



ROLE OF NON-TIMBER FOREST PRODUCTS AND ANALYSIS OF TOTAL IMPORTANT VALUE OF WOODY PLANT SPECIES PRESENT IN KOTHAMANGALAPATTI SACRED GROVE, PUDUKKOTTAI, TAMILNADU, INDIA

Dhanasekar S.^{1&2*} and B. Muthukumar³

^{1*}Department of Botany, Arignar Anna Govt. Arts College, Musiri-621 211, Tamilnadu, India.

²Department of Botany, National College (Autonomous), Tiruchirappalli-620001, Tamilnadu, India.

³Department of Botany, National College (Autonomous), Tiruchirappalli -620001, Tamilnadu, India.

(Affiliated to Bharathidasan University , Tiruchirappalli)

Abstract

Bio – diversity is the totality of genes, species and ecosystem of a region. Sacred groves are a type of in -situ conservation, ideal centre for biodiversity which conserves several living organisms. The present study was carried out in Kothamangalapatti sacred grove, Pudukkottai, Tamilnadu, India. All the woody plant species (38) of this sacred grove contributed non – timber forest products (NTFPs) such as medicine, fire wood (or) fuel, fodder, natural pesticides and as in sacred and cultural activities. It also includes pollution control and air purifier. Total important value (TIV) index was also analysed. *Azadirachta indica*. has contributed highest TIV index (13).

Key words : Biodiversity, sacred groves, NTFPs, air purifier and TIV.

Introduction

Biodiversity is the biological diversity which includes the variety of the whole species present on earth. It includes different plants, animals, microorganisms and their genes, water ecosystems, terrestrial ecosystems and marine ecosystems in which they all are present. Therefore, the term biodiversity refers to the totality of genes, species and ecosystems of a region.

Many parts of the globe are constantly losing organisms through pollution, loss of natural habitats and environmental degradation due to human over population. The conservation of biodiversity is a vast undertaking requiring the globalisation of existing knowledge and new information on the monitoring and management of biodiversity on an unprecedented scale (Smith *et al.*, 1993).

Sacred groves

Many traditional conservation practices of indigenous people in many parts of the world such as protection of small forest patches by dedicating them to the local deity,

**Author for correspondence* : E-mail : dhanas39@gmail.com

also contributed to the conservation and protection of biodiversity such forests patches called sacred groves. Sacred groves are tracts of virgin forest harbouring rich biodiversity, protected by the local people based on their indigenous cultural and religious beliefs and taboos.

Such traditional practices have been invariably operating in different parts of India (Anthwal *et al.*, 2006). Sacred groves are the tracts of virgin forest that were left untouched by local inhabitants, sometime women are not allowed enter them, harbour rich biodiversity and are protected by the local people due to their beliefs and taboos that the idols reside in them (Gadgil and Vartak, 1975; Khiewtam and Ramakrishnan, 1989).

The sacred groves of Tamilnadu are a part of the local folklore and religion. Every village may have a grove, a protected area associate with local folk deities of obscure origin. Amman or the mother goddess enshrined in one of her many synonym tic forms as Kali, Mari, Pidari, Ellaikali, etc. in fulfilment of prayers for a good harvest or good health. The people of the village make votive offerings of terracotta horses, bulls or elephants to Ayyanar, the mythical watchman of the village whose

statue is also consecrated in the groves.

Sacred groves are important, not only because they are sacred, but values of for reaching importance are implicit them. The scientific economical social and spiritual values in them will have to explicit. The vegetation in undisturbed groves is luxuriant and comprises several stories of trees mixed with shrubs, lianas and herbs. The soil is rich in humus and covered with thick litter (Anish Babu *et al.*, 2014). Such vegetation present in the sacred forests produces non – timber forest products (NTFPs) are which help to improve local communities lively hood sustainably. Non-Timber Forest Products (NTFP) have been considered as minor forest products in many countries and it refer to all biological materials which are collected from the natural forests for human use. Ethnobotanical researchers have so far brought on record over 500 plants significantly used by the tribal as food, dyes, tannins, drugs, narcotics, drinks, housing materials weapons, fibres and medicine (Cunningham, 2001). NTFPs play vital role among the tribal people and provide a source of income and subsistence living and are integral part of day-to-day livelihood activities of tribal people (Hedge *et al.*, 1996).

Objectives of the present study

This perspective present study aims of Kothamangalapatti sacred grove

1. To analyse the composition and distribution of woody species in 0.1
2. To enlist the NTFPs and their total important values (TIV) of plants that inhabits in this sacred grove.

Materials and Methods

Study Area

The present study was done in a sacred grove ordained to Ayyanar, the presiding deity. The sacred grove is situated between Kothamangalapatti and Pasumalaipatti villages near the Trichy – Pudukkottai highway. It is located at lat / long of 78 46'53" E - 10 30'54"N.

The sacred grove is spread over 2-hectare area with the Ayyanar temple in the midst. In spite of the human activity within its precincts, the site is well protected and conserved since it is revered as sacred. The temple is taken care by the local community and a special festival is conducted every year in the month of April in the honour of the deity.

Materials

Four ropes in 12m length with single knot in 10m length at both terminals, Sickle, paper and pen, field note

book and rough paper to collect unknown specimens.

Methodology

A one-hectare area was marked and again it was divided into 10, 10 × 10m randomly marked quadrats. Within each quadrat all woody species were identified and entered in the field note book. Unidentified plants were collected, dried using standard herbarium techniques and identified at RHT (Rapinat Herbarium, Trichy). The occurrence of respective species was tabulated with their habit and taxonomic family. The NTFPs of the enlisted woody species were noted by visiting field in different periods from local community for day to day income and their other needs sustainably and valued by giving maximum value 5 and tabulated to evaluate TIV.

Results and Discussion

The data collected during the field sampling are tabulated and consolidated in table 1 and 2. The inventory area (0.1 hectare) in the sacred grove yielded a total of woody species 38 coming under genera 36 and families 22 (Table 1). Of these species 15 were trees, shrubs 15 and straggler, lianas and vines were 8. Considering the number of families for any one hectare in different tropical forests, it shows that its 22 families within the range of 2 to 26 (Johnston and Gillman, 1995). The family *Fabaceae* have contributed species (9) followed by *Rubiaceae* (5 species) and *Euphorbiaceae* (3 species) having similarity to the total of Thirumanikkuzhi on the coromandel coast of south India (Parthasarathy and Karthickeyan, 1997).

Non-timber forest products of woody species present in the study area

The NTFPs or non- wood forest products (NWFPs) collected from all 38 plant species by the local community for their lively hoods. All the plant species have medicinal use except *Reissantia indica* (Willd.) N. Halle. *Azadirachta indica* Adr. Juss., *Senna auriculata* Roxb., *Cissus quadrangularis* L., and *Ficus benghalensis* L. have high medicinal value. The whole plant parts of *Azadirachta indica* Adr. Juss. Used as medicine, the alkaloid Margosine is found in the stem bark, the bark is used to relive Kapha and Pittadosha (Ayurvedha) (Kritikar and Basu, 1975). *Cissus quadrangularis* L. contain calcium oxalate 267 mg per 100g of tender stem parts, the juice of the stem is used in irregular menstruation and scurvy, the stem is given internally and applied topically for fracture of bones; beaten into a paste given asthma (Chopra *et al.*, 1996). Such useful medicinal plant parts are collected by the local and nearby village folk medicating persons for their own use and daily income. The fallen dried woods were

Table 1: Woody Plants list present in the Kothamangalappatti Sacred grove showing their Habit and Family.

S.No.	Name of the species	Habit	Family
1	<i>Acacia caesia</i> (L.) Willd.	Shrub	Fabaceae
2	<i>Albizia amara</i> (Roxb.) Boivin	Tree	Fabaceae
3	<i>Azadirachta indica</i> Adr. Juss.	Tree	Meliaceae
4	<i>Benkara malabarica</i> Adanson	Shrub	Rubiaceae
5	<i>Canthium parviflorum</i> Lam.	Shrub	Rubiaceae
6	<i>Capparis sepiaraia</i> L.	Shrub	Capparaceae
7	<i>Cassine glauca</i> (Rottb.) Kuntze	Tree	Celastraceae
8	<i>Chloroxylon swietenia</i> D.C.	Tree	Rutaceae
9	<i>Cissus quadrangularis</i> L.	Vine	Vitaceae
10	<i>Cissus vitigenea</i> L.	Vine	Vitaceae
11	<i>Clausena dentata</i> (Willd.) Roxb.	Shrub	Rutaceae
12	<i>Cleistanthus collinus</i> Roxb.	Tree	Euphorbiaceae
13	<i>Commiphora berryi</i> (Arn.) Engl.	Shrub	Burseraceae
14	<i>Cordia obliqua</i> Willd.	Tree	Cordiaceae
15	<i>Derris scandens</i> (Roxb.) Benth.	Liana	Fabaceae
16	<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	Shrub	Fabaceae
17	<i>Diospyros ebenum</i> J. Koenig Retz.	Tree	Ebenaceae
18	<i>Euphorbia antiquorum</i> L.	Shrub	Euphorbiaceae
19	<i>Ficus benghalensis</i> L.	Tree	Moraceae
20	<i>Flacourtia indica</i> (Burm. f) Merr.	Shrub	Flacourtiaceae
21	<i>Gmelina asiatica</i> L.	Shrub	Verbenaceae
22	<i>Holoptelea integrifolia</i> (Roxb.) Planchon	Tree	Ulmaceae
23	<i>Jasminum angustifolium</i> Vahl.	Liana	Oleaceae
24	<i>Jatropha gossypifolia</i> L.	Shrub	Euphorbiaceae
25	<i>Lannea corromandelica</i> (Houtt) Merr.	Tree	Anacardiaceae
26	<i>Pavetta indica</i> L.	Shrub	Rubiaceae
27	<i>Premna serratifolia</i> L.	Shrub	Verbenaceae
28	<i>Prosopis juliflora</i> (Sw.) DC.	Tree	Fabaceae
29	<i>Pteralobium haxapetalum</i> (Roth.) Santapau & Wagh	Straggler	Fabaceae
30	<i>Randia dumetorum</i> (Retz.) Poinet.	Shrub	Rubiaceae
31	<i>Reissantia indica</i> (Willd.) N. Halle	Liana/Woody climber	Celastraceae
32	<i>Senna auriculata</i> Roxb.	Shrub	Fabaceae
33	<i>Strychnos nuxvomica</i> L.	Tree	Loganiaceae
34	<i>Tarena asiatica</i> L.	Shrub	Rubiaceae
35	<i>Vachellia horrida</i> (L.) Kyal. & Boatwr.	Tree	Fabaceae
36	<i>Vachellia leucoploea</i> (Roxb.) Willd.	Tree	Fabaceae
37	<i>Wrightia tinctoria</i> (Roxb.) R.Br.	Tree	Apocynaceae
38	<i>Ziziphus oenoplia</i> (L.) Miller	Straggler	Rhamnaceae

collected to use as fire wood (FW).

Acacia caesia (L.) Willd., *Albizia amara* (Roxb.) Boivin, *Prosopis juliflora* (Sw.) DC., *Pteralobium haxapetalum* (Roth.) Santapau & Wagh, *Vachellia horrida* (L.) Kyal. & Boatwr., *Vachellia leucoploea* (Roxb.) Willd. And *Ziziphus oenoplia* (L.) Miller plant parts such as leaves and pods are collected and used as fodder for cattle and goats. Some plants raw extracts

may contain organic chemical compounds that control disease causing microbes, pests, insects etc., such as *Acacia caesia* (L.) Willd., *Azadirachta indica* Adr. Juss., *Chloroxylon swietenia* D.C. and *Euphorbia antiquorum* L., *Prosopis juliflora* (Sw.) DC. Fruits of *Pteralobium haxapetalum* (Roth.) Santapau & Wagh used as vegetable by olden people.

Azadirachta indica Adr. Juss., *Wrightia tinctoria*

Table 2: Non-Timber Forest Products obtained from woody plants and their total important value of present study area.

S.No.	Name of the species	MED	FW	FOD	NP	CULT	Total
1	<i>Acacia caesia</i> (L.) Willd.	2	1	2	1	-	6
2	<i>Albizia amara</i> (Roxb.) Boivin	2	2	2	-	1	7
3	<i>Azadirachta indica</i> Adr. Juss.	5	2	1	3	2	13
4	<i>Benkara malabarica</i> Adanson	1	2	-	-	-	3
5	<i>Canthium parviflorum</i> Lam.	2	1	2	-	-	5
6	<i>Capparis sepiararia</i> L.	2	1	-	-	-	3
7	<i>Cassine glauca</i> (Rottb.) Kuntze	2	1	-	-	-	3
8	<i>Chloroxylon swietenia</i> D.C.	2	3	-	2	-	7
9	<i>Cissus quadrangularis</i> L.	3	1	-	1	-	5
10	<i>Cissus vitigena</i> L.	2	1	-	-	-	3
11	<i>Clausena dentata</i> (Willd.) Roxb.	1	1	-	-	-	2
12	<i>Cleistanthus collinus</i> Roxb.	1	1	-	-	-	2
13	<i>Commiphora berryi</i> (Arn.) Engl.	-	1	-	-	-	1
14	<i>Cordia obliqua</i> Willd.	2	1	-	1	-	4
15	<i>Derris scandens</i> (Roxb.) Benth.	1	2	-	1	-	4
16	<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	1	1	-	-	-	2
17	<i>Diospyros ebenum</i> J. Koenig Retz.	2	1	-	-	-	3
18	<i>Euphorbia antiquorum</i> L.	1	-	-	2	-	3
19	<i>Ficus benghalensis</i> L.	3	2	1	-	1	7
20	<i>Flacourtia indica</i> (Burm. f) Merr.	1	-	-	-	-	1
21	<i>Gmelina asiatica</i> L.	1	1	-	-	-	2
22	<i>Holoptelea integrifolia</i> (Roxb.) Planchon	1	-	-	-	-	1
23	<i>Jasminum angustifolium</i> Vahl.	1	1	-	-	1	3
24	<i>Jatropha gossypifolia</i> L.	1	1	-	1	-	3
25	<i>Lannea corromandelica</i> (Houtt) Merr.	1	1	-	-	-	2
26	<i>Paveta indica</i> L.	1	-	-	-	-	1
27	<i>Premna serratifolia</i> L.	1	-	-	-	-	1
28	<i>Prosopis juliflora</i> (Sw.) DC.	2	2	1	2	-	7
29	<i>Pteralobium haxapetalum</i> (Roth.) Santapau & Wagh	1	1	2	-	-	4
30	<i>Randia dumetorum</i> (Retz.) Poinet.	1	1	-	-	-	2
31	<i>Reissantia indica</i> (Willd.) N.Halle	-	1	-	-	-	2
32	<i>Senna auriculata</i> Roxb.	4	1	1	-	-	6
33	<i>Strychnos nuxvomica</i> L.	2	2	-	-	-	4
34	<i>Tarena asiatica</i> L.	1	1	-	-	-	2
35	<i>Vachellia horrida</i> (L.) Kyal. & Boatwr.	1	2	2	-	-	5
36	<i>Vachellia leucoploea</i> (Roxb.) Willd.	2	2	2	1	-	7
37	<i>Wrightia tinctoria</i> (Roxb.) R.Br.	2	1	-	2	2	7
38	<i>Ziziphus oenopia</i> (L.) Miller	1	1	2	1	-	5

Note: MED: Medicine, FW: Fire Wood, FOD: Fodder, NP: Natural Pesticide, CULT: Cultural

(Roxb.) R.Br., *Ficus benghalensis* L. and *Jasminum angustifolium* Vahl., are used during village functions to decorate and also people believes that they may prevent them from some disease transfer and body odour. Those plant species used in cultural activities during temple functions as sacred of deities. Such plant twigs are collected by the local community during their pooja

celebrations and some people collect them in some extent to earn money.

Plants or small and large forest vegetations are natural air purifiers, top soil managers, soil fertile and erosion protectors and ground water level and weather stabilizers.

Total important value analysis (TIV)

Total important value index has been calculated by

adding, up the different uses of plant species *i.e.*, bark, fruit, leaves, etc., (Table 2). *Azadirachta indica* A.Dr. Juss. (13) has obtained highest value as its parts used for different purposes such as medicine, fuel, fodder, natural pesticide to protect agricultural crops eco-friendly and also a major sacred plant (cultural activities also). Whilst *Albizia amara* (Roxb.) Boivin, *Chloroxylon swietenia* D.C., *Ficus benghalensis* L., and *Wrightia tinctoria* (Roxb.) R.Br. (each 7) too are considered sacred and have been used for medicine, fire wood, fodder, natural pesticides. Those plant extracts are sprayed along with Panchakavyam.

Conclusion

All the woody plant species (38) have non – timber forest products. The local community known about NTFPs using the sacred grove for collecting parts to improve their daily income by earning money through marketing the plant products such as seeds, shade dried leaves, fruits, roots, barks, etc. TIV index analysis showed that predominant plants that which are used by us in many ways. People must aware of such plants used as medicine, natural pesticide that used by farmers of previous generation to present generation and plants used cultural activities. Urban development in and around the forests and small sacred patches should be restricted by government and its related officials. People also owe to protect such vegetations and even a single tree. Sacred groves also get diminishing due to modernization. Government sectors must take necessary steps to conserve forest resources strictly because they conserve as from pollutions, soil erosions and natural disasters.

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