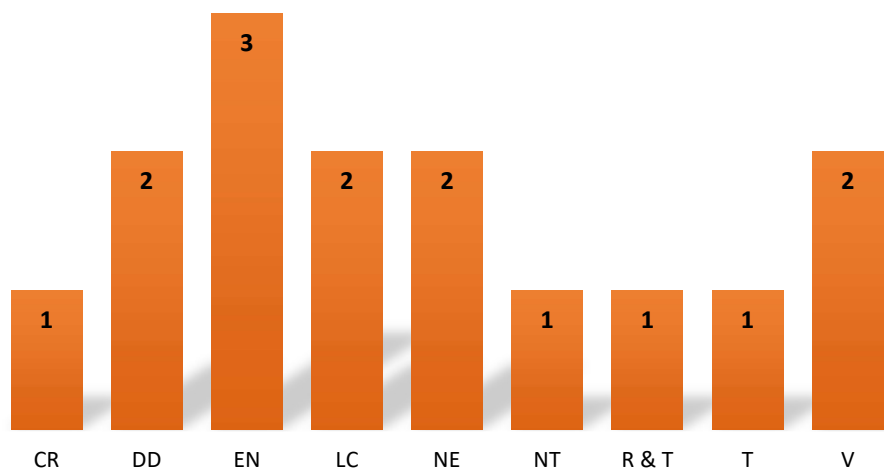


Fig.3: Threatened status of plants



The 7 plants that were not yet assessed, 2 species that were Not Evaluated and the 2 plants in the Data Deficient category seems significant. From the total of 11 such plants, 7 plants had a narrow distribution extending in two or three districts only, 3 were new species reported during 2014- 2015, and only one plant had wide distribution and mainly in the sacred

grooves. Thus 110 plants that are not yet assessed need to be assessed for their conservation status, as many of them are having a narrow distribution and especially in the non-forest areas. Table 1 shows the details of all the 22 plant species studied, their conservation status and the recommendations for the conservation status.

SL. NO	NAME OF PLANT	FAMILY	STATUS	HABITAT	ENDEMISM	RECOMMENDATION
1	<i>Aponogeton appendiculatus</i> van Bruggen	Aponogetonaceae	DD	CWL	SI(K)	Needs assessment as the plant has a narrow distribution
2	<i>Avicennia marina</i> (Forssk.) Vierh.	Avicenniaceae		CWL		Needs assessment as the plant has a narrow distribution
3	<i>Buchanania barberi</i> Gamble	Anacardiaceae	CR	SG	SWG	Assessment not needed
4	<i>Calophyllum inophyllum</i> Linn	Clusiaceae	LC	COSTAL		Assessment not needed
5	<i>Dolichandrone spathacea</i> (L. f.) K. Schum.	Bignoniaceae		SWMP		Needs assessment as the plant has a narrow distribution
6	<i>Eriocaulon cuspidatum</i> Dalz.	Eriocaulaceae	LC	SWMP	WG	Assessment not needed
7	<i>Eriocaulon vandaanamense</i> Sunil, Ratheesh et Sivadasan	Eriocaulaceae	DD	COSTAL	SWG	Needs assessment as it is a new taxon described in 2014



8	<i>Hopea ponga</i> (Dennst.) Mabb.	Dipterocarpaceae	V	SG	SWG	Assessment not needed
9	<i>Limnopoa meeboldii</i> (Fischer) C.E. Hubb. in Hook.	Poaceae	EN	CWL	SI	Assessment not needed
10	<i>Murdannia crocea</i> (Griff) Faden sssp. ochracea (Dalz.) Faden	Commelinaceae	T	SWMP	SWG	Assessment not needed
11	<i>Myristica fatua</i> Houtt. var. magnifica (Bedd.) Sinc	Myristicaceae	EN	SWMP	SWG	Assessment not needed
12	<i>Neanotis rheedei</i> (Wall. Ex Wight & Arn.) Lewis	Rubiaceae	R & T	COSTAL	WG	Assessment not needed
13	<i>Ochna gamblei</i> King ex Brandis	Ochnaceae		COSTAL		Needs assessment as the plant has a narrow distribution
14	<i>Polypleurum filifolium</i> (Rama m. & Joseph) Nagendran et al.	Podostemaceae	V	SWMP	PI	Assessment not needed
15	<i>Rotala anamika</i> Lemiya	Lythraceae	NE	SWMP	SWG	Needs assessment as it is a new taxon described in 2015
16	<i>Rotala dhaneshiana</i> Sunil, Ratheesh & Sivadasan	Lythraceae	NE	SWMP	SWG	Needs assessment as it is a new taxon



						described in 2014
17	<i>Rotala ritchiei</i> (Clarke) Koehne	Lythraceae	EN	SWMP	WG	Assessment not needed
18	<i>Sonneratia alba</i> J. E. Smith	Sonneratiaceae		SWMP		Needs assessment as the plant has a narrow distribution
19	<i>Sonneratia caseolaris</i> (L.) Engl	Sonneratiaceae		SWMP		Needs assessment as the plant has a narrow distribution
20	<i>Strophanthus wightianus</i> Wall. ex Wight	Apocynaceae		SG	SWG	Needs assessment as the plant has a narrow distribution
21	<i>Tabernaemontana heyneana</i> Wall.	Apocynaceae	NT	SG	SWG	Assessment not needed
22	<i>Vateria indica</i> L.	Dipterocarpaceae		SG	WG	Assessment not needed

Table1: List of plants studied along with the recommendations for status assessment

### Conclusion

The study brings out 511 threatened plant species within Kerala of which 22 species are distributed within the coastal areas of Central Kerala within the wetlands (marshes, swamps, backwaters), sand dunes and sacred grove habitats. These species were assessed against IUCN criterion based on secondary information of which 16 species are endemic, 13 already assessed by IUCN and listed under various categories including Data Deficient. The study recommends 10 species listed above need to be assessed for their threatened status

since their habitat is getting degraded in alarming rates. We also recommend priority for these species for conservation and restoration action.

### Acknowledgement

The authors are grateful to UGC Minor Research Programme for the financial assistance in the work. Our sincere gratitude to Dr. Ajims P Mohammed, Principal, MES Asmabi College, P. Vemballur and other staff and colleagues in the department for their support in carrying out the work.



Reference

**Cheeluvarv. 2016.** List of Rare and Endangered Indian Plants. <https://owlcation.com/stem>

**ENVIS, BSI. 2016.** List of families and genera of Algae in India.

**IUCN, I. (2012).** Independent report on biodiversity offsets. Prepared by The Biodiversity Consultancy.

**Karthikeyan, S. 2009.** Flowering plants of India in 19th and 21st Centuries – A comparison. In: Krishnan, S. & Bhat, D.J. (Eds.), Plant and fungal biodiversity and bioprospecting. Goa University, Goa. pp. 19–30.

**Nair, N.C. & Henry, A.N. 1983.** *Flora of Tamil Nadu, India, series 1: Analysis.* Botanical Survey of India, Coimbatore

**Nayar, T.S., Sibi, M., Rasiya Beegam, A., Mohanan, N. & Rajkumar, G. 2008.** Flowering Plants of Kerala: Status and Statistics. *Rheedea*. 18., pp.95–106.

**Pimm, S.L & Joppa, L.N. 2015.** How many plant species are there, where are they, and at what rate are they going extinct?. *Ann. Mo. Bot. Gard.*, 100, pp. 170-176

**Rao, R. R. 1984.** *Biodiversity in India: floristic aspects.* Bishen Singh & Mahendra Pal Singh, Dehra Dun.

**Sasidharan, N. 2004.** *Biodiversity Documentation For Kerala, Part6: Flowering Plants.* Handbook No. 17. Kerala Forest Research Institute, Peechi.

**Sasidharan, N. 2012.** *Flowering Plants of Kerala- Digital Version 2.0.* Kerala Forest Research Institute, Peechi.

**Yoganarasimhan, S.N. 2000.** *Medicinal Plants of India*, Vol .2, Tamil Nadu, R. R. I, Bangalore.

Received: 16<sup>th</sup> September 2019

Revised and accepted: 24<sup>th</sup> November 2019

Published: 31<sup>st</sup> January 2020