



Floral diversity of Karianshola MPCA, Coimbatore district, Tamilnadu, with special emphasis on the conservation of ret and endemic plants of Anamalai hills

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ARTICLE INFO

Article history:

Received: 27 November 2013;

Received in revised form:

3 January 2014;

Accepted: 7 January 2014;

Keywords

Conservation,
Medicinal plants,
Karian Shola,
Anamalais,
Coimbatore District,
Western Ghats.

ABSTRACT

To catalogue the medicinal plant wealth of Karian Shola MPCA, Coimbatore District of Tamilnadu, Southern India and to categorize the RET status and their need for conservation along with the Ethnobotanical knowledge of the medicinal plants. Field trips were made to collect the medicinal plants from Karian Shola MPCA, Anamalais, Coimbatore District, Tamilnadu during January 1994 to December 1995. A total of 300 species of angiosperms, of which 6 are additions to the Flora of Tamilnadu, 50 endemic plants, 15 Red listed taxa, 20 highly traded medicinal plants and 27 ethno-medicinal Plants were documented from the study area. The study emphasized the need for *in situ* conservation along with the wild plants used by the Malasars and Kadars were also provided.

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Introduction

The Western Ghats biogeographic zone is rich in plant diversity and it holds a number of endemic and potential plant species. There is a great threat to the native plant species due to grazing, tourism development, road laying, dam construction and pressure from introduced plants leads to reduction in number becoming rare. Within Western Ghats, the Anamalais is becoming an economic hotspot region in Tamilnadu due to its rich biological resources, huge amount of hydrological energy and vast areas of man-made plantations. The Karian Shola, a semi evergreen forest of Anamalais, is unique in its ecological and floral diversity within Western Ghats and it habitat to most of the threatened and endemic plants and animals. Hence, an attempt has been made to document the flora of Karian Shola MPCA. The project was carried out by FRLHT, Bangalore under the Medicinal Plant Conservation Areas (MPCA) programme established in three southern states of India, viz. Kerala, Karnataka and Tamilnadu in the year 1993 in collaboration with the respective State forest departments. It has a network of 30 'in-situ' conservation areas established in Karnataka (12), Tamilnadu (11) and Kerala (7). Karian Shola MPCA is one among the eleven MPCAs established in the State of Tamilnadu averaging between 150-250 hectares in size. The MPCA's are designed as "No Harvest Zones" for the protection of flora and to carry out the future conservation activities.

The MPCAs located as far as possible, in buffer zones of the wildlife sanctuaries and national parks so that they could be given automatic legal protection. Inclusions of species richness, ecological niches and endemic centres, major vegetation types were the criteria used while selecting this centres. Medicinal plants are renewable natural resources and therefore, their conservation and sustainable utilization must necessarily involve a long term, integrated, scientifically-oriented holistic action

program. Apart from conservation, it is necessary to document local indigenous knowledge on the use of plants for health care.

The achievements of the project in its early years included the creation of its network of MPCAs, with floral and medicinal plants diversity within their boundaries. MPCA offers a wide range of activities like protection to threatened species, mother plants as a seed source for regeneration and safe habitat for other associated species. Systematic data on medicinal properties and local uses were also documented on 27 plants; a specific database of ethnomedicinal plants has been developed based on these data. The documentation of medicinal plants has also enabled us to prepare a list of threatened species which needs immediate attention for conservation. Using the IUCN red list categories, 15 species were classified as critically endangered, endangered and vulnerable.

Study area

The study area lies at 10⁰-25' North latitude and 16⁰-50' East longitude. Its elevation ranges from 680-740 meters. The moist evergreen forests have luxuriant growth of vegetation. The study area is hilly, with well drained soil and the velocity of wind is moderate. The rainfall here is about 200 mm which is much lower than the rainfall received in other evergreen forests of Anamalai Tiger Reserve (ATR). However the good forest cover is due to the more favourable conditions such as climate, soil and moisture.

Materials and Methods

Field trips were conducted during the study period from January 1994 to December 1995. The Karian Shola forest was surveyed both intensively and extensively; six trips were made to cover different seasons. Each specimen was carefully examined in fresh condition, checked with descriptions given by Gamble & Fischer's *Flora of the Presidency of Madras* (1915-1936). Identification of the plants was confirmed after critical studies with reference to authentic specimens deposited in the

Herbarium of Botanical Survey of India, Southern Regional Circle, Coimbatore (MH). All specimens are deposited in the herbarium of Foundation for Revitalization Local Health Traditions (FRLHT), Bangalore.

Floral Diversity

Floristic study was carried out in Karian Shola MPCA which resulted in the documentation of 300 species of angiosperms, of which 6 are additions to the Flora of Tamilnadu, 50 endemic plants, 15 Red listed taxa, 20 highly traded medicinal plants and 27 ethno-medicinal Plants.

Vegetation Types

According to Champion and Seth (1968), the forests of Karian Shola are tropical wet evergreen with moist deciduous at the fringes. The type of vegetation one can encounter are i) Tropical evergreen forest ii) Tropical moist deciduous forests iii) Plantations. Inside the study area there is a good proportion of Teak, Eucalyptus and Mahogany plantations are found. Bamboo breaks are found along the fringes. The Karian Shola forest is bounded on the north by teak plantation and bamboo breaks, south by Erumppari, east by the road (Parambikulam - Sethumadai Road) and west by Kerala boundary.

Evergreen Forest

The most important trees documented from Karian shola are: *Aglaia elaeagnoides* (A. Juss.) Benth., *Artocarpus gomezianus* Wall. ex Trecul ssp. *zeylanicus* Jarrett, *Baccaurea courtallensis* (Wight) Muell.-Arg., *Bischofia javanica* Blume, *Cinnamomum malabratrum* (Burm.f.) Blume, *Diospyros bourdillonii* Brandis, *Diospyros buxifolia* (Blume) Hiern, *Drypetes longifolia* (Blume) Pax & Hoffm., *Drypetes wightii* (Hook.f.) Pax & Hoffm., *Ficus drupacea* Thunb. var. *pubescens* (Roth) Corner, *Hopea parviflora* Bedd., *Mangifera indica* L., *Mesua ferrea* L., *Sageraea laurifolia* (Graham) Blatt., *Vateria indica* L. Climbers like *Ancistrocladus heyneanus* Wall. ex Graham, *Cryptolepis buchananii* Roem. & Schultes, *Cyclea peltata* (Lam.) Hook. f. & Thoms., *Elaeagnus conferta* Roxb., *Mussaenda frondosa* L are also abundant in evergreen forest. A few common herbs are *Arisaema barnesii* Fischer, *Costus speciosus* (Koen.) J. E. Smith, *Curculigo orchioides* Gaertn, *Curcuma zedoaria* (Christm.) Rosc.

Moist Deciduous Forests

The most dominant trees of the study area include *Alstonia scholaris* (L.) R.Br., *Cipadessa baccifera* (Roth) Miq., *Dalbergia latifolia* Roxb., *Diospyros montana* Roxb., *Schleichera oleosa* (Lour.) Oken, *Spondias pinnata* (L.f.) Kurz, *Stereospermum colais* (Buch.-Ham. ex Dillw.) Mabblerley, *Syzygium cumini* (L.) Skeels, *Terminalia paniculata* Roth, *Vitex altissima* L.f., *Wrightia tinctoria* (Roxb.) R.Br., *Albizia odoratissima* (L. f.) Benth., *Protasparagus racemosus* (Willd) Oberm., *Grewia tiliifolia* Vahl., *Helicteres isora* L., *Lagerstroemia microcarpa* Wight, *Tectona grandis* L.f.

Additions to the flora of Tamil Nadu

Based on the earlier publications pertaining to the state of Tamilnadu Gamble & Fischer's *Flora of the Presidency of Madras* (1915-1936), Nair & Henry (1983), Henry et al., (1987) and Henry et al (1989) *Flora of Tamilnadu*, India Series I: Analysis Vol: (1-3), Matthew, K.M. (1999) *Flora of Palani Hills* Vol: (1-3), it was found that the species like *Indigofera constricta* (Thwaites) Trimen (Fabaceae), *Sida beddomei* K.C.Jacob (Malvaceae), *Phalaenopsis mysorensis* Sald. (Orchidaceae), *Curcuma vamana* Sabu & Mangaly (Zingiberaceae), *Arisaema muricaudatum* Sivadasan (Araceae), *Orophea zeylanica* Hook. f. Thoms.(Annonaceae) forms a new record : Out of this, *Curcuma vamana* Sabu & Mangaly were already reported by one of the author (Ramachandran,1998).

Endemic plants recorded in Karian Shola MPCA

An attempt was made to understand the occurrence of endemic plants which are present in the study area and found that the plants are listed under three categories based on the existing literature. (Vajravelu & Daniel (1983), Ahmedullah & Nayar (1987), Henry et al (1987), Nayar,(1996), Sasidharan (2004)).

1. Southern Western Ghats

Orophea uniflora Hook. f. & Thoms., *Hopea parviflora* Bedd., *Sida beddomei* Jacob, *Impatiens floribunda* Wight, *Clausena austroindica* Stone & Nair., *Dysoxylum malabaricum* Bedd. ex Hiern, *Solenocarpus indicus* Wight & Arn., *Ophiorrhiza barberi* Gamble, *Pavetta wightii* Hook.f., *Diospyros bourdillonii* Brandis, *Jasminum azoricum* L., *Torenia hirsuta* Willd., *Justicia santapaui* Bennet, *Justicia wynaadensis* (Nees) Heyne ex T.And., *Gomphostemma heyneanum* Benth. var. *rottleri* Prain, *Piper galeatum* Cas., *Piper trichostachyon* (Miq.) C.DC., *Beilschmiedia wightii* (Nees) Benth. ex Hook. f., *Croton malabaricus* Bedd., *Drypetes wightii* (Hook.f.) Pax & Hoffm., *Curcuma vamana* Sabu & Mangaly, *Disperis neilgherrensis* Wight,

Habenaria multicaudata Sedgw., *Oberonia anamalayana* Joseph, *Arisaema barnesii* Fischer, and *Arisaema muricaudatum* Sivadasan.

2. Western Ghats

Orophea thomsonii Bedd., *Grewia barberi* Drumm. ex Dunn, *Lagerstroemia microcarpa* Wight, *Torenia bicolor* Dalz., *Knema attenuata* (Hook. f. & Thoms.) Warb., *Neolitsea scrobiculata* (Meisner) Gamble, *Dimorphocalyx lawianus* (Muell.-Arg.) Hook.f., *Aneilema ovalifolia* (Wight) Hook. f. ex Clarke, *Sageraea laurifolia* (Graham) Blatt. and *Kingidium mysorensis* (Sald.)Sathish.

3. Peninsular India

Tetrastigma sulcatum (Lawson) Gamble, *Terminalia paniculata* Roth, *Ixora cuneifolia* Roxb. ex DC., *Mussaenda frondosa* L., *Chionanthus mala-elengi* (Dennst.) P.S. Green, *Ceropegia hirsuta* Wight & Arn., *Didymocarpus tomentosa* Wight, *Radermachera xylocarpa* (Roxb.) K.Schum., *Piper hymenophyllum* Miq., *Mallotus philippensis* (Lam.) Muell.-Arg. *Curcuma pseudomontana* Graham, *Globba ophioglossa* Wight, and *Cyanotis papilionacea* (L.) Schult. f.

Ret plants of Karian Shola

The literature pertaining to the threatened plants of South India (Henry et al., 1978, Ahmedullah & Nayar, 1987, Henry et al., 1987, Nayar, 1997, IUCN, 2000).

Rare

Aglaia lawii (Wight) Saldanha, *Commelina indehiscens* Barnes, *Solenocarpus indicus* Wight & Arn. (Nayar, 1997), *Aneilema ovalifolia* (Wight) Hook (Nayar & Sastry, 1987), *Indigofera constricta* (Thwaites) Trimen (Henry et al., 1978, Nayar, 1997), *Geophila repens* (L.) Johnston (Henry et al., 1987), *Impatiens floribunda* Wight and *Beilschmiedia wightii* (Nees) Benth. ex Hook. f. Rare & Threatened (Ahmedullah & Nayar, 1987).

Endangered

Ophiorrhiza barberi Gamble (Nayar, 1997) and *Orophea thomsonii* Bedd. (IUCN, 2000).

Threatened

Arisaema barnesii Fischer (Nayar, 1997) and *Sageraea laurifolia* (Graham) Blatt.- Lower risk: near threatened (IUCN, 2000)

Vulnerable: (IUCN, 2000)

Drypetes wightii (Hook.f.) Pax & Hoffm., *Orophea uniflora* Hook. f. & Thoms. and *Syzygium densiflorum* Wall ex Wight & Arn.

Ved & Goraya (2007) have stated that wild populations of many a medicinal plant species, forming the major resource base for the herbal industry, are reported to be facing a serious threat of extinction due to indiscriminate harvesting. In this present investigation, it was found that more than 20 plants are recorded from the study area.

Highly traded medicinal plants

Alstonia scholaris (L.) R.Br. (Apocynaceae), *Anogeissus latifolia* (Roxb. ex DC.) Wall ex Guill. & Perr. (Combretaceae), *Protasparagus racemosus* (Willd) Oberm. (Asparagaceae), *Cassia fistula* L. (Caesalpiniaceae), *Celastrus paniculatus* Willd. (Celastraceae), *Cyclea peltata* (Lam.) Hook. f. & Thoms. (Menispermaceae), *Decalepis hamiltonii* Wight & Arn. (Periplocaceae), *Desmodium gangeticum* (L.) DC. (Fabaceae), *Gmelina arborea* Roxb. (Verbenaceae), *Helicteres isora* L. (Sterculiaceae), *Holarrhena pubescens* (Buch. – Ham.) Wall. ex G. Don (Apocynaceae), *Mimusops elengi* L. (Sapotaceae), *Naregamia alata* Wight & Arn. (Meliaceae), *Phyllanthus emblica* L. (Euphorbiaceae), *Rauvolfia serpentina* (L.) Benth. ex Kurz (Apocynaceae), *Rubia cordifolia* L. (Rubiaceae), *Santalum album* L. (Santalaceae), *Strobilanthes ciliatus* Nees (Acanthaceae), *Vateria indica* L. (Dipterocarpaceae), *Wrightia tinctoria* (Roxb.) R.Br. (Apocynaceae).

Ethnomedicinal plants

Abutilon indicum (L.) Sweet (Malvaceae), *Achyranthes aspera* L. (Amaranthaceae), *Ageratum conyzoides* L. (Asteraceae), *Aristolochia tagala* Cham. (Aristolochiaceae), *Protasparagus racemosus* (Willd) Oberm. (Asparagaceae), *Bauhinia racemosa* Lam. (Caesalpiniaceae), *Blepharis repens* (Vahl) Roth. (Acanthaceae), *Caralluma umbellata* Haw. (Asclepiadaceae),

Carica papaya L. (Caricaceae), *Centella asiatica* (L.) Urban (Apiaceae), *Curculigo orchioides* Gaertn (Hypoxidaceae), *Cyclea peltata* (Lam.) Hook. f. & Thoms. (Menispermaceae), *Cynanchum callialatum* Ham. ex Wight. (Asclepiadaceae), *Drymaria cordata* (L.) Willd. ex Roem. & Schultes (Caryophyllaceae), *Embelia ribes* Burmf. (Myrsinaceae), *Hibiscus*

hispidissimus Griff. (Malvaceae), *Jatropha curcas* L. (Euphorbiaceae), *Kalanchoe pinnata* (Lam.) Pers. (Crassulaceae), *Lablab purpureus* (L.) Sweet (Fabaceae), *Mangifera indica* L. (Anacardiaceae), *Mimosa pudica* L. (Mimosaceae), *Phyllanthus urinaria* L. (Euphorbiaceae), *Rauvolfia serpentina* (L.) Benth. ex Kurz (Apocynaceae), *Rubia cordifolia* L. (Rubiaceae), *Scilla hyacinthina* (Roth) Meabr. (Hyacinthaceae), *Senna tora* (L.) Roxb. (Caesalpiniaceae), *Terminalia chebula* Retz. (Combretaceae).

Abutilon indicum and *Cynanchum callialatum* used for dermatopathy; *Phyllanthus urinaria* for icterus; *Achyranthes aspera*, *Drymaria cordata* and *Jatropha curcas* used for nasopharyngitis and cephalalgia; *Aristolochia tagala*, *Cyclea peltata*, *Drymaria cordata* and *Rubia cordifolia* for snake-bite; *Jatropha curcas* for odontalgia; *Bauhinia racemosa* for dyspepsia; *Caralluma umbellata* for anthelmintic use; *Carica papaya* used as galactagogue; *Mimosa pudica* and *Terminalia chebula* for nasopharyngitis; *Lablab purpureus* for curing swellings; *Terminalia chebula* to cure acute dysentery; *Aristolochia tagala* for rheumatoid arthritis; *Mangifera indica* used to cure cracks at foot; *Rauvolfia serpentina* for acute stomachalgia; *Scilla hyacinthina* for dressing wounds on heels; *Senna tora* for cure ring-worms and itches; *Kalanchoe pinnata* for dressing boils, wounds and cuts.

Conclusion

The present finding reveals that Karian Shola MPCA is having more genetic diversity; hence it is advocated that it has to

be exploited further by advances in biotechnology. The wild useful, under and exploited diversity of medicinal plants holds greater promise for contributing to the future welfare of humankind. This knowledge generated by this finding will form a baseline data.

The Joint Tamilnadu Forest Department – FRLHT, MPCA programme was initiated with emphasising medicinal plants for *in-situ* conservation. This type of research action will help at regional level to ensure the sustainable utilization and conservation of medicinal plants. *In situ* conservation under the project was, therefore, not to be restricted to medicinal plants, but other plant species and the fauna of the area were also to be protected to conserve medicinal plants within their ecosystems. This type of studies will provide benchmark data on the diversity of plants which are restricted to Karian Shola and in turn it will pave a way for *in situ* and *ex situ* conservation of plants. Along with the taxonomic work, observations were also made to list out the wild medicinal plants used by the indigenous communities like Malasars and Kadars for their health care from the wild and the same is provided.

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