

## Documentation of rare, endanger and threatened medicinal plants species in Sadhuragiri Hills, Tamil Nadu, India

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### Abstract

The present study deal with survey and documentation of rare, endanger and threatened plants in Sadhuragiri hills, Southern Western Ghats, Tamil Nadu India. Survey, identification and documentation of plants in study area during 2015-2016. Collections of materials are preserving and documented to college herbarium with referred Standard flora and IUCN (RET) data books. In the present study (45) RET species and they belongs to the (29) families were (18) are rare, (11) were endangered, (10) were Vulnerable, (2) were critically endangered, (3) were threatened and (1) near threatened. RET status were gathered from IUCN, BSI annual reports and standard research articles. From the result plants were categorized into rare, endangered, endemic and threatened, species such as *Asparagus racemosus* Willd. *Decalepis hamiltonii* Wight. & Arn, *Tylophora indica* (Burn. f.) Merr. And *Gymnema sylvestre* (Retz.) R.Br. ex Schult. so on. Finally it has been suggested that the RET medicinal plants are need to be proper conservation and management plans before it lost forever.

**Keywords:** medicinal plants, *hydnocarpus macrocapra* (bedd.) warp, endangered, conservation, western ghats, Tamil Nadu

### Introduction

In India the work on Threatened plants was first published in 1980 by the Botanical Survey of India (BSI). (Jain and Sastry, 1980) [11]. Published a small booklet entitled "Threatened plants of India". Later on comprehensive work on rare and threatened plants of India was also published by BSI in the form of a book in three volumes entitled "RED DATA BOOK OF INDIAN PLANTS" (Nayar and Sastry, 1987, 1988, 1990) [25, 26, 27].

As medicinal plants use has become more popular worldwide, concern about plant conservation and sustainability has increased. According to the Medicinal Plant Specialist Group of the International Union for the Conservation of Nature and Natural Resources (IUCN), more than 20,000 plant species are used medicinally worldwide. Nearly half of these species are potentially threatened by either over-harvest or loss of habitat (IUCN 2005) [10].

In India, different classical medicinal systems such as Ayurveda, Siddha and Unani are being practiced since time immemorial in the country and in addition to these; innumerable local folk medicinal traditions exist. In total about 8000 plant species are in medicinal use. It constitutes around 45 per cent of 17,500 known flowering plant species of India (Ravikumar, Ved, 2000) [35]. These rich medicinal plants are mainly distributed in two hot spots diversity that is north eastern region and Western Ghats. The Western Ghats comprises of a hill range running about 1500 km long the western edge of Indian sub-continent. Although it covers a mere 5 per cent of the country's total land area in the country, it is believed to be more than 27 per cent of country's plant species remarkably high level of endemism ranging from 25 to 60 per cent of recorded species (Pascal, 1992) [31].

In view of the tremendously growing world population, increasing anthropogenic activities, rapidly eroding natural ecosystem, etc the natural habitat for a great number of herbs

and trees are dwindling and of per capita consumption has resulted in unsustainable exploitation of Earth's biological diversity, exacerbated by climate change, ocean acidification, and other anthropogenic environmental impacts (Rands *et al.*, 2010) [34].

The southern Western Ghats is by far the richest area in context to floristic composition and concentration of endemic taxa. Peninsular India has a Centre of flowering plant endemism, due to diversity of climate and vegetation (Ahmedullah and Nayar, 1987; Nayar 1996) [2, 24]. The Western Ghats of India is one of the 34 global biodiversity hotspots of the world (Myers *et al.*, 2000) [21] and over one-third of its angiosperms are endemic (Kaveriappa and Shetty, 2001) [14]. The genetic diversity of medicinal plants in the world is getting endangered at alarming rate because of ruinous harvesting practices and over-harvesting for production of medicines), with little or no regard to the future. Also, extensive destruction of the plant-rich habitat as a result of forest degradation, agricultural encroachment, urbanization etc. In other factors, thus challenging their existence (Gupta *et al.*, 1998) [9].

On scrutiny, large patches of natural habitat are found degraded for one region or the other. Since the environmental process in totality are linked to each other very intricately and man being the biggest destroyer or alternator of the Earth's unique ecosystem, it becomes necessary to review our approach towards generating inputs for resource management plans of all Biologically rich areas. Keeping these points in view, the present study was carried out to identify areas of biological rich areas of natural forest resources and also to prioritize Biodiversity Conservation Zones and to prepare resource management plans to restore and rehabilitate Rare, Endanger and Threatened (RET) species in biologically rich areas. (Sudhakar *et al* 2015) [43]. Medicinal plants are also under constant threat due to over exploitation from natural

habitats in the absence of cultivation. The high anthropogenic pressures and associated fragmentation of natural forests have resulted in loss of habitat and species.

## Materials and Methods

### Study area

Sadhuragiri hills are situated in Southern Western Ghats comes under Srivilliputhur Grizzled Squirrel Wildlife

Sanctuary Srivilliputhur taluk, Virthunagar district of Tamil Nadu. Sadhuragiri is located at 1200 meters (3,937.0 ft) mountain in the part of Western Ghats of South India. It lies between 9°. 42' - 9 °.44" West latitude and between 77 °.37 - 77°. - 41" East longitude and it has an elevation of 881 meters above sea level. Sadhuragiri is in an area with a Tropical evergreen forest, Semi evergreen forest and mixed deciduous forest climate. Fig: 1).



**Fig 1:** A view of study region

### Methods

The survey was carried out during the month of January 2015 to April 2016 on visited various seasons and observed distribution of plant species. On the basis of RET plants identification and collection from different area of Sadhuragiri hills as well as carefully documented. The plants are enumerated alphabetically with their botanical name with author citation, family name; habit/life form by referring to standard flora (Gamble and Fischer, 1915- 36; Matthew, 1983; Nair and Henry, 1983) [7, 17-18, 23] and threat status referred by CAMP, BSI and The threatened status of the plants was confirmed with IUCN Ret list and also the help of using available RET data books and standard publications such as (Nair NC 1986, Nair MP 1987, 1990 and Scott K, 1997) [22, 39]. The botanical information was made into a database consisting of binomial name, family, mode of dispersal, source of collection, morphology of useful part and conservation status. The voucher specimens were deposited in the Department of Botany, National College, Tamil Nadu, India.

### Results and Discussion

The results of the study have revealed that 45 plant species belonging to 29 families 40 genera (Tab. 1). Among them 20 were climbers, 10 were herb, 1 were Shrub and 14 were tree. In the present study the maximum number of rare, endangered and threatened medicinal plant species belongs to the family Asclepiadaceae they cover 6 species, followed by Acanthaceae and Combretaceae families are each 2 species are in RET list category. In remaining families one are two species each were listed. Among the various categories of RET plant divided in to list out, 18 were rare (RE), 11 were endangered (EN), 10 were Vulnerable (VU) 2 were critically endangered (CE), 3 were threatened (TE) and 1 near

threatened (NT) were observed in our study area of Sadhuragiri hills (Fig:-2 & 3).

Most of the plants which are known to have medicinal properties and categorized into RET status. This lack of effort to draw resources may result in their depletion from natural habitats. There is great need to create awareness among the indigenous communities about endangered medicinal plants, if over exploited to meet market demand (Choudhary *et al.*, 2008) [5].

Many rare species were also collected from the study area including *Crotalaria scabra* Gamble, *Murdannia lanuginosa* (Wall. ex Clarke) Brueck. (Nayar & Sastry 1990) [29], *Smilax wightii* A. DC., *Elaeocarpus recurvatus* Corner (Nayar & Sastry 1990) [29], *Litsea wightiana* (Nees) Hook.f. var. *tomentosa* (Meissner) Gamble and *Dalbergia congesta* Graham ex Wight (Sasidharan, 2006) [38].

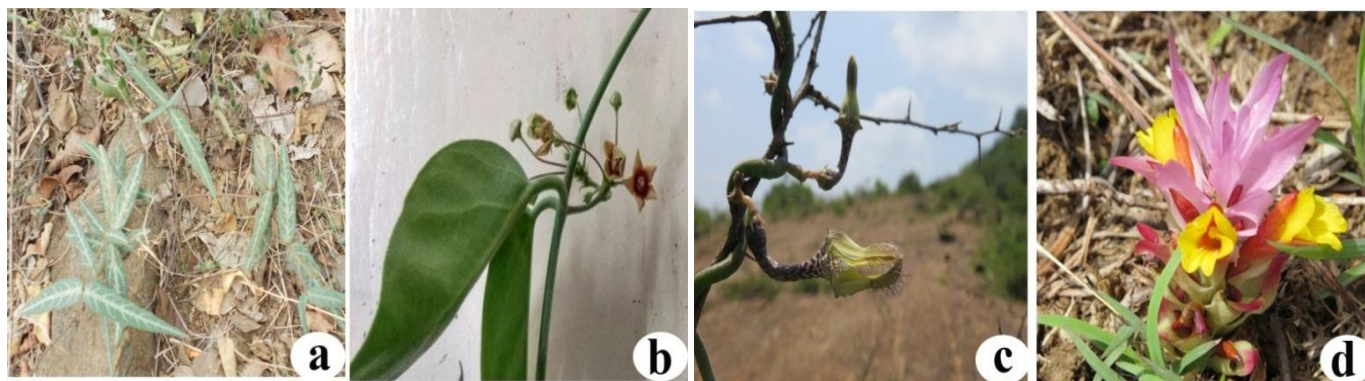
Gritto *et al.* (2012) [8, 19] reported that the RET plant species surveyed in Pachamalai hills had identified 15 plant species are RET categories such as, *Santalum album*, *Decalepis hamiltonii*, *Terminalia arjuna* and *Gloriosa superba* were mentioned Threatened (T), Near Threatened (NT) and Endangered (EN). (Pattanaik *et al.*, 2009) [32] also reported RET species like *Celastrus paniculatus*, *Cycas beddomei*, *Decalepis hamiltonii*, *Gloriosa superba* and *Santalum album* were declared as RET listed by IUCN in the Eastern Ghats of Orissa.

Sivakamasundari *et al.*, (2015) [42] mentioned 25 RET Medicinal Plants in Thadagamalai Range of Kanyakumari District, Tamil Nadu. Even today, tribes and some community practice herbal medicine to cure a variety of disease and disorders. They collect and preserve locally available wild species, unaware of the fact that some of the species are endemic or some in the RET category. They are not aware about the importance of such species, which need aware to conserve wild populations without lost.

Table 1: List of RET Medicinal plant species in Sadhuragiri hills

| S. No. | Binomial name  | Family           | Habitat/<br>Life form | Ecological<br>status | Flower/<br>Fruiting      | Source  |
|--------|--|------------------|-----------------------|----------------------|--------------------------|---|
| 1      | <i>Abrus fruticosus</i> Wight & Arn.                     | Fabaceae         | Climber               | RE                   | Aug.-Sep                 | Murugeswaran <i>et al.</i> , 2014 [20].   |
| 2      | <i>Acorus calamus</i> L.                                 | Araceae          | Herb                  | VU                   | July-Aug                 | Gritto <i>et al.</i> , 2012 [8, 19].  |
| 3      | <i>Alangium salvifolium</i> (L.f.) Wang.                 | Alangiaceae      | Shrub                 | RE                   | Feb -May                 | Murugeswaran <i>et al.</i> , 2014 [20].   |
| 4      | <i>Andrographis echinoids</i> Nees.                      | Acanthaceae      | Herb                  | RE                   | Oct-Dec                  | Jayanthi <i>et al.</i> (2011) [12].   |
| 5      | <i>Andrographis paniculata</i> (Burm. f.) Wall. ex Nees. | Acanthaceae      | Herb                  | RE                   | June - Sep               | Murugeswaran <i>et al.</i> , 2014 [20].   |
| 6      | <i>Aristolochia tagala</i> Retz.                         | Aristolochiaceae | Climber               | TE                   | Aug-Dec                  | Sivakamasundari <i>et al.</i> , 2015 [42].  |
| 7      | <i>Aristolochia indica</i> L.                            | Aristolochiaceae | Climber               | RE                   | Aug-Dec                  | Murugeswaran <i>et al.</i> , 2014 [20].<br>Sharma <i>et al.</i> , 2014 [15, 40].                                  |
| 8      | <i>Artocarpus hirsutus</i> Lam.                          | Moraceae         | TREE                  | VU                   | Dec - June               | Sivakamasundari <i>et al.</i> , 2015 [42].  |
| 9      | <i>Asparagus racemosus</i> Willd.                        | Liliaceae        | Climber               | TE                   | Oct- Nov                 | Sarvalingam <i>et al.</i> 2012 [37],<br>Uma <i>et al.</i> , 2015 [47].  |
| 10     | <i>Barleria buxifolia</i> L                              | Acanthaceae      | Herb                  | RE                   | Nov-Mar                  | Sindhuja <i>et al.</i> , 2012 [41].   |
| 11     | <i>Canarium strictum</i> Roxb.                           | Bursaceae        | Tree                  | VU                   | Feb - Apr                | Sivakamasundari <i>et al.</i> , 2015 [42].  |
| 12     | <i>Caralluma diffusa</i> (Wight.) N.E. Br.               | Asclepiadaceae   | Herb                  | NT                   | Through<br>Out the year. | Prabhu Kumar <i>et al.</i> , 2012 [33].   |
| 13     | <i>Cayratia pedata</i> (Lam), Juss ex Gagnep.            | Vitaceae         | Climber               | CR                   | Mar - Aug                | Gritto <i>et al.</i> , 2012 [8, 19].  |
| 14     | <i>Celastrus paniculatus</i> Willd.                      | Celastraceae     | Climber               | EN                   | Jun-Nov                  | Gritto <i>et al.</i> , 2012 [8, 19].  |
| 15     | <i>Ceropegia juncea</i> Roxb.                            | Asclepiadaceae   | Climber               | RE                   | Aug-Dec                  | Karuppusamy & Pullaiah 2009 [13],<br>Malpure <i>et al.</i> , 2006 [16],<br>Nikam <i>et al.</i> , 2009 [30].       |
| 16     | <i>Cissus rependa</i> Vahl. Hadjod                       | Vitaceae         | Climber               | RE                   | Jun-Nov                  | Sulekha Joshi <i>et al.</i> , 2014 [45].  |
| 17     | <i>Commelina wightii</i> Raiz.                           | Commelinaceae    | Herb                  | TE                   | Feb - Apr                | Prabhu Kumar <i>et al.</i> , 2012 [33].   |
| 18     | <i>Curcuma neilgherrensis</i> Wight                      | Zingiberaceae    | Herb                  | EN                   | Aug-Dec                  | Prabhu Kumar <i>et al.</i> , 2012 [33].   |
| 19     | <i>Cycas circinalis</i> L.                               | Cycadaceae       | Tree                  | CR                   |                          | Sivakamasundari <i>et al.</i> , 2015 [42],<br>Gritto <i>et al.</i> , 2012 [8, 19].                                |
| 20     | <i>Decalepis hamiltonii</i> Wight. & Arn.                | Asclepiadaceae   | Climber               | EN                   | Aug-May                  | Gritto <i>et al.</i> 2012 [8, 19].<br>Pattanaik <i>et al.</i> 2009 [32],<br>Anburaja <i>et al.</i> , 2012 [4].    |
| 21     | <i>Dioscorea oppositifolia</i> L.                        | Dioscoreaceae    | Climber               | RE                   | Jun-Aug                  | Deshmukh, 2010 [6].   |
| 22     | <i>Elaeocarpus recurvatus</i> Corner.                    | Elaeocarpaceae   | Tree                  | EN                   | Aug- Sep                 | Prabhu Kumar <i>et al.</i> , 2012 [33].   |
| 23     | <i>Gloriosa superba</i> L.                               | Liliaceae        | Climber               | EN                   | Jun-Aug                  | Amalraj <i>et al.</i> , 1991 [3],<br>Sukumaran <i>et al.</i> , 2007 [44],<br>Gritto <i>et al.</i> , 2012 [8, 19]. |
| 24     | <i>Gymnema sylvestre</i> (Retz.) R.Br. ex Schult.        | Asclepiadaceae   | Climber               | VU                   | Apr-May                  | Pattanaik <i>et al.</i> , 2009 [32].  |
| 25     | <i>Helicteres isora</i> L.                               | Sterculiaceae    | Tree                  | R E                  | April - Dec              | Sarvalingam <i>et al.</i> , 2012 [37].  |
| 26     | <i>Hemidesmus indicus</i> (L.) R. Br                     | Asclepiadaceae   | Climber               | RE                   | Nov-Feb                  | Amalraj <i>et al.</i> , 1991 [3],<br>Matthew, 1983 [17-18],<br>Sukumaran <i>et al.</i> , 2007 [44].               |
| 27     | <i>Hydnocarpus macrocapra</i> (Bedd.) Warp               | Flacourtiaceae   | Tree                  | EN                   | Aug- Sep                 | Sivakamasundari <i>et al.</i> , 2015 [42].  |
| 28     | <i>Ipomoea muelleri</i> Benth.                           | Convolvulaceae   | Climber               | RE                   | Jun-Aug                  | Sarvalingam <i>et al.</i> , 2016 [36].  |
| 29     | <i>Leuca lanceifolia</i> Desf.                           | Lamiaceae        | Herb                  | EN                   | Nov-Feb                  | Prabhu Kumar <i>et al.</i> , 2012 [33].   |
| 30     | <i>Limonia acidissima</i> L.                             | Rutaceae         | Tree                  | RE                   | Jun-Aug                  | Murugeswaran <i>et al.</i> , 2014 [20].   |
| 31     | <i>Madhuca longifolia</i> (Koen) Macler                  | Sapotaceae       | Tree                  | VU                   | Jun-Aug                  | Gritto <i>et al.</i> , 2012 [8, 19].  |
| 32     | <i>Nyctanthes arbortristis</i> L.                        | Nyctagenaceae    | Tree                  | VU                   | Aug.-Sep                 | Vinay Kumar <i>et al.</i> , 2015 [48].  |
| 33     | <i>Piper longum</i> L.                                   | Piperaceae       | Climber               | EN                   | Jun-Aug                  | Ahamedhullah <i>et al.</i> , 1986 [1].  |
| 34     | <i>Pterolobium hexapetalum</i> (Roth.) Sant&Wagh.        | Fabaceae         | Climber               | EN                   | Nov-Feb                  | Prabhu Kumar <i>et al.</i> , 2012 [33].   |
| 35     | <i>Rubia cordifolia</i> L.                               | Rubiaceae        | Herb                  | VU                   | Jun-Aug                  | Pattanaik <i>et al.</i> , 2009 [32].  |
| 36     | <i>Santalum album</i> L.                                 | Santalaceae      | Tree                  | EN                   | Dec - Jan                | Murugeswaran <i>et al.</i> , 2014 [20].   |
| 37     | <i>Smilax wightii</i> A. DC.                             | Smilacaceae      | Climber               | EN                   | Aug.-Sep                 | Prabhu Kumar <i>et al.</i> , 2012 [33],<br>Nayar <i>et al.</i> , 1990 [27].                                       |
| 38     | <i>Smilax zeylanica</i> L.                               | Smilacaceae      | Climber               | RE                   | Aug.-Sep                 | Ahamedhullah <i>et al.</i> , 1986 [1].  |
| 39     | <i>Syzygium cuminii</i> (L.) Skeels.                     | Myrtaceae        | Tree                  | VU                   | Jun-Aug                  | Komal <i>et al.</i> , 2014 [15].  |
| 40     | <i>Terminalia arjuna</i> (Roxb) ex. DC.W&A               | Combretaceae     | Tree                  | VU                   | Feb - Apr                | Gritto <i>et al.</i> , 2012 [8, 19].  |
| 41     | <i>Terminalia bellirica</i> Gaertn.                      | Combretaceae     | Tree                  | RE                   | Nov-Feb                  | Sulekha <i>et al.</i> , 2014 [45],<br>Komal Chandrakar <i>et al.</i> , 2014 [15].                                 |
| 42     | <i>Tylophora indica</i> (Burn. f.) Merr.                 | Asclepiadaceae   | Climber               | RE                   | Aug-Mar                  | Sarvalingam <i>et al.</i> , 2012 [37].  |
| 43     | <i>Withania somnifera</i> Dunal                          | Solanaceae       | Herb                  | RE                   | Aug-Mar                  | Gritto <i>et al.</i> , 2012 [8, 19].  |
| 44     | <i>Nothapodytes nimmoniana</i> (Graham.) Mabb.           | Icacinaceae      | Tree                  | VU                   | Aug.-Sep                 | Sivakamasundari <i>et al.</i> , 2015 [42].  |

Key: CR: Critically endangered; EN: Endangered; RE: Rare; VU: Vulnerable TE: threatened and NT: Near threatened.



**Fig 2:** RET species in study area.

- a. *Hemidesmus indicus* (L.) R. Br. b. *Tylophora indica* (Burn. f.) Merr.  
 c. *Ceropogia juncea* Roxb. d. *Curcuma neilgherrensis* Wight.



**Fig 3:** RET species in study area

- e. *Helicteres isora* L. f. *Elaeocarpus recurvatus* Corner.  
 g. *Santalum album* L. h. *Hydnocarpus macrocapra* (Bedd.) Warp

### Conclusion

The present study suggests that Rare, Endanger and Threatened (RET) species could give vital information about the niches and amplitudes of a regional scale. This report can help in identifying areas and habitats of rich concentration of these species so that critical habitat and habitat sites would get priority for conservation. By conducting the awareness program among the tribal's, we can promote the knowledge about importance of diversity and also can conserve the RET plants. We trained to make the herbal garden and proper cultivation of important RET plants like, *Hemidesmus indicus*, *Gymnema sylvestre*, *Asparagus racemosus*, *Gloriosa superba*, and *Decalepis hamiltonii* to give them livelihood.

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