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ROLE OF SACRED GROVES IN CONSERVATION OF ETHNO - MEDICINAL PLANTS IN DAPOLI TEHSIL OF RATNAGIRI DISTRICT, MAHARASHTRA (INDIA)

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ABSTRACT

Forest pockets preserved on religious beliefs are playing vital role in conservation of different plant species. Sadavli, Kudavle, Pachavli, Bondivli and Burondi sacred groves of Dapoli tahsil are the best examples in having rare ethno-medicinal plants. These sacred groves cover an area of 58.40 ha. and consist 48 rare ethno-medicinal plants. Out of 48 species, 36 species from 34 genera belongs to 24 families of dicotyledons while 11 species from 8 genera belongs to 3 families of monocotyledons and 1 species belongs to gymnosperms. Eleven plant species are reported as threatened to Maharashtra and 12 species are endemic to Maharashtra. These rare ethno-medicinal plants are conserved due to religious beliefs and are not found generally in surrounding area.

Key words: Sacred groves, Threatened plants, Ethno-medicinal, Conservation.

Introduction

The practice of dedicating forest pockets to deities is common ancient custom in India (Kosambi, 1962). As deforestation has been taking place at a rapid rate in many areas, such sacred groves have come to be the only remnants of the original forest in a number of cases. Because of the absence of human interference the sacred forests support the climax vegetation appropriate for their particular locality. Such climax vegetation is rich in species of trees, climbers and epiphytes. As such, these sacred groves serve the vital function of preservation of plant species, which have become very rare or extinct elsewhere (Gadgil and Vartak, 1975). All components of vegetation like herbs, shrubs, climbers and lofty trees are supposed to be under the protection of the local deity of that sacred grove. Removal of even a small twig or harassing any animal is considered as a criminal act (Vartak and Gadgil, 1981). Upadhye *et al.* (2004) noted that the forests are the main resources for the collection of crude drugs and about 96% of the herbs are procured from wild. She also reported 10 threatened medicinal plants from 102 sacred groves of Pune district (M.S.). Jain *et al.* (2011) reported that the plant diversity of Western Madhya Pradesh is still preserved due to sacred groves because of strong religious beliefs held by the indigenous people of Jhabua district of Madhya Pradesh. Sukumaran and Raj (2008) reported 329 plant species from 201 sacred groves of Kanyakumari district in Tamil Nadu. Out of 329 species, 12 species were listed as rare, endemic and threatened. Kulkarni and Shindikar (2005) evaluated plant diversity in Shirkai sacred grove from catchment area of Panshet Dam of Pune district and reported 116 species from 54 families, which includes some rare endangered species also. They also reported that, such sacred groves should be conserved on priority basis as there is an urgent need to protect the germplasm required for *in situ* conservation. Mundlye (2002) documented 186 sacred groves from Dapoli, in addition to 186 sacred groves, Ghalme *et al.* (2010) reported 25 new un-noticed sacred groves from Dapoli tahsil. Since then no work on sacred groves has been undertaken in this area.

Realising the importance of ethno-medicinal plants for further scientific study and conservation, the study was conducted in five sacred groves of Dapoli tahsil, district Ratnagiri of Maharashtra state.

Study area

Dapoli Tahsil is totally hilly area, situated along the coastal side of Arabian sea. It lies between 17°4' 54'', N latitude and 73°10' 39'' E longitude and at 250 M. altitude. The geographical area is about 86398 km^2, out of the total area only 8310 hectares area is under cultivation of various crops and remaining area consist various types of forests and vegetation. The predominant soil type is lateritic, average rainfall received was about 3500 mm per annum. The average humidity in morning ranges from 89-93%. The average maximum temperature not goes beyond 30°C and minimum temperature 16°C. As per 2001 census the population of the tahsil was 1,93,430. The density of the population per square km was about 2.23. The percentage of rural

Dapoli tehsil of Ratnagiri district of Maharashtra was found to have 48 species of ethno-medicinal plants including 36 dicotyledons, 11 monocotyledons and 1 species of gymnosperms.

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Table 1 : Rare ethno- medicinal plants recorded are arranged according to botanical name, relevant plant family, vernacular name, known use of the plant in local medicine and status of threatened and endemic plants.

Sr. No.	Botanical name	Family	Vernacular name	Use of the plant in local medicine	Status of threatened and endemic plants
1	***Abrus precatorius*** L. **RLG 048**	Fabaceae	Gunj	**Throat infection or problem of sound:** Leaves are chewed 5-6 times in a day to get relief. **White / Red discharge:** Roots of *Hibiscus*, *Abrus* and Stem Bark of *Arjun Sadada* juice 1 cup in water which is placed overnight is given in the morning for seven days.	
2	***Alstonia scholaris*** (L.) R. Br. **RLG152**	Apocynaceae	Satvin	**Skin diseases:** ½ teaspoons bark powder with water is applied externally till cure. **Stomach ache and Acidity:** Stem bark eaten with coconut endosperm.	
3	***Atalantia racemosa*** Wight **RLG 001**	Rutaceae	Makad limbu	**Vet: Fever:**Leaf extract is mixed with jaggery solution in the proportion of 1:3 and is fed to the animal suffering from fever for-34 days. **Paralysis:** Leaves paste is used on paralysis. **Rheumatism**: root paste is used for body massage.	
4	***Calophyllum inophyllum*** L. **RLG150**	Clusiaceae (Guttifereae)	Undi	**Wound and Skin diseases :** Oil is applied directly on wound	
5	***Ceropegia attenuata*** Hook. **RLG 038**	Asclepiadaceae	Tilori	**Tonics:** Tubers are eaten as a tonic	Endangered and Endemic
6	***Ceropegia oculata*** Hook. **RLG027**	Asclepiadaceae		**Fever:** Tubers are given to child.	Critically endangered and Endemic
7	***Chlorophytum breviscapum*** **Dalz. RLG098**	Liliaceae	Phodshi	**Tonic:** Fresh / dried tubers are given. **Stomach problems:** Fresh leaves are used as vegetable and eaten specially in rainy season.	
8	***Chlorophytum tuberosum*** (Roxb.) Baker **RLG107**	Liliaceae	Phodshi	**Tonic:** Fresh / dried tubers are given. **Stomach problems:** Fresh leaves are used as vegetable and eaten specially in rainy season.	
9	***Curcuma amada*** Roxb. **RLG 115**	Zingiberaceae	Ran halad	**Fracture, swelling:** Paste is applied externally on fracture portion or swelling at night till cure	Vulnerable and Endemic
10	***Dalbergia candenatensis*** (D ennst.) Prain **RLG199**	Fabaceae	Garudvel	**Snake bite:** 1 cup leaf juice is given 3 times in a day. **Scorpion-sting:** 2 spoon leaf juice is given 3 times in a day and apply leaf extract on bite portion of body.	
11	***Dendrophthoe falcata*** (L. F.) Etting var. *falcata*. **RLG 110**	Loranthaceae	Bandgul	**Acidity:** 2 spoon leaves extract given orally two times per day.	
12	***Desmodium gangeticum*** (L.) DC. **RLG234**	Fabaceae	Salvan	**Urinary disorder:** A teaspoon of root infusion taken twice a day. **Jaundice:** Root is chewed.	
13	***Dillenia pentagyna*** Roxb. **RLG 230**	Dilleniaceae	Karmal	**Tonic:** 4-5 ripe fruits are eaten to cure increase appetite.	
14	***Santalum album*** L. **RLG 154**	Santalaceae	Chandan	**Cooling:** 2-3 gm stem powder with cup of water is given two times in a day	
15	***Saraca asoca*** (Roxb.) de Wilde **RLG 171**	Caesalpiniaceae	Ashok	**Menorrhoea:** Soak the bark powder in water. 10-20 ml of filtrate is given twice a day till cure.	

Sr. No.	Botanical name	Family	Vernacular name	Use of the plant in local medicine	Status of threatened and endemic plants
16	***Entada rheedei*** Spreng **RLG 236**	Mimosaceae	Garambi, Gaidhad	**Cuts:** Paste of leaves is directly applied on wound. **Snakebite:** ½ spoon powder of seed + 1 glass of water is taken orally only once. **Mumps**: Seed extract produced by crushing on stone is applied on infected part.	Endangered.
17	***Eranthemum roseum*** (Vahl.) R. Br. **RLG 081**	Acanthaceae	Dasamuli	**Wound/cut**: Root paste applied. **Stomach ache:** Fresh root juice is given to the patient.	Endemic
18	***Flacourtia montana*** Grah. **RLG 214**	Flacourtiaceae	Attak	**Stomach disorder:** The dried bark is crushed and makepowder.½cupful decoction is taken only once.	Endemic
19	***Curcuma pseudomontana*** Grah **RLG 085**	Zingiberaceae	Ran haldi	**Stomach disorder:** cooked rhizome is eaten.	Vulnerable Endemic
20	***Gloriosa superba*** L. **RLG 108**	Liliaceae	'Gauricha hat'	**Rheumatism:** The paste of root is applied externally once a day till cure. **Delivery:** At the time of delivery twig is used by local people.	
21	***Globba marantina*** L. **RLG 135**	Zingiberaceae		**Abortion:** Rhizome extract is taken orally for abortion.	
22	***Gnetum ula.*** Brongn. **RLG 188**	Gnetaceae	Shembi	**Massage:** Seed oil is used for body massage.	
23	***Gymnema sylvestre*** (Retz.) R. Br. Ex Schultes **RLG 267**	Asclepiadaceae	Bedkicha pala	**Diabetes:** ½ teaspoon powder of leaves is taken orally twice a day.	
24	***Habenaria grandifloriformis*** Blatt. & McC. **RLG 079**	Orchidaceae	Chickurkanada	**Stomach-ache:** Flowers are used as vegetable and eaten. **Tonic**: Tubers are eaten as tonic.	Lower Risk and Endemic
25	***Helicteres isora*** L. **RLG 207**	Sterculiaceae	Murudseng	**Diarrhoea:** Paste of fruit 1-spoon taken till cure **Cough:** Follicle decoction given 1 cup/day.	
26	***Holigarna arnottiana.*** Hook. F. **RLG 194**	Anacardiaceae	Bibba	**Cracks in feet**: Warm seed juice is applied at night.	Endemic
27	***Hitchenia caulina*** (Grah.)Baker **RLG 282**	Zingiberaceae	Chower	**Cut / wound:** Rhizome paste is applied on cut / wound.	Vulnerable and Endemic
28	***Holoptelea integrifolia (Roxb.)*** Planch **RLG 163**	Ulmaceae	Wavli	**Cut:** Juice of leaf is applied externally on cut only once.	
29	***Antiaris toxicaria*** (Pers.) Leschen. **RLG 283**	Moraceae	Jasund	**Diabetes:** Mature seeds are used for control of diabetics.	
30	***Hydnocarpus pentandra*** (Buch-Ham) Oken **RLG 036**	Flaortiaceae	Kadu-Kvath	**Leprosy**: seed powder is externally used.	Vulnerable and Endemic
31	***Mammea suriga*** (Buch-Ham. Ex Roxb.) Kosterm. **RLG 148**	Clusiaceae (Guttiferae)	Surangi	**Diarrhoea:** Fresh or powder of dried flowers is used in diarrhoea. **Ed:** ripe fruits are edible.	
32	***Nothapodytes nimmoniana*** J. Grah) Mabberley **RLG 059**	(Icacinaceae	Narkya	**Cancer**: All plant parts are used to control cancer.	Endangered.
33	***Plumbago zeylanica*** L. **RLG 252**	Plumbaginaceae	Chitrak	**Skin diseases:** Root paste is applied externally on infected skin.	

Sr. No.	Botanical name	Family	Vernacular name	Use of the plant in local medicine	Status of threatened and endemic plants
34	***Rauvolfia serpentina*** (L.) B th. Ex Kurz **RLG 257**	Apocynaceae	Sarpagandha	**Hypertension, High blood pressure:** The half-teaspoon root powdeis administered twice a day till cure	Endangered.
35	***Schleichera oleosa*** (Lour.) Oken. **RLG 280**	Sapindaceae	Kusum	**Rheumatism:** The seed oil is applied in rheumatic pains	
36	***Sterculia guttata*** Roxb. **RLG 166**	Sterculiaceae	Vandri	**Stomach ache:** Half teaspoon seed oil is given.	
37	***Strychnos dalzellii*** C.B.Cl. **RLG 266**	Loganaceae		**Ulcers:** Leaf juice applied externally on wound and ulcers.	Endemic
38	***Strychnos nux-vomica L.*** **RLG 205**	Loganaceae	Kajara	**Dysentery:** root bark is used to control.	
39	***Barleria prionitis*** L. **RLG 088**	Acanthaceae	Kate Koranti	**Dysentery:** root bark is used to control.	Vulnerable
40	*Terminalia cuneata* Roth **RLG 217**	Combretaceae	Aujun	**Heart Problem**Bark of stem is given as cardiac tonic. **Burning and wound**Ash of bark with coconut applied on burned skin **White discharge**Bark of*white Ain*+ leaf juice of white*Hibiscus*+ roots of*white Gunja* given.	
41	***Tinospora cordifolia*** (Willd.) Miers . **RLG 142**	Minispermacea	Gul vele	**Jaundice:** Decoction obtained from one ft. of stem after removing bark, is taken twice a day for 7 to 21 days. **Weakness:** 1 cup juice extracted from stem of *'Gulvel'* and all plant parts of *'Bharangi'* and *'Brahmi'* is given orally in morning	
42	***Thunbergia laevis*** Nees. **RLG 089**	Thunbergiaceae	Sarpasudha	**Snake bite**: About 1 cup fresh Leaf juice is given for 3-4 days.	
43	***Vanda testacea*** (Lindl.) Reichb. **RLG 101**	Orchidaceae	Hadaicha-lasun	**Ear-ache:** 2-3 drops of leaf juice put in infected ear.	
44	***Viscum angulatum*** Heyne ex DC. **RLG 157**	Loranthaceae	Sandhe Lingdum	**Rheumatism :** 1-2 spoon dried plant powder in boiled water 2 times per day.	
45	***Vitex altissima*** L.f. var. *altissima* **RLG 265**	Verbenaceae	Bavalge	**Bronchitis:** 1 teaspoon leaf decoction is given 2 times in a day.	
46	***Wrightia tinctoria*** R. Br. ssp. ***tinctoria*** **RLG 268**	Apocynaceae	Kala kuda	**Wounds:** The fresh latex is applied on wound twice a day.	
47	***Zingiber neesanum*** (Grah.) Ramam. **RLG 126**	Zingiberaceae	Nisam	**Piles:** 1 teaspoon juice of rhizome, two times per day till cure.	Vulnerable and Endemic
48	***Zingiber nimmonii*** (Grah.) Dalz. **RLG 102**	Zingiberaceae		**Piles:** 1 teaspoon juice of rhizome, two times per day till cure.	

population was about 91.79%. The percentage of schedule caste and schedule tribes in tahsil was 1.95. The main occupation is farming. These rural people are still depends on knowledge of local 'vaidoo' for primary health care. These local 'vaidoo' used fresh medicinal plants from sacred groves for healing human and animal illness. Dapoli tahsil contains 218 sacred groves comes to an area of 247.86 hectors, out of which Kudavle sacred grove, Sadavli sacred grove, Burondi sacred grove, Bondivli sacred grove and Pachavli sacred grove covers

an area 38.81 ha., 12.14 ha., 0.36 ha., 3.08 ha. and 4.01 ha. respectively were selected for present study. All sacred groves are well conserved and show moist semi-evergreen type of vegetation rich with plant diversity.

Material and Method

During 2006-2010 surveys were undertaken for preparation of an inventory of sacred groves of Dapoli tahsil. Total 218 sacred groves were invented out of which, 05 sacred groves having total area 58.40 hectares were selected for ethno-medico-botanical study. Ethno-medico-botanical survey of the selected study area was conducted by visiting several times in all seasons of the years 2010-2012. At the same time firsthand information was elicited from the local herbal doctors such as vaidoos and elder villagers. The tribal herbalists were taken individually to the sacred groves where they pointed out the herbs which they were useing to cure different ailments. The herbalists were then interviewed orally on the spot. The information obtained was cross checked form other herbalists.

The field data was collected as plant parts used, medicinal use and the local names of the plants. The information on medicinal uses of plants has been recorded on the basis of knowledge of 3 persons from different localities around sacred groves.

Plants specimens with ethno-medicinal value were collected either in flowering or fruiting stage from sacred groves. Further, specimens were processed as per routine herbarium techniques and identified with the help of available literatures (Cook, 1958; Sharma *et al.*, 1996; Singh and Karthikeyan, 2000 and Singh *et al.*, 2001). The herbarium specimens were consulted with the standard herbarium of Botanical Survey of India, Western Regional Centre, Pune and deposited in the herbarium of Research laboratory, Botany Department, Dapoli Urban Bank Senior Science College Dapoli, Dist. Ratnagiri.

List of all ethno-medicinal plants were prepared along with their botanical name followed by family, local name/s and use of the plant in local medicine. During field visits it was observed that some ethno-medicinal plants are occurring only in sacred groves and not in surrounding area of sacred groves. List of such 48 rare ethno-medicinal plants generally observed in selected sacred groves with botanical name followed by family, local name/s, use of the plant in local medicine and status of threatened and endemic plants are given in Table 1.

Results and Discussion

During the year 2006- 2010, 218 sacred groves were invented from Dapoli tahsil. Out of which, Sadavli sacred grove, Kudavle sacred grove, Pachavli sacred grove, Vanzaloli sacred grove and Burondi sacred grove are assessed ethno- medico - botanical point of view during 2010-2012. Total 281 plant species used by tribals and local people surrounding of selected five sacred groves have been reported.

During the field survey, it is observed that out of 281 plant species, 48 plant species were generally found only in sacred groves and not in surrounding area of sacred groves. Out of 48 plant species, 36 plant species from 34 genera belongs to 24 families of dicotyledons while 11 plant species from 8 genera belongs to 3 families of monocotyledons and 1 species belongs to gymnosperms.

From 48 ethno-medicinal plant species found generally only in sacred groves, 11 plant species falls under IUCN Red Data categories (Mishra and Singh, 2001). Out of 11 threatened species, 7 species from 6 genera belongs to 6 families of dicotyledons while 4 species from 4 genera belongs to 2 families of monocotyledons. Out of 11 species, 1 species is critically endangered, 3 species are endangered, 6 species are vulnerable and 1 species is lower risk category.

From 48 plant species, 12 species are endemic to Maharashtra state. Out of 12 endemic species, 7 species of 6 genera belongs to 5 families of dicotyledons and 5 species from 4 genera belongs to 2 families of monocotyledons.

Conclusion

These forest pockets preserved on religious beliefs are indicators of type of vegetation present in this area in the past. These sacred groves are good resources of rare ethno-medicinal plants.

The rare ethno-medicinal plants which are generally seen only in sacred groves are conserved due to religious beliefs in sacred groves and are not found generally in surrounding area of sacred groves. These might have been destroyed indiscriminately by people. Sacred groves are the last refuge for such medicinal plants, so attempt should be made to conserve these sacred groves.

The plant species like *Antiaris toxicaria* (Pers.) Leschen, family Moraceae is very rare, found only 1 tree specimen in only Sadavli sacred grove in Dapoli tahsil. Such species should be included in threatened category and should be conserved properly.

Some sacred groves are disturbed partially / completely due to decreased faith on deities and other causes. Such sacred groves require new plantation of indigenous plants and conservation measures.

रत्नागिरी जिला, महाराष्ट्र (भारत) की डयोली तहसील में मानव-औषधीय पादपों के संरक्षण हेतु पवित्र बागों की भूमिका

आर.एल. घालमे तथा एस.एस. देवकुले

सारांश

विभिन्न पादप प्रजातियों के संरक्षण में धार्मिक विश्वासों के कारण परिरक्षित वनीय स्थल, महत्वपूर्ण भूमिका निभा रहे हैं। डयोली तहसील के सदावली, कुदावली, पचावली, वोंडावली तथा बुरौन्डी के पवित्र बाग इसके उत्तम उदाहरण हैं। जहां दुर्लभ मानव-औषधीय पादप मौजूद हैं। इन पवित्र बागों का क्षेत्र 58-40 हे0 है। जिसमें 48 दुर्लभ मानव-औषधीय पादप मौजूद हैं। 48 प्रजातियों में से 36 प्रजातियां डायकोटेलेडन के 24 कुलों के 34 वंशों से संबंधित है जबकि 11 प्रजातियां, मोनोकोटोलेडन्स के 3 कुलों के 8 वंशों से संबंधित हैं और एक प्रजाति जिम्मोस्पर्मा की है। महाराष्ट्र में ग्यारह पादप प्रजातियां खतरे में बताई गई हैं। जबकि वहां की बारह प्रजातियां देशज हैं। ये दुर्लभ मानव-औषधीय पादप, धार्मिक विश्वास के कारण संरक्षित हैं और सामान्यत- जुड़े हुये क्षेत्रों में नहीं पाये जाते हैं।

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