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USEFUL PLANTS OF KABI SACRED GROVE, SIKKIM

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ABSTRACT

The paper provides the vegetation account of the Kabi Sacred Grove of North Sikkim and the detail information regarding utilization of the plants. The different medicinal plants used in traditional treatments of different ailments by the local inhabitants of the area are appended in the tabular form.

INTRODUCTION

The studies of sacred groves have become important worldwide today as it is not only embedded with rich floristic diversity amidst high endemism but also serves as natural habitat for many rare species. The importance of sacred grove in bio-diversity conservation has long been recognized (Kosambi 1962, Gadgil & Vartak 1976, 1996; Hajra, 1979, Gadgil & al. 1993; Lal 1989, Ramakrishnan & al., 1998). Sacred groves have been reported to exist in many parts of the world (Anonymous 1995) such as Ghana, Japan, Nigeria, Senegal, Indonesia, Syria and Turkey. In India sacred groves are mostly found in Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Rajasthan and Sikkim. However, no systematic studies (Dash & Chauhan 2002) so far been conducted on the sacred groves of Sikkim except some sketchy reference in some gazetteers.

Sikkim, one of the smallest states of India located in the Eastern Himalaya is blessed with ethnic and cultural diversity. The indigenous communities include Nepali, Bhutia, Lepcha, Sherpa, which coexist amicably thereby complementing each other due to their long interdependence of recognizable reciprocal obligation to participate in social, cultural, linguistic, religious and economic activities. A study in all the 4 districts of Sikkim reveals altogether 35 sacred areas, of which, 24 are terrestrial and 11 are aquatic either sacred lakes or water bodies. But due to urbanization, scientific breakthrough and fast changing scenario of the rural societies, these sacred area are shrinking rapidly. Today there is a need to give immediate attention to preserve these fragile ecosystem using successful traditional management practices reinforced with proper modern knowledge. The present paper highlights the useful plants of the grove so that necessary conservation measures can be introduced.

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STUDY AREA

Kabi Sacred Grove is situated about 22 km away towards North of Gangtok on Gangtok-Chungthang road at an elevation of 1950 m above mean sea level. The grove covers about 3 sq km of area and is bounded by households and degraded forests.

Climate:

The area enjoys a temperate monsoonic climate. Depending upon rainfall and temperature the year can be broadly divided into 3 distinct well marked seasons; Rainy season (June to September), Prolonged winter season (October – March) and very short summer season (April – May).

The maximum average winter temperature remains 13.6 °C and the minimum average summer temperature normally remains below 16 °C. Recorded highest and lowest mean temperature at Kabi for a year during 1999– 2000 is given in table–I.

Table I : Monthly average Temperature variation in Kabi

Months	April-1999	May-1999	June-1999	July-1999	August-1999	Sept.-1999	Oct.-1999	Nov.-1999	Dec.-1999	Jan.-2000	Feb.-2000	Mar.-2000
Max.	24.4	24.2	27.3	24.1	24.5	24.3	18.2	14.9	13.6	11.4	10.9	13.6
Mini.	16.6	15.7	20.6	20.5	20.1	18.7	17.2	11.7	10.2	6.8	6.5	8.8

South East monsoon is the main source of rainfall. Maximum rainfall occurs from early June to September, remaining July and August the wettest months. December is the driest month with minimum rainfall. Pre-monsoon showers or thunder showers often accompanied by hail, occur in the month of April and May. The winter season remains almost dried with a negligible amount of shower except in October and March. Monthly rainfall recorded in the Kabi grove varies from 10.7 mm to 788. 8 mm. The details is given in the table – II

Table II : Monthly rainfall variation in Kabi

Months	April-1999	May-1999	June-1999	July-1999	Aug.-1999	Sept.-1999	Oct.-1999	Nov.-1999	Dec.-1999	Jan.-2000	Feb.-2000	Mar.-2000
Rainfall	747.3	579	788	772	724	459.7	278.6	15.8	10.7	45	38.2	225.6
Total rainy day	18	23	23	31	29	22	13	5	6	9	6	21

As the grove is located in the temperate zone of Himalaya and amidst high density of vegetation it remains adequately humid throughout the year. Maximum relative humidity varies between 85 - 100% in June to September and minimum 50 - 65% in November to January.

Spiritual value and history of the Kabi Sacred Grove:

The historical background of the Kabi Sacred grove, locally known as *Kabi- Lungchuk* is till today alive basing on oral renditions though there is less evidences supporting it in Sikkim Gazetteer books. *Kabi- Lungchuk* literally a lepcha word means blood *stained stones* symbolizing the friendship between Lepchas and Bhutias. Etymologically it says *Ka= Hand; Wi= Blood; Lung= Stone; Chuk = Erection.*

The story goes back to the 12th century AD. The childless king of Sikkimese Bhutia tribe *Jo Khye Bhumsa* ruled over Tibet area. Even after several years still unable to have a child he came to Sikkim hoping for treatment. Sikkim was then under the rule of *Thekung Tek Nikung Nel* an ancestral Lepcha King. After receiving mantras from the Lepcha King of Sikkim he returned back to Tibet giving a promise that no sooner he turns a father he will give away his child to the Sikkim ruler. When he was blessed with a baby boy, he kept his promise and erected nine stones at this sacred spot and fenced the stones with animal intestine. Mount Kanchendzonga was the symbol of witness to this ritual. They invoked the entire guardian deities of Sikkim by cutting their finger and dropping blood from finger tips on the stones and took a solemn oath of brotherhood till the existence of Mount Kanchendzonga and river flowing through.

Every year on the 15th July the Sikkimese Lepcha and Bhutia people gather in this sacred grove seeking blessing for their generations to have happiness and prosperity thereby remembering the noble and holy promise made by their fore-fathers on this spot.

METHODOLOGY

The detail study of Kabi Sacred Grove was carried out from April 1998 to May 2000. The boundary of the area was defined with the help of State revenue map and existing wired fencing. Several exploration tours were undertaken in every season and the detailed floristic survey was done. About 750 plant specimens were collected and brought to herbarium Botanical Survey of India, Gangtok and identified with existing available literature. All the specimens processed, labeled and deposited in the Herbarium, Botanical Survey of India, Sikkim Himalayan Circle, and Gangtok (BSHC).

Traditional botanical knowledge particularly pertaining to the usefulness of the plants found inside the grove was collected. The details regarding uses of plants, the method of preparation of various doses, method of administration of the doses are discussed and documented. Later the information was cross checked with *local headman, Jakris and Lamas.*

RESULTS

Analysis of Flora:

Analysis of the plant diversity available within the boundary of the sacred grove revealed altogether 241 species. The species come under 183 genera, 84 families. The pteridophytic flora comprises of 13 families, 21 genera and 30 species and the angiosperm flora represented by 70 families, 161 genera and 210 species, while gymnosperms represented by a solitary species *Cryptomeria japonica.* Out of 84 families the dicotyledons represent 72.6 % and mono represent 10.7%, while the dicot genera represented by 17.58 % and monocot genera by 16.4 %. The monocot and dicot family, genera and species ratio are 1: 6.7, 1: 4.3 and 1: 4.25 respectively. There are 44 species of trees, 26 species of shrubs, 91 species of herbs, 21 species of climbers, 13 species of grasses and 16 species of epiphytes. Table III indicates the break up of the 241 species and table IV shows the number of genera and species in respect of 10 dominating families. The ten dominating families represent 66 genera and 86 species which is about 36 % of total genera and species encountered in the grove.

The families represented by single genus with single species are *Menispermaceae, Lardizabalaceae, Polygalaceae, Rhamnaceae, Vitaceae, Hydrangeaceae, Hamamelidaceae, Cucurbitaceae, Araliaceae, Lobeliaceae, Primulaceae, Symplocaceae, Boraginaceae, Cuscutaceae, Plantaginaceae, Amaranthaceae, Saururaceae, Proteaceae, Santalaceae, Daphniphyllaceae, Juglandaceae, Taxodiaceae and Acoraceae.*

Table III : Statistical Analysis of Flora found in the Kabi Sacred Grove

Category	Dicotyledons		Monocotyledons		Gymnosperms		Pteridophytes		Total
	Total	%	Total	%	Total	%	Total	%	
Family	61	72.6	9	10.7	1	1.19	13	15.47	84
Genera	131	71.58	30	16.4	1	0.54	21	11.4	183
Species	170	70.53	40	16.6	1	0.41	30	12.44	241

Table IV : Ten dominant families of Kabi Sacred Grove

Name of the families	**No. of genera**	**No. of species**
Asteraceae	11	12 + 2 var.
Araceae	3	7
Lamiaceae	6	8
Leguminosae	5	6
Orchidaceae	5	9
Poaceae	10	10
Polygonaceae	3	9
Rosaceae	5	6
Rubiaceae	11	13
Urticaceae	7	8
Total	66	88

Economic Plants:

Man's dependence on plants to fulfill the day to day requirements of life needs no exaggeration. Human being utilize the resources available around them in various way to fulfill the basic needs such as food, clothing shelter, different tools and even to cure the ailments they suffer from. The biodiversity of Kabi sacred grove gives a service to the community by providing a spiritual refuge and source for germplasm conservation as well as some economic utilization of plants. During the study it was observed that in spite of restriction, i.e., not to cut tree and not to destroy the diversity, beneficiaries do collect wood, medicinal parts of plants, edible fruits and orchids from the grove. Besides, a good number of plants are present within the grove which can be very much economically important. The plants which render service to the local people are mentioned below:

Sacred plants :

Eight plants or parts of plants are worshiped or used during different rituals by the people. The important plants are *Drepanostachyum intermedium, Arundo donax, Elaeocarpus lancaefolius, Elaeocarpus sikkimensis, Exbucklandia populnea, Erythrina arborescens, Saccharum rufipilus* and *Thunbergia lutea.* The sacred plants by and large are protected by the people and this mode of preservation over a large period of time reflects the social and ecological stability of the region and helps to conserve the germplasm.

Food :

Wild fruits and leaves are used by the people as food. Not only does it support the human society but also to animal husbandry system as fodder. The study revealed 11 species of plants with edible fruits and 12 species of plants with edible leaves. Table V shows the plants which are edible.

Table V : Plants with edible fruits and edible leaves

Plants with edible fruits	Plants with edible leaves
Agapetes serpens (Wight) Sleum.	*Aconogonon molle* (D. Don) Hara
Castanopsis indica (Roxb). DC.	*Cardamine circaeoides* Hook. f. & Thomson
Choerospondias axillaris (Roxb.) Burtt. & Hill	*Hovenia acerba* Thunb.
Fragaria nubicola (Hook. f.) Lacaita	*Houttuyinia cordata* Wall.
Holboellia latifolia Wall.	*Lysimachia debilis* Wall.
Persea fructifera Kosterm.	*Laportia terminalis* Wight
Prunus cerasoides D. Don	*Maotia puya* (Hook.) Weddell
Rubus ellipticus Smith	*Nasturtium officinale* Brown
Tetradium fraxinifolia (Hook.) T.G. Hartley	*Peperomia heyneana* Miquel
Tetrastigma serrulatum (D.Don) Hara.	*Persicaria chinensis* (L.) Gross
Trichosanthes lepiniana (Naud) Cogn.	*Polystichum* spp.
	Urtica dioica L.

Fuel wood :

Local inhabitants around the grove mainly depend on wood biomass for fuel which were usually collected from the outskirt areas, however occasionally fuel wood are also collected from inside the grove. Eight plants mainly used as fuel wood available in the sacred grove are *Clerodendron colebrookeanum, Clerodendron viscosum, Eurya acuminata, Myrsine semiserrata, Tetradium fraxinifolia, Vaccinium vacciniaceum, Viburnum erubescens, Rhododendron arboreum,* etc.

Timber valued trees :

Sixteen types of timber valued plants are present in the Kabi Sacred Grove. (Table VI) Although these plants are not for cutting and collection, but a long range preservation of these trees species helps in germplasm conservation and constitute a climax group of vegetation.

Plants with economic benefits :

Apart from this, people do collect plant specimens from the grove which fetches direct monetary benefits to them. The main plants are different kinds of mushroom, *Choerospondias axillaris* (Fruit), different kinds of edible fruits. *Thysanolaena maxima Cinnamomum tamala* (Bark.), *Rubia manjith* (Dye), *Engelhardia spicata* (Bark for tanning), *Smilax lanceifolia* (Drum stick) etc.

Table VI : Timber valued plants in Kabi Sacred Grove

Plants with timber value	Local name	Cost (Rs/cubic feet)	Used for
Alnus nepalensis D. Don	Utis	180/-	House construction
Albizia odoratissima Benth.	Kakur Siris	200/-	House construction
Albizia procera (Roxb.) Benth.	Seto siris	200/-	Cabinet, planks
Aphanamixis polystachya (Wall.) Parker	Lahasune	250/-	Beams, poles
Castanopsis indica (Roxb.) DC.	Dhalne katus	260/-	Beams, poles
Castanopsis lancifolia (Roxb.) Hickle & Camus	Patle katus	260/-	Beams, furniture
Castanopsis tribuloides (Smith) DC.	Murse katus	260/-	Beams, furniture
Engelhardia spicata Blume	Mouwa	300/-	Beams , furniture
Exbucklandia populnea (Griff). R.W. Brown	Pipli	200/-	Rarely used for sacred purpose
Lindera pulcherrima (Nees) Hook.f.	Sissi	—	Poles
Persea fructifera Kosterm.	Lapshi	—	Poles
Phoeb attenuata (Nees) Nees	Lapche Kawla	250/-	Planks, Cabinets
Alcimandra cathcartii (Hook f.) Thomson	Tite champ	550/-	Furniture
Michelia doltsopa DC.	Ranichamp	450/-	Furniture
Michelia velutina DC.	Gugay chanp	450/-	Furniture
Schima wallichii (Wight & Arn.) Farms	Aule chilaune	300/-	Planks, house beams, Poles

*Timber value in the local market during study period

Medicinal Plants :

The recurring theme of Ayurveda is that the body and mind should remain healthy and there must be equilibrium between the two. In this age of synthetic drug it is estimated that about 64% of the total global population dependent on traditional medicine for their health care system (Farnsworth 1994) while in India 75 – 80% of the population depends upon the traditional folklore medicines (Jain 1994). The local inhabitants around the Kabi sacred grove are also mostly depends upon the herbal cure and collect medicinal plans which are used by them very often to treat against various ailments they suffers from. Table VII shows the details of the medicinal plats, the parts used against the diseases and the methods of preparation and mode of administrations.

Table VII : Medicnal Plant of Kabi Sacred Grove and their uses

Name of plants	Family	Parts used	Remedy for	Mode of the use
Acoros calamus L.	ACORACEAE	Root	i) Cough, cold & fever ii) Epilepsy	i) Decoction of the root is taken orally to cure common cough and cold. ii) Rhizomes paste is made into small tablets of 5 mg each. One tablet twice daily taken orally to cure mental depression and headache.
Ainsliaea latifolia (D. Don) Hook. f.	ASTERACEAE	Root	Stomachache	i) The roots are pounded to a paste, the paste after dilution with warm water taken orally for stomachache caused due to indigestion.
Ajuga macrosperma Benth.	LAMIACEAE	Root	Stomachache	i) Decoction of the root taken orally to cure urinary disorders and burning sensation during urination. ii) Decoction of the root is also taken orally to cure hangover caused due to over consumption of liquor.
Anaphalis contorta (D. Don) Hook. f.	ASTERACEAE	Flower	Styptic	i) Flowers paste is applied on bleeding wounds as antiseptic.
Aphanamixis polystachya (Wall.) Parker	MELIACEAE	Seed	Anthelmintic	i) Seed paste is given orally to children to cure stomachache and expelling intestinal worms.
Artemisia nilagirica (C.B. Clarke) Pamp.	ASTERACEAE	Leaves, flowering shoot	i) Vermifuge ii) Febrifuge	i) Leaf paste is given orally to cure intestinal worm. ii) Two to three teaspoon of thick decoction of leaf and flowers given orally to cure fever.
Begonia cathcartii Hook. f. & Thomson	BEGONIACEAE	Whole plant	Febrifuge	i) Two teaspoon of the plant paste mixed with warm milk as an antipyretic drug.
Boenninghausenia albiflora (Hook.) Reichenb. ex Meisn.	RUTACEAE	Leaves	Inflammation	i) Leaf past is applied in and around the inflammatory part to get a quick relief from pain and swelling.
Brugmania suaveolens Bercht. & Pers.	SOLANACEAE	Leaves	Headache and cold	i) Leaf paste is tied in a clean cloth and squeezed in nasal cavity to clear congestion and sinusitis.
Centella asiatica (L.) Urb.	APIACEAE	Flowers	Antibiotic	i) Flower paste is applied around wounds of cattle for speedy recovery.
Cinnamomum tamala Nees & Eberm.	LAURACEAE	Bark	Diarrhoea	i) Bark paste is administered orally thrice a day.
Clerodendum viscosum Vent.	VERBENACEAE	Root	Inflammation	i) Root paste is applied on the affected area to get relief from pain and swelling.
Cuscuta reflexa Roxb.	CUSCUTACEAE	Stem	Rheumatism	i) Item paste is applied around the swollen parts to get relief from pain.

Name of plants	Family	Parts used	Remedy for	Mode of the Use
Dichrocephala integrifolia (L.f.) Kunze	ASTERACEAE	Leaves	Astringent	i) Leaf paste is tied around fresh wound for stopping bleeding.
Dichroa febrifuga Lour.	HYDRANGIACEAE	Root	Febrifuge	i) Root paste is administered twice daily for fever.
Didymocarpus pedicellata R.Br.	GESNERIACEAE	Leaves	Antiseptic	i) Leaf paste is applied in cuts and wounds as antiseptic.
Drymaria villosa Cham. & Schlecht.	CARYOPHYL-LACEAE	Whole plant	i) Cough and cold ii) Sinusitis	i) Ten grams of plant paste taken orally daily for cough and cold. ii)Plant paste is tied in a cloth, one or two drops of juice is squeezed in nasal cavity to cure sinusitis.
Erythrina arborescens Roxb.	FABACEAE	Seed	Rheumatic pains	i) Seed are grounded to a paste and applied around affected parts to alleviate swelling and pain.
Eurya acuminata DC.	THEACEAE	i) Seed ii)Leaf paste	i) Rheumatic pains ii) Insect antidote	i) Fruit paste is applied around the affected parts to get relief from pain in rheumatic. ii) Leaf paste is applied around the affected area and taken orally as antidote for insect biting. This application reduces the burning sensation of the affected area.
Hedera nepalensis K. Koch	ARALIACEAE	i) Stem ii) Leaves and fruits	i) Stomachic ii) Stimulants	i) Stem bark is crushed into paste and about 5 gms of paste taken orally with warm water for stomachache. ii) Equal amount of leaves and fruit paste mixed and taken orally as a sexual stimulant for women.
Hedyotis scandens Roxb. ex D. Don	RUBIACEAE	Root	Inflammation & Sprain	i) About 50gms of root bark is crushed into a paste and applied around the affected area in inflammation and sprain.
Houttuynia cordata Thunb.	SAURACEAE	Leaves	i) Purgative, ii) Stomachic	i) Leaf paste taken orally to cure chronic constipation. ii) It also cures stomachache and gastritis.
Lyonia villosa (Hook f.) Hand.-Mazz.	VACCINIACEAE	Leaves	Skin diseases	i) Leaf paste made night before is applied in the morning to cure skin diseases particularly itching sensation in the epidermal areas.
Musea chisia D. Don	MYRSINACEAE	Leaves bark	Insecticides	i) Equal amount of leaf and bark paste mixed and applied all over the body of domestic animals for relief from insects, worm and leech.
Nasturtium officinale Brown	BRASSICACEAE	Whole plant	Cough and cold	i) Plant paste is taken orally to cure cold.
Ophiorrhiza treutleri Hook. f.	RUBIACEAE	Leaves	Diuretic	i) Leaf paste is taken orally to cure burning sensation in urine.
Osbeckia nepalensis Hook.	MELASTOMATA-CEAE	Flowers	Antibiotic	i) Flowers paste is taken orally and applied on wounds for rapid recovery.
Persicaria hydropiper (L.) Spach	POLYGONACEAE	Leaves	Emmenagogue	i) Leaf paste taken orally to cure irregular menses.

Name of plants	Family	Parts used	Remedy for	Mode of the Use
Polygala arilata Buch.-Ham. ex D. Don	POLYGALACEAE	Root	i) Purgative ii) Febrifuge	i) Root paste taken orally to cure chronic dysentery. ii) Root bark and stem bark paste in equal amount to cure fever.
Plantago erosa L.	PLANTAGINACEAE	Leaves	Antiseptic	i) Leaf paste is applied around the injuries
Ranunculus diffusus L.	RANUNCULACEAE	Whole plant	Antiseptic	i) Leaf paste is applied on and around the injuries
Rhododendron arboreum Smith	ERICACEAE	Flower bud	Dysentery	i) Paste of the flower bud is taken orally to cure blood dysentery.
Rhus succedanea L.	ANACARDIACEAE	Branch gall, Leaves & bark	i) Expectorants, ii) Dysentery	i) The paste of branch gall is made into small tablets of 5mg each. Two tablets taken orally thrice a day to cure cough. ii) Equal amount (10gm each) of leaf and bark is made into paste and taken orally to cure blood dysentery
Rubus ellipticus Smith	ROSACEAE	Fruit	Jaundice	i) Root paste given orally against jaundice and liver ailments
Rumex nepalensis Sprengle	POLYGONACEAE	Leaves	Stomachic,	i) Leaf paste given orally to cure Antacids stomach upset ii) Leaf decoction is used as antiseptic
Sanicula elata Buch.-Ham. ex D. Don	APIACEAE	Whole plants & flowers	Blood dysentery. Antiseptic	i) About 5gms of plant paste is taken orally to cure blood dysentery. ii) Flowers paste is used as antiseptic
Solanum viarum Dun	SOLANACEAE	Fruit with bark	Cough & cold, Nasal congestion	i) Equal amounts of fruit and bark is mixed and crushed into a paste. One teaspoon of the paste is taken orally twice daily to cure viral cold. ii) The paste is also inhaled to cure nasal congestion.
Stellaria patens D. Don	CARYOPHYL-LACEAE	Whole plant	Piles	i) Plant paste is applied around the anus to get relief from pain in piles.
Tetradium fraxinifolium (Hook.) T.G. Hartley	RUTACEAE	Fruits with bark	Dysentery	i) 10 gms of fruit and bark past is taken orally to cure dysentery.
Thunbergia grandiflora Roxb.	THUNBERGIA-CEAE	Leaves	Stomachic	i) Leaf decoction is taken orally to cure indigestion
Thunbergia lutea Roxb.	THUNBERGIACEAE	Seeds	Abortifacient	i) Seed paste is taken orally within one week of the sexual intercourse for abortion.
Thysanolaena maxima (Roxb.) Kuntze	POACEAE	Root	Purgative	i) Root paste is applied around boils and carbuncles for easy burst.

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कबी पावन उपवन, सिक्किम में उपयोगी पौधे

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सार संक्षेप

आलेख में कबी पावन वन में पाए जाने वाले वनस्पतिजात का उल्लेख एवं उनके उपयोग का विस्तृत उल्लेख है। तालिका के रूप में औषधीय पौधों का पारम्परिक चिकित्सा में उपयोग भी दर्शाया गया है।