

Rare, endemic and medicinal plants of selected sacred groves in Chavakkad, Thrissur district, Kerala

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Abstract

Sacred groves are the remnants of forest patches which is protected and conserved based on religious beliefs. It acts as repositories of many RET, medicinal and economically important plant species. An exploratory survey was conducted in some selected sacred groves of Chavakkad Taluk in Thrissur District namely Cherayi padinjakkara sarpakavu, Kanjiramthara kavu, Nariyampully kavu, Ullanatt raman moothapanicker vaka sarpakavu and Ullannur mana sarpakavu. There are 79 species of flowering plants in the grove distributed in 42 families comprising of 46.84 % trees, 15.19 % shrubs, 11.39 % herbs and 26.58 % climbers. Three species of palms *Areca catechu* L., *Caryota urens* L. and *Cocos nucifera* L. were found to occur in the groves. *Caryota urens* L., *Dioscorea bulbifera* L. and *Pothos scandens* L. were found to be distributed all over the grove. Out of these 79 plants 7 plants were Endemic, 7 Vulnerable and 3 plants coming under Lower risk near threatened in Kerala. All 79 plants are medicinal. Groves are rich in its floral and faunal wealth. This helps to increase the water table in surrounding areas and purifies air. This is beneficial for all organisms including human beings.

Key words : Rare, Endemic, Medicinal plants, Sacred grove.

INTRODUCTION

Sacred groves are forest patches preserved in the name of religion as observed in some societies. Sacred groves otherwise *Kavu* (in Malayalam), *Sindhravana* or *Pavithravana*, *Devarkadu* (in Kannada), *Deoban* or *Devraj* (in Marathi), *Orans* (in Rajasthan), *Sarpakadu* (in Tamil) are religiously protected forests. The age old system of every village having a temple, a tank and associated sacred grove explains the ancient method of water harvesting and sharing and may be considered as the backbone of village economy. Sacred groves are invariably associated with certain Gods and Goddesses. The concept of 'sacred grove' could be viewed as symbolic of 'nature-human' interconnections^[1]. Sacred groves occur in India and in other parts of Asia and Africa^[2]. These are important reservoirs of biodiversity, preserving unique species of plants, insects and animals^[3]. Groves are representatives of relic climax vegetation of Indian sub-continent and part of socio-cultural traditions^[4]. In groves all forms of vegetation including trees, shrubs, herbs and climbers are conserved^[5]. Since most of the groves are located near human settlements, human disturbances in these groves are progressively increasing. It preserves many rare, endemic and endangered species some of which hold potential use to man^[6-10]. Some of the sacred groves are still undisturbed but majority is in different stages of degradation. Protection of sacred groves mainly due to the fear of deities and people were prohibited from felling trees and even removing a twig is considered as taboo.

STUDY AREA

The study was carried out in the sacred groves of Chavakkad Taluk in Thrissur district, Kerala state. Study area includes Cherayi padinjakkara sarpakavu, Kanjiramthara kavu, Nariyampully kavu, Ullanatt raman moothapanicker vaka sarpakavu and Ullannur mana sarpakavu. (Plate 1). The area of sacred groves, latitude/longitude, locality of sacred groves and main deities are listed in table 1. The management of these kavu is under the control of different families. The main deity is Nagam.

MATERIALS AND METHODS

Five sacred groves were selected from Chavakkad Taluk in Thrissur District for the study. Each grove was visited during different seasons between June 2013 and December 2015, analysed the floristic composition and flowering twigs were collected. Field observation like habit, phenology of the plant, colour, texture and smell of leaves, local names and local uses available were noted in the field book. Plants were identified with the help of floras like, *Flora of Presidency of Madras*^[11] and *Flowering plants of Thrissur district*^[12]. Angiosperms including trees, shrubs, herbs and climbers were considered for the study and herbarium sheets were prepared and verified with the help of Kerala Forest Research Institute (KFRI), Peechi and Calicut University Herbarium (CALI). IUCN categories are used to evaluate the plants and arranged in to RET species (IUCN, 2012). The voucher specimens were deposited in the herbarium of Department of Botany, Sree Krishna College, Guruvayur, Kerala.

RESULTS

Sacred Grove takes major effort to recognize and conserve biodiversity traditionally. The study area includes Cherayi padinjakkara sarpakavu, Kanjiramthara kavu, Nariyampully kavu, Ullanatt Raman Moothapanicker vaka sarpakavu and Ullannur mana sarpakavu. Nagam is the main deity in groves. Other deities like Siva, Ganapathy, Darmadaivam and Manikandabhootham were also present. There were 79 species of angiosperms coming under 70 genus and 42 families. In these plants 46.84% trees, 15.19% shrubs, 11.39% herbs and 26.58% climbers. *Caryota urens* L, *Dioscorea bulbifera* L. and *Pothos scandens* L. were found to be distributed all the groves. These sacred groves 8.86% plants are Endemic, 8.86% plants are Vulnerable and 3.8% plants coming under Lower risk near threatened regionally. All of the 79 species of plants present in sacred groves are medicinal. (Table-3 & Plate 2). *Albizia saman* (Jacq.) F.Muell. and *Ixora javanica* (Blume) DC. are very much effective in treatment of serious disease like cancer. During this study Moraceae is considered as the dominant family. Maximum

Table 1: Location and Deities of Sacred groves

Sacred groves	Locality	Area in Ha.	Latitude/ Longitude	Deity
Cherayi padinjakkara sarpakavu (CHP)	Punnayurkulam	0.646	10.6667°N, 75.9833° E	Siva, Ganapathy, Nagam
Kanjiramthara kavu (KJT)	Engandiyur	0.215	10.5000°N, 76.0500° E	Nagam
Nariyampully kavu (NRP)	Manathala	0.323	10.58121°N, 76.01815°E	Nagam
Ullanatt raman moothapanicker vaka sarpakavu (URM)	Vengidangu	1.076	10.85051°N, 76.27108°E	Nagam
Ullannur mana sarpakavu (UMS)	Vengidangu	0.430	10.85051°N, 76.27108°E	Darmadaivam, Nagam, Manikandabhotham

Table 2: Number of Angiosperms in Sacred groves.

Sacred groves	Total No. of Species	Total No. of Genus	Total No. Family	No. of Endemic Plants	No. of Vulnerable Plants
Cherayi padinjakkara sarpakavu	33	33	28	5	4
Kanjiramthara kavu (KJT)	21	21	20	3	2
Nariyampully kavu	30	26	21	1	-
Ullanatt raman moothapanicker vaka sarpakavu	32	31	21	2	5
Ullannur mana sarpakavu	28	27	28	1	3

Table 3: Species recorded from Sacred groves and Medicinal uses

Col. No.	Botanical name (Family)	Sacred grove(s)	Habit	Part(s) used	Uses
1	<i>Abrus precatorius</i> L. Fabaceae	CHP, KJT	C	Leaves, Roots, Seeds	Cures fever, dryness of mouth, difficult breathing, thirst, diseases of eye and skin, improves sexual vigour and bodily strength, painful swellings, paralysis, destroys worms and other parasites, jaundice and arthritis
65	<i>Achyranthes aspera</i> L. Acanthaceae	NRP	H	Whole plant	Disease of skin, head, stomach and ear, worm infestation, piles, enlargement of cervical glands, anorexia, leucorrhoea, anaemia, dropsy and jaundice
2	<i>Adenanthera pavonina</i> L. Mimosaceae	UMS, URM	T	Bark, Leaves, Seeds, Heart wood	Ulcers, burning sensation, vomiting, fever, giddiness, dysentery, pain in joints, warts and emetic
155	<i>Albizia saman</i> (Jacq.) F.Muell. Mimosaceae	NRP, URM	T	Root, Seeds	Stomach cancer, colds, diarrhoea, headache, intestinal ailments and stomach ache, sore throat, Mycobacterium tuberculosis.

13	<i>Alstonia scholaris</i> (L.) R. Br. Apocynaceae	NRP	T	Bark, Leaves, Milky exudate	Diarrhoea, malarial fever, asthma, cardiac troubles, dropsy, fever, abdominal disorders, leprosy, skin and respiratory diseases, foul ulcers, bronchitis and congested liver
243	<i>Anamirta cocculus</i> (L.) Wight & Arn. Menispermaceae	CHP, UMS	C	Roots, Fruits	Tumors, filariasis, poisoning, anaemia, affections of the skin and epilepsy
260	<i>Annona reticulata</i> L. Annonaceae	CHP, UMS, URM	T	Roots, Fruits, Seeds	Mental depression, spinal disorders, anaemia, burning sensation, diarrhoea, dysentery, cardiac diseases, fever, thirst, vomiting and cough.
4	<i>Aphanamixis polystachya</i> (Wall.) Parker Meliaceae	CHP, UMS, URM	T	Bark, Seeds	Enlargement of liver, spleen, abdominal complaints, tumors and sores.
68	<i>Areca catechu</i> L. Arecaceae	NRP, URM	T	Roots, Leaves, Nut	Sore lips, urinary disorders, anorexia and decay of tooth.
60	<i>Artocarpus heterophyllus</i> Lam. Moraceae	URM	T	Roots, Seeds, Leaves, Fruits	Boils, wounds, skin diseases, fever and ulcers.
5	<i>Artocarpus hirsutus</i> Lam. Moraceae	CHP, URM, KJT	T	Fruits, Leaves, Bark	Small pimples, cracks on the skin and sores.
156	<i>Asparagus racemosus</i> , Willd. Liliaceae	KJT	C	Tubers	Urinary diseases, hyperacidity, gastritis, increases breast milk, piles, eye diseases, and leucorrhoea.
201	<i>Azadirachta indica</i> A. Juss. Meliaceae	URM	T	Bark, Leaves, Flowers, Fruits, Seeds	Skin and eye diseases, rheumatism, intestinal worms, diabetes, small pox, chicken pox, ulcers, ringworm, scabies, leprosy, liver disorders, cough, anorexia, wounds, fever and poisoning.
207	<i>Bauhinia purpurea</i> L. Caesalpinaceae	URM	T	Roots, Bark, Flower buds	Diarrhoea, dysentery, skin diseases, leprosy and intestinal worms
200	<i>Biophytum reinwardtii</i> (Zucc.) Klotzsch Oxalidaceae	NRP, CHP	H	Whole plant	Hyperdipsia, wounds, asthma, snakebite and insomnia
6	<i>Caryota urens</i> L. Arecaceae	NRP, CHP, UMS, URM, KJT	T	Shoot apex, Toddy	Diarrhoea, migraine and scorpion-sting poisoning.
150	<i>Cayratia pedata</i> (Lam.) A. Juss. ex Gagnep. Vitaceae	CHP, UMS	C	Whole plant	Uterine reflexes and cracked heels.
7	<i>Chassalia curviflora</i> (Wall. ex Kurz) Thw. Rubiaceae	CHP, UMS, URM	S	Roots	Cough and malaria.
211	<i>Chromolaena odorata</i> (L.) King & Robins. Asteraceae	CHP	S	Leaves	Cuts and wounds to stop bleeding
8	<i>Chrysophyllum cainito</i> L. Sapotaceae	CHP, KJT	T	Fruit	Diarrhoea

16	<i>Cissus latifolia</i> Lam. Vitaceae	CHP	C	Whole plant	Burning fever, alleviates cough, purifies blood, cure the ulcer of lungs, toothache and bad smell of gums.
12	<i>Cocos nucifera</i> L. Arecaceae	CHP, URM	T	Inflorescence, Fruits, Roots, Seeds	Bronchitis, uterine disorders, gastritis, haemorrhage, leucorrhoea, tumours, skin diseases, dysentery, diarrhoea, dehydration and diabetes.
235	<i>Commelina benghalensis</i> L. Commelinaceae	NRP, CHP	H	Whole plant	Haemorrhage and leprosy
266	<i>Corchorus aestuans</i> L. Tiliaceae	NRP	H	Leaves, Seeds	Pneumonia, wounds, stomach disorders, dysentery, leprosy and itching
166	<i>Dendrophthoe falcata</i> (L.f.) Etting. Loranthaceae	CHP, KJT	S	Whole plant	Wounds, worm infestation, sterility in female, pulmonary tuberculosis, ulcers, asthma, menstrual disorders, swellings, and wounds
195	<i>Dioscorea bulbifera</i> L. Dioscoreaceae	NRP, CHP, UMS, URM, KJT	C	Tubers	Ulcers, piles, leprosy, worm infestation, cardiac diseases, urinary calculi, aphrodisiac, dysentery and syphilis.
215	<i>Dipteracanthus prostratus</i> (Poir.) Nees Acanthaceae	NRP	H	Leaves	Gonorrhoea and ear diseases
145	<i>Eleutheranthera ruderalis</i> (Sw.) Sch.-Bip. Asteraceae	NRP	H	Whole plant, Leaves	Enhance the production of milk in lactating/nursing mothers, high blood pressure, cuts and wounds and rheumatic pain
19	<i>Ficus amplissima</i> J. E. Smith Moraceae	NRP	T	Leaves	Anti-inflammatory and wound healing
247	<i>Ficus benghalensis</i> L. Moraceae	NRP	T	Bark, Aerial roots, Buds	Skin diseases, dysentery, diarrhoea, leucorrhoea, nervous disorders and reduces blood sugar in diabetes.
51	<i>Ficus racemosa</i> L. Moraceae	NRP	T	Bark	Skin and vaginal diseases and ulcers.
77	<i>Ficus religiosa</i> L. Moraceae	NRP, URM	T	Bark	Skin and vaginal diseases and ulcers.
144	<i>Ficus tinctoria</i> G. Forst. Moraceae	NRP, KJT	T	Root, Leaves	Women during childbirth, relieve swollen eyes.
50	<i>Gloriosa superba</i> L. Liliaceae	URM	C	Tubers	Swelling, piles, leprosy, ulcers, pain in the bladder, itching, antidote against cobra poison; easy and quick expulsion of the placenta after delivery.
78	<i>Glycosmis pentaphylla</i> (Retz.) DC. Rutaceae	UMS	S	Whole plant	Anemia, rheumatism, jaundice, and liver complaints.
217	<i>Grewia nervosa</i> (Lour.) Panigrahi Tiliaceae	UMS	S	Whole plant	Indigestion, eczema and itch, typhoid, dysentery and syphilitic ulceration of the mouth.
21	<i>Hibiscus hispidissimus</i> Griff. Malvaceae	NRP	S	Leaves, Roots	Improves digestion, inflammations and dyspepsia

218	<i>Hibiscus rosa-sinensis</i> L. Malvaceae	URM	S	Leaves, Flowers, Roots	Skin diseases, diarrhoea, piles, haemorrhage, polyuria, hair falling, cough, contraceptive, fever, cystitis and irritable conditions of genito urinary tract.
174	<i>Holigarna arnottiana</i> Hook. f. Anacardiaceae	NRP, UMS, URM, KJT	T	Fruits	Arthritis, tumours, leucoderma, ulcers, diabetes, leprosy and warts.
192	<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken Flacourtiaceae	UMS, URM, KJT, CHP	T	Seeds, Seed oil	Leprosy, skin diseases, eczema, dermatitis, tubercular laryngitis, chronic ulcers, dyspepsia and flatulence
175	<i>Ichnocarpus frutescens</i> (L.) R.Br. Apocynaceae	UMS, CHP	C	Roots	Dyspepsia, diabetes, fever, skin troubles and stones in bladder.
176	<i>Ipomoea staphylina</i> Roem. & Schult. Convolvulaceae	KJT	C	Stem latex	Skin disease.
80	<i>Ixora coccinea</i> L. Rubiaceae	URM	S	Roots, Leaves, Flowers	Blood purifier, antiseptic, infantile skin ailments, diarrhoea, dysentery, fever, sores, ulcers, catarrhal bronchitis, eye troubles, scabies and cholera
141	<i>Ixora javanica</i> (Blume) DC. Rubiaceae	URM	S	Flowers	Cancer
140	<i>Laportea interrupta</i> (L.) Chew Urticaceae	NRP, UMS	H	Leaves	Support fetal-maternal health
48	<i>Leea indica</i> (Burm.f.) Merr. Leeaceae	UMS, KJT, CHP	S	Roots	Diarrhoea, dysentery, hyperdipsia, ulcer and skin diseases.
267	<i>Macaranga peltata</i> (Roxb.) Muell.-Arg. Euphorbiaceae	NRP, UMS	T	Leaves, Bark, Gum	Used as vulnerary. Gum used for venereal sores.
24	<i>Mangifera indica</i> L. Anacardiaceae	NRP, URM, CHP, KJT	T	Bark, Tender leaves, Flowers, Kernels	Syphilis, wounds, ulcers, diarrhoea, dysentery, rheumatism, haemorrhages, anorexia, and dyspepsia.
123	<i>Memecylon talbotianum</i> Brandis Melastomataceae	CHP	T	Bark, Root, Seeds, Leaf	Anti-diarrhoeal, Hypoglycemic, Antimicrobial, Wound healing.
47	<i>Mikania micrantha</i> Kunth Asteraceae	UMS, KJT	C	Leaves	Snake bites, antimicrobial activity, eliminating discomfort of hornet, bee and ant stings
84	<i>Mimusops elengi</i> L. Sapotaceae	UMS, URM, CHP	T	Bark, Flowers, Fruits	Diarrhoea, dysentery, leprosy, constipation, dental, cardiac and eye diseases, burning sensation, thirst, uterine disorders, fever, headache, poisoning and aphrodisiac.
180	<i>Morinda pubescens</i> J. E. Smith Rubiaceae	NRP, KJT	T	Bark, Roots, Fruits	Eczema, fever, ulcers, glandular swellings and digestive disorders especially in children.
25	<i>Mukia maderaspatana</i> (L.) Roem. Cucurbitaceae	NRP	C	Whole plant	Burning sensation, flatulence, constipation, ulcers, cough, neuralgia, piles, tuberculosis and alleviating <i>pitta</i> .

118	<i>Mussaenda frondosa</i> L. Rubiaceae	CHP	S	Roots, Leaves and Stem	Leprosy, eye troubles, coughs and intestinal worms.
46	<i>Naravelia zeylanica</i> (L.) DC. Ranunculaceae	KJT	C	Whole plant	Helminthiasis, leprosy, dermatopathy, rheumatalgia, odontalgia, wounds, cephalalgia, inflammations, and ulcers.
252	<i>Olea dioica</i> Roxb. Oleaceae	CHP	T	Bark , Leaves	Febrifuge and emetic.
88	<i>Phyllanthus emblica</i> L. Euphorbiaceae	CHP	T	Fruits, Bark, Leaves	Gonorrhoea, jaundice, cardiac diseases, chronic fever, vomiting, constipation, eye diseases, haemorrhage, tuberculosis, cough, anaemia, diabetes, general debility and greyness of hair.
124	<i>Piper longum</i> L. Piperaceae	UMS	C	Fruits, Roots	Improve intellect memory, cures cough, asthma, indigestion, worm troubles, anaemia and chronic fever
89	<i>Piper nigrum</i> L. Piperaceae	UMS, URM, CHP	C	Fruits	Arthritis, asthma, fever, cough, dysentery, dyspepsia and flatulence
137	<i>Pothos scandens</i> L. Araceae	NRP, UMS, URM, CHP, KJT	C	Whole plant	Skin diseases, boils, swellings, wounds, ulcers, dropsy, vomiting, flatulence and burning sensation.
43	<i>Pouzolzia zeylanica</i> (L.) Bennett Urticaceae	NRP	H	Roots	Gastric problems, gangrenous ulcers, sores and boils
125	<i>Putranjiva roxburghii</i> Wall. Euphorbiaceae	KJT	T	Leaves, Seeds	Sensation, constipation, elephantiasis, and habitual abortion.
41	<i>Saraca asoca</i> (Roxb.) de Wilde Caesalpinaceae	URM	T	Bark , Flowers	Enlargement of cervical glands, burning sensation, dyspepsia, worms, piles, scabies and other skin diseases.
187	<i>Sarcostigma kleinii</i> Wight & Arn. Icacinaceae	NRP, UMS, URM	C	Bark, Leaves, Seed oil	Leprosy, skin diseases, epilepsy and indolent ulcers.
93	<i>Schleichera oleosa</i> (Lour.) Oken Sapindaceae	UMS, URM	T	Bark, Seeds	Ulcers, inflammations, malaria, boils, leprosy, blood disorders, intermittent fever, snakebite and burns
31	<i>Smilax zeylanica</i> L. Smilacaceae	CHP	C	Roots	Veneral diseases, rheumatism, urinary complaints and dysentery.
106	<i>Sterculia balanghas</i> L. Sterculiaceae	UMS	T	Fruits	Laxative.
128	<i>Streblus asper</i> Lour. Moraceae	UMS, URM, CHP	T	Bark, Roots, Seeds	Sinusitis, inflammations, elephantiasis, cough, bronchitis, ulcers, diarrhoea, dysentery, fever, and swellings
39	<i>Strychnos nux-vomica</i> L. Loganiaceae	NRP, UMS, URM, CHP	T	Bark, Seeds	Intermittent fevers, dyspepsia, dysentery, paralytic and neuralgic affections, chronic rheumatism, impotence and skin and heart disease.
135	<i>Tabernaemontana alternifolia</i> L. Apocynaceae	KJT	T	Roots, Bark	Toothaches, inflammations of cornea and also as a vermicide.

97	<i>Tamarindus indica</i> L. Caesalpinaceae	URM, CHP	T	Leaves, Flowers, Fruits	Constipation, cough, dyspepsia, fever, flatulence, gastrointestinal diseases, urinary infection, sore throat and ulcers.
129	<i>Tecoma stans</i> (L.) HBK Bignoniaceae	URM	S	Roots	Snake, rat bites and scorpion stings.
130	<i>Terminalia bellirica</i> (Gaertn.) Roxb. Combretaceae	UMS	T	Fruits	Anaemia, cough, fever, leprosy, tuberculosis and stomach diseases
33	<i>Tetrastigma leucostaphylum</i> (Dennst.) Alston ex Mabb. Vitaceae	KJT	C	Roots	Boils and ulcers, traumatic bleeding, snakebites
255	<i>Tiliacora acuminata</i> (Poir.) Miers ex Hook.f. & Thoms. Menispermaceae	NRP, URM, KJT	C	Roots	Antidote to snake poison
131	<i>Tinospora cordifolia</i> (Willd.) Miers. Menispermaceae	NRP	C	Stems	Fever, jaundice, thirst, burning sensation, diabetes, piles, skin ailments, respiratory disorders, neurological disorders and rheumatism
37	<i>Tinospora sinensis</i> (Lour.) Merr. Menispermaceae	CHP	C	Stems	Piles and ulcerated wounds, liver complaints, chronic rheumatism and also as muscle relaxant.
99	<i>Trema orientalis</i> (L.) Blume Ulmaceae	UMS	T	Roots, Leaves	Diarrhoea, presence of blood in urine and epilepsy.
273	<i>Vanda tessellata</i> (Roxb.) Hook. ex D. Don Orchidaceae	NRP, CHP	H	Roots	Dyspepsia, bronchitis, inflammations and piles.

H: Herb; S: Shrub; T: Tree; C: Climber

numbers of families were represented by Cherayi padinjakkara sarpakavu and Ullannur mana sarpakavu. Large numbers of Endemic plants present in Cherayi padinjakkara sarpakavu and vulnerable plants present in Ullanatt raman moothapanicker vaka sarpakavu (Table-2).

Artocarpus hirsutus Lam., *Dipteracanthus prostratus* (Poir.) Nees, *Hydnocarpus pentandra* (Buch.-Ham.) Oken, *Memecylon talbotianum* Brandis, *Mussaenda frondosa* L., *Olea dioica* Roxb. and *Tabernaemontana alternifolia* L. are Endemic, *Aphanamixis polystachya* (Wall.) Parker, *Artocarpus hirsutus* Lam., *Gloriosa superba* L., *Glycosmis pentaphylla* (Retz.) DC., *Hydnocarpus pentandra* (Buch.-Ham.) Oken, *Saraca asoca* (Roxb.) de Wilde and *Smilax zeylanica* L. are Vulnerable and *Piper longum* L., *Piper nigrum* L. and *Tinospora sinensis* (Lour.) Merr. coming under the category Lower risk near threatened in Kerala

In this five selected sacred groves under study Cherayi padinjakkara sarpakavu and Ullanatt raman moothapanicker vaka sarpakavu are well protected. In other three sacred groves compound walls were absent, therefore external disturbance and soil erosion is common. Invasive plant species *Mikania micrantha* Kunth is present in Kanjiramthara kavu. It is coming

under weed category. Numerous bats are present in Nariyampully kavu and Ullanatt raman moothapanicker vaka sarpakavu.

DISCUSSIONS

Sacred groves under study Cherayi padinjakkara sarpakavu and Ullanatt raman moothapanicker vaka sarpakavu are well protected and it contains compound walls. In Kanjiramthara kavu, Nariyampully kavu and Ullannur mana sarpakavu compound walls were absent, therefore external disturbance and soil erosion is common. Soil erosion is a naturally occurring process that affects all landforms. Water and wind are the two main mechanisms by which soil is eroded and transported. Of the two, water has proven experimentally to be the most important in causing soil erosion with long-lasting results^[13]. The fertility of the soil inside the grove and biodiversity is adversely affected by this.

Mikania micrantha Kunth is a weed. It climbs over other plants in a particular area and controls the growth of other plants, and small seedlings in that area. The overgrowth of invasive plant species *Mikania micrantha* Kunth in Kanjiramthara kavu can be considered as a threat to the grove.



Cherayi padinjakkara sarpakavu



Kanjiramthara kavu



Nariyampully kavu



Ullannur mana sarpakavu



Ullanatt raman moothapanicker vaka sarpakavu

Plate 1

The very interesting feature is the presence of large number of bats in Nariyampully kavu and Ullanatt raman moothapanicker vaka sarpakavu. In Ullanatt raman moothapanicker vaka sarpakavu a large *Ficus religiosa* L. acts as shelter for bats and other birds and this tree controls the ecosystem inside the grove. Loss of this tree causes changing the biodiversity inside the grove and this causes serious damage to ecosystem. Therefore conservation of *Ficus* tree is a necessary factor for conserving biodiversity. Their fruit are a key resource for bats and for some birds. So it acts as Keystone species and conservation of this tree is necessary for biodiversity conservation inside the grove. The peepal tree *Ficus religiosa* is classified as a "keystone mutualist" for the maintenance of tropical biological diversity^[14-15]. This species is widely protected all over India^[16].

CONCLUSION

Sacred groves are important element of biological diversity and rich in floras and faunas. Groves have been conserved by local communities under informal conservation concept. In some groves more importance is given to temples than forests. Mainly its conservation is community based and under religious faith. Each grove has its own peculiarities with respect to other. Groves are abodes of RET, medicinal and economically important plants. Most of the medicinal plants grow in natural vegetation. Natural vegetation is conserved inside the sacred groves and in this study shows 100% plants are medicinal inside these groves. It acts as store house of natural genetic diversity. So groves are ecologically very important. Conservation of sacred grove means



**Anamirta cocculus (L.)
Wight & Arn.**



**Aphanamixis polystachya
(Wall.) Parker**



**Artocarpus hirsutus
Lam.**



Caryota urens L.



Ficus racemosa L.



Gloriosa superba L.



**Grewia nervosa (Lour.)
Panigrahi**



**Hydnocarpus pentandra
(Buch.- Ham.) Oken**



**Memecylon talbotianum
Brandis**



Mimusops elengi L.



Piper longum L.



**Sarcostigma kleinii
Wight & Arn.**

Plate 2.

conservation of valuable biological diversity inside groves. Hence a new dimension of protection, like National or international levels of conservation of sacred groves are necessary for maintaining the natural and valuable bio-resources inside the groves.

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