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RESEARCH ARTICLE

Documentation of angiosperms and ferns of Lamb's Rock Conoor, Nilgiris District, Tamil Nadu

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ABSTRACT

The documentation of the angiosperms and ferns study was carried out in Lamb's rock, Conoor, Nilgiris Districts, Tamil Nadu. It has been undertaken during January 2022 to March 2022 and it has resulted in providing information on 55 plant species. In the present study, 42 angiosperms and 13 ferns plant species belonging 32 families were documented in the lamb's rock Tamil Nadu. The medicinal plants such as herbs (60%), shrub (22%), trees (60%), and climber (8%) were mainly used by traditional healers for the treatment of fever, cough, wound healing, and skin disease. *Zehneria maysorensis* was mainly used for menstrual problem. Medicinal plants and its scientific name, common name, medicinal uses and diversity status were documented.

Keywords: Endemic plant, Lamb's Rock, Nilgiri District, Traditional healers, Medicinal plants

1. INTRODUCTION

India represents about 11% of world's flora in just about 2.4% of total land mass. Out of the 25 biodiversity "hotspots" identified in the World [1], India has two, namely Eastern Himalaya and Western Ghats. These hotspots possess majority of plant diversity in India. In terms of species diversity, approximately 45,000 plant species are found in India [2]. The angiosperms are represented by circa 17,500 species out of which 5725 species are endemic to India. About 28% of the total Indian flora and about 33% of angiosperms occurring in India are endemic [3]. It is roughly estimated that about 10% of flowering plant species in India are threatened and 34 plant species have been reported to be extinct [3, 4].

In India, richness is largely due to varied physical environment, latitude, altitude, geology and climate. The climate and altitudinal variations coupled with varied ecological habitats have contributed in the development of immensely rich vegetation wealth, and varied flora and fauna forming a very unique biodiversity. Seeing the rich plant diversity, [5] commented that 'The Indian flora is more varied than that of any other country of equal area in the eastern hemisphere, if not on the globe'. Indian flora is also rich in botanical curiosities, such as insectivorous plants and saprophytes. The main objective of the study is as follows: The aim of this study is to identify and document the flowering plants and ferns found in and around the Lamb's rock region and to find endangered, endemic and exotic plants.

- ✓ To study the effects of the exotic and invasive plants to do the landscape and the native flora.
- ✓ To analyse the medicinal capabilities of the plants found in the region through oral conversations with tribal people around the area.

2. MATERIALS AND METHODS

2.1. Study area

Lamb's rock, Coonoor was chosen as the study area. It is located at a distance of about 8 km from Coonoor town. The study area varies in elevation from 1600 meters above sea level to about 1900 meters above sea level in some places. It is just about the right elevation for tropical moist evergreen forests to flourish and the area contains many plants endemic to the Western Ghats. The region has several small streams running through it which favors a great variety of flora and moisture loving plants and trees. It lies in 11.34 latitude and 76.83 longitude. Temperature is pleasant and cool during the monsoon months, cold and dry during the winter months and sunny and dry during the summer months. Rainfall is high to very high. The

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soil type is laterite and humus rich from the fallen leaves of the trees. The study was conducted mainly along the roadsides of the Lamb's rock and its surroundings. It possesses a great biodiversity as it is located in the Western Ghats, one of India's richest biodiversity hotspots.

2.2. Data collection

The wealth of medicinal plants knowledge among the people of these hills are based on 500 years of beliefs and observations. This knowledge has been transmitted orally from generation to generation. After seeking their consent, the traditional practitioners were interviewed using semi-constructive questionnaires and open-ended conversations. The informants are the custodians of indigenous knowledge on herbal medicines. Traditional healers are divided into two broad groups of herbalists who mainly use while diviners also invoke ancestral spirits to guide them in their healing.

During the field survey, old and experienced persons were interviewed and cross checked in a way to explore their traditional knowledge, habitat, medicinal uses of the plants, their status, etc. Photographs of the plants were taken in their natural habitat. Each plant presented were provided with botanical nomenclature followed by author citation. The vernacular names if the plants were given in Tamil, English with their medicinal uses and ailments treated.

2.3. Preservation of plant specimens

Standard method was followed for the collection of plant specimens, drying mounting, preparation and preservation of plant specimens. Identified plants were arranged alphabetically with their botanical name with author citation, family and habit referring to Flowering Plants of Kerala [3] Flora of Presidency of Madras [6] and Flora of Presidency of Tamil Nadu [7]. The preserved herbarium was deposited in the Department of Botany, Kongunadu Arts and Science College, Coimbatore.

3. RESULTS AND DISCUSSION

The present survey has been undertaken during January 2022 to March 2022 and it has resulted in providing information on 55 plant species (Table 1 and Fig. 3) These species were belonging to 32 families and 46 genera of Angiosperms and Pteridophytes. There were many medicinal plants used by the tribal people to cure various ailments. Plants such as *Acmella paniculata*, *Eucalyptus globulus, Justicia neesii* are used for cold, cough, head ache. Among the recorded 55 plant species,33 herbaceous plants, 12shrubs, 4 climbers and 6 trees (Table 2 and Fig. 5). Hence, herbs are majorly used as traditional medicines, followed by trees, shrubs and climbers.

Among the families represented, Asteraceae registered the greatest number of plants with 4 species and the family Pteridaceae in ferns registered the greatest number of plants with 5 species, followed by Fabaceae, Melastomataceae, Urticaceae, Rubiaceae, Lamiaceae and Balsaminaceae with 3 species each, Cyatheaceae, Orchidaceae and Solanaceae with 2 species each. The remaining 2 families contributed 1 species each (Table 3) (Fig. 4). For each reported species, we have provided the botanical name of the plant, family, vernacular name, habit, parts used, mode of usage and ailments treated (Tables 1 and 2). The medicinal values of some endemic plants are still not known and more investigation and documentation have to be done in this regard. The worldwide distribution of the plants present in the study area is also given in the Table 5 native range of the species were shown in Table 6 and exotic or alien species have also been calculated and presents in Table 6 and Fig. 6. Among the total of 55 plants recorded in the survey, 22 species were found to be endemic to Western Ghats, 9 species were native to India, 11 species were native to South East Asia, and 7 were exotic or alien plants (Table 6 and Fig. 6).

In the present survey, some plants were identified only up to the genus level because they were not in flowering state during the study pelist. Floral characters are very important for these plants to identify the species. They were *Piper sp.* (Piperaceae), *Dioscorea sp.* (Dioscoreaceae), *Psychotria sp.* (Rubiaceae), and *Schefflera sp.* (Araliaceae). The study area is the type locality for *Impatiens levingei* Gambl. and this plant was recorded in the present survey. James Sykes Gamble collected the plant for the first time from Lamb's rock and described it in Flora of presidency of Madras (1847-1925). The locality is also rich and had a great diversity of ferns with species from the families Pteridaceae, Gleicheniaceae,'Polypodiaceae and Dryopteridaceae (Table 1). The fern, *Arachniodes aristata,* which produces diploid gametophytes directly from the vegetative cells of the sporophyte, this phenomenon is named as Apospory, it was also spotted in the study.

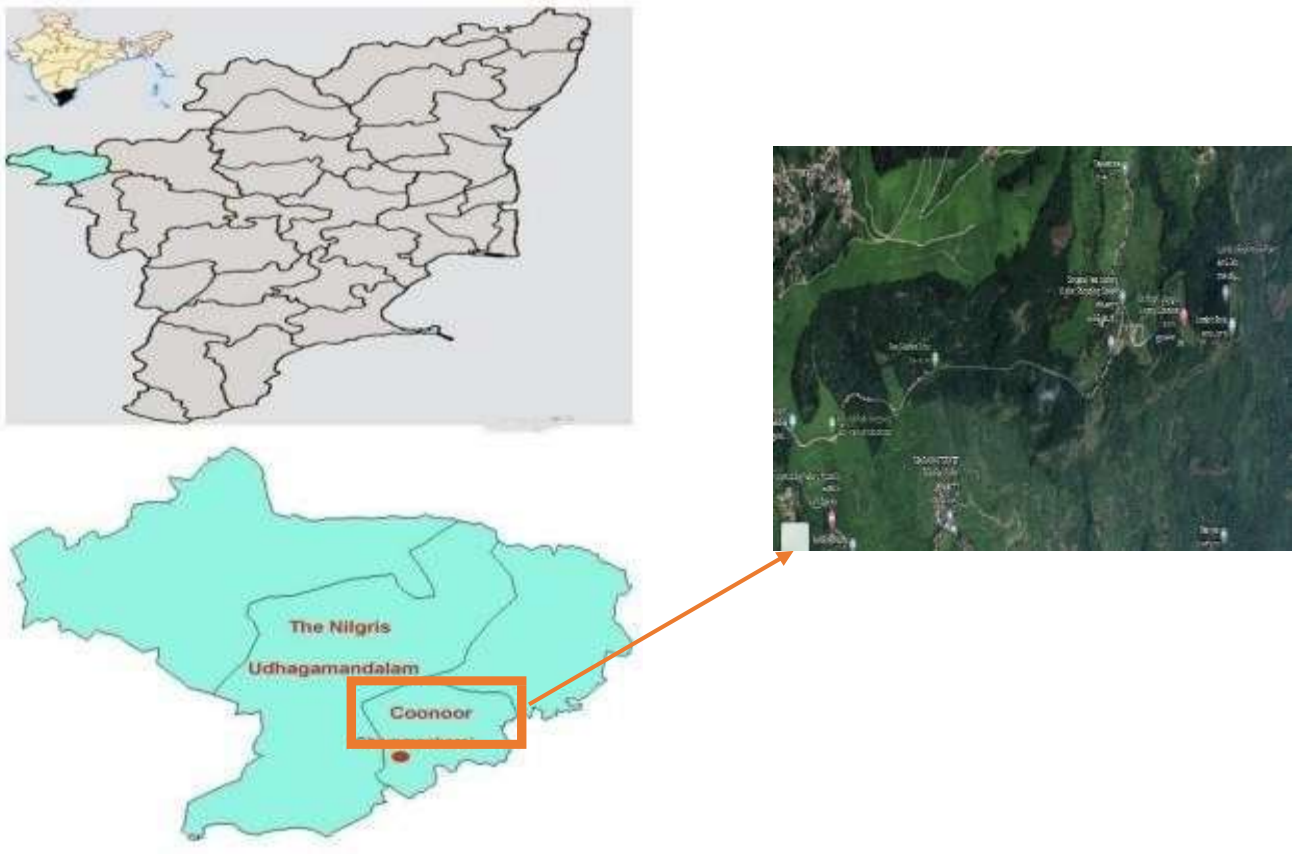

Figure 1. Showing the study area of Lamb's rock, Coonoor, Nilgiris District, Tamil Nadu.

Figure 2. Vegetation of Lamb's Rock and surrounding areas, of Coonoor, The Nilgiris (Dt.).

Figure 3. Some endemic plants of Lamb's rock, Coonoor, Nilgiris District, Tamil Nadu forest,

a) *Impatiens levingei* b) *Euphorbia rothiana* c) *Osbeckia reticulata*

d) *Impatiens fruticose* e) *Alstonia venenata* f) *Cheirostylis flabellate*

g) *Sonerila versicolar var. versicolor* h) *Pogostemon nilgiricus* i) *Asystasia chelonoides.*

Table 1. List of Angiospermic plants, their families and medical potentials against various ailments.

S.No.	Binomial name	Family	Life form	Vernacular Name	Parts Used	Mode of Usage	Ailments treated
1.	*Acmella paniculata*	Asteraceae	Herb	Panicled spot flower	Fruits	As spices	It is used as antiseptic, antiseptic, antibacterial, antifungal and antimalarial treatment and as remedy for toothache, flu, cough, rabies diseases and tuberculosis.
2.	*Ageratina adenophora*	Asteraceae	Herb	Catweed	Leaf, Root	Juice, decoction	The leaf juice is used to stop bleeding of cut and wounds, forming clots. Root juice is prescribed to treat fever. Pure juice of the leaf is poured in the eye to treat insomnia. A decoction of the plant has been recommendedto treat jaundice and ulcers.
3.	*Ageratum conyzoides*	Asteraceae	Herb	Pumppillu	All	Paste, Powder	Used against epilepsy and wounds, also usedas an insect repellent.
4.	*Alstonia venenata*	Apocynaceae	Tree	Poison deviltree	Roots, fruits	As vegetable	It is used to cure skin diseases, leprosy, cobra and other venomous bites, epilepsy, fatigue,fever syphilis, insanity, helminthiasis.
5.	*Anoectochilus elatus*	Orchidaceae	Herb	South Indian jewelorchid	Entire plant	Powder	It is used to treat diabetes.
6.	*Asystasia chelonoides*	Acanthaceae	Shrub	Kodikkurunthu	Leaves	As vegetable	The leaves are used in many parts of Nigeriaas a traditional African medicine
7.	*Bidens pilosa*	Asteraceae	Herb	Black jack	Root, leaf, seed.	All	Reported to possess antibacterial, antimicrobial, antimalarial, diuretic, hepatoprotective activityes.
8.	*Chassalia curviflora var. ophioxyloides* (Wall.) Deb & B.Krishna	Rubiaceae	Shrubs to treelets	Vellakurinji	-	-	Not known.
9.	*Cheirostylis flabellata*	Orchidaceae	Herb	Small fan Cheirostylis	-	-	Not known.
10.	*Citrus aurantium*	Rutaceae	Tree		Leaf	None	Used as traditional Chinese medicine to treat nausea, indigestion and constipation, cancer, cardio vascular effect and sedative.
11.	*Commelina diffusa*	Commelinaceae	Herb	Dayflower	Entire plant	None	Used as heal swelling, urinary tract and respiratory tract infection, diarrhoea,

							enteritis and fever, malaria, insect , bug bites, rheumatoid arthritis, gonorrhoea influenza andbladder infection.
12.	*Elaeagnus latifolia*	Elaeagnaceae	Tree	-	-	-	Not known.
13.	*Elatostema cuneatum*	Urticaceae	Herb	-	-	-	Not known.
14.	*Elatostema integrifolium*	Urticaceae	Herb	-	-	-	Not known.
15.	*Eucalyptus globulus* Labill.	Myrtaceae	Tree	Thaila maram	Leaves	Leaf extract	The leaves are as a source of powerful antiseptic, expectorant, febrifuge, haemostatic, stimulant, tonic and vermifuge. The essential oil is used in aromatherapy.
16.	*Euphorbia rothiana*	Euphorbiaceae	Herb	Common hill spurge	-	-	Not known.
17.	*Exacum wightianum*	Gentianaceae	Herb	Wight's persian violet	-	-	No significance in tribal medicine.
18.	*Grona ferruginea*	Fabaceae	Shrub	Thattanpul	-	-	Not known.
19.	*Henckelia humboldtiana*	Gesneriaceae	Herb	Humboldt's stone flower	-	-	Not known.
20.	*Hydrocotyle sibthorpioides*	Apiaceae	Herb, runner	Malai vallarai	Entire plant	Decoction, paste, juice	Juice is used in the treatment of fevers. A paste made from the plant is applied externally to wounds and boils. A decoction of the plant is used in the treatment of abscesses, boils, bruises, cirrhosis, colds, coughs, hepatitis, hepatoma, influenza, itch, jaundice, sinusitis and sore throat. It is a Chinese herbal drug for hepatoma.
21.	*Hylodesmum repandum*	Fabaceae	shrub	Leaf Desmodium	-	-	Not known.
22.	*Impatiens cuspidata*	Balsaminaceae	Shrub	Fruit Balsam	-	-	Not known.

23.	*Impatiens fruticosa*	Balsaminaceae	Shrub	Shrubby Balsam	-	-	Not known.
24.	*Impatiens levingei*	Balsaminaceae	Herb	Levinge Balsam	-	-	Not known.
25.	*Justicia neesii*	Acanthaceae	Herb	Water willow	Leaves	Juice	The juice of the leaves are used to treat cold,asthma and cough.
26.	*Lantana camara*	Verbenaceae	Shrub	Unni poo	Leaves	Leaf extract	In traditional herbal medicines for treating skin itches, leprosy, chicken pox, measles, asthma and ulcers.
27.	*Neanotis indica*	Rubiaceae	Herb	Indian star violet	-	-	Not known.
28.	*Osbeckia reticulata*	Melastomataceae	Shrub	Giant osbeckia	-	-	Not known.
29.	*Parochetus communis*	Fabaceae	Herb	Blue oxalis	Entire	powder	Used to cure stress, nervousness and restlessness.
30.	*Passiflora leschenaultii*	Passifloraceae	Climber	Passion vine	-	-	Not known.
31.	*Peperomia tetraphylla*	Piperaceae	Epiphytic herb	Four-Leaf Peperomia	-	-	Not known.
32.	*Pilea melostomoides*	Urticaceae	Shrub	Melastome Clearweed	-	-	Not known.
33.	*Plectranthus glabratus*	Lamiaceae	Shrub	Padappayila	-	-	Not known.
34.	*Pogostemon nilagiricus*	Lamiaceae	Herb	Cherunjaval	Flower	Juice	The juice of the flower is used to cure cancer.
35.	*Schefflera wallichiana*	Araliaceae	Tree	-	-	-	Not known.
36.	Scutellaria violaceae	Lamiaceae	Herb	Novu pachilai	-	-	Not known.
37.	*Smilax wightii*	Smilacaceae	Climber	-	-	-	Not known.
38.	*Solanum erianthum*	Solanaceae	Shrub	Karimulli	Leaves	Paste	Leaves have been extensively used for treatingleucorrhoea, piles, hemorrhoids, scrofula, headache, vertigo, digestive troubles and for wound healing purposes.
39.	*Solanum robustum*	Solanaceae	Shrub	-	-	-	Not known.
40.	*Sonerila speciosa*	Melatomataceae	Herb	Showy Sonerilla	-	-	Not known.
41.	*Sonerila versicolor*	Melatomataceae	Herb	ColorfulSonerilla	-	-	Not known.

42.	*Zehneria maysorensis*	Cucurbitaceae	Climber	-	Entire plant	Whole plant	It is used as a wide therapeutic spectrum which includes skin disease, gonorrhoea, syphilis, cleansing uterus before a child is delivered, malaria, diarrhoea, mumps, fever, taeniasis, constipation, headache, eye infection, evil eye, rabies, swelling, conjunctivitis.

Table 2. List of ferns, their families and medical potentials against various ailments.

S.No.	Binomial name	Family	Life form	Vernacularname	Parts used	Mode of usage	Ailments treated
1.	*Adiantum capillus*	Pteridaceae	Herb	Black mainden hairfern	-	-	Not known.
2.	*Adiantum hispidulum*	Pteridaceae	Herb	Rough maiden hairfern	-	-	Not known.
3.	*Adiantum venustum*	Pteridaceae	Herb	Himalayan maiden hair fern	-	-	Not known.
4.	*Alsophila gigantean*	Cyathaceae	Herb	-	-	-	Not known.
5.	*Alsophila nilgerensis*	Cyathaceae	Herb	Tree fern	-	-	Not known.
6.	*Arachniodes aristata*	Dryopteridaceae	Herb	-	-	-	Not known.
7.	*Asplenium inaequilaterale*	Aspleniaceae	Herb	-	-	-	Not known.
8.	*Blechnum medium*	Blechnaceae	Herb	-	-	-	Not known.
9.	*Dicranopteris linearis*	Gleicheniaceae	Climber	Scramblingfern	Leaf	Juice	Used as external application of crushed leavesto combat fever and wounds dressing.
10	*Nephrolepis exaltata*	Nephrolepidaceae	Herb	Sword fern orBoston fern	-	-	Not known.
11.	*Pteris argyraea*	Pteridaceae	Herb	Silver brake	-	-	Not known.
12	*Pteris biaurita*	Pteridaceae	Herb	Chijese ladderbrake	None	None	It is used to treat plant and animal diseases.
13.	*Thelypteris dentate*	Aspleiniaceae	Herb	Downy maiden fern	-	-	Not known.

Table 3. Analysis of families of the plants found in the study area.

S. No.	Family	Number of plants
Angiospermic plants		
1	Acanthaceae	2
2	Apiaceae	1
3	Apocynaceae	1
4	Araliaceae	1
5	Asteraceae	4
6	Balsaminaceae	3
7	Commelinaceae	1
8	Cucurbitaceae	1
9	Elaegnaceae	1
10	Euphorbiaceae	1
11	Fabaceae	3
12	Gentianaceae	1
13	Gesneriaceae	1
14	Lamiaceae	3
15	Melastomataceae	3
16	Myrtaceae	1
17	Orchidaceae	2
18	Passifloraceae	1
19	Piperaceae	1
20	Rubiaceae	2
21	Rutaceae	1
22	Smilacaceae	1
23	Solanaceae	2
24	Urticaceae	3
25	Verbenaceae	1
Ferns		
26	Aspleniaceae	**2**
27	Blechnaceae	1
28	Cyatheaceae	2
29	Dryopteridaceae	1
30	Gleicheniaceae	1
31	Nephrolepidaceae	1
32	Pteridaceae	5

Table 4. Life form analysis of the plants of the study area.

S.no	Habit	Number of Angiospermic Plants	Number of Ferns	Total number of plants	Percentage (%)
1	Herb	22	11	33	60
2	Shrub	12	-	12	22
3	Climber	3	1	4	8
4	Tree	5	1	6	10

Table 5. Analysis of native range of the species present in the study area.

S. No.	Plant name	Distribution
1	*Acmella paniculata*	Native to South East Asia
2	*Ageratina Adenophora*	Native to South America
3	*Ageratum conyzoides*	Native to South America
4	*Alstonia venenata*	Endemic to peninsular India
5	*Anoectochilus elatus*	Endemic to Southern Western Ghats
6	*Asystasia chelonoides*	Endemic to Southern Western Ghats
7	*Bidens pilosa*	Native to the Americas
8	*Chassalia curviflora var. ophioxyloides*	Endemic to Western Ghats
9	*Cheirostylis flabellate*	Endemic to Southern Western Ghats
10	*Citrus aurantium*	Native to India
11	*Commelina diffusa*	Found throughout the tropics
12	*Elaeagnus latifolia*	Native to India
13	*Elatostema cuneatum*	Native to south East Asia
14	*Elatostema integrifolium*	Native to South East Asia
15	*Eucalyptus globulus*	Native to Australia
16	*Euphorbia rothiana*	Endemic to Western Ghats
17	*Exacum wightianum*	Endemic to Southern Western Ghats
18	*Grona ferruginea*	Endemic to peninsular India and Sri Lanka
19	*Henckelia humboldtiana*	Endemic to Southern Western Ghats
20	*Hydrocotyle sibthorpioides*	Endemic to Western Ghats
21	*Hylodesmum repandum*	Endemic to Southern Western Ghats
22	*Impatiens cuspidate*	Endemic to Southern Western Ghats
23	*Impatiens fruticosa*	Endemic to Southern Western Ghats
24	*Impatiens levingei*	Endemic to Nilgiris

25	*Justicia neesii*	Endemic to Western Ghats
26	*Lantana camara*	Native to South America
27	*Neanotis indica*	Endemic to India
28	*Osbeckia reticulate*	Endemic to Southern Western Ghats
29	*Parochetus communis*	Native to the Himalayas
30	*Passiflora leschenaultia*	Endemic to peninsular India
31	*Peperomia tetraphylla*	Native to India
32	*Pilea melostomoides*	Native to Indo-Malaysia
33	*Plectranthus glabratus*	Endemic to Western Ghats
34	*Pogostemon nilagiricus*	Endemic to Nilgiris
35	*Schefflera wallichiana*	Endemic to India
36	*Scutellaria violacea*	Native to India
37	*Smilax wightii*	Endemic to India
38	*Solanum erianthum*	Native to South America
39	*Solanum robustum*	Native to South America
40	*Sonerila speciosa*	Endemic to Southern Western Ghats
41	*Sonerila versicolor*	Endemic to Southern Western Ghats
42	*Zehneria maysorensis*	Endemic to Southern Western Ghats
Ferns		
1	*Adiantum capillus*	Worldwide distribution
2	*Adiantum hispidulum*	Native to South East Asia
3	*Adiantum venustum*	Native to South East Asia
4	*Alsophila gigantean*	Native to South East Asia
5	*Alsophila nilgerensis*	Endemic to Southern Western Ghats
6	*Arachniodes aristata*	Native to South East Asia
7	*Asplenium inaequilaterale*	Native to the tropical areas
8	*Blechnum medium*	Native to Australia and New Zealand
9	*Dicranopteris linearis*	Native to South East Asia
10	*Nephrolepis exaltata*	Native to the Tropical Americas
11	*Pteris argyraea*	Endemic to Southern Western Ghats
12	*Pteris biaurita*	Found throughout the tropics
13	*Thelypteris dentate*	Native to South East Asia

Table 6. Analysis of endemism of the plants of the study area

S. No.	Diversity status	Number of Angiospermic plants	Number of ferns	Total number of plants	Percentage (%)
1	Endemic to Western Ghats	20	2	22	40.0
2	Native to India	9	0	9	16.4
3	Native to South East Asia	5	6	11	20.0
4	Found throughout the World	1	3	4	7.2
5	Exotic or alien	7	2	9	16.4

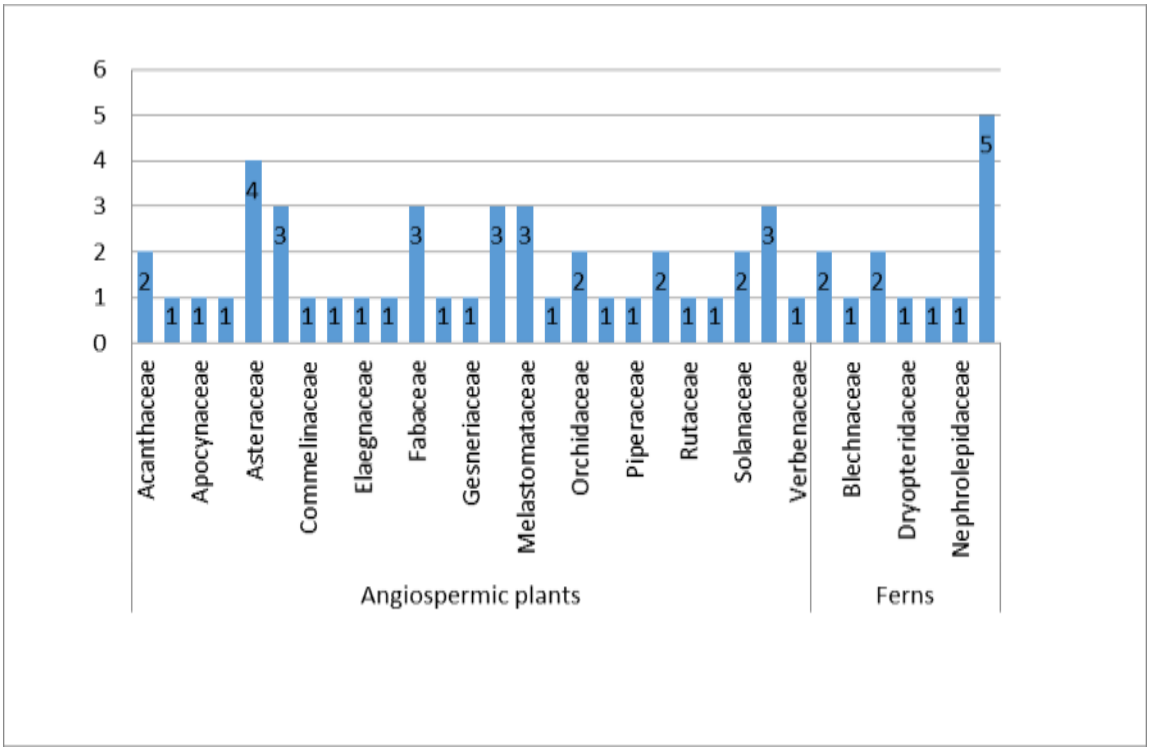

Figure 4. Analysis of family of the plants in study area

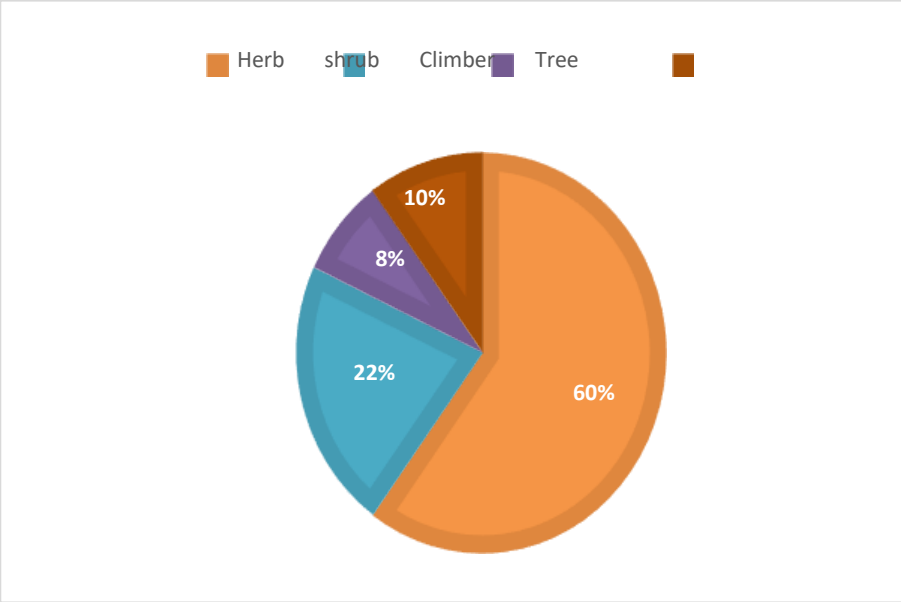

Figure 5. Life form analysis of the plants of the study area

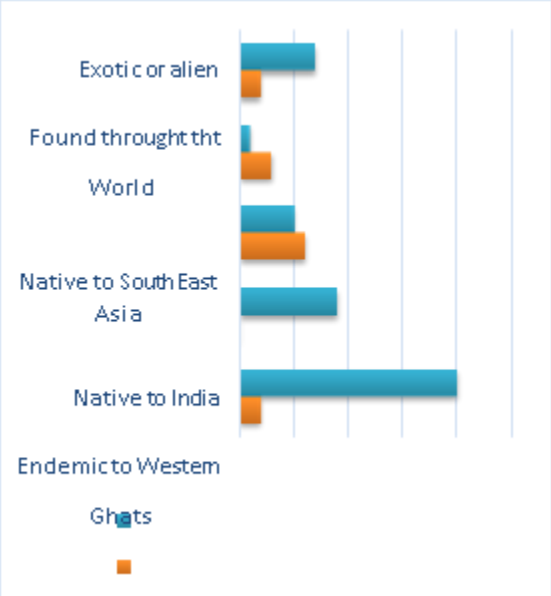

Figure 6. Analysis of endemism of theplants of the study area.

4. CONCLUSION

The present study was carried out in Lamb's rock conoor, Nilgiris Western Ghats of India and documented 55 plant species belonging to 32 families. In recent days there is a hindrance in the transfer of traditional knowledge from generation to generation. So the knowledge about medicinal plants, traditional healers and their uses were highly important. This study could help in creating awareness about the endemic plants of Western Ghats, their medicinal values and also about the exotic plants present in the Nilgiris. The rich diversity of different plant species in and around Lamb's rock, Coonoor may be due to the presence of different microclimatic zones like open habitats, shaded habitats under evergreen trees, perennial streams that run through the forests, water dripping rocks, and cliffs which serve as perfect habitats for various kinds of plants that grow well in moist and cool areas. This documentation study helped for the conservation of endangered plants.

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