

**Developing an Information System for the  
Rare Endangered and Threatened (RET)  
Plants of Southern Western Ghats**

**P.A. Jose  
K.H. Hussain  
V.B. Sreekumar**



**Kerala Forest Research Institute  
Peechi**

**December 2014**

## PROJECT PARTICULARS

1. Title of the project  
Developing an Information system for the Rare Endangered and Threatened (RET) Plants of Southern Western Ghats.
2. Department/Organization implementing the project  
Kerala Forest Research Institute, Peechi.
3. Special Area of study  
Literature survey and enlisting of RET plants recorded in the Southern Western Ghats.  
  
Literature survey and compilation of RET plants publications under six research areas of study.  
  
Creating a web based information system along with search interface on species particulars and publication details further uploading in the Internet.  
  
Preparation of a CD version of the uploaded database for reference in the Institute Library.
4.
  1. Name of the Principal Investigator  
**Dr. P.A. Jose**  
Scientist E1, Forest Ecology Department  
Forest Ecology & Biodiversity Conservation Division
  2. Name of Project Associates  
**Mr. K.H. Hussain**  
Scientist C (Retired), Library & Information Division.  
  
**Dr. V.B. Sreekumar**  
Scientist-B  
Forest Botany Department  
Forest Ecology & Biodiversity Conservation Division
  3. Name of the Technical Personnel  
**Ms. K.V. Vidhya**, Technical Assistant
5. Name of the Funding Agency  
Plan Grant of the Kerala Forest Research Institute, Peechi, Thrissur
6. Duration of the Project  
October 2012- March 2014  
(1.6 years)
7. Particulars of the Report  
Final Technical Report

## CONTENTS

	Page No:
Acknowledgements	iv
Abstract	v
<b>1. Introduction</b>	<b>1</b>
<b>2. Objectives</b>	<b>3</b>
<b>3. Materials and Methods</b>	<b>4</b>
<b>4. Results</b>	<b>5</b>
<b>5. Conclusion</b>	<b>29</b>
<b>6. References</b>	<b>30</b>

## Acknowledgements

The conduct of the project was made possible by the award of plan grant of the Kerala Forest Research Institute, Peechi. The Project Investigators express their deep sense of gratitude and thanks to the Director and Staff of the Institute. Further, this database is a compilation of information from online sources, various institutions, scientists and librarians. The Investigators place on record their sincere gratitude who provided necessary information or facilitated the work.

Dr. P.S. Easa, Director in Charge, Kerala Forest Research Institute (KFRI), Peechi, Thrissur.

Prof. (Dr.) V.N. Rajasekhara Pillai, Executive Vice President, Kerala State Council for Science, Technology and Environment (KSCSTE), Pattom, Thiruvananthapuram.

Dr. K.V. Sankaran, Former Director, KFRI, Peechi, Thrissur.

Dr. P.G. Latha, Director, Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI), Palode, Thiruvananthapuram.

Dr. N. Krishnakumar, Director, Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore.

Prof. (Dr.) Velayoudom Marimoutou, Director, Institut Francais, Pondicherry.

Dr. G.V.S. Murthy, Joint Director, Botanical Survey of India, Southern Circle, Coimbatore.

Dr. Padma Venkat, Director and Dr. K. Haridasan, Joint Director, Institute of Ayurveda and Integrative Medicine, Yelahanka, Bengaluru.

The Director, Ashoka Trust for Research in Ecology and the Environment, Srirampura, Bengaluru.

Dr. N. Anilkumar, Programme Director, Community Agro-Biodiversity Centre of the MS Swaminathan Research Foundation (MSSRF), Wayanad.

Dr. Indira Balachandran, Project Director, Centre for Medicinal Plant Research, Kottakkal Arya Vaidyasala, Kottakkal.

Dr. A.G. Pandurangan, Senior Scientist, JNTBGRI, Palode, Thiruvananthapuram.

Dr. P.E. Rajasekharan, Principal Scientist, Division of Plant Genetic Resources, Indian Institute of Horticulture Research, Bengaluru.

Dr. N. Sasidharan, Emeritus Scientist, KFRI, Peechi.

Dr. P. Sujanalal, Scientist, KFRI, Peechi.

Smt. N. Sarojam, Librarian, KFRI, Peechi.

Dr. K. Swarupandan, Dr. M. Balagopalan former Research Coordinators and Dr. E.A. Jayson Research Coordinator, KFRI, Peechi.

Dr. V.V.Sudheendrakumar and Dr.R.C. Pandalai former Registrars in Charge and CA. K. Satheesa Kumar, Registrar in Charge, KFRI, Peechi.

Division colleagues; C.V. Ranjith, V.S. Hareesh, M.S. Sowmya, M.V. Saritha, and S. Sobha.

## Abstract

The Western Ghats of India has been recognized as one of the 34 hotspot areas in the world in terms of species richness, diversity and endemism. The Southern Western Ghats covering Southern parts of Karnataka, South- West parts of Tamil Nadu and Kerala are holding over 4,500 flowering plants of which 1,500 are Western Ghats endemics. However, information about the Rare, Endangered and Threatened (RET) plants of the region is still lacking. Moreover, a comprehensive account on the various studies conducted or articles published on RETs are either scattered or lacking. Many of the species are not even investigated after its taxonomic identity and studies in some species are also repeated. With this backdrop, a database of RET plants of Southern Western Ghats is developed in order to understand the various studies conducted/ publications available so as to overcome the duplication of studies on same species, further to strengthen the conservation efforts on the RETs where no studies are conducted so far. The database would be facilitated for the use of Researchers, Foresters, Policy makers and those who are involved in plant biodiversity conservation programmes particularly on the conservation of RET plants in the country.

Literature from 26 sources are used for the compilation of RET plants in the Southern Western Ghats. The information covers particulars of the species such as threat status, references in support of threat status, family, citations, synonym, habit, distribution in the three states covering the Southern Western Ghats etc. The major literature followed is viz., IUCN, 2012; Nayar, *et al* ., 2006; Sasidharan, 2004, 2011; Ravikumar and Ved, 2000; Molur and Walker, 1996, 1997; Nayar and Sastry, 1987, 1989 and 1990. A total of 760 RET flowering plants recorded from the Southern Western Ghats are included in the database of which 558 species has been with 'present status' and 202 species included under 'needs updation'. The entire species spreads over in 332 genera

belonging to 109 families. The species under 'present status' is followed as per IUCN, 2012 and Sasidharan, 2011 publications where as species 'needs updation' is based on the criteria under which at least two or more authors have given the references in different periods for the same species but current citation is lacking. The threat status is followed as per the 6 categories of IUCN along with other published works. The IUCN threat categories listed are viz., Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened.

The abstracts of publications are compiled from the online sources, R&D library information systems and scientists those worked in the field. Commonwealth Agriculture Bureau International (CABI), Google scholar, Indian Forestry Abstracts etc. are other sources which facilitated the collection of publications. About 2,159 abstracts and 51 citations of publications of RETs are included in the database.

The literature collected has been brought under six broad criteria of study such as population structure, population dynamics, climatic and edaphic analysis, conservation strategies, restoration and evaluation. The abstracts/citations of each study have been incorporated in respective criteria. Out of 760 RET plants recorded from the Southern Western Ghats, 260 species have been available with studies/publications and the same has provided whereas, 500 species are yet to be attended for study.

The database is enabled with information through search interface in which simple and advance search provisions are given. In simple search, query can be built through the fields such as Status, State, Criteria, Species and Habit. In advanced search, in addition to the above fields, multiple query can be made through Genus, Synonym, Family along with Status reference. The search shows all hits with list of all species.

In simple search, a click on 'Status' is enabled to explore the species availability in 13 threat status which included 6 status is given as per the IUCN. The 'State' wise search shows the species distribution in 10 combinations viz., Kerala; Tamil Nadu; Karnataka; Kerala only; Tamil Nadu only; Karnataka only; Kerala, Tamil Nadu, Karnataka; Kerala, Tamil Nadu; Kerala, Karnataka and Tamil Nadu, Karnataka. The 'Criteria' wise search is enabled to get the information on the nature of study conducted in each species and the same has been categorized under 6 broad areas along with 'No publications' category where no study is available to the species. The 'Species' wise search shows all listed species. The 'Habit' wise search displayed with 4 life forms viz., Herb Tree, Climber, Shrub. In all the five fields of search, the information regarding viz., Status/State, Criteria, Reference/ Abstract of publication of each species is made available.

The entire information generated has been uploaded in the website for quick access. The website launched is given as [www.retplants.org](http://www.retplants.org). The site is developed with Open source softwares PHP and Java Script as front end and MySQL as back end. The Database can also be available in the KFRI website [www.kfri.res.in](http://www.kfri.res.in)

A Compact Disc version, KFRI -CD No.19 of the uploaded database is made available in the Institute library for desktop retrieval.

**സംഗ്രഹം**

കർണ്ണാടകത്തിന്റെ തെക്ക് മലനിരകളും, തമിഴ്നാടിന്റെ തെക്ക്പടിഞ്ഞാറൻ ഭാഗങ്ങളും കേരളവും ഉൾപ്പെടുന്ന ദക്ഷിണ പശ്ചിമഘട്ട മലനിരയിലെ അപൂർവ്വങ്ങളും വാഗ്നാശം നേരിടുന്നതുമായ സപ്തകുളായ സസ്യങ്ങളെ അപഗ്രഥിച്ചു കൊണ്ടുള്ള ഒരു ഡാറ്റാബേസ് വികസിപ്പിക്കുകയും ഓൺലൈനായി പ്രസിദ്ധീകരിക്കുകയും ആണ് ഈ ഗവേഷണ പദ്ധതിയിലൂടെ ചെയ്തിട്ടുള്ളത്.

പ്രകൃതിസംരക്ഷണത്തിനായുള്ള അന്താരാഷ്ട്രസംഘടനയായ ഐ.യു.സി.എൻ. 2012 ചുവപ്പു പട്ടിക ഉൾപ്പെടെ 26 ഗ്രന്ഥങ്ങളും പ്രസിദ്ധീകരണങ്ങളും അവലംബമാക്കി 760 സസ്യങ്ങളെയാണ് ഡാറ്റാബേസിൽ ഉൾപ്പെടുത്തിയിട്ടുള്ളത്. ഇതിൽ തന്നെ കാലിക പ്രസിദ്ധീകരണങ്ങളായ ഐ.യു.സി.എൻ. 2012, ശശിധരൻ, 2011 എന്നിവയിൽ ഉൾപ്പെട്ടിട്ടുള്ള 558 സസ്യങ്ങൾ നിലവിൽ വാഗ്നാശഭീഷണി ഉള്ളവയായും മറ്റു പ്രസിദ്ധീകരണങ്ങളിൽ പറഞ്ഞിട്ടുള്ള 202 സസ്യങ്ങൾവാഗ്നാശസ്ഥിതി പുനർനിർണ്ണയിക്കപ്പെടേണ്ടതും ആയ വിഭാഗങ്ങളായി തരം തിരിച്ചിട്ടുണ്ട്. ഈ സസ്യങ്ങൾ 332 ജനുസുകളിലായി 109 കുടുംബങ്ങളിലായാണ് വിന്യസിച്ചിട്ടുള്ളത്. ഐ.യു.സി.എൻ. ന്റെ 6 ചുവപ്പു വിഭാഗങ്ങൾ അടക്കം വാഗ്നാശഭീഷണിയുടെ അളവ് നിർണ്ണയിക്കുന്ന 13 വിഭാഗങ്ങളിലുള്ള സസ്യങ്ങളാണ് ഡാറ്റാബേസിൽ ഉള്ളത്. ഇതോടൊപ്പം തന്നെ, ഓരോ സസ്യവും വാഗ്നാശ പട്ടികയിൽ ഉൾപ്പെടുത്തിയിട്ടുള്ളതിന്റെ പ്രസിദ്ധീകരണവും സൂചകമായി നൽകിയിട്ടുണ്ട്. ഓരോ സസ്യത്തിനും അനുബന്ധമായി ശാസ്ത്രീയനാമം, കുടുംബം, നേരത്തെ നിലനിന്നിരുന്ന ശാസ്ത്രീയനാമം എന്നിവയും ചേർത്തിട്ടുണ്ട്.

ഗവേഷണം നടന്നിട്ടുള്ള 260 സസ്യങ്ങളിലെ ഗവേഷണ സംഗ്രഹവും സൈറ്റേഷനും ലൈബ്രറി സംവിധാനങ്ങളിലൂടെയും അതത് മേഖലയിലെ ഗവേഷകരുമായി സംവദിച്ചും ഓൺലൈനായും സ്വരൂപിക്കുകയും, ഗവേഷണങ്ങൾ ആറ് വ്യത്യസ്ത ഗ്രൂപ്പുകളായി വിന്യസിക്കുകയും ചെയ്തു. ഓരോ ഗ്രൂപ്പിന്റേയും ഗവേഷണവിഷയങ്ങൾ അനുബന്ധമായി നൽകുകയും ചെയ്തിട്ടുണ്ട്. മൊത്തം 2159 ഗവേഷണ സംഗ്രഹങ്ങളും 51 സൈറ്റേഷനും ഡാറ്റാബേസിൽ ഉൾപ്പെടുത്തിയിട്ടുണ്ട്. ഗവേഷണം നടത്തപ്പെടാത്ത 500 സസ്യങ്ങളുടെ



വിവരങ്ങളും നൽകിയിട്ടുണ്ട്. പ്രത്യേകം തയ്യാറാക്കിയ സോഫ്റ്റ്‌വെയർ ഉപയോഗിച്ച് അന്വേഷണ ഖട്ടങ്ങൾ അമർത്തുക വഴി സസ്യങ്ങളെക്കുറിച്ച് വിവരങ്ങൾ ലഭ്യമാവുകയാണ്. ലളിതമായ രീതിയിലുള്ള അന്വേഷണപ്രകാരം, വാഗ്ദാനം വിഭാഗം, സംസ്ഥാനം, ഗവേഷണമേഖല, സസ്യ ഇനം, സസ്യരൂപം തുടങ്ങി 5 അന്വേഷണങ്ങളിലൂടെയും വിശദമായ (അഡ്വാൻസഡ്) അന്വേഷണ പ്രകാരം, മേൽപ്പറഞ്ഞ സൂചികയോടൊപ്പം ജീനസ്, സ്പീഷീസ്, പര്യായനാമം, കുടുംബം തുടങ്ങി സസ്യത്തിനെക്കുറിച്ചുള്ള ഒന്നിലധികം അന്വേഷണവും ഒരേസമയം ക്ലിക്ക് ചെയ്ത് അറിയുവാൻ കഴിയുന്നതുമാണ്.

ദക്ഷിണ പശ്ചിമഘട്ടത്തിലെ അപൂർവ്വങ്ങളും വാഗ്ദാനം നേരിടുന്നതുമായ സസ്യങ്ങളെ കുറിച്ച് ഇദംപ്രഥമമായി തയ്യാറാക്കിയ ഡാറ്റാബേസ് മേഖലയിലെ ഈ വിഭാഗത്തിലുള്ള സസ്യങ്ങളെ കുറിച്ച് മനസ്സിലാക്കുവാനും നാളിതു വരെ പഠനം നടത്തപ്പെടാത്തതുമായ സസ്യങ്ങളിൽ ഊർജ്ജിതഗവേഷണം അനുവർത്തിക്കുന്നതിന് സഹായകരമാകുകയും ചെയ്യുന്നു.

[www.retplants.org](http://www.retplants.org) എന്ന അഡ്രസ്സ് ടൈപ്പ് ചെയ്താൽ ഇന്റർനെറ്റിൽ ഈ സൈറ്റ് സന്ദർശിക്കാവുന്നതാണ്. കേരള വനഗവേഷണ കേന്ദ്രത്തിന്റെ വെബ്സൈറ്റ് അഡ്രസ്സ് ആയ [www.kfri.res.in](http://www.kfri.res.in) മുഖേനയും ഈ സൈറ്റ് ലഭ്യമാണ്. ഓൺലൈൻ ഡാറ്റാബേസിന്റെ സിഡി പതിപ്പ് (കെ.എഫ്.ആർ.ഐ സി.ഡി. നമ്പർ:19) വനഗവേഷണകേന്ദ്രത്തിലെ ലൈബ്രറിയിൽ റഫറൻസിനായി ലഭ്യമാക്കിയിട്ടുണ്ട്. പി.എച്ച്.പി. ജാവ സ്ക്രിപ്റ്റ് MySQL എന്ന ഓപ്പൺ സോഴ്സ് സോഫ്റ്റ്‌വെയർ മുഖേനയാണ് ഈ വെബ്സൈറ്റ് വികസിപ്പിച്ചിട്ടുള്ളത്.

## 1. Introduction

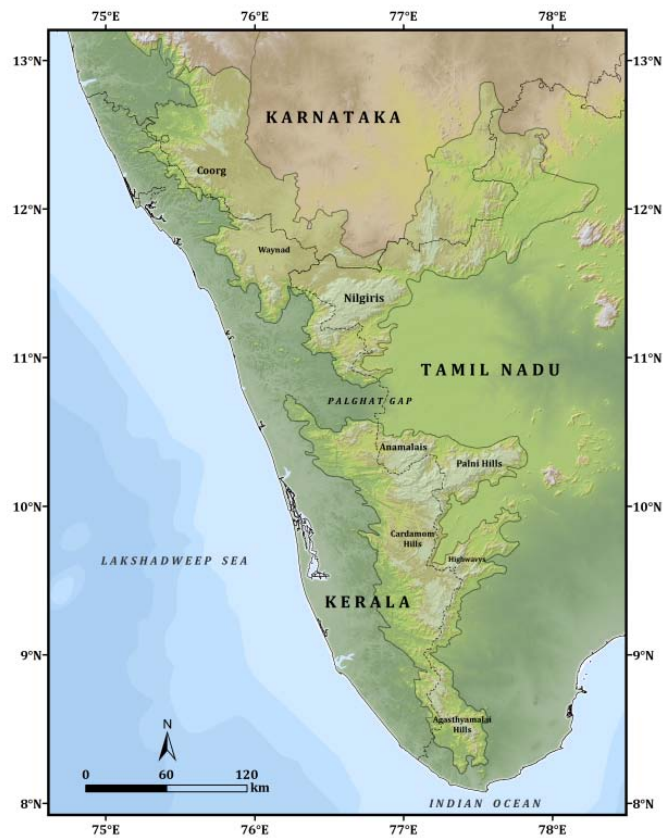
The concept of plant rarity has been classified based on three traits that all the species possess namely; geographical range, habitat specificity and local population size (Drury, 1974). The rarity concept which was again followed as per the 7 forms of rarity based on the above three traits in which three forms are assessed on the basis of species distribution in a larger geographical range and remaining four as per the distribution within a small geographical range. (Rabinovitz and Dillon, 1986). Subsequently, the IUCN has been classified threatened plants under 9 categories based on the three criteria namely; reduction in population size over the last 10 years / 3 generations; geographic range in the form of either extent of occurrence or area of occupancy or both and by the population size numbers. In many instances, the rarity standards assigned have become deviated from the original concept and threat status is given to a species based on local species/ population knowledge by the individuals or institutions. This has been resulted the formation of different threat status to a species by different authors. However, the IUCN threat categories are followed for a realistic assessment on red listed plant species in the country.

In India, an account is available on endemic flora. Among the 17,000 flowering plants reported in the subcontinent, 5725 species are endemic which constitute 33.5% of the total flora (Nayar, 1996). The Western Ghats of Peninsular India has been recognized as one of the 34 hotspot areas in the world in terms of species richness, diversity and endemism. The floristic diversity and endemism in the Western Ghats of Peninsular India including southern Western Ghats have been documented in several studies by different authors (Joseph, 1977, Henry *et al.*, 1979, 1987, 1989; Nayar and Sastry 1987, 1988, 1990; Nayar, 1996; Ravikumar and Ved, 2000; Pandurangan, 2003; Sasidharan, 2004, 2011; Sharma *et al.*, 1984; Yasodharan and Jose, 2011). Among the 5,725

flowering plants are endemic to India, 2,015 species are found in Western Ghats of Peninsular India and remaining are distributed in Himalayas (3471) and Andaman & Nicobar islands (239) (Nayar, 1996). Many of the endemic plants recorded in the region are also included in the red listed group by different authors including by the International Union for Conservation of Nature and Natural Resources (IUCN). Based on the IUCN (2012), the red listed plants are categorized under 6 categories viz., Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened. In the Western Ghats, the southern Western Ghats consisting southern parts of Karnataka, Kerala and southern and western parts of Tamil Nadu (Fig.1.) are the richest in plant diversity endemism. The plant diversity in the area estimates over 4,500 flowering plants in which 1,500 Western Ghats endemics are reported.

Though an account of the Western Ghats plant diversity and endemism is available, a comprehensive picture about the Rare, Endangered and Threatened (RET) plants of the region particularly of the Southern Western Ghats is lacking. Moreover, the studies conducted and publications available on RETs are also scattered. As a result, many of the studies based on species are found overlapping and repetitive. A fare number of species also had become unattended or devoid with any kind of studies. According to the IUCN, the current species extinction rate is between 1,000 and 10,000 times higher than it would naturally occurs. It is also estimated that about 1950 narrow endemic plant species would become extinct in India in the foreseeable future (Nayar, 1996). This mass extinction is imminent for the peninsular Indian endemics and once a species becomes extinct, the particular genetic resource is also lost forever. Hence it is high time to record RET plants distributed in the region and to compile information on the publications further to stress studies on RET species in which no publication is available so far.

**Fig.1. Map of Southern Western Ghats**



In this background the project aims at preparing a database for the Rare, Endangered and Threatened (RET) plants of Southern part of Western Ghats with the available published and grey literature.

## **2. Objectives**

By considering the above fact, following objectives are envisaged.

- 2.1. To prepare a database of RET plants of the Southern Western Ghats.
- 2.2. To create a web based information system for RET plants of Southern Western Ghats and upload in the web.
- 2.3. To prepare a CD version of the uploaded database for reference in the Institute Library.

### 3. Materials and Methods

The information from 26 literature sources covering 8 major reference sources viz., IUCN, 2012., Sasidharan, 2004, 2011; Nayar, *et al.*, 2006., Ravikumar and Ved, 2000., Molur and Walker, 1996, 1997., Nayar, and Sastry, 1987, 1989 and 1990 are used for the documentation of RET plants distributed in the Southern Western Ghats. The information covers particulars of the species such as threat status, references in support of status, Family, Citations, Synonym, Habit, Distribution in the three states covering the Southern Western Ghats etc. The threat status is followed as per 6 categories of IUCN along with other published works. The species compiled are put under two categories such as species with present statuses and species with 'needs updation'. The species under 'present status' is followed as per IUCN, 2012 and Sasidharan, 2011 publications where as species 'needs updation' is based on the criteria that at least two or more authors have given the references in different periods for the same species but current citation is lacking.

The abstracts of publications are compiled from the online sources, R&D Library Information Systems and from scientists those worked in the field. Commonwealth Agriculture Bureau of International (CABI), Google Scholar, Indian Forestry Abstracts etc. is other sources which facilitated the collection of publications. The literature collected has been brought under six broad criteria of study such as Population structure, Population dynamics, Climatic and edaphic analysis, Conservation strategies, Restoration and Evaluation. The Key words provided are enabled to understand the nature of work included in each broad area of study/ criteria. The abstracts/ citations of each publication have been incorporated in respective criteria.

The database is formulated in a web based information system along with detailed search interface. The search interface is provided with provisions for simple and advance search. In simple search, query can be built through the

fields such as Status, State, Criteria, Species and Habit. In advanced search in addition to the above fields, multiple queries can be made through Genus, Synonym, Family along with Status reference. The search shows all hits with list of all species.

The entire information generated has been uploaded in the website for quick access. The website launched is given as [www.retplants.org](http://www.retplants.org). The site is developed with Open source softwares PHP and Java Script as front end and MySQL as back end.

A CD version of the uploaded database is also made available in the Institute library for reference. The database has also made link with related 5 websites.

#### **4. Results**

The database has been described with a total of 760 RET flowering plants distributed in the Southern Western Ghats. Among these, 558 species are attained with ‘present status’ (Table 1) and 202 species included under ‘needs updation’ (Table 2.). These species spreads over in 332 genera and in 109 families. Among the 760 RETs enlisted, 260 species have been available with publications and the abstracts/ citations of the same have been provided under respective broad area of study/ criteria are prepared. Whereas, 500 species are lacking with publications and are yet attended for the study. A detailed search provision is provided in the web based information system developed for the study. The web site of the database is opened with Home pages in which brief notes are given under different captions viz., About, Features, Search, References, Image Gallery, Acknowledgements, Contact and Help. On clicking ‘About’, the project particulars along with aim of the study is given. The ‘Features’ are indicated with six broad areas of study/ criteria as Population structure, Population dynamics, Climatic and edaphic analysis, Conservation

strategies, Restoration and Evaluation along with respective key words of each criteria (Table 3). The click on ‘References’ shows all the 26 literature sources referred for compiling the RET plants distributed in the Southern Western Ghats (Table 4). Along with this, a link to related 5 websites viz., [Database on RET plants of Kerala](#), [www.kfri.res.in](http://www.kfri.res.in), [www.iucnredlist.org](http://www.iucnredlist.org), [www.jntbgri.in](http://www.jntbgri.in), [www.keralabiodiversity.org](http://www.keralabiodiversity.org) is also provided. The images available to the species are provided in the ‘Image Gallery’. Information on the Institutions visited, facilities extended towards data collection are gratefully remembered in the ‘Acknowledgements’. The addresses of the project investigators are given in the ‘Contact’ and a brief note on how to use this database is also given in the ‘Help’.

Two provisions are given under ‘Search’ (Fig 2 & 3). In simple search, a click on ‘Status’ is enabled to explore the species availability in 13 threat status which included 6 status given as per the IUCN (Table 5). The ‘State’ wise search shows the species distribution in three States covering Southern Western Ghats; Kerala, Tamil Nadu and Karnataka. Results are available exclusive to state wise along with combinations of state viz., Kerala; Tamil Nadu; Karnataka; Kerala only; Tamil Nadu only; Karnataka only; Kerala, Tamil Nadu, Karnataka; Kerala, Tamil Nadu; Kerala, Karnataka and Tamil Nadu, Karnataka. The ‘Criteria’ wise search is enabled to retrieve information on the nature of study conducted in each species and the same has categorized under 6 broad areas along with ‘No publications’ category where no study is available to the species. The criteria wise results among these species viz., population structure (159), population dynamics (120), climatic and edaphic analysis (31), conservation strategies (98), restoration (23) evaluation (116) and No publications (500). The ‘Species’ wise search shows all listed species. The ‘Habit’ wise search displayed with 4 categories of life forms viz., Herb, Tree, Climber and shrub and results are available in each category viz., Herb (280), Tree (211), Climber (79), and Shrub (190). In all the five fields of search, the

information regarding viz., Status/ State, Criteria, Reference/ Abstract of publication of each species is given. In advanced search, in addition to the above fields, multiple queries can be made through Genus, Synonym, Family along with Status reference. The Family search shows that 760 RETs distributed among 109 families. The species with 'present status' is also enabled through a click on Status Reference. Results have shown viz; IUCN (237), and Sasidharan (471). The search shows all hits with list of all species.

**Table - 1. Rare, Endangered and Threatened (RET) plants with present status**

<b>Sl. No.</b>	<b>SPECIES</b>	<b>PRESENT STATUS</b>
1	<i>Acranthera grandiflora</i>	Vulnerable
2	<i>Actinodaphne bourneae</i>	Endangered
3	<i>Actinodaphne campanulata</i> var. <i>campanulata</i>	Vulnerable
4	<i>Actinodaphne campanulata</i> var. <i>obtusata</i>	Endangered
5	<i>Actinodaphne lanata</i>	Critically Endangered
6	<i>Actinodaphne lawsonii</i>	Vulnerable
7	<i>Actinodaphne malabarica</i>	Vulnerable
8	<i>Actinodaphne salicina</i>	Endangered
9	<i>Adenosma malabaricum</i>	Critically Endangered
10	<i>Agasthiyamalai pauciflora</i>	Critically Endangered
11	<i>Aglaia apiocarpa</i>	Vulnerable
12	<i>Aglaia barberi</i>	Vulnerable
13	<i>Aglaia bourdillonii</i>	Vulnerable
14	<i>Aglaia edulis</i>	Vulnerable
15	<i>Aglaia lawii</i>	Vulnerable
16	<i>Aglaia malabarica</i>	Critically Endangered
17	<i>Aglaia perviridis</i>	Vulnerable
18	<i>Aglaia simplicifolia</i>	Endangered
19	<i>Albizia lathamii</i>	Endangered
20	<i>Allophylus concanicus</i>	Critically Endangered
21	<i>Amomum nilgircum</i>	Critically Endangered
22	<i>Amorphophallus hohenackeri</i>	Critically Endangered
23	<i>Amorphophallus smithsonianus</i>	Endangered
24	<i>Anacolosa densiflora</i>	Endangered
25	<i>Anaphalis barnesii</i>	Endangered
26	<i>Anaphalis beddomei</i>	Vulnerable
27	<i>Anaphalis leptophylla</i>	Vulnerable



28	<i>Anaphalis neelgerryana</i>	Vulnerable
29	<i>Anaphalis notoniana</i>	Endangered
30	<i>Anaphalis travancorica</i>	Vulnerable
31	<i>Anaphalis wightiana</i>	Vulnerable
32	<i>Anaphyllum beddomei</i>	Vulnerable
33	<i>Anaphyllum wightii</i>	Vulnerable
34	<i>Andrographis explicata</i>	Vulnerable
35	<i>Anisochilus argenteus</i>	Vulnerable
36	<i>Anisochilus robustus</i>	Critically Endangered
37	<i>Anthoxanthum borii</i>	Near Threatened
38	<i>Antistrophe serratifolia</i>	Vulnerable
39	<i>Aponogeton appendiculatus</i>	Endangered
40	<i>Aporosa bourdillonii</i>	Endangered
41	<i>Aralia malabarica</i>	Vulnerable
42	<i>Archidendron monadelphum</i> var. <i>gracile</i>	Vulnerable
43	<i>Ardisia amplexicaulis</i>	Endangered
44	<i>Ardisia blatterii</i>	Endangered
45	<i>Ardisia sonchifolia</i>	Endangered
46	<i>Arenga wightii</i>	Vulnerable
47	<i>Arisaema barnesii</i>	Endangered
48	<i>Arisaema psittacus</i>	Vulnerable
49	<i>Asparagus fysonii</i>	Endangered
50	<i>Aspidopterys canarensis</i>	Vulnerable
51	<i>Atuna indica</i>	Endangered
52	<i>Atuna travancorica</i>	Endangered
53	<i>Begonia albo-coccinea</i>	Vulnerable
54	<i>Begonia canarana</i>	Vulnerable
55	<i>Begonia cordifolia</i>	Vulnerable
56	<i>Begonia trichocarpa</i>	Vulnerable
57	<i>Beilschmiedia wightii</i>	Endangered
58	<i>Belosynapsis kewensis</i>	Endangered
59	<i>Belosynapsis vivipara</i>	Vulnerable
60	<i>Bentinckia condapanna</i>	Vulnerable
61	<i>Berberis nilghiriensis</i>	Critically Endangered
62	<i>Bhidea burnsiana</i>	Vulnerable
63	<i>Biophytum insigne</i>	Critically Endangered
64	<i>Biophytum longipedunculatum</i>	Endangered
65	<i>Blepharistemma serratum</i>	Vulnerable
66	<i>Buchanania barberi</i>	Critically Endangered
67	<i>Buchanania lanceolata</i>	Vulnerable
68	<i>Bulbophyllum aureum</i>	Endangered
69	<i>Bulbophyllum elegantulum</i>	Vulnerable
70	<i>Bulbophyllum fuscopurpureum</i>	Vulnerable
71	<i>Bulbophyllum kaitiense</i>	Vulnerable
72	<i>Bulbophyllum mysorensense</i>	Endangered
73	<i>Burmannia indica</i>	Critically Endangered

74	<i>Burmannia stricta</i>	Critically Endangered
75	<i>Burmannia wallichii</i>	Critically Endangered
76	<i>Byrsophyllum tetrandrum</i>	Endangered
77	<i>Cajanus cajanifolius</i>	Near Threatened
78	<i>Calamus brandisii</i>	Endangered
79	<i>Calamus nagbettae</i>	Vulnerable
80	<i>Campanula alphonsii</i>	Vulnerable
81	<i>Canthium neilgherrense</i>	Vulnerable
82	<i>Capparis diversifolia</i>	Vulnerable
83	<i>Capparis fusifera</i>	Vulnerable
84	<i>Capparis rheedei</i>	Vulnerable
85	<i>Capparis shevaroyensis</i>	Vulnerable
86	<i>Carex wightiana</i>	Vulnerable
87	<i>Casearia wynadensis</i>	Vulnerable
88	<i>Cayratia pedata</i> var. <i>glabra</i>	Vulnerable
89	<i>Ceropegia beddomei</i>	Endangered
90	<i>Ceropegia decaisneana</i>	Vulnerable
91	<i>Ceropegia fimbriifera</i>	Vulnerable
92	<i>Ceropegia metziana</i>	Vulnerable
93	<i>Ceropegia pusilla</i>	Vulnerable
94	<i>Ceropegia spiralis</i>	Vulnerable
95	<i>Ceropegia thwaitesii</i>	Vulnerable
96	<i>Chionanthus mala-elengi</i> ssp. <i>linocieroides</i>	Endangered
97	<i>Chloroxylon swietenia</i>	Vulnerable
98	<i>Chrysopogon tadulingamii</i>	Vulnerable
99	<i>Chrysopogon velutinus</i>	Endangered
100	<i>Cinnamomum chemungianum</i>	Endangered
101	<i>Cinnamomum filipedicellatum</i>	Endangered
102	<i>Cinnamomum perrottetii</i>	Vulnerable
103	<i>Cinnamomum riparium</i>	Vulnerable
104	<i>Cinnamomum travancoricum</i>	Critically Endangered
105	<i>Cinnamomum wightii</i>	Critically Endangered
106	<i>Claoxylon anomalum</i>	Vulnerable
107	<i>Cleistanthus malabaricus</i>	Vulnerable
108	<i>Cleistanthus travancorensis</i>	Endangered
109	<i>Clematis bourdillonii</i>	Vulnerable
110	<i>Coelogyne mossiae</i>	Vulnerable
111	<i>Colubrina travancorica</i>	Endangered
112	<i>Commelina indehiscens</i>	Vulnerable
113	<i>Commelina wightii</i>	Vulnerable
114	<i>Conchidium nanum</i>	Critically Endangered
115	<i>Corymborkis veratrifolia</i>	Vulnerable
116	<i>Crotalaria alata</i>	Endangered
117	<i>Crotalaria barbata</i>	Vulnerable
118	<i>Crotalaria clarkei</i>	Endangered
119	<i>Crotalaria fysonii</i> var. <i>glabra</i>	Endangered

120	<i>Crotalaria grahamiana</i>	Endangered
121	<i>Crotalaria longipes</i>	Endangered
122	<i>Crotalaria scabra</i>	Vulnerable
123	<i>Crotalaria willdenowiana</i>	Endangered
124	<i>Croton lawianus</i>	Critically Endangered
125	<i>Cryptocarya anamalayana</i>	Endangered
126	<i>Cryptocarya beddomei</i>	Vulnerable
127	<i>Cryptocarya praetervis</i>	Vulnerable
128	<i>Cryptocoryne consobrina</i>	Near Threatened
129	<i>Curcuma decipiens</i>	Endangered
130	<i>Cyanotis burmanniana</i>	Vulnerable
131	<i>Cyathocline lutea</i>	Endangered
132	<i>Cyclea fissicalyx</i>	Endangered
133	<i>Cynanchum alatum</i>	Vulnerable
134	<i>Cynometra beddomei</i>	Endangered
135	<i>Cynometra travancorica</i>	Endangered
136	<i>Dalbergia beddomei</i>	Endangered
137	<i>Dalbergia congesta</i>	Endangered
138	<i>Dalbergia latifolia</i>	Vulnerable
139	<i>Dalbergia malabarica</i>	Vulnerable
140	<i>Dalbergia travancorica</i>	Endangered
141	<i>Dendrobium diodon</i> ssp. <i>kodayarensis</i>	Critically Endangered
142	<i>Dendrobium microbulbon</i>	Endangered
143	<i>Dendrobium panduratum</i> var. <i>villosum</i>	Critically Endangered
144	<i>Derris benthamii</i>	Endangered
145	<i>Derris brevipes</i> var. <i>travancorica</i>	Endangered
146	<i>Derris thothathrii</i>	Vulnerable
147	<i>Desmodium ferrugineum</i> ssp. <i>wynaadense</i>	Vulnerable
148	<i>Desmos viridiflorus</i>	Endangered
149	<i>Dialium travancoricum</i>	Critically Endangered
150	<i>Dictyospermum ovalifolium</i>	Endangered
151	<i>Didymocarpus fischeri</i>	Vulnerable
152	<i>Didymocarpus macrostachya</i>	Critically Endangered
153	<i>Didymocarpus meeboldii</i>	Critically Endangered
154	<i>Didymocarpus ovalifolia</i>	Endangered
155	<i>Didymocarpus repens</i>	Endangered
156	<i>Didymocarpus wightii</i>	Critically Endangered
157	<i>Dimeria borii</i>	Vulnerable
158	<i>Dimeria hohenackeri</i>	Endangered
159	<i>Dimeria kanjirapallilana</i>	Vulnerable
160	<i>Dimeria kurumthotticalana</i>	Endangered
161	<i>Dimorphocalyx beddomei</i>	Endangered
162	<i>Dioscorea wightii</i>	Critically Endangered
163	<i>Diospyros atrata</i>	Vulnerable
164	<i>Diospyros barberi</i>	Vulnerable
165	<i>Diospyros trichophylla</i>	Vulnerable

166	<i>Dipterocarpus bourdillonii</i>	Critically Endangered
167	<i>Dipterocarpus indicus</i>	Endangered
168	<i>Discospermum sphaerocarpum</i>	Critically Endangered
169	<i>Drypetes confertiflora</i>	Vulnerable
170	<i>Drypetes gardneri</i>	Endangered
171	<i>Drypetes malabarica</i>	Critically Endangered
172	<i>Drypetes porteri</i>	Endangered
173	<i>Drypetes travancoria</i>	Endangered
174	<i>Drypetes wightii</i>	Vulnerable
175	<i>Dysoxylum beddomei</i>	Endangered
176	<i>Dysoxylum ficiforme</i>	Vulnerable
177	<i>Ehretia wightiana</i>	Endangered
178	<i>Elaeocarpus blascoi</i>	Endangered
179	<i>Elaeocarpus gaussonii</i>	Critically Endangered
180	<i>Elaeocarpus munronii</i>	Near Threatened
181	<i>Elaeocarpus recurvatus</i>	Vulnerable
182	<i>Elaeocarpus venustus</i>	Vulnerable
183	<i>Elatostema lineolatumsetosum</i>	Endangered
184	<i>Eleiotis rottleri</i>	Vulnerable
185	<i>Embelia gardneriana</i>	Endangered
186	<i>Epithema carnosum</i> var. <i>hispida</i>	Vulnerable
187	<i>Eria albiflora</i>	Vulnerable
188	<i>Eriocaulon anshiense</i>	Endangered
189	<i>Eriocaulon barbeyanum</i>	Near Threatened
190	<i>Eriocaulon cuspidatum</i>	Endangered
191	<i>Eriocaulon dalzellii</i>	Endangered
192	<i>Eriocaulon ensiforme</i>	Critically Endangered
193	<i>Eriocaulon karnatakense</i>	Vulnerable
194	<i>Eriocaulon pectinatum</i>	Vulnerable
195	<i>Eriocaulon richardianum</i>	Endangered
196	<i>Eriocaulon sivarajanii</i>	Critically Endangered
197	<i>Eriolaena lushingtonii</i>	Vulnerable
198	<i>Eugenia discifera</i>	Endangered
199	<i>Eugenia floccosa</i>	Endangered
200	<i>Eugenia indica</i>	Endangered
201	<i>Eugenia rottleriana</i>	Vulnerable
202	<i>Eugenia singampattiana</i>	Critically Endangered
203	<i>Eulophia flava</i>	Vulnerable
204	<i>Euonymus angulatus</i>	Vulnerable
205	<i>Euonymus paniculatus</i>	Endangered
206	<i>Euonymus serratifolius</i>	Endangered
207	<i>Euphorbia santapau</i>	Endangered
208	<i>Euphorbia vajravelui</i>	Vulnerable
209	<i>Exacum anamallayanum</i>	Vulnerable
210	<i>Exacum courtallense</i>	Vulnerable
211	<i>Exacum travancoricum</i>	Critically Endangered

212	<i>Farmeria indica</i>	Endangered
213	<i>Farmeria metzgerioides</i>	Vulnerable
214	<i>Ficus macrophylla</i>	Critically Endangered
215	<i>Fimbristylis crystallina</i>	Endangered
216	<i>Fimbristylis dauciformis</i>	Endangered
217	<i>Fimbristylis hirsutifolia</i>	Critically Endangered
218	<i>Fuirena ponmudiensis</i>	Vulnerable
219	<i>Fuirena swamyi</i>	Vulnerable
220	<i>Garcinia imberti</i>	Endangered
221	<i>Garcinia rubro-echinata</i>	Vulnerable
222	<i>Garcinia travancorica</i>	Vulnerable
223	<i>Garcinia wightii</i>	Vulnerable
224	<i>Garnotia puchiparensis</i>	Endangered
225	<i>Glochidion bourdillonii</i>	Vulnerable
226	<i>Glochidion candolleianum</i>	Endangered
227	<i>Glochidion hohenackeri</i> var. <i>johnstonei</i>	Vulnerable
228	<i>Glochidion pauciflorum</i>	Endangered
229	<i>Glochidion zeylanicum</i> var. <i>tomentosum</i>	Endangered
230	<i>Gluta travancorica</i>	Near Threatened
231	<i>Glycosmis macrocarpa</i>	Vulnerable
232	<i>Glyphochloa divergens</i>	Vulnerable
233	<i>Glyptopetalum lawsonii</i>	Vulnerable
234	<i>Gnaphalium coarctatum</i>	Endangered
235	<i>Goniothalamus rhynchantherus</i>	Endangered
236	<i>Goniothalamus wynaadensis</i>	Near Threatened
237	<i>Grewia gamblei</i>	Endangered
238	<i>Grewia heterotricha</i>	Endangered
239	<i>Grewia pandaica</i>	Critically Endangered
240	<i>Gymnacranthera farquhariana</i>	Vulnerable
241	<i>Gymnema khandalense</i>	Vulnerable
242	<i>Gynura travancorica</i>	Near Threatened
243	<i>Habenaria barnesii</i>	Endangered
244	<i>Haplothismia exannulata</i>	Critically Endangered
245	<i>Hedyotis albonervia</i>	Vulnerable
246	<i>Hedyotis articularis</i> ssp. <i>santapau</i>	Vulnerable
247	<i>Hedyotis beddomei</i>	Endangered
248	<i>Hedyotis bourdillonii</i>	Vulnerable
249	<i>Hedyotis buxifolia</i>	Vulnerable
250	<i>Hedyotis eualata</i> var. <i>agastyamalayana</i>	Endangered
251	<i>Hedyotis eualata</i> var. <i>eualata</i>	Vulnerable
252	<i>Hedyotis hirsutissima</i>	Endangered
253	<i>Hedyotis pruinosa</i>	Vulnerable
254	<i>Hedyotis ramarowii</i>	Endangered
255	<i>Hedyotis swertioides</i>	Vulnerable
256	<i>Hedyotis travancorica</i>	Critically Endangered
257	<i>Helichrysum wightii</i>	Critically Endangered

258	<i>Heterostemma deccanense</i>	Endangered
259	<i>Hildegardia populifolia</i>	Critically Endangered
260	<i>Holigarna beddomei</i>	Endangered
261	<i>Holigarna grahamii</i>	Vulnerable
262	<i>Homalium jainii</i>	Endangered
263	<i>Homalium travancoricum</i>	Vulnerable
264	<i>Hopea erosa</i>	Critically Endangered
265	<i>Hopea glabra</i>	Endangered
266	<i>Hopea jacobi</i>	Critically Endangered
267	<i>Hopea parviflora</i>	Endangered
268	<i>Hopea ponga</i>	Endangered
269	<i>Hopea racophloea</i>	Endangered
270	<i>Hopea utilis</i>	Endangered
271	<i>Hoya kanyakumariana</i>	Critically Endangered
272	<i>Hubbardia heptaneuron</i>	Vulnerable
273	<i>Humboldtia bourdillonii</i>	Endangered
274	<i>Humboldtia decurrens</i>	Near Threatened
275	<i>Humboldtia laurifolia</i>	Vulnerable
276	<i>Humboldtia unijuga</i> var. <i>trijuga</i>	Critically Endangered
277	<i>Humboldtia unijuga</i> var. <i>unijuga</i>	Endangered
278	<i>Hybanthus travancoricus</i>	Critically Endangered
279	<i>Hydnocarpus macrocarpa</i>	Vulnerable
280	<i>Hydrocotyle conferta</i>	Endangered
281	<i>Hygrophila madurensis</i>	Critically Endangered
282	<i>Ilex gardneriana</i>	Critically Endangered
283	<i>Impatiens acaulis</i>	Critically Endangered
284	<i>Impatiens anaimudica</i>	Endangered
285	<i>Impatiens auriculata</i>	Critically Endangered
286	<i>Impatiens cochinica</i>	Critically Endangered
287	<i>Impatiens coelotropis</i>	Vulnerable
288	<i>Impatiens dasysperma</i>	Endangered
289	<i>Impatiens denisonii</i>	Endangered
290	<i>Impatiens elegans</i>	Critically Endangered
291	<i>Impatiens herbicola</i>	Vulnerable
292	<i>Impatiens johnii</i>	Endangered
293	<i>Impatiens laticornis</i>	Endangered
294	<i>Impatiens lucida</i>	Endangered
295	<i>Impatiens macrocarpa</i>	Critically Endangered
296	<i>Impatiens oppositifolia</i>	Endangered
297	<i>Impatiens orchiioides</i>	Vulnerable
298	<i>Impatiens pallidiflora</i>	Endangered
299	<i>Impatiens pandata</i>	Endangered
300	<i>Impatiens phoenicea</i>	Endangered
301	<i>Impatiens platyadena</i>	Critically Endangered
302	<i>Impatiens rufescens</i>	Endangered
303	<i>Impatiens tenella</i>	Endangered

304	<i>Impatiens travancorica</i>	Critically Endangered
305	<i>Impatiens umbellata</i>	Vulnerable
306	<i>Impatiens verecunda</i>	Critically Endangered
307	<i>Impatiens viscosa</i>	Vulnerable
308	<i>Impatiens wightiana</i>	Endangered
309	<i>Indigofera constricta</i>	Vulnerable
310	<i>Indotristicha tirunelveliana</i>	Near Threatened
311	<i>Ipea malabarica</i>	Endangered
312	<i>Isachne fischeri</i>	Vulnerable
313	<i>Isachne meeboldii</i>	Critically Endangered
314	<i>Isachne setosa</i>	Vulnerable
315	<i>Isachne veldkampii</i>	Critically Endangered
316	<i>Ischaemum muticum</i>	Critically Endangered
317	<i>Ischaemum travancorense</i>	Endangered
318	<i>Isodon rivularis</i>	Critically Endangered
319	<i>Isonandra stocksii</i>	Endangered
320	<i>Isonandra villosa</i>	Endangered
321	<i>Ixora johnsonii</i>	Critically Endangered
322	<i>Ixora lawsonii</i>	Endangered
323	<i>Ixora malabarica</i>	Vulnerable
324	<i>Ixora monticola</i>	Vulnerable
325	<i>Ixora notoniana</i>	Endangered
326	<i>Julostylis polyandra</i>	Endangered
327	<i>Justicia notha</i>	Critically Endangered
328	<i>Kalanchoe olivacea</i>	Endangered
329	<i>Kingiodendron pinnatum</i>	Endangered
330	<i>Knema attenuata</i>	Lower Risk/Least Concern
331	<i>Koilodepas calycinum</i>	Endangered
332	<i>Kunstleria keralensis</i>	Vulnerable
333	<i>Lasianthus blumeanus</i>	Endangered
334	<i>Lasianthus capitulatus</i>	Vulnerable
335	<i>Lasianthus ciliatus</i>	Vulnerable
336	<i>Lasianthus cinereus</i>	Vulnerable
337	<i>Lasianthus dichotomous</i>	Endangered
338	<i>Lasianthus jackianus</i>	Vulnerable
339	<i>Lasianthus oblongifolius</i>	Critically Endangered
340	<i>Lasianthus obovatus</i>	Endangered
341	<i>Lasianthus rostratus</i>	Vulnerable
342	<i>Lasianthus strigillosus</i>	Vulnerable
343	<i>Lasianthus verticillatus</i>	Vulnerable
344	<i>Leucas pubescens</i>	Endangered
345	<i>Limnopoa meeboldii</i>	Endangered
346	<i>Lindernia fugax</i>	Endangered
347	<i>Lindernia manilaliana</i>	Endangered
348	<i>Litsea beddomei</i>	Endangered
349	<i>Litsea mysorensis</i>	Endangered

350	<i>Litsea nigrescens</i>	Endangered
351	<i>Litsea quinqueflora</i>	Vulnerable
352	<i>Litsea travancorica</i>	Endangered
353	<i>Luffa umbellata</i>	Endangered
354	<i>Madhuca bourdillonii</i>	Endangered
355	<i>Madhuca insignis</i>	Extinct
356	<i>Maesa velutina</i>	Endangered
357	<i>Mallotus atrovirens</i>	Vulnerable
358	<i>Mangifera austroindica</i>	Vulnerable
359	<i>Marsdenia raziana</i>	Vulnerable
360	<i>Marsdenia tirunelvelica</i>	Vulnerable
361	<i>Mastixia arborea</i> ssp. <i>arborea</i>	Lower Risk/Least Concern
362	<i>Medinilla malabarica</i>	Vulnerable
363	<i>Melicope indica</i>	Endangered
364	<i>Melicope lunu-ankenda</i>	Endangered
365	<i>Memecylon flavescens</i>	Endangered
366	<i>Memecylon gracile</i>	Vulnerable
367	<i>Memecylon lawsonii</i>	Vulnerable
368	<i>Memecylon sisparensense</i>	Critically Endangered
369	<i>Memecylon subramanii</i>	Endangered
370	<i>Mesua ferrea</i> var. <i>coromandeliana</i>	Endangered
371	<i>Meteoromyrtus wynaadensis</i>	Critically Endangered
372	<i>Microtropis densiflora</i>	Endangered
373	<i>Miliusa nilagirica</i>	Vulnerable
374	<i>Miquelia dentata</i>	Vulnerable
375	<i>Mitrephora grandiflora</i>	Vulnerable
376	<i>Molineria trichocarpa</i>	Near Threatened
377	<i>Morinda reticulata</i>	Endangered
378	<i>Murdannia crocea</i> ssp. <i>ochracea</i>	Endangered
379	<i>Murdannia lanceolata</i>	Vulnerable
380	<i>Murdannia lanuginosa</i>	Vulnerable
381	<i>Mycetia acuminata</i>	Vulnerable
382	<i>Myriactis wightii</i> var. <i>bellidioides</i>	Endangered
383	<i>Myriactis wightii</i> var. <i>wightii</i>	Critically Endangered
384	<i>Myristica fatua</i> var. <i>magnifica</i>	Endangered
385	<i>Myristica malabarica</i>	Vulnerable
386	<i>Neanotis rheedei</i>	Endangered
387	<i>Neolitsea fischeri</i>	Vulnerable
388	<i>Nostolachma crassifolia</i>	Endangered
389	<i>Nothopegia aureo-fulva</i>	Critically Endangered
390	<i>Nothopegia beddomei</i>	Endangered
391	<i>Nothopegia heyneana</i>	Near Threatened
392	<i>Notonia shevaroyensis</i>	Vulnerable
393	<i>Nymphoides krishnakesara</i>	Endangered
394	<i>Nymphoides macrospermum</i>	Critically Endangered
395	<i>Nymphoides sivarajanii</i>	Critically Endangered



396	<i>Oberonia brachyphylla</i>	Vulnerable
397	<i>Ochlandra beddomei</i>	Vulnerable
398	<i>Ochlandra ebracteata</i>	Endangered
399	<i>Ochlandra setigera</i>	Endangered
400	<i>Ochreinauclea missionis</i>	Vulnerable
401	<i>Octotropis travancorica</i>	Vulnerable
402	<i>Ophiorrhiza barberi</i>	Endangered
403	<i>Ophiorrhiza brunonis</i>	Critically Endangered
404	<i>Ophiorrhiza caudata</i>	Critically Endangered
405	<i>Ophiorrhiza munnarensis</i>	Critically Endangered
406	<i>Ophiorrhiza pykarensis</i>	Critically Endangered
407	<i>Ophiorrhiza roxburghiana</i>	Vulnerable
408	<i>Orophea thomsonii</i>	Endangered
409	<i>Orophea uniflora</i>	Vulnerable
410	<i>Oxytenanthera bourdillonii</i>	Endangered
411	<i>Palaquium bourdillonii</i>	Vulnerable
412	<i>Palaquium ravii</i>	Endangered
413	<i>Paphiopedilum druryi</i>	Endangered
414	<i>Pavetta nemoralis</i>	Extinct
415	<i>Pavetta oblanceolata</i>	Critically Endangered
416	<i>Pavetta praeterita</i>	Critically Endangered
417	<i>Pavetta travancorica</i>	Critically Endangered
418	<i>Pavetta wightii</i>	Critically Endangered
419	<i>Peucedanum anamallayense</i>	Endangered
420	<i>Phaeanthus malabaricus</i>	Near Threatened
421	<i>Phyllanthus anamalyanus</i>	Critically Endangered
422	<i>Phyllanthus beddomei</i>	Endangered
423	<i>Phyllanthus chandraboisei</i>	Endangered
424	<i>Phyllanthus gageanus</i>	Vulnerable
425	<i>Phyllanthus megacarpus</i>	Critically Endangered
426	<i>Phyllanthus narayanaswamii</i>	Endangered
427	<i>Phyllocephalum sengaltherianum</i>	Vulnerable
428	<i>Piper barberi</i>	Critically Endangered
429	<i>Pittosporum dasycaulon</i>	Endangered
430	<i>Pittosporum viridulatum</i>	Critically Endangered
431	<i>Podostemum munnarensense</i>	Endangered
432	<i>Pogostemon atropurpureus</i>	Vulnerable
433	<i>Pogostemon gardneri</i>	Endangered
434	<i>Pogostemon travancoricus</i>	Critically Endangered
435	<i>Pogostemon vestitus</i>	Endangered
436	<i>Polyalthia rufescens</i>	Endangered
437	<i>Polyalthia shendurunii</i>	Endangered
438	<i>Polypleurum dichotomum</i>	Near Threatened
439	<i>Polypleurum filifolium</i>	Vulnerable
440	<i>Polyzygus tuberosus</i>	Vulnerable
441	<i>Popowia beddomeana</i>	Endangered

442	<i>Pothos armatus</i>	Endangered
443	<i>Pothos crassipedunculatus</i>	Endangered
444	<i>Pothos thomsonianus</i>	Endangered
445	<i>Premna paucinervis</i>	Endangered
446	<i>Psychotria barberi</i>	Vulnerable
447	<i>Psychotria beddomei</i>	Endangered
448	<i>Psychotria globicephala</i>	Endangered
449	<i>Psychotria johnsonii</i>	Vulnerable
450	<i>Psychotria macrocarpa</i>	Endangered
451	<i>Psydrax ficiformis</i>	Endangered
452	<i>Psydrax pergracile</i>	Endangered
453	<i>Pterospermum reticulatum</i>	Vulnerable
454	<i>Ranunculus reniformis</i>	Vulnerable
455	<i>Rapanea striata</i>	Endangered
456	<i>Rapanea thwaitesii</i>	Endangered
457	<i>Rauvolfia hookeri</i>	Endangered
458	<i>Rauvolfia micrantha</i>	Endangered
459	<i>Rhododendron arboreum</i> ssp. <i>nilagiricum</i>	Vulnerable
460	<i>Rhynchosia heynei</i>	Vulnerable
461	<i>Rotala cookii</i>	Endangered
462	<i>Rotala malabarica</i>	Critically Endangered
463	<i>Rotala ritchiei</i>	Endangered
464	<i>Sageraea laurina</i>	Near Threatened
465	<i>Sageraea thwaitesii</i>	Endangered
466	<i>Salacia beddomei</i>	Vulnerable
467	<i>Salacia macrosperma</i>	Vulnerable
468	<i>Salacia malabarica</i>	Vulnerable
469	<i>Santalum album</i>	Vulnerable
470	<i>Saprosma fragrans</i>	Vulnerable
471	<i>Saraca asoca</i>	Vulnerable
472	<i>Schefflera bourdillonii</i>	Endangered
473	<i>Sciaphila janthina</i>	Endangered
474	<i>Semecarpus auriculata</i>	Near Threatened
475	<i>Semecarpus travancorica</i>	Vulnerable
476	<i>Senecio multiceps</i>	Vulnerable
477	<i>Shorea roxburghii</i>	Endangered
478	<i>Solenocarpus indicus</i>	Vulnerable
479	<i>Sonerila devicolamensis</i>	Vulnerable
480	<i>Sonerila elegans</i> var. <i>beddomei</i>	Vulnerable
481	<i>Sonerila grandiflora</i>	Vulnerable
482	<i>Sonerila nemakadensis</i>	Vulnerable
483	<i>Sonerila pulneyensis</i>	Endangered
484	<i>Sonerila sadasivanii</i>	Vulnerable
485	<i>Sonerila sahyadrica</i>	Vulnerable
486	<i>Sonerila speciosa</i>	Vulnerable
487	<i>Sonerila versicolor</i> var. <i>axillaris</i>	Vulnerable

488	<i>Sophora wightii</i>	Endangered
489	<i>Strobilanthes aurita</i>	Vulnerable
490	<i>Swertia beddomei</i>	Vulnerable
491	<i>Symplocos anamallayana</i>	Endangered
492	<i>Symplocos macrocarpa</i> ssp. <i>kanarana</i>	Vulnerable
493	<i>Symplocos macrocarpa</i> ssp. <i>macrocarpa</i>	Vulnerable
494	<i>Symplocos macrophylla</i> ssp. <i>rosea</i>	Endangered
495	<i>Symplocos nairii</i>	Endangered
496	<i>Symplocos oligandra</i>	Endangered
497	<i>Syzygium beddomei</i>	Endangered
498	<i>Syzygium bourdillonii</i>	Endangered
499	<i>Syzygium calcadense</i>	Vulnerable
500	<i>Syzygium chavaran</i>	Endangered
501	<i>Syzygium courtallensis</i>	Critically Endangered
502	<i>Syzygium densiflorum</i>	Vulnerable
503	<i>Syzygium microphyllum</i>	Endangered
504	<i>Syzygium myhendrae</i>	Endangered
505	<i>Syzygium occidentalis</i>	Vulnerable
506	<i>Syzygium palghatense</i>	Critically Endangered
507	<i>Syzygium parameswaranii</i>	Endangered
508	<i>Syzygium rama-varmae</i>	Vulnerable
509	<i>Syzygium stocksii</i>	Endangered
510	<i>Syzygium travancoricum</i>	Critically Endangered
511	<i>Tabernaemontana alternifolia</i>	Near Threatened
		Lower Risk/Conservation
512	<i>Tabernaemontana gamblei</i>	Dependent
513	<i>Taeniophyllum scaberulum</i>	Endangered
514	<i>Tarenna agumbensis</i>	Endangered
515	<i>Tarenna monosperma</i>	Endangered
516	<i>Tarenna nilagirica</i>	Vulnerable
517	<i>Tephrosia wynaadensis</i>	Vulnerable
518	<i>Theriophonum sivaganganum</i>	Endangered
519	<i>Thottea barberi</i>	Endangered
520	<i>Thunbergia bicolor</i>	Critically Endangered
521	<i>Toxocarpus beddomei</i>	Endangered
522	<i>Toxocarpus palghatensis</i>	Vulnerable
523	<i>Trias bonaccordensis</i>	Critically Endangered
524	<i>Tricholepis angustifolia</i>	Vulnerable
525	<i>Trichosanthes anamalaiensis</i>	Vulnerable
526	<i>Typhonium bulbiferum</i>	Vulnerable
527	<i>Utleria salicifolia</i>	Endangered
528	<i>Utricularia cecillii</i>	Endangered
529	<i>Utricularia praeterita</i>	Near Threatened
530	<i>Utricularia wightiana</i>	Vulnerable
531	<i>Valeriana hookeriana</i>	Endangered
532	<i>Vanasushava pedata</i>	Vulnerable

533	<i>Vanilla wightiana</i>	Vulnerable
534	<i>Vateria indica</i>	Critically Endangered
535	<i>Vateria macrocarpa</i>	Critically Endangered
536	<i>Vatica chinensis</i>	Critically Endangered
537	<i>Vepris bilocularis</i>	Endangered
538	<i>Vernonia anaimudica</i>	Vulnerable
539	<i>Vernonia anamallica</i>	Vulnerable
540	<i>Vernonia beddomei</i>	Endangered
541	<i>Vernonia bourdillonii</i>	Endangered
542	<i>Vernonia gossypina</i>	Critically Endangered
543	<i>Vernonia heynei</i>	Critically Endangered
544	<i>Vernonia malabarica</i>	Vulnerable
545	<i>Vernonia meeboldii</i>	Endangered
546	<i>Vernonia peninsularis</i> var. <i>peninsularis</i>	Vulnerable
547	<i>Vernonia ramaswamii</i>	Endangered
548	<i>Vernonia saligna</i> var. <i>nilghirensis</i>	Vulnerable
549	<i>Vernonia salvifolia</i>	Endangered
550	<i>Vigna khandalensis</i>	Near Threatened
551	<i>Wendlandia angustifolia</i>	Extinct
552	<i>Wendlandia bicuspidata</i>	Endangered
553	<i>Willisia selaginoides</i>	Vulnerable
554	<i>Xylosma longifolia</i>	Endangered
555	<i>Youngia nilgiriensis</i>	Endangered
556	<i>Zehneria maysorensis</i>	Endangered
557	<i>Zehneria maysorensis</i> var. <i>umbellata</i>	Endangered
558	<i>Zenkeria sebastinei</i>	Critically Endangered

**Table -2. Rare, Endangered and Threatened (RET) plants needs status updation**

1	<i>Acorus calamus</i>		var. <i>hirsuta</i>
2	<i>Acranthera anamallica</i>	47	<i>Clematis theobromina</i>
3	<i>Adenia hondala</i>	48	<i>Commelina tricolor</i>
4	<i>Aegle marmelos</i>	49	<i>Coscinium fenestratum</i>
5	<i>Aerva wightii</i>	50	<i>Cotoneaster buxifolius</i>
6	<i>Aglaia elaeagnoidea</i>	51	<i>Crotalaria bidiei</i>
	<i>Amorphophallus commutatus</i>	52	<i>Crotalaria clavata</i>
7	var. <i>commutatus</i>	53	<i>Crotalaria fysonii</i> var. <i>fysonii</i>
8	<i>Amorphophallus paeoniifolius</i>	54	<i>Crotalaria globosa</i>
9	<i>Ampelocissus araneosa</i>	55	<i>Crotalaria peduncularis</i>
10	<i>Ampelocissus indica</i>	56	<i>Crotalaria priestleyoides</i>
11	<i>Anisochilus dysophylloides</i>	57	<i>Crotalaria sandoorensis</i>
12	<i>Anisochilus wightii</i>	58	<i>Cryptocoryne spiralis</i> var. <i>cognatoides</i>
13	<i>Aphanamixis polystachya</i>	59	<i>Curcuma pseudomontana</i>
14	<i>Arisaema leschenaultii</i>	60	<i>Curcuma zedoaria</i>
15	<i>Arisaema murrayi</i>	61	<i>Cyanotis cerifolia</i>
16	<i>Arisaema sarracenioides</i>	62	<i>Cyathea nilgirensis</i>
17	<i>Arisaema translucens</i>	63	<i>Decalepis arayalpathra</i>
18	<i>Arisaema tylophorum</i>	64	<i>Decalepis hamiltonii</i>
19	<i>Aristolochia acuminata</i>	65	<i>Decaschistia trilobata</i>
20	<i>Artocarpus hirsutus</i>	66	<i>Dendrobium nanum</i>
21	<i>Asparagus rottleri</i>	67	<i>Dendrobium nutans</i>
22	<i>Baliospermum montanum</i>	68	<i>Dicranopteris linearis</i> var. <i>sebastiana</i>
23	<i>Begonia aliciae</i>	69	<i>Diospyros candolleana</i>
24	<i>Begonia anaimalaiensis</i>	70	<i>Diospyros courtallumensis</i>
25	<i>Begonia subpeltata</i>	71	<i>Diospyros paniculata</i>
26	<i>Blachia umbellata</i>	72	<i>Diospyros sulcata</i>
27	<i>Boesenbergia pulcherrima</i>	73	<i>Drosera indica</i>
28	<i>Bulbophyllum acutiflorum</i>	74	<i>Drosera peltata</i>
29	<i>Bunium nothum</i>	75	<i>Dysoxylum malabaricum</i>
30	<i>Calamus wightii</i>	76	<i>Elaphoglossum nilgircum</i>
31	<i>Calophyllum calaba</i>	77	<i>Elaphoglossum stigmatolepis</i>
32	<i>Canarium strictum</i>	78	<i>Embelia ribes</i>
33	<i>Caralluma procumbens</i>	79	<i>Embelia tsjeriam-cottam</i>
34	<i>Carex pseudoaperta</i>	80	<i>Erinocarpus nimmonii</i>
35	<i>Casearia rubescens</i>	81	<i>Eugenia argentea</i>
36	<i>Cayratia roxburghii</i>	82	<i>Fimbristylis arnottiana</i>
37	<i>Celastrus paniculatus</i>	83	<i>Garcinia gummi-gutta</i> var. <i>gummi-gutta</i>
38	<i>Ceropegia barnesii</i>	84	<i>Garcinia indica</i>
39	<i>Ceropegia maculata</i>	85	<i>Garcinia morella</i>
40	<i>Ceropegia omissa</i>	86	<i>Gardenia gummifera</i>
41	<i>Ceropegia vincifolia</i>	87	<i>Garnotia schmidii</i>
42	<i>Chonemorpha fragrans</i>	88	<i>Gloriosa superba</i>
43	<i>Cinnamomum beddomei</i>	89	<i>Gymnema montanum</i>
44	<i>Cinnamomum macrocarpum</i>	90	<i>Habenaria richardiana</i>
45	<i>Cinnamomum sulphuratum</i>	91	<i>Hedychium coronarium</i>
46	<i>Cissampelos pareira</i>	92	<i>Hedyotis barberi</i>

	<i>Hedyotis leschenaultiana</i> var.	139	<i>Oroxylum indicum</i>
93	<i>wynaadensis</i>	140	<i>Osbeckia aspera</i> var. <i>travancorica</i>
94	<i>Hedyotis villosostipulata</i>	141	<i>Paracautleya bhatii</i>
95	<i>Helichrysum perlanigerum</i>	142	<i>Pavetta hohenackeri</i>
96	<i>Heliotropium keralense</i>	143	<i>Pavetta zeylanica</i>
97	<i>Henckelia missionis</i>	144	<i>Persea macrantha</i>
98	<i>Heracleum candolleanum</i>	145	<i>Peucedanum josephianum</i>
99	<i>Heterostemma beddomei</i>	146	<i>Pimpinella pulneyensis</i>
100	<i>Holostemma ada-kodien</i>	147	<i>Piper hapnium</i>
101	<i>Hoya retusa</i>	148	<i>Piper longum</i>
102	<i>Humboldtia vahliana</i>	149	<i>Piper mullesua</i>
103	<i>Hydnocarpus alpina</i>	150	<i>Piper nigrum</i> var. <i>hirtellosum</i>
104	<i>Hydnocarpus pentandra</i>	151	<i>Plectranthus bishopianus</i>
105	<i>Impatiens floribunda</i>	152	<i>Pogostemon nilagiricus</i>
106	<i>Impatiens munnarensis</i>	153	<i>Pogostemon paludosus</i>
107	<i>Impatiens neo-barnesii</i>	154	<i>Polycarpha diffusa</i>
108	<i>Impatiens nilgirica</i>	155	<i>Premna coriacea</i> var. <i>villosa</i>
109	<i>Impatiens stocksii</i>	156	<i>Premna glaberrima</i>
110	<i>Impatiens viridiflora</i>	157	<i>Pseudarthria viscida</i>
111	<i>Impatiens viscida</i>	158	<i>Psychotria anamalayana</i>
112	<i>Indigofera trifoliata</i> ssp. <i>trifoliata</i>	159	<i>Psychotria keralensis</i>
113	<i>Inga cynometroides</i>	160	<i>Pterocarpus santalinus</i>
114	<i>Iphigenia sahyadrica</i>	161	<i>Pueraria tuberosa</i>
115	<i>Isachne mysorensis</i>	162	<i>Rauwolfia serpentina</i>
	<i>Ischaemum burmanicum</i> var.	163	<i>Rhaphidophora pertusa</i>
116	<i>burmanicum</i>	164	<i>Rhynchosia velutina</i>
117	<i>Ischaemum dalzielii</i>	165	<i>Saccolabium congestum</i>
118	<i>Ischaemum timorense</i>	166	<i>Salacia oblonga</i>
119	<i>Isodon nilgherricus</i>	167	<i>Salacia reticulata</i>
120	<i>Ixora agasthyamalayana</i>	168	<i>Santapaua madurensis</i>
121	<i>Justicia beddomei</i>	169	<i>Saprosma corymbosum</i>
122	<i>Kendrickia walkeri</i>	170	<i>Sauropus saksenianus</i>
123	<i>Knoxia sumatrensis</i> var. <i>sumatrensis</i>	171	<i>Schizostachyum beddomei</i>
124	<i>Liparis biloba</i>	172	<i>Schrebera swietenoides</i>
	<i>Madhuca longifolia</i>	173	<i>Senecio kundaicus</i>
125	var. <i>longifolia</i>	174	<i>Shorea tumbuggaia</i>
126	<i>Madhuca neriifolia</i>	175	<i>Smilax wightii</i>
127	<i>Magnolia champaca</i>	176	<i>Smilax zeylanica</i>
128	<i>Magnolia nilagirica</i>	177	<i>Smithia venkobarrowii</i>
129	<i>Merremia turpethum</i>	178	<i>Sorghum arundinaceum</i>
	<i>Myristica beddomei</i>	179	<i>Sphaeropteris crinita</i>
130	ssp. <i>beddomei</i>	180	<i>Strobilanthes ciliatus</i>
131	<i>Neanotis prainiana</i>	181	<i>Strobilanthes dupenii</i>
132	<i>Nervilia aragoana</i>	182	<i>Strychnos vanprukii</i>
133	<i>Nervilia crocifformis</i>	183	<i>Swertia corymbosa</i>
134	<i>Nogra dalzellii</i>	184	<i>Swertia lawii</i>
135	<i>Nothapodytes nimmoniana</i>	185	<i>Symplocos cochinchinensis</i> ssp. <i>laurina</i>
136	<i>Ophiorrhiza barnesii</i>	186	<i>Symplocos monantha</i>
137	<i>Ophiorrhiza incarnata</i>	187	<i>Symplocos pendula</i>
138	<i>Orophea erythrocarpa</i>	188	<i>Symplocos racemosa</i>

189	<i>Tarenna canarica</i>		<i>Trichopus zeylanicus</i>
190	<i>Teinostachyum wightii</i>	197	ssp. <i>travancoricus</i>
191	<i>Tephrosia barberi</i>	198	<i>Valeriana leschenaultii</i>
192	<i>Terminalia cuneata</i>	199	<i>Vernonia fysonii</i>
193	<i>Teucrium plectranthoides</i>	200	<i>Vernonia multibracteata</i>
194	<i>Tinospora sinensis</i>	201	<i>Vernonia pulneyensis</i>
195	<i>Tonatelea lanceolata</i>	202	<i>Vernonia rauii</i>
196	<i>Tragia bicolor</i>		

**Table - 3. Broad area of study / criteria along with key words**

<b>1. Population structure</b>	Cross Pollination
Abundance	Crossing
Age Composition	Flower Phenology
Age determination	Flowering
Age differences	Foliage
Age of trees	Fruit development
Age phase	Fruit Phenology
Age structure	Frutification
Age wise distribution	Heterothallism
Basal area	Insect pest incidence
Canopy gaps	Leaf area
Crown cover	Leaf Flushing
Crown projections	Leaf maturity
Floristic diversity	Leaf Phenology
Floristic richness	Leaf senescence
Floristic structure	Natural Regeneration
Growth rings	Pathogen elimination
Habitats	Phenology
Horizontal distribution	Phenotypic corelation
New records	Plant development
Plant ecological groups	Pollen germination
Plant succession	Pollination
Population ecology	Population change
Vegetation data	Population decrease
Relative density	Population growth
Relative dominance	Predator prey relationships
Relative frequency	Regeneration
Spatial distribution	Reproductive Biology
Species diversity	Reproductive efficiency
Biodiversity	Reproductive Phenology
Species richness	Seasonal abundance
Stratification	Seed development
Vertical Distribution	Seed Phenology
<b>2. Population dynamics</b>	Seedling emergence
Allogamy	Self compatibility
Autogamy	Self incompatibility
Compatibility	Stem flow



Vegetative Phenology
<b>3. Climatic &amp; edaphic factors</b>
Adaptation
Aerobic condition
Altitude
Bioclimatic indexes
Climate
Climatic condition in situ
Climatic factors
Ecology
Edaphic factors
Environment
Environmental Factors
Environmental temperature
Evapotranspiration
Frozen conditions
Habitat condition
Hydrological factors
Light
Meteorological factors
Microclimate
Precipitation
Site factors
Soil
Soil fertility
Soil nutrients
Soil properties
Soil texture in situ
Soil types
Soil water
Solar radiation
Temperature
Water relation
Weathering
<b>4. Conservation strategies</b>
Abnormal seedling
Air layering
Albino seedling
Albinos
Artificial seeds

Artificial selection
Asexual reproduction
Biotechnological Tools
Bud culture
Budding
Budwood
Bulbs
Vegetative Propagation
Clonal propagation
Clonal variation
Clones
Coppicing
Cultural methods
Cuttings
Explants
Gene banks
Genetic markers
Genetic variability
Graft hybridization
Grafts
Heterosis
Hybridisation
Hybrids
Intermediate type of seeds
In vitro culture
Layering
Micropropagation
Natural layering
Nurseries
Offshoots
Orthodox type of seeds
Plant Breeding methods
Planting stock
Plus trees
Polyembryony
Pre harvest sprouting
Pre planting treatment
Progeny
Propagation materials
Pruning

RAPD analysis
Recalcitrant seeds
Reproduction
Rhizomes
Rooting
Rootstocks
Sapling production
Seed aging
Seed dispersal
Seed emergence
Seed germination
Seed polymorphism
Seed Propagation
Seed storage practices
Seed testing
Seed viability
Seedling culture
Seedling evaluation
Seedling production
Seedling Stock
Seeds
Seedlings
Stem propagation
Stooling
Stumps
Tillering
Tissue culture
Top working
Twin seedlings
Vegetative propagation
Vivipary
<b>5. Restoration</b>
Ex situ planting
Field gene
Germplasm releases
In situ conservation
In situ planting
Plant colonization
Reintroduction
Restocking

Seedling survival
Seedling monitoring
<b>6. Evaluation</b>
Agricultural products
Anatomical Studies
Antimicrobial properties
Antioxidants
Biochemical Studies
Dendrochronology
Drugs
Edible values
Essential oil
Extracted products
Exudates
Flavanoids
Forest products
Herb-drug interaction
Horticultural crops
Medicinal plants
Medicinal properties
Nutritional analysis
Nutritional enhancement
Oil products
Pharmaceutical products
Pharmaceutical proteins
Pharmacogenomics
Pharmacognistic studies
Pharmacological Studies
Pharming
Physiological Studies
Phytoalexins
Phytochemical analysis
Phytotoxins
Plant extracts
Plant oestrogens
Plant products
Toxicological studies
Vegetable extracts
Wood extracts

**Table - 4. Literature sources**

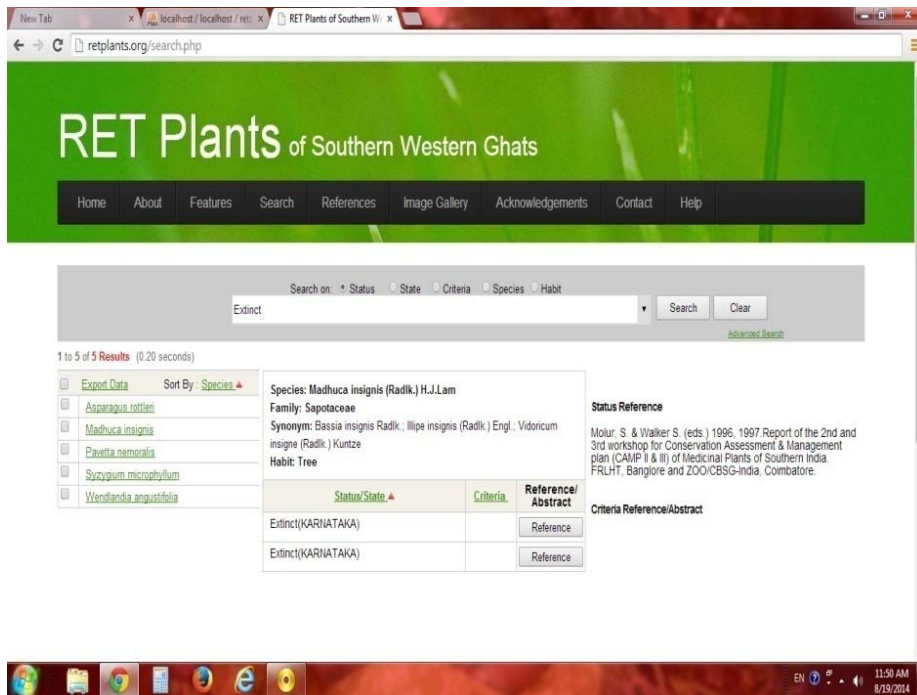
SL.No.	Literature
1.	Ahmedullah, M., Nayar, M.P. 1987. Endemic Plants of the Indian Region. Botanical Survey of India, Calcutta.
2.	Nayar, T.S., Rasiya Beegam, A. Mohanan, N., Rajkumar, G. 2006. Flowering Plants of Kerala- A Handbook. TBGRI, Palode, Thiruvananthapuram, p1069.
3.	Gopalan, R., Henry, A.N. 2000. Endemic Plants of India - Camp for strict endemics of Agasthyamala hills, Southern Western Ghats. Bishen Singh Mahendra Pal Singh, Dehradun.
4.	Henry, A.N., Vivekanandan, K., Nair, N.C. 1979. Rare and threatened flowering plants of South India. J. Bombay Nat. hist. Soc. 75: 684-697.
5.	IUCN, 2012. IUCN Red List of Threatened Species (ver. 2012.2). Available at: <a href="http://www.iucnredlist.org">http://www.iucnredlist.org</a> . (Accessed: 17 October 2012).
6.	IUCN, 2000. The IUCN Red List of Threatened Species. IUCN, Gland.
7.	IUCN, 1994. The IUCN Red List of Threatened Species. IUCN, Gland.
8.	Jose, P.A. 2001. A study on the population structure, dynamics and conservation of two rare and endemic trees of Western Ghats of Kerala. Ph.D. Thesis, University of Kerala, Thiruvananthapuram, p 184.
9.	Krishnan, P.N. Seeni, S. 1994. Rapid micropropagation of <i>Woodfordia fruticosa</i> (L.) Kurz. (Lythraceae) a rare medicinal plant, Plant Cell Reports 14: 55-58.
10.	Mohanan, N., Shaju, T. 2004. On the rediscovery of <i>Pavetta wightii</i> Hook.f. (Rubiaceae)- a rare and little known endemic species of Western Ghats. J.Econ.Taxon.Bot, 28(1):78-80.
11.	Nayar, M.P., Sastry, A.R.K. 1987. Red Data Book on Indian Plants, Vol. I. Botanical Survey of India, Calcutta.
12.	Nayar, M.P., Sastry, A.R.K. 1988. Red Data Book on Indian Plants, Vol II. Botanical Survey of India, Calcutta
13.	Nayar, M.P., Sastry, A.R.K. 1990. Red Data Book on Indian Plants, Vol.III. Botanical Survey of India, Calcutta.
14.	Nayar M.P. 1997. Biodiversity challenges in Kerala and Science of conservation Biology. In : Pushpangadan, P., Nair, K.S.S. (eds. ) Biodiversity of Tropical Forests the Kerala Scenario. STEC, Kerala, Trivandrum.
15.	Rajkumar, G 2011. Ecological Studies of Three Rare and Endemic Annonaceous species from Agasthyamala, Western Ghats. University of Kerala, Thiruvananthapuram.
16.	Rajesh, K.P., Augustine, J., Sasidharan, N. 1997. Rediscovery of <i>Taeniophyllum scaberulum</i> Hook.f., an endemic orchid from Periyar

	Tiger Reserve, Kerala, India.
17.	Ravikumar, K., Ved, D.K. 2000. 100 Red-Listed Medicinal Plants of Conservation Concern in Southern India. FRLHT, Bangalore, p 467.
18.	Sasidharan, N. 1997. Studies on the Flora of Shenduruny Wildlife Sanctuary with emphasis on endemic species. KFRI Research Report No. 128. Kerala Forest Research Institute, Peechi.
19.	Sasidharan, N. 2002. Floristic Studies in Parambikulam Wildlife Sanctuary. KFRI Research Report No. 246. Kerala Forest Research Institute, Peechi.
20.	Jose Kallarackal, Swarupanandan, K., Sharma, J.K. (eds.) 2003. Proceedings of the Workshop on Conservation and Research needs of the Rare, Endangered and Threatened (RET) tree species in Kerala Part of the Western Ghats. KFRI, Peechi, pp10-12.
21.	Sasidharan, N. 2004. Biodiversity Documentation For Kerala, Part6: Flowering Plants. Handbook No. 17. Kerala Forest Research Institute, Peechi. p 702.
22.	Yesodharan, K. Sujana, K.A. 2007. Status of Ethnomedicinal Plants in the Parambikulam Wildlife Sanctuary, Kerala, South India. Ann. For., 15(2):322-334.
23.	Molur, S., Walker, S. (eds.) 1996, 1997. Report of the 2nd and 3rd Workshop for Conservation Assessment & Management Plan (CAMP II & III) of Medicinal Plants of Southern India. FRLHT, Bangalore and ZOO/CBSG-India, Coimbatore.
24.	Sasidharan, N. 2011. Flowering Plants of Kerala- Digital Version 2.0. Kerala Forest Research Institute, Peechi.
25.	Santhosh kumar, E.S. Shaju, T., Roy, P.E., Rajkumar, G. 2013. A new Species of <i>Goniotalamus</i> (Blume) Hook. f. & Thomson (Annonaceae) from Kerala, India.
26.	Yesodharan, K. and Jose, P.A 2011. A Multidisciplinary Database of RET Plants of the Kerala State. KFRI Research Report No.56. KFRI, Peechi, p 49.

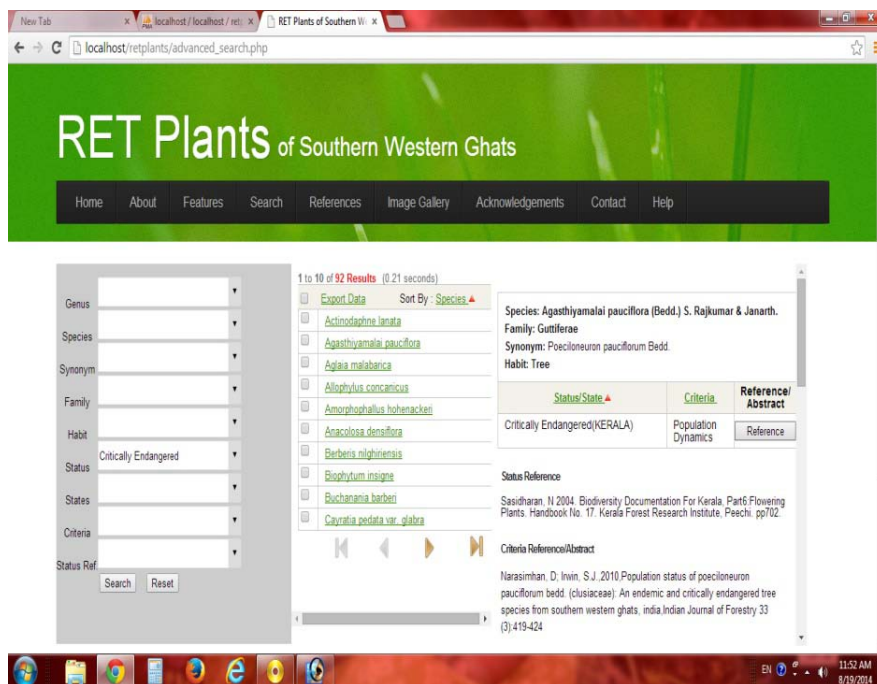
**Table - 5. IUCN Threat categories along with number of species**

Sl. No	Status	No. of species
1.	Extinct	5
2.	Extinct in the Wild	0
3.	Critically Endangered	112
4.	Endangered	315
5.	Vulnerable	311
6.	Near Threatened	48

**Fig.2. Screen shot of the web page showing simple search**



**Fig.3. Screen shot of the web page showing advanced search**



## 5. Conclusion

The database on Rare, Endangered and Threatened (RET) plants of Southern Western Ghats is developed for the first time of its kind with a prime intention to document RET plants so far recorded in the region and to collate publications available to these plants. Subsequently, studies would be facilitated on those species where no information is available and to avoid repetition of studies on same species. The information compiled from 26 literature sources are enabled to document 760 RET plants in the Southern Western Ghats. These species spreads over in 332 genera and in 109 families. Along with this, species particulars such as threat status, references in support of threat status, family, citations, synonym, habit, distribution are also given. The plants belonging to 13 threat status covering 6 status given by IUCN are used in the database. The publications of RETs are collected from different sources and the same are brought under six broad criteria of study such as Population structure, Population dynamics, Climatic and edaphic analysis, Conservation strategies, Restoration and Evaluation along with key words of respective criteria for easy retrieval of information. Among the three states in Southern Western Ghats, the species distributional account exclusive to each state viz., Kerala (63), Tamil Nadu (31) and Karnataka (16) are recorded. About 2,159 abstracts and 51 citations of 260 species among 760 RETs are generated and included in the database whereas, 500 species are identified with no publications.

The search interface enabled to retrieve information through different fields such as 'status', 'state', 'criteria', 'species' and 'habit' along with multiple queries of the species through 'genus', 'synonym', 'family' using advance search. In all the five fields of search, the information regarding viz., status/ state, criteria, reference/ abstract of publication of each species is possible.

The entire information generated has been uploaded in the website for quick access. The website launched is given as [www.retplants.org](http://www.retplants.org)

The Database can also be available in the KFRI Website [www.kfri.res.in](http://www.kfri.res.in)

A Compact Disc version, KFRI -CD No.19 of the uploaded database is made available in the Institute library for desktop retrieval.

## 6. References

Ahmedullah, M. and Nayar, M.P. 1987. Endemic Plants of the Indian Region. Botanical Survey of India, Calcutta.

Drury, W.H. 1974. Rare species. *Bio. Conservation* 6 : 162-169.

Gopalan, R. and Henry, A.N., 2000. Endemic plants of India. Camp for strict endemics of Agasthyamala hills, Southern Western Ghats. Bishen Singh Mahendra Pal Singh, Dehradun.

Henry, A.N., Vivekanandan, K. and Nair, N.C. 1979. Rare and threatened flowering plants of South India. *J. Bombay Nat. Hist.Soc.* 75 : 684-697.

Henry A.N., Kumari G.R. and Chithra V. 1987. Flora of Tamil Nadu, India Series 1 : Analysis, Volume 2., BSI, Coimbatore, p 258.

Henry A.N., Chithra V. and Balakrishnan N.P. 1989. Flora of Tamil Nadu, India Series 1 : Analysis , Volume 3., BSI, Coimbatore p171.

IUCN, 1994. The IUCN Red List of Threatened Species. IUCN, Gland.

IUCN, 2000. The IUCN Red List of Threatened Species. IUCN, Gland.

IUCN, 2012. IUCN Red List of Threatened Species (ver. 2012.2). Available at: <http://www.iucnredlist.org>. (Accessed: 17 October 2012).

Jose Kallarackal, Swarupanandan, K. Sharma, J.K. (eds.) 2003. Proceedings of the Workshop on Conservation and Research needs of the Rare, Endangered and Threatened (RET) tree species in Kerala Part of the Western Ghats. KFRI, Peechi, pp 10-12.

- Jose, P.A. 2001. A study on the population structure, dynamics and conservation of two rare and endemic trees of Western Ghats of Kerala. Ph.D. Thesis, University of Kerala, Thiruvananthapuram, p. 184.
- Joseph, J. 1977. Floristic studies in India with special reference to Southern Circle of Botanical Survey of India. *Bull.Bot. Surv. India*. 19: 109-111.
- Krishnan, P. N. and Seeni S. 1994, Rapid micropropagation of *Woodfordia fruticosa* (L.) Kurz. (Lythraceae) a rare medicinal plant, *Plant Cell Reports*. 14: 55-58.
- Mohanan, N. and Shaju, T. 2004, On the rediscovery of *Pavetta wightii* Hook.f. (Rubiaceae) a rare and little known endemic species of Western Ghats. *J. Econ.Taxon.Bot.*, 28(1):78-80.
- Molur, S. and Walker, S. (eds.) 1996, 1997. Report of the 2nd and 3rd workshop for Conservation Assessment & Management plan (CAMP II & III) of Medicinal Plants of Southern India. FRLHT, Bangalore and ZOO/CBSG-India, Coimbatore.
- Nayar, M.P. 1996. Hot Spots of Endemic Plants of India, Nepal and Bhutan. Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram.
- Nayar, M.P. and Sastry, A.R.K. 1987. Red Data Book on Indian Plants.Vol.1. Botanical Survey of India, Calcutta.
- Nayar, M.P. and Sastry, A.R.K. 1988. Red Data Book on Indian Plants.Vol.11. Botanical Survey of India, Calcutta.
- Nayar, M. P. and Sastry,A.R.K. 1990. Red Data Book on Indian Plants.Vol.111. Botanical Survey of India, Calcutta.
- Nayar, M.P.1997. Biodiversity challenges in Kerala and science of conservation biology. In: P. Pushpangadan and K.S.S. Nair (eds.) Biodiversity of Tropical Forests: the Kerala Scenario. STEC, Trivandrum, Kerala.



- Nayar, T.S., Rasiya Beegam, A., Mohanan, N., Rajkumar, G. 2006. Flowering plants of Kerala A Handbook. TBGRI, Palode, Thiruvananthapuram p1069.
- Pandurangan, A.G. 2003. Rescue and Restoration of endemic and RET medicinal plants of Agasthyamalai, Kulamavu and Wayanad MPCAs, Kerala, India. Final Project Report, Tropical Botanic Garden and Research Institute, Thiruvananthapuram.
- Rabinovitz, D. Cairnes, S. and Dillon, T. 1986. Seven forms of rarity and their frequency in the Flora of the British Isles. In : Soule, M.E. (eds.) The Science of Scarcity and Diversity, Sinauer associates, Sunderland, Massachusetts, 584 p.
- Rajesh, K.P., Augustine, J., Sasidharan, N. 1997. Rediscovery of *Taeniophyllum scaberulum* Hook.f., an endemic orchid from Periyar Tiger Reserve, Kerala, India.
- Rajkumar, G. 2011. Ecological Studies of Three Rare and Endemic Annonaceous species from Agasthyamala, Western Ghats. University of Kerala, Thiruvananthapuram.
- Ravikumar K. and Ved D. K, 2000. 100 Red-Listed Medicinal Plants of Conservation Concern in Southern India. FRLHT, Bangalore. pp 467.
- Santhosh kumar, E.S., Shaju, T. Roy, P.E and Rajkumar, G. 2013. A new Species of *Goniothalamus* (Blume) Hook. f. & Thomson (Annonaceae) from Kerala, India. *Taiwania*, 58(3): 171-175.
- Sasidharan, N. 1997. Studies on the flora of Shenduruny Wildlife Sanctuary with emphasis on endemic species. KFRI Research Report No. 128. Kerala Forest Research Institute, Peechi.
- Sasidharan, N. 2002. Floristic Studies in Parambikulam Wildlife Sanctuary. KFRI Research Report No. 246. Kerala Forest Research Institute, Peechi.

- Sasidharan, N. 2004. Biodiversity Documentation for Kerala Part 6: Flowering Plants. Kerala Forest Research Institute, Peechi, Thrissur, 702 p.
- Sasidharan, N. 2011. Flowering Plants of Kerala - Digital version 2.0. Kerala Forest Research Institute, Peechi, Thrissur.
- Sharma, B.D. Singh, N.P. Raghavan, R.S. and Deshpande, U. R. 1984. Flora of Karnataka -Analysis BSI, Coimbatore, p 395.
- Yasodharan, Y. and P.A. Jose 2011. A Multidisciplinary Database of RET Plants of Kerala. KFRI Extension Report No.56. Kerala Forest Research Institute Peechi, Thrissur.
- Yesodharan, K. and Sujana, K.A 2007. Status of Ethnomedicinal Plants in the Parambikulam Wildlife Sanctuary, Kerala, South India. *Ann. For.*, 15(2) : 322-334.