Indian Journal of Traditional Knowledge
Vol 18 (3), July 2019, pp 541-546

Indigenous knowledge of coastline sacred groves in Central Kerala, India

Geethu Krishna MG & Sanilkumar MG*,+

Research Department of Botany, Sree Narayana Mangalam (SNM) College, Maliankara, Kerala 683 516, India
E-mail: +sanilmgs@yahoo.com

Received 29 November 2018; revised 29 April 2019

Sacred groves are a patch of forest protected by religious belief in South India, especially in Kerala. It preserves a vast array of plants including critically endangered, endangered and vulnerable medicinal plants and a way to conserve biodiversity. The present study was aimed to document plant diversity and related ethno medicinal significance along the coastline sacred groves of central Kerala. Field visits were conducted for sample collection and semi structured open-ended questionnaire tools have been used to conduct interviews with local peoples herbal healers and herbal dealers. A total of 121 plant species belonging 108 genera under 60 families were recorded from the sacred groves under this study. Indigenous people commonly use around 100 species as herbal medicines and for other uses. Among this, the traditional medicinal usages of critically endangered, endangered, vulnerable plants are described in this paper. The study envisage that indigenous people still relay various plants as herbal remedies to treat various diseases, as source of income, as fuel and during rituals in temple etc.

Keywords: Coastline sacred groves, Endangered plants, Indigenous knowledge, Kerala

IPC Code: Int. Cl.[19]: A01G 13/00, A61K 36/00

Protection of environment and life supporting system are interwoven with the conservation of biological diversity. Sacred groves represent embracing concept and practice of ancient Indian way of *in situ* conservation of genetic diversity. The practice of assigning a patch of forest as the abode of Gods or Goddesses is not a new. The societies of Greece, Rome, Asia and Africa had long preserved sections of the natural environment as sacred groves to Gods and Goddesses[1-3].

Sacred groves are small patches of native vegetation types traditionally protected and managed by the local communities. A variety of taboos and prohibitions serve to conserve biodiversity within 'sacred groves'. Many of them are linked to temples premises. These sacred groves (vernacular name: 'kavus') contain the rare and endangered species of medicinal plants. They are thus '*sanctum sanctorum'* having rare, endangered and endemic plant species, many of which have disappeared from the region outside the groves[4].

Traditional knowledge is an important wealth as far as a nation is concerned. The necessity to document such knowledge and do scientific validation has become the need of the hour. Once such knowledge systems are gone to the oblivion it would be an irrecoverable loss to the society[5]. The present study was aimed to document sacred grove plants in coastline area of Central Kerala, Southwest India and their ethnomedicinal documentation to preserve the valuable traditional knowledge, which is transmitted orally.

Materials and methods

Study area

A total of 10 sacred groves were studied from the coastline area of Central Kerala starting from the South 10°22'43.02" N and 76°06'30.08" E to North 10°22'43" N and 76°06'30" E. The selected study area includes major area (1.61 hectares) and certain small sacred groves protected by local communities. The major and minor sacred groves are associated with temples.

Data collection

The data collection includes plant collection, herbarium preparation and ethnobotanical survey. Plant collection was done by direct visit to sacred groves during January–June (2018) and the specimens were properly tagged and noted important characters in field book. The survey was performed using semi structured open ended questionnaires according to Edwards[6] via a face to face interview. Informants include local people, traditional healers, and herbal

*Corresponding author

dealers. The questionnaire consisted of two parts. Herbarium sheets were submitted to SNMH (New York Botanical Garden accredited international herbarium, at SNM College, Maliankara). Photographs of plants and interviews were also taken.

Socio-demographic characteristics: This session of interview was intended at collecting information about the respondents including their name, age, gender, educational status, occupation, etc.

Ethno pharmacological characteristics: In this second phase of the interview ethnomedicinal information was collected through general conversation and include questions about sacred grove myth and believes, medicinal uses of plants in sacred grove, part of plant used, mode of preparation, mode of application and other uses of the plant. All the information received from the respondents was recorded. Personal visits were made to homes, herbalists, indigenous health practitioners and invited them to show the live specimen at sacred grove and voucher specimen or photographs were shown for better understanding instead. During field visits, the important data were photographed and specimens were collected for cross verification. The specimens were identified using The Flora of Presidency of Madras[7], Flora of Alappuzha District, Kerala, India[8], and computerized taxonomic identification of Flowering Plants of Kerala (ver. 2)[9] also cross identified by an expert taxonomist and conservation status were checked using IUCN (2017- 3)[10].

Results

A total of 121 plant species belonging 108 genera under 60 families were recorded from sacred groves (Table 1). Indigenous people know and commonly use many species as herbal medicines and for other purposes, of which six species with conservation status are described here. Among these, *Vateria indica* L., *Vatica chinensis* L., are critically endangered. *Hopea ponga* (Dennst) Mann., *Syzygium caryophyllatum* (L) Alston in Trimen., are endangered. *Memecylon grande* Rotz., *Saraca asoca* (Roxb.) de Wilde., *Swietenia macrophylla* King in Hook., *Ixora malabarica* (Dennst.) Mabberley are vulnerable.

A total of 102 local people were interviewed in the present survey (68 female and 34 male). People with different age group were performed in the survey and age group above 30 having great knowledge and given valid data. The ethno medicinal studies showed that indigenous people still relay various plants, as herbal remedies to curing various ailments, source of income, fuel source, rituals in temple, source of edible and medicinal oils etc.

***Vateria indica* L.,**
Vernacular name: Payanam, payam
Synonym: *Vateria malabarica* Blume.
Family: Dipterocarpaceae.
Conservation status: *Critically Endangered*

Uses: Latex from the stem is used for fumigation purpose, as a mosquito repellent. Oil prepared with its resins is applied to cure body pain. Its bark along with other medicine used to treat piles. Used as fuel wood and manufacturing of magic stick. Decoction prepared with this plant is given to rheumatic patients.

***Vatica chinensis* L.,**
Vernacular name: Vellapayin.
Synonyms: *Vatica roxburghiana* (Wight & Arn.) Blume.; *Vateria roxburghiana* Wight & Arn.,
Family: Dipterocarpaceae.
Conservation status: *Critically Endangered*

Uses: Oil prepared from its resin is applied to cure body pain. Latex or resin from the stem is used for varnish preparation. The latex is also used as natural glue.

***Hopea ponga* (Dennst) Mabberly.,**
Vernacular name: Ponga.
Synonyms: *Artocarpus ponga* Dennst.; *Hopea wightiana* Wall ex Wight & Arn.
Family: Dipterocarpaceae.
Conservation status: *Endangered*

Uses: Boil few seeds in cow milk and mix with ghee and taken orally to cure scabies and skin infections. Psoriasis is effectively controlled by applying the oil prepared with its seeds, leaves of *Wrightia tinctoria* (Roxb.) R. Br., neem leaves, turmeric and coco's milk, also applied in infected skin until the infection is healed. A decoction prepared with its leaves is given to stop over bleeding during menstrual period.

***Syzygium caryophyllatum* (L) Alston in Trimen.,**
Vernacular names: Nara
Synonyms: *Myrtus caryophyllata* L.; *Eugenia caryophyllaea* Wight.
Family: Myrtaceae.
Conservation status: *Endangered*

Uses: Oil prepared with its bark is applied on infected skin until the infection is healed. Fruits also used to make oil and applied topically to treat skin infection. Ripen fruits are edible.

Table 1 — List of plants collected from the study area (*Contd*.)

Sl No.	Scientific Name	Family
1	*Uvaria narum* Wall.	Annonaceae
2	*Anamirta cocculus* (L) Wigjht &Arn.,	
3	*Cyclea peltata* (Poir.) Hook. f. & Thoms.	
4	*Tiliacora acuminata* (Poir) Miers ex Hook f. & Thoms.	Menispermaceae
5	*Tinospora cordifolia* (Willd) Miers	
6	*Tinospora sinensis* (Lour) Merr	
7	*Capparis moonii* Wight.,	Capparidaceae
8	*Hydnocarpus pentandra* (Buch. Ham) Oken	Bixaceae
9	*Xanthophyllum flavescens* Roxb.	Polygalaceae
10	*Calophyllum calaba* L.,	
11	*Calophyllum inophyllum* L.,	Clusiaceae
12	*Garcinia gummi-gutta* (L.) Robson	
13	*Hopea ponga* (Dennst)Mann.,	
14	*Vateria indica* L.,	Dipterocarpaceae
15	*Vatica chinensis* L.,	
16	*Hibiscus hispidissimus* Griff.	Malvaceae
17	*Sterculia guttata* Roxb. ex DC.,	Sterculiaceae
18	*Grewia hirsuta* Vahl.,	Tiliaceae
19	*Grewia microcos* L.,	
20	*Aegle marmelose* (L) Correa.	Rutaceae
21	*Glycosmis pentaphylla* (Retz) DC.,	
22	*Quassia indica* (Gaertn) Nooteb.	Simaroubaceae
23	*Commiphora caudata* (Wight & Arn.) engl.,	Burseraceae
24	*Ailanthus triphysa* (Dennst) Alsone.	
25	*Aphanamixis polystachya* (Wall.) Parker.	Meliaceae
26	*Azadirachta indica* Juss.,	
27	*Swietenia macrophylla* King in Hook.	
28	*Cansjera rheedei* Gmel.,	Opiliaceae
29	*Sarcostigma kleinii* Wight & Arn.,	Icacinaceae
30	*Ziziphus rugosa* Lam.,	Rhamnaceae
31	*Cissus trilobata* Lam.,	
32	*Leea indica* (Burm. f.) Merr.,	Vitaceae
33	*Tetrastigma leucostaphylum* (Dennst) Alston ex Mabberley.	
34	*Holigarna arnottiana* Hook. f.,	Anacardiaceae
35	*Lannea coromandelica* (Houtt.) Merr.,	
36	*Connarus monocarpus* L.,	Connaraceae
37	*Rourea minor* (Gaertn.) Merr.,	
38	*Abrus precatorius* L.,	
39	*Clitoria ternatea* L.,	
40	*Flemingia strobilifera* (L) R. Br. ex Ait. f.,	Fabaceae
41	*Mucuna gigantea* (Willd) DC.,	
42	*Mucuna pruriens* (L.) DC.,	
43	*Pongamia pinneta* (L) Pierre.,	
44	*Cassia fistula* L.,	
45	*Saraca asoca* (Roxb.) de Wilde.,	Caesalpiniaceae
46	*Tamarindus indica* L.	
47	*Adenanthera pavonina* L.,	Mimosaceae
48	*Carallia brachiata* (Lour.) Marr.,	Rhizophoraceae
49	*Calycopteris floribunda* Lam.,	Combretaceae
50	*Terminalia ballirica* (Gaertn) Roxb.,	
51	*Syzygium caryophyllatum* (L) Alston. in Trimen.,	Myrtaceae
52	*Syzygium zeylanicum* (L) DC.,	

(*Contd*.)

Table 1 — List of plants collected from the study area

Sl No.	Scientific Name	Family
53	*Couroupita guianensis* Aubl.,	Lecythidaceae
54	*Memecylon grande* Rotz.,	Melastomataceae
55	*Memecylon randerianum* S.M. Almeida & M.R. Almeida.	
56	*Canthium angustifolium* Roxb.,	Rubiaceae
57	*Chasalia curviflora* Sensu Hook. f.,	
58	*Ixora coccinea* L.,	
59	*Mussaenda belilla* Buch.-Ham.,	
60	*Elephantopus scaber* L.,	Compositae
61	*Emilia sonchifolia* (L) DC.,	
62	*Vernonia cinerea* (L) Less.,	
63	*Mimusops elengi* L.,	Sapotaceae
64	*Diospyros peregrine* (Gaertn) Gurke.	Ebenaceae
65	*Jasminum angustifolium* (L) Willd.,	Oleaceae
66	*Jasminum flexile* Vahl.,	
67	*Alstonea scholaris* (L) R.,	Apocynaceae
68	*Anodendron paniculatum* (Roxb) A. DC.,	
69	*Ichnocarpus frutescens* (L) R. Br. in Ait f.,	
70	*Plumeria rubra* L.,	
71	*Tabernaemontana alternifolia* L.,	
72	*Tabernaemontana divaricata* (L) R. Br.,	
73	*Wrightia arborea* (Dennst.) Mabb.,	
74	*Wrightia tinctoria* (Roxb.) R. Br., Mem.,	
75	*Calotropis gigantea* (L) R. Br.,	Asclepiadaceae
76	*Hemidesmus indicus* (L) R. Br.,	
77	*Wattakaka volubilis* (L. f.) Stapf.,	
78	*Strychnos minor* Dennst.,	Loganiaceae
79	*Strychnos nux- vomica* L.,	
80	*Cordia obliqa* willd.	Boraginaceae
81	*Eryciba paniculata* Roxb.,	Convolvulaceae
82	*Merremia tridentata* (L.) Hall. f,	
83	*Solanum torvum* Sw.,	Solanaceae
84	*Justicia adathoda* L.,	Acanthaceae
85	*Pseuderanthemum malabaricum* (Clarke) Gamble.	
86	*Clerodenrum viscosum* Vent.,	Verbenaceae
87	*Tectona grandis* L.f.,	
88	*Achyranlhes aspera* L.,	Amaranthaceae
89	*Cyathula prostrata* (L.) Bl.,	
90	*Aristolochia indica* L.,	Aristolochiaceae
91	*Cinnamomum verum* Presl.,	Lauraceae
92	*Aporosa lindleyana* (Wight) Bail.,	Euphorbiaceae
93	*Bridelia stipularis* (L) Blume.	
94	*Glochidion zeylanicum* (Gaertn) A. Juss.	
95	*Mallotus philippensis* (Lam) Muell. Arg.,	
96	*Microstachys chamaelea* (L) Muell. Ary.,	
97	*Phyllanthus amarus* Schum. & Thonn.,	
98	*Phyllanthus reticulatus* Poir in Lamk.,	
99	*Tragia involucrata* L.,	
100	*Artocarpus heterophyllus* Lam.,	Moraceae
101	*Artocarpus hirsutus* Lam.,	
102	*Ficus benghalensis* L.,	
103	*Ficus hispida* L.,	
104	*Ficus microcarpa* L.f.,	
105	*Ficus religiosa* L.,	

(*Contd*.)

Table 1 — List of plants collected from the study area

Sl No.	Scientific Name	Family
106	*Gnetum edule* (Wild) Blume.	Gnetaceae
107	*Bulbophyllum sterile* (Lam.) Suresh.	Orchidaceae
108	*Costus speciosus* (Koenig) Smith, Trans. Linn.,	Zingiberaceae
109	*Curculigo orchioides* Gaertn.,	Hypoxidaceae
110	*Dioscorea alata* L.,	Dioscoreaceae
111	*Dioscorea bulbifera* L.,	
112	*Asparagus racemosus* Willd.	
113	*Gloriosa superba* L.,	Liliaceae
114	*Smilax zeylanica* L., (Smilacaceae)	
115	*Caryota arens* L.,	Arecaceae
116	*Pandanus fascicularis* Lam.,	Pandanaceae
117	*Pothos scandens* L.,	Araceae
118	*Cynodon dactylon* (L.) Pres.,	Cyperaceae
119	*Cyperus bifax* Clarke.	
120	*Bambusa bambos* (L.) Voss.,	Poaceae
121	*Bambusa striata* Lodd. ex Lindl.,	

***Memecylon grande* Rotz.,**
Vernacular name: Kayampoo
Family: Melastomataceae.
Conservation status: *Vulnerable*

Uses: Oil prepared with leaf paste or infusion of the whole plant, after oil preparation collyrium (Anjanakallu) dipped in it, this oil is applied on eyes to prevent infections and keep eye fresh. Leaf paste is effective to treat unhealed wound and also applied on fresh cuts or wounds. Boil the leaves in water and after cooling used as an eye wash also it prevent eye infections.

***Saraca asoca* (Roxb.) de Wilde.**
Vernacular name: Asoca-chethi, Asokam.
Family: Ceasalpiniaceae
Synonyms: *Jonesia asoca* Roxb.; *Saraca indica* Sensu Bedd.

Conservation status: *Vulnerable*

Uses: Oil prepared using its flower is a good fairness oil and control skin infection. Juice made of its flowers is good to improve blood count. Flowers also used for worshipping god. Decoction made of its bark is used to control menstrual disorders, also as medicine to control over bleeding during menstrual period. Decoction of root is taken to reduce menstrual pain.

***Swietenia macrophylla* king in Hook.,**
Vernacular name: Mahogani
Synonyms: *Swietenia krukovii* Gleason.
Family: Meliaceae
Conservation status: *Vulnerable*

Uses: Take a bath with hot infusion its bark along with ripen petiole of *Cocos nucifera* is effective against body swellings and body pain. The wood is used for construction purposes.

***Ixora malabarica* (Dennst.) Mabberley.**
Vernacular name: keezkola- chethi
Synonyms: *Chiococca malabarica* Dennst.; *Ixora lanceolaria* Colebr in Roxb.
Family: Rubiaceae
Conservation status: *Vulnerable and endemic*

Uses: Oil prepared with its flower bud, leaves of *Tamarindus indicus* and *Ocimum* is applied to cure head ache and tooth ache. Oil prepared with its flowers is applied on infected skin until the infection is healed. Decoction made of its flower along with other ingredients is taken to control cough and asthma. Powdered dry flowers are given to anaemic patients.

Discussion

The religious believe and myths preserving a large number of isolated forest patches as a centre of *in-situ* conservation. It was reported that, many medicinal plants which have disappeared from the nearby locality are now confined only to the sacred groves[11]. Very similar to this observation, some critically endangered, endangered, vulnerable and rare medicinal plants are found distributed in this study area. Among this, *Vateria indica* is used by the indigenous people as an insect repellent, pain reliever and for treating piles. Richard[12] reported that this plant has been using as natural remedies in Siddha system of medicine for treatment of rheumatism, anti bacterial, blood diseases, throat infections, cough, bronchitis, piles etc. *Hopea ponga* is used to treat piles, stomach ache and in burns[13-16]. Similarly, *Syzygium caryophyllatum*

is used to cure diabetics[15] and *Memecylon grande* is used to treat menstrual disorders[16]. *Swietenia macrophylla* has been widely used by the local people to treat hypertension, inflammation, chest pains and intestinal parasitism. The antimicrobial, anti-nociceptive activity and anti-diarrheal activity of this plant was studied earlier[17]. Another plant *Saraca asoca* is used in this area for treating various ailments related to uterus disorder and the same was already reported by Kailash *et al*[18].

Conservation of such important plants will eventually leads to the conservation of traditional knowledge. Since traditional knowledge is transmitted orally, documentation is prerequisite because when such systems gone to oblivion, it cannot be retrieved[5].

Conclusion

The present study recorded phytodiversity and ethno medicinal knowledge of coastline sacred groves of southwest India. It showed that sacred groves are rich sources and best repository of ethno-medicinally important, economically valuable plants under conservation status such as rare, critically endangered, endangered, vulnerable and endemic species. Endemic species may become threatened in near future if they are not properly protected. It is an excellent example of unique traditional way of *in situ* conservation of different plant species. Loss of such important plants will eventually lead to the loss of traditional knowledge because traditional knowledge is transmitted orally. This study can be used as baseline information for scientific research to develop new plant based commercial drugs following further experimental investigations to elucidate the pharmacological properties of the reported flora.

Acknowledgment

The authors are grateful to all participants for their kind cooperation and owners of sacred groves for granting permission. We are thankful to the DST-FIST supported Research Department of Botany, SNM College, Maliankara, Kerala. gratitude to renowned plant taxonomist Dr C N Sunil for correct identification. We are grateful to Mr Sivasudhan, Mr Sathyan and Mr Krishna Kumar for their rendered support.

References

1 Gadgil, M & Vartak, V.D, Sacred groves of India: a plea for continued conservation. *Journal of Bombay Natural History Society*. 72, (1975) 314- 320.

2 Khiewtam, R.S & Ramakrishnan, P, Socio-cultural studies of the sacred groves at Cherrapunji and adjoining areas in northeastern India. Man in India. 69, (1989) 64-71.

3 Ramakrishnan, P.S, Conserving the sacred: from species to landscapes. Nature and Resources; UNESCO. 32, (1996) 11-19.

4 Sunil, C.N, Studies on flowering plants diversity of Alappuzha district, Kerala. Thesis. Department of Botany, University of Calicut. (2000)

5 Sanilkumar, M.G & John Thomas, K, Indigenous medicinal usages of some macrophytes of the Muriyad wetland in Vembanad-Kol, Ramsar site, Kerala. *Indian Journal of Traditional Knowledge*.6, (2007) 365-367.

6 Edwards, S, Nebel, S & Heinrich, M, Questionnaire surveys: methodological and epistemological problems for field-based ethnopharmacologists. *Journal of Ethnopharmacology*. 100, (2005) 30 - 36.

7 Gamble J.S, Fischer CEC. The Flora of the Presidency of Madras. Parts 1-11 (parts 1-7 by Gamble and 8-11 by Fischer), Vols. 1-3. Adlard & Sons Ltd., London, 1915- 1936.

8 Sunil, C.N & Sivadasan, M, Flora of Alappuzha District, Kerala. Goshen Singh Mahendra no Pal Singh, Dehradun, India. (2009)

9 Sasidharan, N., Flowering plants of Kerala: a Checklist (CD) Ver-2.0, KFRI, ISBN: KFRI-CD-7. (2011)

10 The IUCN Red list of Threatened species TM. - 3.http://www.iucnredlist.org/. 20, (2017) 45-53.

11 Savithramma, N, Yugandhar, P & Linga Rao, M, Ethnobotanical Studies on Japali Hanuman Theertham- A Sacred Grove of Tirumala hills, Andhra Pradesh, India. *Journal of Pharmaceutical Science and Research*.6 (2014), 83-88.

12 Richard Lobo, Nilesh Gupta & Reshma, K.K, Pharmacognostical and phytochemical study of *Vateria indica* Linn. Stem bark. *World Journal of Pharmacy and Pharmaceutical Sciences*. 4, (2015) 972-979.

13 Madhu C Divakar, Jeril John, Vyshnavidevi. Poornima, Anisha, Ansa Subash & Vijeesh Govindan, Herbal remedies of Madayipara hillock tribals in Kannur district, Kerala, India. *Journal of Medicinal Plants Studies*. 1, (2013) 34-42.

14 Sreekumar, V.B, Hareesh, V.S, Sreejith, K.A & Nirmesh, T.K, Ethnobotanical Studies of Mudugars in Muthikkulam High Value Biodiversity Area with Special Reference to Trees. Proceedings of 26th Kerala Science Congress Pookode, Wayanad: 28-31 January, (2014) 2558-2566.

15 Savinaya, M.S, Sangamesh S Patil, Narayana, J & Krishna,V, Traditional medicine knowledge and diversity of medicinal plants in Sharavathi valley region of central western ghats. *International Journal of Herbal Medicine*. 4, (2016) 124-130.

16 Jincy, T.S & Subin, M.P, Impact of Human interference on ethno medicinal plant wealth and diversity: a comparative study of Sankulangara sacred grove and a disturbed non sacred grove land located at S. N. Puram, Thrissur District, Kerala. Review of Research.7, (2018) 1-15.

17 Ahmad Masoud Eid, Nagib Ali Elmarzugi, & Hesham Ali El Enshasy, A review on the phytopharmacological effect of *Swietenia macrophylla. International Journal of Pharmacy and Pharmaceutical Sciences*. 5, (2013) 47-53.

18 Kailash Chandra, Bhagwati P. Nautiyal & Mohan C, Nautiyal, Herbal-based Traditional Medicinal Knowledge of Local Inhabitants in Rudraprayag District of Uttarakhand, India. *Ethnobotany Research & Applications*. 11, (2013) 299-313.