



Floristic study of kalbhairavnath sacred grove, Bharsakale, Satara, Maharashtra

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ABSTRACT

The Bharsakhale sacred grove is very unique in floral diversity. It comprises of 177 flowering plant species under 137 genera belonging to 65 families. This sacred grove is large source of important bioresources for local people. Therefore it is essential to protect these natural habitats.

Keywords: Bharsakhale, Western Ghats, Endemic, Sacred groves

1. INTRODUCTION

In India and many parts of the world, a number of communities practice different forms of nature worship. One such significant tradition of nature worship is that of providing protection to patches of forests dedicated to deities or ancestral spirits. These vegetation patches have been designated as sacred groves.

Sacred groves are dedicated by local communities to their ancestral spirits or deities. Such a grove may consist of a multi-species, multitier primary forest or a clump of trees, depending on the history of the vegetation. These groves are protected by local communities, usually through customary taboos and sanctions with cultural and ecological implications. The sacred groves have played an important role in preservation of vegetation in its virgin condition over many centuries. The religious belief associated with the sacred grove dates back to hunting and gathering phase of human evolution.

It is believed that the sacred groves originated after the introduction of the practice of agriculture and are found in almost all parts of India. They can be described as a mini-ecosystem containing a rich repository of nature's unique biodiversity. They are also a product of the socio-ecological philosophy of our ancestors.

In Maharashtra, sacred groves are found in tribal as well as non-tribal areas. The sacred groves in the western part are called Devrai or Devrahati, whereas in the eastern part the Madiya tribals call it Devgudi. A total of 2,820 sacred groves have been documented in Maharashtra (Deshmukh, 1999). Maruti; Vaghoba, Vira, Bhiroba, Khandoba and Shirkai are some of the deities to whom these groves are dedicated. The felling of timber and the killing of animals in the sacred groves is taboo. Sacred groves form an important landscape feature in the deforested hill ranges of the Western Ghats of Maharashtra (Ghate, 2014).

2. METHODOLOGY

The study area viz. 'Kalbhairvanath devrai' is located at Bharsakale village, Patan taluka, in Satara district (Maharashtra). It covers an area of about 40 hectares. Extensive floristic surveys were carried out in the sacred grove. Specimens of flowering plants were collected and identified with the aid of different floras (Yadav & Sardesai 2002; Sharma et. al 2001). The specimens were processed for herbarium. The botanical names are confirmed and upgraded according to current nomenclatural changes (TROPICOS; THE PLANT LIST).

3. RESULT AND CONCLUSION

An enumeration of plant species along with local names is given in Table 1. The analysis of floristic enumeration of species reveals a total of 177 species belonging to 137 genera under 65 families. The sacred grove comprises of 15% endemic (26 species), 2 % critically endangered (2 species), 3% endangered (5 species), 1.13% vulnerable (2 species), 0.6% low risk (1 species) taxa. Along with this, *Wagatea spicata* Dalzell a monotypic endemic taxa of Western Ghats which is highly recognized medicinal plant occurs in the study region.

Table 1 Enumeration of plant wealth of the sacred grove

Sr. No.	Botanical Name	Family	Common Name	Habit	Status
1.	<i>Acacia concinna</i> (Willd.) DC.	Mimosaceae	Shikakai	T	M
2.	<i>Acacia torta</i> (Roxb.) Craib	Mimosaceae	Chilar	T	
3.	<i>Achyranthes aspera</i> L.	Amaranthaceae	Aghada	H	EW
4.	<i>Actinodaphne angustifolia</i> Nees	Lauraceae	Pisa	T	
5.	<i>Adenoon indicum</i> Dalzell	Asteraceae	Sunki	H	
6.	<i>Aerides crispum</i> Lindl.	Orchidaceae	Kanvel	EH	
7.	<i>Aerides maculosum</i> Lindl.	Orchidaceae	Kanvel	EH	
8.	<i>Allophylus cobbe</i> (L.) Forsyth f.	Sapindaceae	Hadkya	MT	
9.	<i>Alternanthera ficoidea</i> (L.) P. Beauv.	Amaranthaceae	Chibukata	H	
10.	<i>Ancistrocladus heyneanus</i> Wall. ex J. Graham	Ancistrocladaceae	Kardal	L	M; En.
11.	<i>Anisomeles indica</i> (L.) Kuntze	Lamiaceae	Gopali	H	
12.	<i>Argyreia boseana</i> Sant. & Patel	Convolvulaceae	Gayri	S	En. End.
13.	<i>Arisaema murrayi</i> (J. Graham) Hook.	Araceae	Nagphani	H	
14.	<i>Artemisia nilagirica</i> (C.B. Clarke) Pamp.	Asteraceae	Ranvila	H	

15.	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Phanas	T	WE
16.	<i>Asystasia violacea</i> Dalzell	Acanthaceae		H	
17.	<i>Atalantia racemosa</i> Wight & Arn.	Rutaceae	Makadlimbu	MT	
18.	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Kadunimb	T	M
19.	<i>Bauhinia vahlii</i> Wight & Arn.	Caesalpiniaceae		T	O
20.	<i>Begonia crenata</i> Dryand.	Begoniaceae	Kaparu	H	WO
21.	<i>Breynia retusa</i> (Dennst.) Alston	Euphorbiaceae	Asana	S	
22.	<i>Bridelia stipularis</i> (L.) Blume	Euphorbiaceae		SS	
23.	<i>Callicarpa tomentosa</i> Lam.	Lamiaceae	Aisar	T	
24.	<i>Calotropis gigantea</i> (L.) W.T. Aiton	Asclepiadaceae	Rui	S	M
25.	<i>Canthium dicocum</i> (Gaertn.) Merr.	Rubiaceae	Tupa	MT	
26.	<i>Capparis rotundifolia</i> Rottler	Capparidaceae	Kolisna	SS	
27.	<i>Careya arborea</i> Roxb.	Lecithydaceae	Kumbha	T	M
28.	<i>Carissa carandas</i> L.	Apocynaceae	Karanvanda	S	
29.	<i>Caryota urens</i> L.	Areaceae	Fishtail palm	T	M.
30.	<i>Cassia fistula</i> L.	Caesalpiniaceae	Bahav	T	
31.	<i>Catunaregam spinosa</i> (Thunb.) Tirveng.	Rubiaceae	Gela	MT	M
32.	<i>Celtis tetrandra</i> Roxb.	Ulmaceae		T	
33.	<i>Ceriscoides turgida</i> (Roxb.) Tirveng.	Rubiaceae		T	
34.	<i>Ceropegia vincaefolia</i> Hook.	Asclepiadaceae	Mayalu	C	En; End.
35.	<i>Chlorophytum breviscapum</i> Dalzell	Asparagaceae	Musali	H	
36.	<i>Clematis gouriana</i> Roxb. ex DC.	Ranunculaceae	Ranjai	C	WO
37.	<i>Colebrookea oppositifolia</i> Sm.	Lamiaceae	Ukshi	H	
38.	<i>Combretum latifolium</i> Blume	Combretaceae	Piluk	L	
39.	<i>Commelina caroliniana</i> Walter	Commelinaceae	Kena	H	
40.	<i>Commelina forsskalaei</i> Vahl	Commelinaceae	Kena	H	
41.	<i>Commelina tuberosa</i> L.	Commelinaceae	Kena	H	
42.	<i>Crotalaria juncea</i> L.	Fabaceae	Tag	H	
43.	<i>Cryptolepis buchananii</i> R. Br. ex Roem. & Schult.	Apocynaceae	Kavali	C	
44.	<i>Curcuma neilgherrensis</i> Wight	Zingiberaceae	Ran Halad	H	
45.	<i>Curcuma pseudomontana</i> J. Graham	Zingiberaceae	Ran Halad	H	
46.	<i>Cyanotis cristata</i> (L.) D. Don	Commelinaceae	Nabhali	H	
47.	<i>Cyanotis tuberosa</i> Schult. f.	Commelinaceae	Abhali	H	
48.	<i>Cythocline purpurea</i> (Buch.OHam ex D. Don) O. Ktze var. <i>bicolor</i> Sant.	Asteraceae	Gangotra	H	CR
49.	<i>Dalbergia latifolia</i> Roxb.	Fabaceae	Shisav	T	
50.	<i>Dendrobium barbatulum</i> Wight	Orchidaceae		EH	
51.	<i>Dendrobium herbaceum</i> Lindl.	Orchidaceae		EH	
52.	<i>Dendrobium microbulbon</i> A. Rich.	Orchidaceae		EH	
53.	<i>Dendrobium ovatum</i> (L.) Kraenzl.	Orchidaceae		EH	
54.	<i>Dendrophthoe falcata</i> Ettingsh.	Loranthaceae	Bandgul	PH	
55.	<i>Dioscorea quartiniana</i> A. Rich.	Dioscoreaceae	Karand	C	WE
56.	<i>Diploclisia glaucescens</i> (Blume) Diels	Menispermaceae	Watanvel	L	En.
57.	<i>Elaeagnus latifolia</i> L.	Eleagnaceae	Nerli	L	WE; En.
58.	<i>Elaeocarpus glandulosus</i> Wall. ex Merr.	Elaeocarpaceae	Rudraksha	T	O
59.	<i>Entada rheedei</i> Spreng.	Mimosaceae	Garambi	L	En; M
60.	<i>Eranthemum roseum</i> R. Br.	Acanthaceae	Dasmuli	H	
61.	<i>Eria dalzellii</i> Lindl.	Orchidaceae	-	EH	

62.	<i>Eria reticosa</i> Wight	Orchidaceae	-	EH	
63.	<i>Eriocaulon gramineum</i> Bong.	Eriocaulaceae		H	
64.	<i>Eriocaulon stellulatum</i> Körn.	Eriocaulaceae	Chandani	H	
65.	<i>Eriocaulon tuberiferum</i> A.R. Kulk. & Desai	Eriocaulaceae	-	H	En. End.
66.	<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Nilgiri	T	
67.	<i>Eulophia spectabilis</i> (Dennst.) Suresh	Orchidaceae	-	H	
68.	<i>Euphorbia laeta</i> Aiton	Euphorbiaceae	Dudhi	S	EW
69.	<i>Exacum pumilum</i> Griseb.	Gentianaceae	-	H	
70.	<i>Ficus benghalensis</i> L.	Moraceae	Wad	T	WE
71.	<i>Ficus racemosa</i> L.	Moraceae	Umbar	T	WE; M
72.	<i>Flacourtia latifolia</i> (Hook. f. & Thomson) T. Cooke	Flacaurtiaceae	Tambat	MT	
73.	<i>Flacourtia montana</i> J. Graham	Flacaurtiaceae	Tambat	S	WE; En.
74.	<i>Flemingia strobilifera</i> (L.) R. Br.	Fabaceae	Kanphuti	S	
75.	<i>Glochidion ellipticum</i> Wight	Euphorbiaceae	Bhoma	T	
76.	<i>Gloriosa superba</i> L.	Liliaceae	Kal-lavi	C	M
77.	<i>Gnetum ula</i> Brongn.	Gnetaceae	-	C	En.
78.	<i>Gnidia glauca</i> (Fresen.) Gilg	Thymelaeaceae	Datpadi	S	M
79.	<i>Gomphrena serrata</i> L.	Amaranthaceae	-	H	
80.	<i>Grewia asiatica</i> L.	Tiliaceae	Phalsa	S	
81.	<i>Grewia microcos</i> L.	Tiliaceae	Shirali	MT	
82.	<i>Gymnema sylvestre</i> (Retz.) R. Br. ex Schult.	Asclepiadaceae	Bedkich pala	C	M
83.	<i>Gynura nitida</i> DC.	Asteraceae	Halad-Kunku	H	
84.	<i>Habenaria digitata</i> Lindl.	Orchidaceae	-	EH	
85.	<i>Habenaria grandifloriformis</i> Blatt. & McCann	Orchidaceae	Kavadi	H	
86.	<i>Habenaria longicorniculata</i> J. Graham	Orchidaceae	Gudhi	H	
87.	<i>Habenaria marginata</i> Colebr.	Orchidaceae	-	H	
88.	<i>Habenaria panchaganiensis</i> Santapau & Kapadia	Orchidaceae	Kavadi	H	En. End.
89.	<i>Habenaria rariflora</i> A. Rich.	Orchidaceae	Kavadi	H	
90.	<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult.	Asclepiadaceae	Anantamul	C	M
91.	<i>Heterophragma quadriloculare</i> (Roxb.) K. Schum.	Bignoniaceae	Waras	T	M
92.	<i>Heterostemma deccanense</i> Swarupan. & Mangaly	Apocynaceae	-	H	
93.	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Jaswandi	MT	O
94.	<i>Hitchenia caulina</i> (J. Graham) Baker	Zingiberaceae	Sonatakka	H	En. V
95.	<i>Holarrhena pubescens</i> Wall. ex G. Don	Apocynaceae	Pandhara kuda	T	
96.	<i>Holigarna grahamii</i> Kurz	Anacardiaceae	Ran-bibba	T	En.
97.	<i>Hoya wightii</i> Hook. f.	Apocynaceae	Dudh vel	EH	
98.	<i>Impatiens dalzellii</i> Hook. f. & Thomson	Balsaminaceae	Terda	H	En.
99.	<i>Impatiens inconspicua</i> Benth. ex Wight & Arn.	Balsaminaceae	-	H	
100.	<i>Impatiens lawii</i> Hook. f. & Thomson	Balsaminaceae	Ganga Gavar	H	En.
101.	<i>Impatiens pulcherrima</i> Dalzell	Balsaminaceae	Dhal terda	H	
102.	<i>Impatiens walleriana</i> Hook. f.	Balsaminaceae	Terda	H	WO; En.
103.	<i>Indigofera cassioides</i> Rottler ex DC.	Fabaceae	Chimnati	S	
104.	<i>Ixora brachiata</i> Roxb.	Rubiaceae	Kurati	S	WO
105.	<i>Ixora coccinea</i> L.	Rubiaceae	Bakora	S	
106.	<i>Ixora nigrescens</i> Drake	Rubiaceae	Kat-Kuda	S	

107.	<i>Ixora pavetta</i> Andrews	Rubiaceae	Nevali	MT	
108.	<i>Jasminum malabaricum</i> Wight	Oleaceae	Ran- mogara	SS	WO
109.	<i>Justicia adhatoda</i> L.	Acanthaceae	Adulasa	S	M
110.	<i>Justicia cuspidata</i> Vahl	Acanthaceae	-	H	
111.	<i>Lagerstroemia microcarpa</i> Wight	Lythraceae	Nana	T	
112.	<i>Leea indica</i> (Burm. f.) Merr.	Leeaceae	Dinda	S	WE
113.	<i>Leucas indica</i> (L.) R. Br. ex Sm.	Lamiaceae	Rudrapushpam	H	
114.	<i>Maesa lanceolata</i> Forssk.	Myrsinaceae	Aataki	S	
115.	<i>Magnolia champaca</i> (L.) Baill. ex Pierre	Magnoliaceae	Sonchapha	T	O
116.	<i>Malaxis rheedii</i> Sw.	Orchidaceae	-	H	
117.	<i>Mallotus pallidus</i> (Airy Shaw) Airy Shaw	Euphorbiaceae	Haldi-Kunku	T	En.
118.	<i>Mangifera indica</i> L.	Anacardiaceae	Amba	T	WE
119.	<i>Memecylon umbellatum</i> Burm. f.	Melastomaceae	Anjan	T	En.
120.	<i>Merremia umbellata</i> (L.) Hallier f.	Convolvulaceae	Motiya	C	
121.	<i>Meyna laxiflora</i> Robyns	Rubiaceae	Alu	MT	WE
122.	<i>Mimusops elengi</i> L.	Sapotaceae	Bakul	T	WO; M
123.	<i>Murdannia lanuginosa</i> G. Brückn.	Commelinaceae	Abolima	H	En. End.
124.	<i>Murdannia nudiflora</i> (L.) Brenan	Commelinaceae	-	H	
125.	<i>Murdannia simplex</i> (Vahl) Brenan	Commelinaceae	Nilima	H	
126.	<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	Kadhipatta	T	
127.	<i>Naravelia zeylanica</i> (L.) DC.	Ranunculaceae	-	C	
128.	<i>Nervilia infundibulifolia</i> Blatt. & McCann	Orchidaceae	Pachar-Kuda	H	
129.	<i>Nothapodytes nimmoniana</i> (J. Graham) Mabb.	Icacinaeae	Narkya	S	CR; En.; M
130.	<i>Oberonia recurva</i> Lindl.	Orchidaceae		H	
131.	<i>Olea dioica</i> Roxb.	Oleaceae	Parjamb	T	En.
132.	<i>Oxyceros rugulosus</i> (Thwaites) Tirveng.	Rubiaceae	Vel Gela	C	
133.	<i>Paracalyx scariosus</i> (Roxb.) Ali	Fabaceae	Ran Ghevada	C	En.
134.	<i>Paracaryum caelestinum</i> Benth. & Hook. f.	Boraginaceae	Nisurdi	H	
135.	<i>Pavetta crassicaulis</i> Bremek.	Rubiaceae	Papat	S	En.
136.	<i>Pavetta indica</i> L.	Rubiaceae		S	
137.	<i>Persicaria chinensis</i> (L.) H. Gross	Polygonaceae	Paral	CH	
138.	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Awala	T	M, WE
139.	<i>Pimpinella wallichiana</i> Gandhi	Apiaceae	Ranjire	H	
140.	<i>Pinda concanensis</i> (Dalzell) P.K. Mukh. & Constance	Apiaceae	Pand	H	En. LR
141.	<i>Pogostemon benghalensis</i> (Burm. f.) Kuntze	Lamiaceae	Pangali	H	
142.	<i>Pogostemon deccanensis</i> (Panigrahi) Press	Lamiaceae	Redangi	H	En.
143.	<i>Porpax reticulata</i> Lindl.	Orchidaceae		EH	
144.	<i>Protasparagus racemosus</i> Oberm	Asparagaceae	Shatavari	C	M
145.	<i>Prunus ceylanica</i> Miq.	Rosaceae	Badam	T	
146.	<i>Rhamphicarpa longiflora</i> Wight ex Benth.	Scrophulariaceae	Tutari	H	
147.	<i>Ricinus communis</i> L.	Euphorbiaceae	Erandi	MT	M
148.	<i>Rotheca serrata</i> (L.) Steane & Mabb.	Verbenaceae	Bharangi	S	WE
149.	<i>Scutia myrtina</i> (Burm. f.) Kurz	Rhamnaceae	Chimat	T	
150.	<i>Smithia agxharkarii</i> Hemadri	Fabaceae	Kawla	H	En.V
151.	<i>Smithia hirsuta</i> Dalzell	Fabaceae	Nal	H	
152.	<i>Smithia sensitiva</i> Aiton	Fabaceae	Wakal	H	
153.	<i>Solanum anguivi</i> Lam.	Solanaceae	Chichurdi	H	M,WE

154.	<i>Striga densiflora</i> (Benth.) Benth.	Scrophulariaceae	Tarphula	PH	
155.	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Jambhul	T	M
156.	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae	Unhali	H	M
157.	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjun	T	M
158.	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	Behada	T	M
159.	<i>Terminalia chebula</i> Retz.	Combretaceae	Hirada	T	M
160.	<i>Terminalia crenulata</i> Roth	Combretaceae	Kinjal	T	
161.	<i>Terminalia elliptica</i> Willd.	Combretaceae	Ain	T	
162.	<i>Thunbergia fragrans</i> Roxb.	Thunbergiaceae	Dahyali	C	WO
163.	<i>Tragia hispida</i> Willd.	Asteraceae		H	
164.	<i>Tylophora dalzellii</i> Hook. f.	Asclepiadaceae	Pitmari	C	
165.	<i>Utricularia caerulea</i> L.	Lentibulariaceae	Dhavadi	H	
166.	<i>Utricularia graminifolia</i> Vahl	Lentibulariaceae	-	H	
167.	<i>Utricularia reticulata</i> Sm.	Lentibulariaceae	-	H	
168.	<i>Vernonia indica</i> C.B. Clarke	Asteraceae	Bramhadandi	S	
169.	<i>Wagatea spicata</i> Dalzell	Caesalpiniaceae	Wakeri	S	ME; M
170.	<i>Wattakaka volubilis</i> (L. f.) Stapf	Asclepiadaceae	Hiran-dodi	C	
171.	<i>Wendlandia thyrsoides</i> (Roem. & Schult.) Steud.	Rubiaceae	Pervi	H	
172.	<i>Woodfordia fruticosa</i> (L.) Kurz	Lythraceae	Dhayati	S	M
173.	<i>Wrightia tinctoria</i> R. Br.	Apocynaceae	Kalakuda	T	
174.	<i>Xantolis tomentosa</i> (Roxb.) Raf.	Sapotaceae	Kombal	T	
175.	<i>Zanthoxylum rhetsa</i> DC.	Rutaceae	Tirphal	T	
176.	<i>Zingiber neesatum</i> (J. Graham) Ramamoorthy	Zingiberaceae	Ran-Ale	H	
177.	<i>Ziziphus rugosa</i> Lam.	Rhamanceae	Toran	S	WE; En.

Note: H- Herb; S- Shrub, T- Tree; MT- Medium tree; C- Climber; L- Liana; EH- Epiphytic Herb; SS – Small Shrub; CH – Climbing Herb; PH – Parasitic Herb.

En. - Endemic; WE – Wild Edible; M – Medicinal; WO – Wild Ornamental; EW – Exotic Weed; ME – Monotypic Endemic; O- Ornamental; CR- Critically Endangered; LR – Low Risk; End. – Endangered; V- Vulnerable

The habitat analysis showed that the herbs predominate with 64 species (36.36 %) followed by trees (41 species 23.29%), shrubs (24 species 13.63%), climbers (16 species 9.09%), medium trees (10 species 6%), lianas (5 species 3%) and small shrubs least with (3 species 2%). Along with these some species represent special habit such as epiphytes 11 (6.25%), parasitic herbs 2 (1.13%), climbing herb 1 (0.56%). The family Orchidaceae is dominant with 19 species followed by Rubiaceae 12 species and Fabaceae 9 species (table 2 – 5).

Table 2 Statistical Analysis of the present investigation

Class		Families	Genera	Species
Gymnosperm		01	01	01
Dicotyledons	Polypetalae	28	46	59
	Gamopetalae	18	50	58
	Monochlamydae	09	18	19
Monocotyledons		09	22	40

Table 3 Largest families with maximum number of taxa

Sr. No.	Families	No. of taxa
1.	Orchidaceae	19
2.	Rubiaceae	12

3.	Fabaceae	09
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Table 4 Analysis habit of species

Sr. No.	Habit	No. of taxa
1	Herb	64
2	Tree	41
3	Shrub	24
4	Climber	16
5	Epiphytic herb	11
6	Medium tree	10
7	Liana	5
8	Small shrub	3
9	Parasitic herb	2
10	Climbing herb	1

Table 5 Analysis of status of species

Endemic	26
Medicinal	26
Wild edible	13
Wild ornamental	7
Endangered	5
Ornamental	4
Critically Endangered	2
Vulnerable	2
Exotic Weed	2
Low Risk	1
Monotypic Endemic	1

About 80 % of herbal medicines are being collected from forests and natural habitats. Due to different anthropogenic activities natural habitats are under great threat. This has resulted in decline of bioresources obtained from forests. Traditionally human has conserved forests in form of sacred groves which are the real way of *in situ* conservation. These groves had been serving the society since past. Sacred groves harbors unique plant species cannot grow in open forests or plains such as *Entada*, orchids etc. The study reveals the importance of sacred groves in socioeconomic aspects and need of protection of such sites. It also reveals that there is a need to create awareness among the ethnic groups about the use and conservation of resources of sacred groves.

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