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RESEARCH ARTICLE

Floristic composition in Paramananda Devara Gudda A sacred grove at Lingadahalli Village Devadurga Taluk Raichur District Karnataka, India

Theophilus Deenadayal*, Tarun Jain

Abstract

Sacred groves are an important feature of any preservation of diversity as they are ecological, cultural and medicinal assets. A survey conducted in this study aimed to determine floral diversity in the *Paramananda Devara Gudda* sacred grove utilizing Shannon–Wiener (SW = 4.29), Simpson's Diversity (SD = 1.00), and Species Diversity (SD = 0.78). The analysis pointed out a number of genera, that is, Crotalaria and Indigofera having the most species (10 species of each) other than *Blumea* and *Vachellia* with five species each respectively. Other genera, which also pointed to the high diversities within the site, included *Cleome, Cyperus, Albizia* and *Ziziphus*. This grove is not only valuable in terms of having unique and outstanding features as ecological and cultural taxa, nitrogen-fixing plants including *Indigofera* and *Crotalaria, Phyllanthus, Ocimum* as medicinal plants, and multipurpose plants including Aloe, *Carrisa, and Aegle*. High indices are explained by the values of effective species equality and the species sharing minimal impacts, the low-representation genera match with called for conservation program. The *Paramananda Devara Gudda* is a holy grove performing vital ecosystem services of conservation and, hence, is a very important biore-cultural site. The present research focuses on the community approach to sustainable management of regional diversity and cultural resources.

Keywords: Sacred Grove, Shannon-Weiner index, Simpson's diversity index, floral diversity, conservation, Paramananda Devara Gudda, ecological stability, ethnomedicinal plants.

Introduction

This thing of worshipping nature has been considered very natural all through the ages and especially in India, it is considered to be deep rooted. Sacred groves, a special form of this nature worship, are stands of trees that are protected by the local people in order that they might serve as dwelling places for deities of regions. These groves, usually unconverted primitive forests, are more diverse and biologically productive and have been conserved by indigenous people through the use of cultural norms, cultural values and ethnoreligious beliefs and taboos (Gadgil and Vartak, 1976; Telly, 2006). Sacred groves, rituals and sustainable community development in Ghana. *The Role of Sacred Natural Sites and Cultural Landscapes*, 194; Das, 1997; Kumar *et al.,* 2023). They act as important reserves of rather specialized plants and animals, often considered the remains of the pristine tropical forests, which cannot be logged because spirits dwell in the spiritual groves (Mandal *et al*., 2024). There are traditions of nature worship in India among different tribes who believe that any type of living being must be saved. Consequently, sacred groves provide diverse information genetic bases such as forest species with socio-religious and medicinal utilities (Berked, 2017; Behera & Mishra, 2023; Ain *et al*., 2023).

Sacred groves are an in-situ conservation strategy for plant diversity that is strongly associated with traditional customs, beliefs, prohibitions and norms, which strengthen its ecological use. But in the modern generation, those traditional values and socio-cultural practices are becoming less and less and mostly in the youthful population. This cultural transformation, in conjunction with socio-economic and environmental factors, has further lesser importance for these sacred groves from the social, religious and cultural viewpoint and that is why we are gradually observing the

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exclusion of these groves from the rural terrains of India (Imarhiagbe and Ogwu, 2022; Trehan and Trehan, 2024; Chandra & Sharma, 2021).

Traditional sacred groves are renowned as natural reserves and religious shrines, which are highly valued within existing ecosystems. It is a center for the preservation of species genetic diversity and plays an important role in supporting other species. An example of the cultural history that interweaves cultural sites is Paramananda Devara Gudda, located in Lingadahalli Village Devadurga Taluk Raichur District Karnataka and ecological sustainability (Haryana, 2023; Deb & Malhotra, 2022). These groves, guarded and worshipped by tribal communities, have been identified to conserve bio-diversity and endemic plant and animal species, which directly reflect residual interaction between local culture and nature (Brockington, 2012; Manna & Roy, 2021). Yadgir's sacred forest at Chintanapalli is home to angiosperm plants. Out of 209 species from 169 genera and 57 families, 54 were deemed to be medicinally relevant, and 14 were placed on the Red List. About 60 tree species, 34 shrubs, 89 plants, 21 twiner/climbers, three aquatic species, three parasitic species, and one liana are all included in this study (Pratima Mathad and Rajasamarsen K Modi, 2015).

Due to the restrictions with anthropogenic impacts on sacred groves, they afford a unique potential in providing flora that are endemic or rare and, indeed, those plants with medicinal benefits. A great deal of research conducted in different parts of India has highlighted the utility of sacred groves in maintaining bio-equilibrium and protecting plant generics of aboriginal areas (Khan *et al.,* 2008; Chandran *et al*., 2012). Ethnomedicinal plants, often called "traditional medicinal plants," have been integral to human health and well-being for centuries. Across various cultures, plants have served as the primary source of medicinal remedies for different ailments long before the advent of modern pharmaceuticals (Farnsworth et al., 1985). In many indigenous communities, plants are still the cornerstone of healthcare, especially in regions where access to modern medical facilities is limited (Balick & Cox, 1996). Paramananda Devara Gudda is unique in that it is located in a semi-arid zone which has its own climatic and soil requirements for plant growth. The initial findings reveal there are many endemic and economic plant species that form part of medical practices and religious beliefs. Nonetheless, considerable research has not been conducted on the species composition of this sacred grove, underlining the importance of future methodical investigation, which would help various specialists better assess its significance for the development of landscape and ethnobotanical parks.

Methodology

Study Area

The study area Paramananda Devara Gudda is a sacred grove and its geographic coordinates are in Lingadahalli village, Devadurga Taluk, Raichur District, Karnataka, India. The grove can be found in a climatically marginal zone and is embedded in a semi-desert climate which features a rugged terrain and an availability of water typical of the region. This stunning place is located in the part of Karnataka that receives a tropical dry climate characterized by differences in monthly temperature and rainfall patterns. The Latitude is 16.2326°N & Longitude is 76.7082°E, which has moderate levels of rainfall and high temperatures all throughout the year but higher in the summer season as illustrated in Figure 1. A nature cum religious site – Devara Gudda, also known as Paramananda Devara Gudda, is located at an altitude that has a slightly better climate as compared to the agricultural fields. This makes the grove an independent ecological area. In this, it shelters a wide variety of plant life, some of which are native to the region. The entire forest patch is dedicated to the local deity of Lord Shiva, Where there is no cutting of trees and killing of animals is strictly prohibited. However, some of the medicinal plants and flowers are collected to worship god and treat different illnesses.

Methodology

The survey had been planned in such a way as to cover all the possible forest areas of the region in Lingadahalli Village, Devadurga Taluk, Raichur District, Karnataka, India, during all the seasons. Comprehensive and exhaustive data on the vegetation of the entire forest area was collected. Fidelibus and Mac Aller (1995) have agreed that in a study site, quadrate can be established regularly, subjectively, or randomly.

The floristic and physiognomic characteristics were studied and recorded during the said period. A stratified random sampling approach was established. A squared field plot of size 20m x 20m (Standardized Quadrat Structure) was inventoried. During the survey, most of the species were identified and recorded on site. If immediate identification was not possible, specimens were collected for later identification with keys. Unidentified plants were collected, dried using standard herbarium techniques and identified. Plant species identification was conducted using the following references: *Flora of Gulbarga District* by Seetharam *et al*. (2000), *Flora of the Presidency of Madras* (Volumes I to III) by Gamble (1957), *Flora of North Eastern Karnataka* by N.P. Singh (1988), and the detailed studies *Flora of Karnataka* (Volume I, 1984 and Volume II, 1996) by Saldanha & Larsen. Photographs and voucher specimens of the identified species were deposited in the Herbarium of the Department of Botany at Sunrise University, Alwar, Rajasthan (HSUR).

The recorded data were utilized to calculate the following calculation.

- Frequency – Proportion of the total number of samples taken that contain the species.

%F = No. of quadrats in which species present/ Total no. of quadrats studied × 100

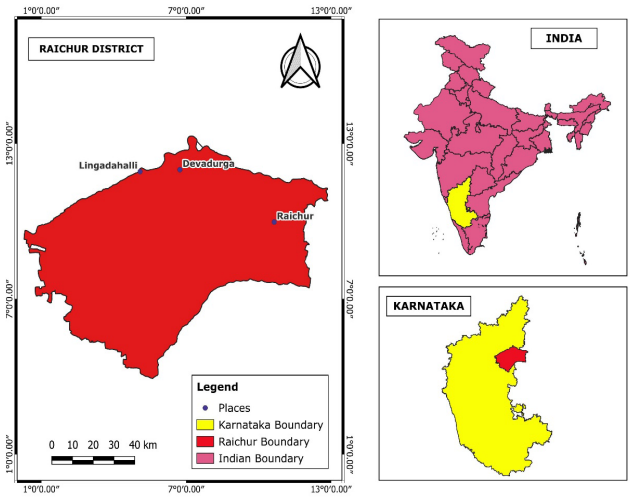


Figure 1: Map of Lingadahalli Village, Devadurga Taluk, Raichur District, Karnataka, India

- Density – Number of individuals expressed per unit area.

D = No. Of individuals of a species/ Total no. of quadrats studied

- Abundance – Total number of individuals of a species in all quadrats studied.

AB = Total no. of individuals of a species/ No. Of quadrats in which the species occurred

- Shannon-Weiner Diversity Index (H')

$$H' = -\sum_{i=1}^{S} p_i \ln(p_i)$$

The Shannon-Weiner Index is calculated using the formula:
Where:

- H' is the Shannon-Weiner Diversity Index,
- S is the total number of species,
- pi is the proportion of individuals or abundance of species iii relative to the total number of individuals for all species,
- ln is the natural logarithm.

- 5. Simpson's Diversity Index (D)

The Simpson's Diversity Index has two common versions, D and 1 - D (or 1 / D for the reciprocal Simpson's index).
The formula for Simpson's Index is:

$$D = \sum_{i=1}^{S} p_i^2$$

Where:

- D is Simpson's Index,
- S is the total number of species,
- Pi is the proportion of individuals or abundance of species iii relative to the total number of individuals for all species.

For Simpson's Diversity Index, 1 - D or the reciprocal 1 / D is often used to interpret diversity, where higher values indicate greater diversity.

Result and Discussion

The survey reveals about 328 plant species belonging to 207 genera and 56 families. The plant species are categorized and dividing the plants into trees, herbs and shrubs based on typical classifications shown in Table 1.

Distinguishing trees, herbs and shrubs in systems of botanical classification is important for the purpose of relating a plant's use or role in the ecosystem and its growth patterns. Incorporating existing discoveries, the additional studies to date remain relevant to understanding the functional significance of these plant categories in the different ecosystems with emphasis on their aspects such as pharmacological or medicinal purposes, and habitat and species conservation. Trees are tall, long-lived plants with a single main axis (trunk) that bears the leaves or branches. They live long and are quite large and this makes them offer various important environmental functions, including acting as carbon sinks, wildlife shelters, and soil stabilizers.

Sacred groves, which are conserved due to their religious, cultural, and ecological significance, often harbor a diverse array of medicinal plants used by local communities in traditional healing practices. These plants revered both for their therapeutic properties and spiritual value, are integral to the health practices of Indigenous populations. Among the plants found in such groves, *Carissa carandas* (Karonda) is used for treating gastrointestinal disorders, with its fruit and leaves serving as remedies for dysentery and skin infections. Similarly, *Aegle marmelos* (Bael), highly regarded in Hindu tradition, offers medicinal benefits such as improving digestion and treating fever, while its leaves are used in purification rituals. Other plants like *Cadaba fruticosa* and *Acalypha indica* have a long history in traditional medicine, treating ailments ranging from rheumatism, snake bite, and skin diseases to malarial fevers. The presence of these plants in sacred groves underscores their dual role in both ecological preservation and the maintenance of community health.

In addition to their medicinal value, plants such as *Aloe vera* and *Catunaregam spinosa* are integral to the spiritual and ritualistic life of the communities that use them. *Aloe vera*, known for its wound-healing and digestive properties, is commonly used in both physical treatments and spiritual cleansings, while *Catunaregam spinosa* is prized for its antimicrobial effects and is employed in healing rituals for infections and fever the panoramic view of sacred grove and some of the selected plants with fallen tress is shown in Plate 1.

According to the World Health Organization (WHO), approximately 80% of the global population relies on plant-based remedies for their primary healthcare needs (WHO,

Table 1: Calculating the density, abundance and frequency by quadrate method- Lingadahalli Village, Devadurga Taluk, Raichur District, Karnataka

S. No	*Plant Species*	*Family*	*Density = A/B*	*Abundance= A/C*	*Frequency (%) = C/B* 100*
1	*Barleria longiflora* L.	Acanthaceae	2.2	2.93	75
2	*Barleria prionitis* L.	Acanthaceae	3	4.29	70
3	*Barleria tomentosa* Roth	Acanthaceae	1.05	2.63	40
4	*Blepharis integrifolia* (L.f.) E. Mey. & Drege ex Schinz	Acanthaceae	1.1	2.75	40
5	*Blepharis maderaspatensis* (L.) Roth	Acanthaceae	1.9	3.8	50
6	*Dicliptera paniculata* (Forssk.) I.	Acanthaceae	1.2	3	40
7	*Dipteracanthus prostratus* (Poir.) Nees	Acanthaceae	1.15	3.83	30
8	*Elytraria acaulis* (L.f.) Lindau	Acanthaceae	0.95	2.71	35
9	*Hygrophila auriculata* (K.Schmach.) Heine	Acanthaceae	1.4	3.11	45
10	*Indoneesiella echioides* (L.) Sreem	Acanthaceae	1.6	2.91	55
11	*Justicia diffusa* Willd	Acanthaceae	1.75	3.18	55
12	*Justicia glauca* Rottler	Acanthaceae	1.85	3.7	50
13	*Lepidogathis cristata* Willd.	Acanthaceae	1.9	3.8	50
14	*Rostellularia procumbens* (L.) Nees	Acanthaceae	2.45	3.77	65
15	*Rungia elegans* Dalz.	Acanthaceae	1.4	2.8	50
16	*Rungia linifolia* Nees	Acanthaceae	1.65	3.3	50
17	*Trianthema portulacastrum* L.	Aizoaceae	1.8	3.6	50
18	*Trianthema triquetrum* Rottl.ex Willd.	Aizoaceae	0.85	2.43	35
19	*Achyranthes aspera* L.	Amaranthaceae	1.95	3.25	60
20	*Alternanthera pungens* Kunth	Amaranthaceae	1.1	1.83	60
21	*Alternanthera sessilis* (L.) R. Br. Ex A. DC.	Amaranthaceae	1.15	2.56	45
22	*Alternthera philoxeroides* (Mart.) Griseb.	Amaranthaceae	0.9	1.5	60
23	*Aerva lanata* (L.) Juss.	Amaranthaceae	2.1	4.2	50
24	*Chenopodium album* L.	Amaranthaceae	4.7	5.53	85
25	*Gomphrena celosioides* Mart L.	Amaranthaceae	2.15	2.87	75
26	*Pupalia lappacea* (L.) Juss.	Amaranthaceae	1.65	2.36	70
27	*Trichuriella monsoniae* (L.f.) Bennet	Amaranthaceae	1.95	2.79	70
28	*Calotropis gigantean* (L.) W.T.Aiton	Apocynaceae	1.15	1.77	65
29	*Calotropis procera* (Aiton) W.T.Aiton	Apocynaceae	2.6	3.71	70
30	*Carissa spinarum* L.	Apocynaceae	4	4.44	90
31	*Catheranthus roseus* (L.) G. Don	Apocynaceae	1.7	3.4	50
32	*Caralluma adscendens* var. fimbriata (Wall.) Grav. & Mayur	Apocynaceae	1.65	2.75	60
33	*Cryptolepis buchanani* R. Br. Ex Roem. & Sch.	Apocynaceae	1.75	3.18	55
34	*Cryptostegia grandiflora* Roxb. ex R.Br.	Apocynaceae	1.25	2.78	45
35	Cynanchum acidum (Roxb.) Oken	Apocynaceae	1.7	3.4	51
36	*Hemidesmous indicus* (L.) R.BR.	Apocynaceae	1.55	3.1	50
37	*Oxystelma esculentum* (L.f.) R. Br.	Apocynaceae	1.85	3.7	50
38	*Pergularia daemia* (Forsk.) Chiov.	Apocynaceae	1.4	3.5	40
39	*Stephanotis volubilis* (L.f.) S. Reuss	Apocynaceae	1.5	3.33	45
40	*Rauvolfia tetraphylla* L.	Apocynaceae	1.25	3.13	40
41	*Aristolochia indica* L.	Aristolochiaceae	1.95	3.25	60

42	*Aristolochia bracteolata* Lam.	Aristolochiaceae	1.85	2.64	70
43	*Agave americana* L.	Asperagaceae	1.25	2.78	45
44	*Asparagus racemosus* Willd.	Asperagaceae	1.65	2.75	60
45	*Drimia indica* (Roxb.) Jessop	Asperagaceae	1.3	3.25	40
46	*Ledebouria revoluta* (L.f.) Jessop	Asperagaceae	1.35	3	45
47	*Aloe vera* (L.) Burm. f.	Asphodelaceae	1.45	3.22	45
48	*Acanthospermum hispidum* DC.	Asteraceae	1.65	3.67	45
49	*Ageratum conyzoides* L.	Asteraceae	1.6	3.56	45
50	*Blumea axillaris* (Lam.) Dc.	Asteraceae	1.25	2.78	45
51	*Blumea eriantha* DC.	Asteraceae	1.1	2.75	40
52	*Blumea lacera* (Burm.f.) DC.	Asteraceae	1.2	3.43	35
53	*Blumea malcolmii* Hook. f.	Asteraceae	0.95	3.17	30
54	*Blumea obliqua* (L.) Druce	Asteraceae	0.9	3.6	25
55	*Caesulia axillaris* Roxb.	Asteraceae	1.2	3	40
56	*Eclipta prostrata* (L.) L.	Asteraceae	1.7	3.78	45
57	*Echinops echinatus* Roxb.	Asteraceae	1.15	2.56	45
58	*Grangea maderaspatana* (L.) Poir.	Asteraceae	1.5	3.75	40
59	*Lagascea mollis* Cav.	Asteraceae	1.65	3.3	50
60	*Launaea procumbens* (Roxb.) Ramayya & Rajgopal	Asteraceae	1.15	3.29	35
61	*Launaea intybacea* (Jacq.) Beauverd	Asteraceae	0.95	1.12	85
62	*Parthenium hysterophorus* L.	Asteraceae	1.7	2.13	80
63	*Phagnalon rupestre* (L.) DC.	Asteraceae	1	2.22	45
64	*Pluchea tomentosa* DC.	Asteraceae	1.1	2.2	50
65	*Pulicaria wightiana* (DC.) Clarke	Asteraceae	1.65	3.3	50
66	*Soncus aspera* L.	Asteraceae	1.4	3.11	45
67	*Sphaeranthus indicus* L.	Asteraceae	1.6	3.56	45
68	*Synedrella nodiflora* (L.) Gaertn.	Asteraceae	0.9	2.57	35
69	*Tricholepis amplexicaule* Clarke	Asteraceae	0.95	3.17	30
70	*Tricholepis radicans* (Roxb.) DC.	Asteraceae	1.65	3.67	45
71	*Tridex procumbens* L.	Asteraceae	2.15	4.3	50
72	*Vernonia cinerea* (L.) Less.	Asteraceae	1.2	3.43	35
73	*Vicoa indica* R. Wight	Asteraceae	1.25	4.17	30
74	*Xanthium indicum* Koen.	Asteraceae	1.65	4.71	35
75	*Dolichandrone atrovirens* (Roth) Sprague	Bignoniaceae	0.95	2.71	35
76	*Coldenia procumbens* L.	Boraginaceae	1.15	2.88	40
77	*Cordia myxa* L.	Boraginaceae	0.95	3.17	30
78	*Cordia wallichi* G. Don	Boraginaceae	1.1	3.14	35
79	*Heliotropium marifolium* Retz.	Boraginaceae	1.25	4.17	30
80	*Heliotropium indicum* L.	Boraginaceae	1	2.86	35
81	*Trichodesma zeylanicum* (burm. F.) R Prodr.	Boraginaceae	1.15	4.6	25
82	*Schouwia purpurea* (Forssk.) Schweinf	Brassicaceae	0.95	3.17	30
83	*Opuntia elatior* (Willd). Miller	Cactaceae	1.6	3.56	45
84	*Capparis divaricata* Lamk	Capparaceae	1.25	3.13	40
85	*Capparis sepiara* L.	Capparaceae	1.2	3.43	35
86	*Capparis zyelanica* L.	Capparaceae	1.15	3.29	35

87	*Cadaba fruticosa* (L.) Druce	Capparaceae	1.75	4.38	40
88	*Maeruua oblongifolia* (Forsk.) A. Richard Guill. & Perr.	Capparaceae	0.95	2.71	35
89	*Gymnosporia emarginata* (Willd.) Thwaites	Celastraceae	1.1	3.67	30
90	*Cleome chelidonii* L.f.	Cleomaceae	1.25	3.13	40
91	*Cleome gynandra* L.	Cleomaceae	1.65	3.3	50
92	*Cleome monophylla* L.	Cleomaceae	1.35	3.38	40
93	*Cleome viscosa* L.	Cleomaceae	1.85	3.7	50
94	*Commelina benghalensis* L.	Commelinaceae	1.95	3.25	60
95	*Commelina clavata* C.B.Clarke.	Commelinaceae	1.6	4.57	35
96	*Commelina longifolia* Lam.	Commelinaceae	1.5	3.75	40
97	*Cyanotis arachnoidea* Clarke.	Commelinaceae	1.55	4.43	35
98	*Cyanotis axillaris* (L.) D. Don ex Sweet	Commelinaceae	1.45	3.22	45
99	*Cyanotis fasciculata* (B. Heyne ex Roth) Schult. & Schult.f.	Commelinaceae	1.4	4.67	30
100	*Cyanotis tuberosa* (Roxb.) J. A. & J. H. Schult.	Commelinaceae	1.1	2.75	40
101	*Murdannia semiteres* (Dalz.) Sant.	Commelinaceae	1.2	2.67	45
102	*Cuscuta reflexa* Roxb.	Convoluvulaceae	1.5	4.29	35
103	*Evolvulus alsinoides* (L.) L.	Convoluvulaceae	1.65	4.13	40
104	*Ipomea aquatica* Forssk.	Convoluvulaceae	1.85	4.11	45
105	*Ipomoea nil* (L.) Roth	Convoluvulaceae	1.2	4	30
106	*Ipomoea quamoclit* L.	Convoluvulaceae	1.65	4.13	40
107	*Rivea hypocrateriformis* (Desr.) Choisy	Convoluvulaceae	1.75	3.89	45
108	*Xenostegia tridenta* (L.) Austin & Staples	Convoluvulaceae	1.2	2.67	45
109	*Coccinia grandis* (L.) Voigt	Cucurbitaceae	1.95	3.9	50
110	*Diplocyclos palmatus* (L.) Jeffrey	Cucurbitaceae	1.75	3.89	45
111	*Momordica cymbalaria* Fenzel ex Naudin	Cucurbitaceae	2	4.44	45
112	*Mukia madaraspatana* (L.) Roemer.	Cucurbitaceae	1.65	3.67	45
113	*Cyperus compressus* L.	Cyperaceae	1.85	4.11	45
114	*Cyperus difformis* L.	Cyperaceae	1.9	3.8	50
115	*Cyperus haspan* L.	Cyperaceae	1.95	3.9	50
116	*Cyperus iria* L.	Cyperaceae	1.65	3.3	50
117	*Fimbristylis complanata* (Retz.) Link.	Cyperaceae	1.9	3.8	50
118	*Fuirena capitata* (Burm.f) Koyama	Cyperaceae	1.75	3.5	50
119	*Kyllinga brevifolia* Rottb.	Cyperaceae	2	4	50
120	*Acalypha indica* L.	Euphorbiaceae	1.7	3.4	50
121	*Acalypha lanceolata* Willd.	Euphorbiaceae	1.5	2.73	55
122	*Chrozophora plicata* (Vahl) A.Juss. ex Spreng	Euphorbiaceae	1.15	2.88	40
123	*Chrozophora rottlerin* (Geiseler) A. Jussieu ex Sprengel.	Euphorbiaceae	1.1	2.44	45
124	*Croton bonplandianus* Bail.	Euphorbiaceae	1.5	3.75	40
125	*Euphorbia heyneana* Spreng.	Euphorbiaceae	1.8	4	45
126	*Euphorbia hirta* L.	Euphorbiaceae	1.75	3.5	50
127	*Euphorbia parviflora* L.	Euphorbiaceae	1.55	3.1	50
128	*Euphorbia tirucalli* L.	Euphorbiaceae	1.75	7	25
129	*Givotia rottleriformis* Griffith	Euphorbiaceae	1.55	2.82	55
130	*Jatropha gossipifolia* L.	Euphorbiaceae	1.9	4.75	40

131	*Microstachy chamaelea* (L.) Muell-Arg	Euphorbiaceae	1.8	3	60
132	*Abrus precatorius* L.	Fabaceae	1.6	3.2	50
133	*Albizia amara* (Roxb.) Boivin	Fabaceae	2	3.64	55
134	*Albizia lebbeck* (L.) Benthem	Fabaceae	1.2	3	40
135	*Albizia procera* (Roxb.) Bentham	Fabaceae	2.15	3.91	55
136	*Alysicarphus moniliform* (L.) DC.	Fabaceae	1.6	2.67	60
137	*Alysicarpus hamosus* Edg.	Fabaceae	1.6	2.46	65
138	*Alysicarpus rugosus* (Willd.) DC.	Fabaceae	1.65	3.3	50
139	*Alysicarpus vaginalis* DC.	Fabaceae	1.55	3.1	50
140	*Aschynomene aspera* L.	Fabaceae	1.45	4.14	35
141	*Canavalia rosea* (Sw.) DC.	Fabaceae	1.65	2.54	65
142	*Clitoria ternetea* L.	Fabaceae	2	4	50
143	*Crotalaria albida* Heyne ex Roth	Fabaceae	1.65	3	55
144	*Crotalaria medicaginea* (Wight & Arn.) Hooker	Fabaceae	1.7	3.09	55
145	*Crotalaria nana* N. Burman.	Fabaceae	1.65	2.75	60
146	*Crotalaria orixensis* Willd.	Fabaceae	1.65	3.67	45
147	*Crotalaria pallida* Aiton.	Fabaceae	2.25	4.09	55
148	*Crotalaria pusilla* Heyne ex DC.	Fabaceae	2.2	3.67	60
149	*Crotalaria ramosissima* Roxb.	Fabaceae	2.6	4	65
150	*Crotalaria retusa* L.	Fabaceae	1.5	2.5	60
151	*Crotalaria verrucousa* L.	Fabaceae	1.6	2.91	55
152	*Crotolaria hebecarpa* (DC.) Rudd.	Fabaceae	2	4	50
153	*Cullen corylifolium* (L.) Medick	Fabaceae	1.9	3.45	55
154	*Grona heterophylla* (Willd.) H.Ohashi & K.Ohashi	Fabaceae	1.2	1.6	75
155	*Grona triflorum* (L.) DC.	Fabaceae	1.3	3.71	35
156	*Dichrostachys cineria* (L.) Wight & Arn.	Fabaceae	1.45	4.14	35
157	*Guilandina bonduc* L.	Fabaceae	1.6	2.91	55
158	*Indigofera cordifolia* Heyne ex Roth	Fabaceae	2	4	50
159	*Indigofera coultea* (Burm.f.) Merr.	Fabaceae	2.15	3.91	55
160	*Indigofera glandulosa* J.C. Wendl.	Fabaceae	1.7	2.62	65
161	*Indigofera hirsuta* L.	Fabaceae	1.4	2.33	60
162	*Indigofera linifolia* (L.f.) Retzius.	Fabaceae	1.8	3.6	50
163	*Indigofera linifolia* var. cambelli Wight ex Baker	Fabaceae	1.5	3.75	40
164	*Indigofera linnaei* Ali.	Fabaceae	1.55	3.1	50
165	*Indigofera nummularifolia* (L.) Livera	Fabaceae	1.65	4.13	40
166	*Indigofera trifoliata* L.	Fabaceae	1.6	3.56	45
167	*Indigofera trita* L.f.	Fabaceae	1.45	3.63	40
168	*Mimosa hamata* Willd.	Fabaceae	1.7	6.8	25
169	*Mimosa pudica* L.	Fabaceae	1.65	3	55
170	*Prosopis cineraria* (L.) Druce	Fabaceae	1.6	3.2	50
171	*Prosopis juliflora* (Sw.) DC.	Fabaceae	1.9	4.22	45
172	*Rhynchosia capitata* (B. Heyne ex Roth) DC.	Fabaceae	1.6	3.56	45
173	*Rhynchosia minima* (L.) DC.	Fabaceae	1.4	3.5	40
174	*Rhynchosia rufescens* (Willd.) DC.	Fabaceae	1.45	3.63	40

175	*Rhynchosia viscosa* DC.	Fabaceae	1.35	3	45
176	*Rothia indica* (L.) Druce	Fabaceae	1.4	3.5	40
177	*Senna auriculata* (L.) Roxb.	Fabaceae	2	3.64	55
178	*Senna occidentalis* (L.) Link.	Fabaceae	1.4	3.11	45
179	*Senna uniflora* (Mill.) H. S. Irwin & Baeneby	Fabaceae	2	4.44	45
180	*Sesbania bispinosa* (Jacquin) W.F. Wight	Fabaceae	1.2	2.18	55
181	*Stylosanthes fruticose* (Retz.) Alston	Fabaceae	1.15	2.09	55
182	*Stylosanthes hamata* (L.) Taub.	Fabaceae	1.15	2.88	40
183	*Tamarindus indica* L.	Fabaceae	1.5	2.73	55
184	*Taverniera cuneifolia* (Roth) Arnott	Fabaceae	1.6	3.2	50
185	*Tephrosia pumila* (Lam.) Pers.	Fabaceae	1.2	2	60
186	*Tephrosia purpurea* (L.) Pers.	Fabaceae	1.45	2.42	60
187	*Tephrosia strigose* (Dalz) Santapau & Mahesh.	Fabaceae	1.3	2.36	55
188	*Tephrosia villosa* (L.) Pers.	Fabaceae	1.55	3.44	45
189	*Vachellia eburnea* (L.f.) P.J.H.Hurter & Mabb.	Fabaceae	1.25	2.5	50
190	*Vachellia farnesiana* (L.) Wight & Arn	Fabaceae	1.35	3.86	35
191	*Vachellia horrida* (L.f) Willd.	Fabaceae	1.85	3.7	50
192	*Vachellia leucophloea* (Roxb.) Maslin	Fabaceae	1.65	2.75	60
193	*Vachellia nilotica* (L.) P.J.H.Hurter & Mabb.	Fabaceae	2.45	3.77	65
194	*Vigna aconitifolia* (Jacq.) Marechal	Fabaceae	1.25	1.56	80
195	*Vigna trilobata* (L.) Verdcourt	Fabaceae	1.6	2.67	60
196	*Vigna vexillata* (L.) A. Rich.	Fabaceae	1.25	2.78	45
197	*Zornia gibbose* Span.	Fabaceae	1.45	3.63	40
198	*Pithecellobium dulce* (Roxb.) Benth	Fabaceae	1.8	4	45
199	*Enicostemma axillare* (Por.ex Lam.) A. Raynal	Gentianaceae	1.6	3.56	45
200	*Gisekia pharnaceoides* L.	Gieskiaceae	1.65	3.3	50
201	*Gyrocarpus americanus* Jacq.	Hernandinaceae	1.95	3.55	55
202	*Anisomeles indica* (L.) Kuntze.	Lamiaceae	1.65	2.75	60
203	*Clerodendrum phlomidis* L.	Lamiaceae	1.7	3.78	45
204	*Mesosphaerum suaveolens* (L.) Kuntze.	Lamiaceae	2.25	3.21	70
205	*Leonotis nepetiifolia* (L.) R. Br.	Lamiaceae	1.7	5.67	30
206	*Leucas aspera* (Willd.) Link.	Lamiaceae	1.65	3.67	45
207	*Leucas martinicensis* (Jacq.) R.Br.	Lamiaceae	1.45	2.42	60
208	*Ocimum basilicum* L.	Lamiaceae	2.4	4.36	55
209	*Ocimum filamentosum* Forssk.	Lamiaceae	1.7	3.09	55
210	*Ocimum sanctum* L.	Lamiaceae	2.65	4.42	60
211	*Orthosiphon thymiflorus* (Roth) V. D. Sleesen	Lamiaceae	1.65	2.54	65
212	*Platostoma menthoides* (L.) A.J.Paton	Lamiaceae	1.15	3.29	35
213	*Cassytha filiformis* L.	Lauraceae	1.95	2.79	70
214	Lindernia parviflora (Roxb.) Haines	Linderniaceae	1.2	1.85	65
215	*Bombax ceiba* L.	Malvaceae	1.65	3.3	50
216	*Abutilon hirtum* (Lam.) Sweet	Malvaceae	1.85	2.47	75
217	*Abutilon indicum* (L.) Sweet	Malvaceae	1.95	2.29	85
218	*Corchorus aestuans* L.	Malvaceae	1.7	3.78	45
219	*Corchorus olitorius* L.	Malvaceae	1.25	2.27	55
220	*Corchorus trilocularis* L.	Malvaceae	1.9	4.75	40

221	*Grewia damine* Gaertn.	Malvaceae	1.7	3.78	45
222	*Grewia villosa* Willd.	Malvaceae	1.3	3.71	35
223	*Hibiscus lobatus* (Murray) Kuntze	Malvaceae	2.2	4.4	50
224	*Hibiscus ovalifolius* (Forsk) Vahl.	Malvaceae	2.15	3.58	60
225	*Hibiscus panduriformis* Burm.	Malvaceae	2.1	3.82	55
226	*Hibiscus vitifolius* L.	Malvaceae	1.95	3.9	50
227	*Pavonia odorata* Willd.	Malvaceae	1.65	3.3	50
228	*Pavonia zeylanica* (L.) Cav.	Malvaceae	1.7	3.4	50
229	*Sida acuta* Burm.f.	Malvaceae	1.75	3.18	55
230	*Sida cordata* (N.Burman) Borssum	Malvaceae	1.85	3.08	60
231	*Sida rhombifolia* L.	Malvaceae	1.2	3.43	35
232	*Sida spinosa* L.	Malvaceae	1.35	3.38	40
233	*Trimufetta rhomboidea* Jacq.	Malvaceae	1.45	3.63	40
234	*Triumfetta malabarica* Koen. ex Rottb.	Malvaceae	1.4	3.11	45
235	*Waltheria indica* L.	Malvaceae	1.45	2.42	60
236	*Martynia annua* L.	Martyniaceae	1.6	3.2	50
237	*Azadirachta indica* A Juss.	Meliaceae	2	4.44	45
238	*Tinospora cordifolia* (Willd) Hook.f. & Thomson	Menispermaceae	2.35	4.27	55
239	*Cocculus hirsutus* (L.) W. Theob.	Menispermaceae	1.7	3.4	50
240	*Glinus lotoides* L.	Molluginaceae	1.65	2.75	60
241	*Glinus oppositifolius* (L.) A. DC.	Molluginaceae	1.45	2.64	55
242	*Ficus religiosa* L.	Moraceae	1.6	2.91	55
243	*Syzygium cumini* (L.) Skeels	Myrtaceae	1.85	2.47	75
244	*Boehravia diffusa* L.	Nyctaginaceae	2.2	2.59	85
245	*Boerhavia erecta* L.	Nyctaginaceae	2.45	4.45	55
246	*Jasminum arborescens* Roxb.	Olacaceae	2.8	4.31	65
247	*Jasminum auriculatum* Vahl	Olacaceae	2.05	3.73	55
248	*Sopubia delphinifolia* (L.) G.Don.	Orobanchaceae	1.6	2.67	60
249	*Striga angustifolia* (D.Don) Sald.	Orobanchaceae	1.4	2.8	50
250	*Striga gesnerioides* (Willd.) Vatke	Orobanchaceae	1.45	2.64	55
251	*Argemone mexicana* L.	Papavaraceaea	1.7	2.83	60
252	*Passiflora foetida* L.	Passifloraceae	1.9	3.45	55
253	*Passiflora edulis* Sims.	Passifloraceae	1.65	2.2	75
254	*Pedalium murex* L.	Pedaliaceae	1.9	3.45	55
255	*Sesamum indicum* L.	Pedaliaceae	1.75	2.69	65
256	*Phyllanthus amarus* Schum. & Thonn.	Phyllanthaceae	2.75	4.58	60
257	*Phyllanthus maderapatensis* L.	Phyllanthaceae	1.7	2.27	75
258	*Phyllanthus reticulata* Poir	Phyllanthaceae	1.65	2.2	75
259	*Phyllanthus virgatus* G. Forster	Phyllanthaceae	1.75	3.5	50
260	*Alloteropsis cimicina* (L.) Stapf.	Poaceae	1.75	2.69	65
261	*Aristida adscensionsis* L.	Poaceae	2.95	3.93	75
262	*Aristida hystrix* L.	Poaceae	3.85	5.13	75
263	*Aristida setacea* Retz.	Poaceae	1.2	2	60
264	*Cenchrus pedicillatus* (Trin) Morrone	Poaceae	1.15	1.92	60
265	*Chloris quinquesetica* Bhide	Poaceae	4.15	5.93	70
266	*Chloris virgata* Sw.	Poaceae	2.45	4.45	55

267	*Cynodon dactylon* (L.) Pers	Poaceae	3.6	4.5	80
268	*Digitaria ciliaris* (Retz.) Koeler.	Poaceae	2.6	4.33	60
269	*Dactyolectnium aegypticum* (L.) Willd.	Poaceae	2.65	3.79	70
270	*Dichanthium annulatum* (Forssk.) Stapf.	Poaceae	1.65	2.75	60
271	*Dichanthium pertusum* (L.) Clayton	Poaceae	1.8	2.77	65
272	*Dinebra chinensis* (L.) P.M.Peterson & N.Snow	Poaceae	1.8	2.77	65
273	*Dinebra retroflexa* (Vahl) Panz.	Poaceae	1.85	2.47	75
274	*Eragrostiella bifaria* (Vahl) Bor	Poaceae	2.25	3.46	65
275	*Eragrostis atrovirens* (Desf.) Trin ex Steud.	Poaceae	1.8	2.4	75
276	*Eragrostis minor* Host.	Poaceae	2.2	3.14	70
277	*Eragrostis pilosa* (L.) P. Beauv.	Poaceae	2.7	3.6	75
278	*Eragrostis viscosa* (Retz.) Trin.	Poaceae	1.7	2.43	70
279	*Eriochola procera* (Retz.) C. E. Hubb.	Poaceae	1.7	2.27	75
280	*Hackelochloa granularis* (L.) Kuntze	Poaceae	1.65	2.36	70
281	*Heteropogon contortus* (L.) P. Beauv. Ex Roem. & Schult.	Poaceae	3.85	4.53	85
282	*Melanocenchris jacquemontii* Jaub. & Spach.	Poaceae	1.65	2.2	75
283	*Moorochloa eruciformis* (Sm.) Veldkamp	Poaceae	1.75	3.18	55
284	*Oplismenus burmanii* (Retz) Pal-Beauv	Poaceae	1.7	2.83	60
285	*Paspalum vaginatum* Sw.	Poaceae	1.65	3.3	50
286	*Paspalidium punctatum* (Burm.f.) A. Camus	Poaceae	1.7	3.4	50
287	*Paspalidium flavidum* (Retz.) A. Camus	Poaceae	1.6	2.29	70
288	*Perotis indica* (L.) O.Ktze	Poaceae	1.55	2.07	75
289	*Rottboellia cochinchinensis* (Lour.) W. D. Clayton	Poaceae	1.65	3.3	50
290	*Sacciolepis myosuroides* (R.Br.) A. Camus	Poaceae	1.55	2.58	60
291	*Setaria intermedia* (Roth) Roem. & Schult.	Poaceae	2.15	3.91	55
292	*Setaria pumila* (Poir.) Roem. & Schult.	Poaceae	2.05	3.15	65
293	*Trachys muricata* (L.) Pers. ex Trin.	Poaceae	2.25	3.46	65
294	*Urochloa panicoides* P. Beauv.	Poaceae	2.2	3.14	70
295	*Polygala persicarsifolia* DC.	Polygalaceae	1.15	1.53	75
296	*Polygala arvensis* Willd.	Polygalaceae	1.65	2.75	60
297	*Persicaria glabra* (Willd.) Gomez.	Polygonaceae	1.15	1.64	70
298	*Portulaca oleracea* L.	Portulacaceae	1.7	2.27	75
299	*Ziziphus mauritiana* Lam	Rhamnaceae	1.65	2.06	80
300	*Ziziphus nummularia* (Burm.f.) Wt.	Rhamnaceae	1.6	2.13	75
301	*Ziziphus xylopyrus* (Retz.) Willd.	Rhamnaceae	1.45	1.81	80
302	*Canthium coromandelicum* (N.Burman). Alston	Rubiaceae	2.85	4.07	70
303	*Catunaregam spinosa* (Thumb.) Tirveng.	Rubiaceae	2.9	4.83	60
304	*Oldenlandia corymbose* L.	Rubiaceae	2.8	3.73	75
305	*Spermacoce articularis* L.	Rubiaceae	1.55	2.38	65
306	*Spermacoce pusilla* Wall	Rubiaceae	1.65	2.06	80
307	*Aegle marmelos* (L.) Correa.	Rutaceae	4.35	6.21	70
308	*Chloroxylon swietenia* DC.	Rutaceae	3.25	4.06	80
309	*Naringi crenulata* (Roxb.) Nicolson	Rutaceae	2.15	3.07	70
310	*Cardiospermum halicacabum* L.	Sapindaceae	2.9	4.14	70

311	*Sapindus emerginatus* Vahl	Sapindaceae	1.7	3.78	45
312	*Physalis minima* L.	Solanaceae	1.8	3.6	50
313	*Physalis peruviana* L.	Solanaceae	1.9	3.45	55
314	*Physalis pruinosa* L.	Solanaceae	1.6	3.2	50
315	*Solanum lasiocarpum* Dunal	Solanaceae	1.6	2.29	70
316	*Solanum nigrum* L.	Solanaceae	1.65	2.75	60
317	*Solanum trilobatum* L.	Solanaceae	1.45	2.07	70
318	*Datura innoxia* Mill.	Solanaceae	1.65	2.75	60
319	*Typha angustifolia* L.	Typhaceae	1.35	3	45
320	*Holoptelia integrifolia* (Roxb.) Planchon	Ulmaceae	1.7	3.78	45
321	*Lantana camara* L.	Verbinaceae	1.9	4.75	40
322	*Premna serratifolia* L.	Verbinaceae	1.35	3	45
323	*Stachyterpeta jamaicensis* (L.) Vahl	Verbinaceae	1.65	3.67	45
324	Hybanthus enneaspermus (L.) F.Muell.	Violaceae	1.2	2.4	50
325	*Cissus repanda* (Wight & Arn.) Vahl	Vitaceae	1.35	2.7	50
326	*Balanites roxburghii* Planchon.	Zygophyllaceae	2.35	3.92	60
327	*Tribulus terrestris* L.	Zygophyllaceae	2.25	3.75	60
328	*Zygophyllum indicum* (Burm.f.) Christenh. & Byng	Zygophyllaceae	1.25	2.78	45

2013). The ethnomedicinal uses of *Cynanchum acidum* further exemplify the intersection of health and spirituality in sacred groves, where the plant is consumed for digestive ailments and respiratory conditions. Together, these plants represent a vital part of the rich medicinal knowledge preserved in sacred groves, which function as both a source of natural remedies and a cultural nexus linking health practices with spiritual beliefs. This symbiotic relationship between nature, medicine, and culture highlights the importance of preserving sacred groves for future generations.

New research shows that medicinal trees and shrubs include *Mangifera indica* (Mango). The results also showed that Mangifera indica in particular, has noteworthy antioxidant and anti-inflammatory capacities. Likewise, the *Santalum album* (Sandalwood) is getting consideration for its high standard of consistent fundamental oils required for Ayurveda medicine and the aroma compound market (Shariffi *et al*., 2023).

Flowers are usually small and they do not have a specified stem structure; they are commonly used for their flavor, as a medicine and for producing aroma. They usually possess a short growing season and can be bid perennial as well. Recent literature points to the importance of herbs in pharmacology, where a number of herbs contain bioactive compounds. Some of these plants include *Centella asiatica* (Gotu kola), which has been extensively studied for its neuroprotective, anti-inflammatory and wound-healing activity and remains occurring in traditional medicine today in line with modern pharmacology studies such as Sun *et al*., 2020. In the same way, *Andrographis paniculata* (King of bitters) is a herb plant with versatile therapeutic uses ranging from treating ailments including but not limited to respiratory tract infections and liver ailments (Kumar *et al.,* 2021).

Shrubs are low plants that are stemmed and wooded but are not as large and taller as trees- they bear more than one stem. It is used for erosion control and it becomes natural habitat for animals and plants. Many of these shrubs also have medicinal uses. For example, *Barleria prionitis* is known to possess antibacterial and anti-inflammatory properties, as postulated by Alkahtani *et al*., 2022. Further studies on the involvement of shrubs in the environment and ecology of the region have also advanced recently. Sunn hemp (*Crotalaria juncea*) is gradually being incorporated into these systems because of the nitrogen-fixing properties of the plant that make the soil fertile, hence supporting sustainable farming.

The number of plants in each family are Acanthaceae (16), Aizoaceae (2), Amaranthaceae (9), Apocynaceae (13), Aristolochiaceae (2), Asperagaceae (4), Asphodelaceae (1), Asteraceae (26), Bignoniaceae (1), Boraginaceae (6), Brassicaceae (1), Cactaceae (1), Capparaceae (5), Celastraceae (1), Cleomaceae (4), Commelinaceae (8), Convoluvulaceae (7), Cucurbitaceae (4), Cyperaceae (7), Euphorbiaceae (12), Fabaceae (87), Gentianaceae (1), Gieskiaceae (1), Hernandinaceae (1), Lamiaceae (11), Lauraceae (1), Linderniaceae (1), Malvaceae (21), Martyniaceae (1), Meliaceae (1), Menispermaceae (2), Molluginaceae (2), Moraceae (1), Myrtaceae (1), Nyctaginaceae (2), Olacaceae (2), Orobanchaceae (3), Papavaraceaea (1), Passifloraceae (2), Pedaliaceae (2), Phyllanthaceae (4), Poaceae (35),


Fallen Wood Decaying Naturally in Sacred Grove


Paramananda Devara Gudda View


Sri. Paramananda Temple View Lingadahalli


Carissa spinarum L.


Catunaregam spinosa (Thumb.) Tirveng.


Dolichandrone atrovirens (Roth) Sprague

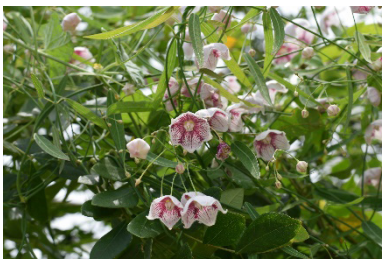

Cynanchum acidum (Roxb.) Oken


Caralluma adscendens var. fimbriata (Wall.) Grav. & Mayur


Melanocenchris jacquemontii Jaub. & Spach.


Cyanotis arachnoidea Clarke.


Heteropogon contortus (L.) P. Beauv. ex Roem. & Schult.


Oxystelma esculentum (L.f.) R. Br.


Portulaca oleracea L.


Cissus repanda (Wight & Arn.) Vahl


Hybanthus enneaspermus (L.) F.Muell.

Plate 1: Some of the Selected Plants Listed at Paramananda Devara Gudda Sacred Grove Lingadahalli Village, Devadurga Taluk, Raichur District

Polygalaceae (2), Polygonaceae (1), Portulacaceae (1), Rhamnaceae (3), Rubiaceae (5), Rutaceae (3), Sapindaceae (2), Solanaceae (7), Typhaceae (1), Ulmaceae (1), Verbinaceae (3), Violaceae (1), Vitaceae (1) and Zygophyllaceae (3).

The number of genera in each family are Acanthaceae (11), Aizoaceae (1), Amaranthaceae (7), Apocynaceae (12), Aristolochiaceae (1), Asperagaceae (4), Asphodelaceae (1), Asteraceae (21), Bignoniaceae (1), Boraginaceae

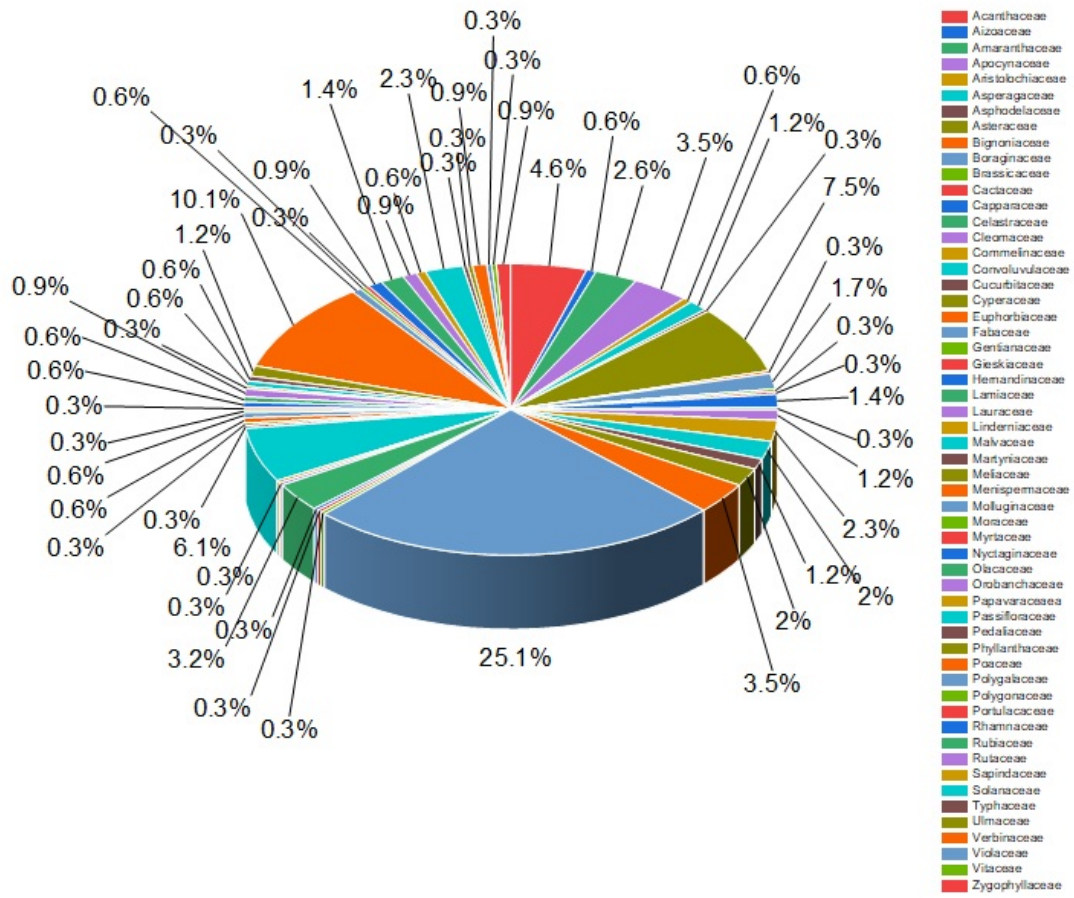


Figure 2: Number of plants in each family of Lingadahalli Village, Devadurga Taluk, Raichur District, Karnataka

(4), Brassicaceae (1), Cactaceae (1), Capparaceae (3), Celastraceae (1), Cleomaceae (1), Commelinaceae (3), Convoluvulaceae (5), Cucurbitaceae (4), Cyperaceae (4), Euphorbiaceae (7), Fabaceae (26), Gentianaceae (1), Gieskiaceae (1), Hernandinaceae (1), Lamiaceae (8), Lauraceae (1), Linderniaceae (1), Malvaceae (9), Martyniaceae (1), Meliaceae (1), Menispermaceae (2), Molluginaceae (1), Moraceae (1), Myrtaceae (1), Nyctaginaceae (1), Olacaceae (1), Orobanchaceae (2), Papavaraceaea (1), Passifloraceae (1), Pedaliaceae (2), Phyllanthaceae (1), Poaceae (25), Polygalaceae (1), Polygonaceae (1), Portulacaceae (1), Rhamnaceae (1), Rubiaceae (4), Rutaceae (3), Sapindaceae (2), Solanaceae (3), Typhaceae (1), Ulmaceae (1), Verbinaceae (3), Violaceae (1), Vitaceae (1) and Zygophyllaceae (3) depicted in Figure 2.

Shannon-Weiner index is the quantitative method that is used to measure species diversity basing the results on species richness and evenness of the species. Large values, therefore, indicate that the ecosystem is productive and stable owing to the different number of species, as shown below. This is a value of 4.29, meaning that the species in this sacred grove are relatively balanced, whereby one can find many species that are dominant and others that are quite rare. Categorically, the main feature observed in the grove was the high level of species diversification, which implies a diverse and steady kind of environment. This may be due to the fact that a number of species of trees are protected by the sacred groves thus this reason the groves are primarily home to a unique and lesser disturbed variety of species (Magurran, 2004). The Simpson's heterogeneity index (D) approximates the chances that two conforming individuals in a community are of separate species. It assumes a value from 0 to 1 inclusive, where 1 presupposes nil levels of diversity while 0 means one is at the peak of diversity the floristic diversity index at sacred grove is shown in the Figure 3.

The result of 1.00 as the forward value of the parameter means that when two species are selected at a given time, they are most likely to come from two different species, which in effect, shows that the species is randomly distributed across the grove. A six-sigma value of 1.00 is infrequent and corresponds to a high level of species heterogeneity and low values of species specificity representatives. The grove probably has many species, and no one species is very abundant, thus maintaining a relatively simple and stable structure (Simpson, 1949).

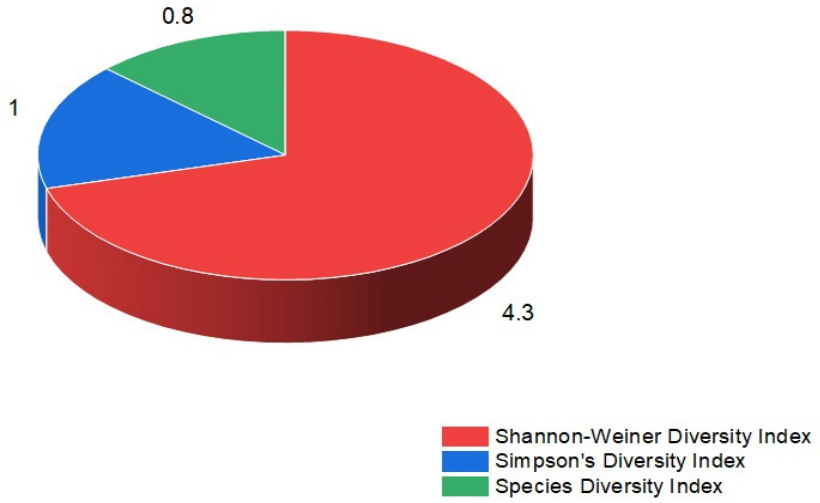


Figure 3: Floristic Diversity Index of Lingadahalli Village, Devadurga Taluk, Raichur District, Karnataka

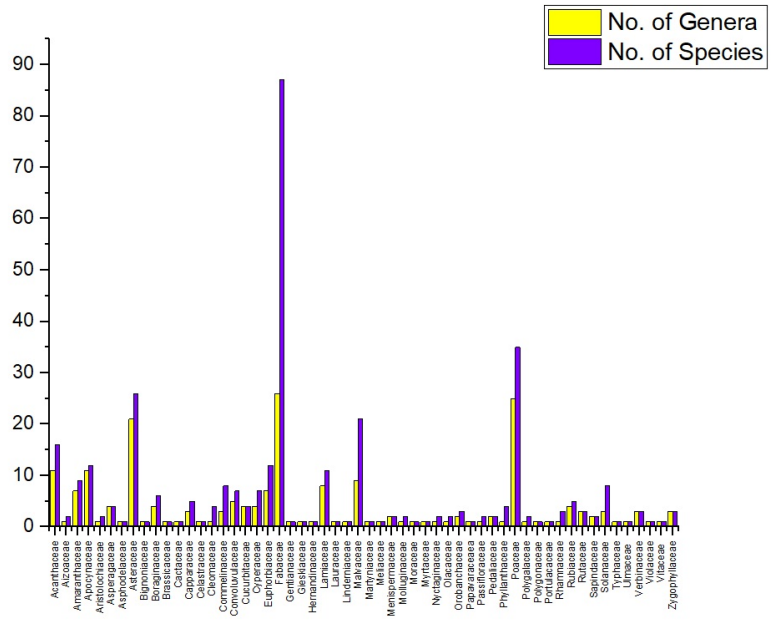


Figure 4: Generic Level Distribution of Lingadahalli Village, Devadurga Taluk, Raichur District, Karnataka

The Species Diversity Index reflects the overall diversity of species present in a particular area. A value of 0.78 is indicative of a moderately high level of species diversity but not as high as in the Shannon-Weiner Index. This suggests that while the grove is diverse, there may be some areas of ecological dominance or clustering. A value of 0.78 indicates that while the grove is diverse, there may be certain species that are more dominant or there could be a mix of abundant and rare species. This is typical of natural ecosystems, where certain species tend to dominate in specific microhabitats (Pielou, 1966).

Crotalaria and *Indigofera* accounted for ten species each in the surveyed region and, therefore, can be regarded as the most diverse genera. This is evidence of their environmental role as well as flexibility in the particular biome. *Crotalaria, Indigofera,* and *Blumea* genera, with many species and sections, provide evidence for a suitable habitat for the plants growing there because of certain ecological or microclimatic conditions. Such genera as *Cleome, Cyperus, Euphorbia* and *Phyllanthus* are described for their roles in

the ecosystem but with slightly lower richness compared to dominants. These genera may well be fundamental to providing functional-structural complexity to the ecosystem. Three genera with only two species are *Blepharis, Justicia, Launaea and Tricholepis,* which may suggest specific niche events or lower tolerance to ecological situations as depicted in Figure 4.

This biomass and vegetation density is complemented by indicators such as the presence of genera such as Crotalaria and Indigofera, both part of the Fabaceae family which is credited with nitrogen-fixing capabilities. Some genera as Cleome and Euphorbia, are drought endemics, which indicates that the surveyed territory does contain varieties pertaining to different levels of humidity (Gadgil & Vartak, 1976). Data-deficient genera with fewer numbers of species in the databases may need special attention to conserve them in the ecosystem, for example, *Jasminum* and Passiflora. The overall diversity shows the importance of these groves as repositories of both genetic and species diversity and the fact that these groves act as refuges for some plant species, which may be declining in other disturbed ecosystems, as observed by Kala (2005).

Some of the generations, such as *Phyllanthus, Ocimum,* and *Ziziphus* have ethnomedicinal uses, hence implying that the grove may also be a source of other traditional products to the surrounding people. The cultural importance of sacred groves to communities means cultural taboos protect the plants found within groves, and this supplements the biological reasons for preserving them, which are, indirectly, reasons for the promotion of biodiversity conservation (Parween, 2021).

Conclusion

The social audit of the Paramananda Devara Gudda sacred grove reveals its natural forest ecosystem's socio-cultural and bio-physical values. The availability of 10 species of each of the *Crotalaria* and *Indigofera* genera demonstrates that the grove is well adapted to nitrogen-fixing and soil-improving plants that are otherwise toxic to other plants. Our *Cleome, Cyperus, Euphorbia* and *Phyllanthus* genera, which are present in moderate variety, also support production and service-related functional diversity of the grove. The ecological stability of the high value of Shannon-Weiner (4.29) and Simpsons (1.00) shows that the ecosystem is quite stable and closely balanced because no single species had competed to dominate others and there is an even distribution of species in the sampling sites. The Conservation Value for Genera profile genera such as *Gyrocarpus* and *Blepharis* need some urgent action before they go local and ultimately become extinct. Medicinal and culturally important genera Carissa, Aegle, Cynanchum, *Aloe, Cadaba, Acalypha, Catunaregam*, *Phyllanthus, Ocimum, and Ziziphus* found in the grove show their usefulness to the local people as a traditional plant resource. Places such as Paramananda Devara Gudda are conservation areas of genetic and ecological resources, especially in areas of land disturbance. They are examples of how communities that have been culturally involved in conservation efforts can practice it.

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