



**ECOLOGICAL STATUS OF THERAPEUTICALLY IMPORTANT PLANTS IN
THIASHOLA, MANJOOR, WESTERN GHATS, TAMIL NADU, INDIA**

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ABSTRACT

Sholas are the places of high biodiversity, which includes many endemic, endangered and rare species of both flora and fauna. Documentation of flora with their medicinal uses and the identification of ecological status are the most essential part in the conservation programmes. For this purpose in the present investigation was undertaken to document the ecological status, medicinal and economic uses of herbaceous plants in Thiashola, Manjoor, Nilgiris South Division, Western Ghats. The results of the study revealed that out of 53 species enumerated, 36 have been recognized as therapeutically important species. Among them, the species such as *Achyranthes bidentata*, *Acmella calva*, *Asparagus fysoni*, *Centella asiatica* and *Gaultheria fragrantissima* are suggested for cultivation and conservation so as to reduce the pressure upon wild population. Conclusion: These species may lose their ecological importance further and may become rare elements due to some intrinsic and extrinsic factors. However, long-term studies on their sociological behaviour are required to confirm this fact. Hence, it is suggested that in addition to habitat protection, priorities must be given for these species so as to protect the genetic stock and species as well.

KEYWORDS: Shola, Nilgiris, Therapeutic, Conservation, Thiashola.

INTRODUCTION

The Nilgiri Biosphere Reserve, located in Western Ghats of Palghat Gap comprises of substantial unspoiled areas of natural moist evergreen forests, semi evergreen forests, thorn forests, savannah woodland, sholas with associated grasslands and swamps thus contributing to the highest biodiversity. Sholas, an evergreen forest and non-renewable natural resources found in the mountain zones around 1600 m and above. These relic forests occupy the sheltered valleys in the mountain depressions.^[1,2] The sholas are extremely dense, with an average of 3000 small trees per hectare. It is a natural vegetation of the high plateau. It is also called as primary vegetation or virgin forest. The sholas are the residual forests confined to the sheltered sites such as the valleys, glens, hollows and depressions where moisture is good in all the basins of the Nilgiris and are unique features of Nilgiris.^[3,4]

Sholas are generally distributed at floral, faunal and microbial levels. In addition to diverse tree species, the shola understorey is characterized by the presence of herbs and conservation of such herbaceous bioresources needs information on their ecological status in the community. Keeping this fact in mind Thiashola at Manjoor, The Nilgiris, Western Ghats, India was selected for the present study. The Thiashola (Figure 1) one of the undisturbed subtropical montane wet evergreen forest harbours a high number of medicinal and other economically important plants in its understorey^[5] despite the existence of adequate soil moisture at all times of the year.^[6] However, the documentation of therapeutic value and ecological features of such important plants of this region have not been completely executed.^[7] Hence the present study was carried out to explore the availability of medicinal plants and their ecological status in Thiashola, Manjoor (Figure 4).

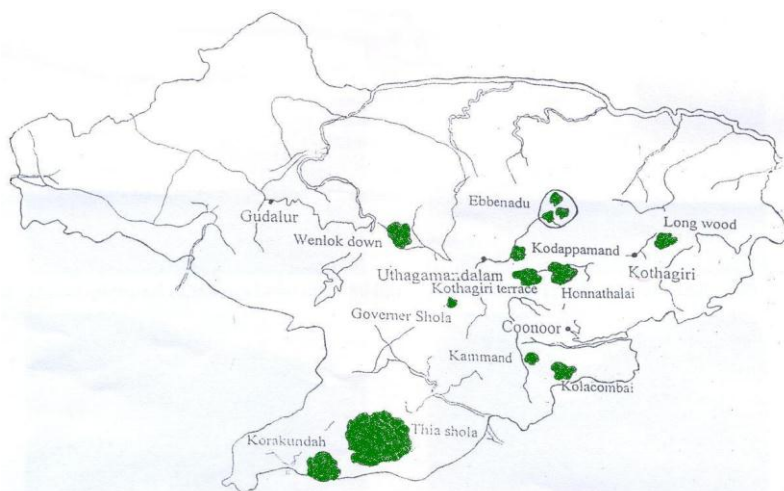


Figure 1. Location of the study shola showing vegetation pattern

MATERIALS AND METHODS

The vegetation pattern, soil and climatic factors of Thiashola, Manjoor, The Nilgiris were analyzed for the present study. Climatic data of Thiashola were collected

from Thiashola Tea Factory, Manjoor and from Government Meterological Station, Ootacamund (Figure 2). Soil samples were collected from the study shola (Figure 3) and were analysed as per Piper.^[8]

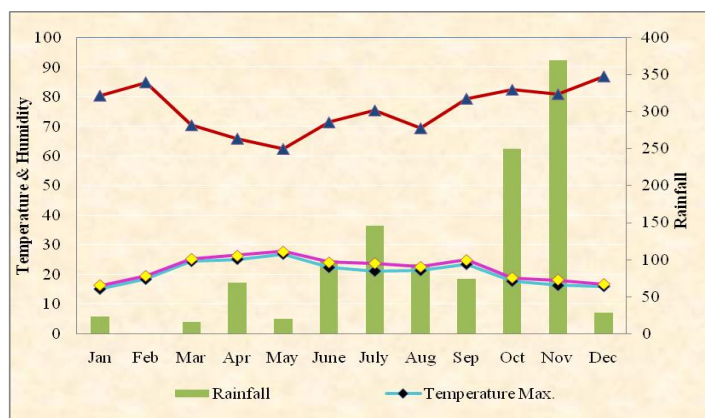


Figure 2. Ombrothermic graph of Thiashola (2009-2010)

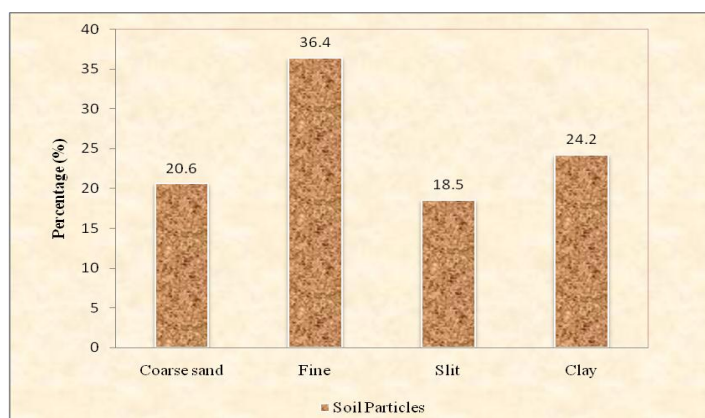


Figure 3. Percentage composition of soil particles (Thiashola)

Sampling

The ethnopharmacobotanical investigations of herbaceous plants were carried out in Thiashola, Manjoor during January 2009 to December 2010. Plants were collected in their flowering and fruiting seasons

from the natural habitat. While collecting the individual plant species, a thorough observation was made regarding the location, natural habitat, distribution pattern, habit, nature of roots, tubers, bulbs or rhizomes, floral and fruit characteristics etc. Seasonal variations,

flowering and fruiting stages were also recorded and were entered on the spot in the field note book. The collected specimens were pressed properly. Dried specimens were poisoned with 0.1% HgCl₂ following the method of Jain and Rao.^[9] All the informations were transferred from the field note book to the right hand corner of the herbarium sheet for ready identification. The voucher specimens were deposited in the Department of Botany, Vellalar College for Woman, Thindal, Erode. Photographs were also taken to supplement the herbarium.

The collected plants were identified with the help of the existing Floras^[10,11,12] and compared with type specimens available in the herbarium of Botanical Survey of India, Southern Circle, TNAU Campus, Coimbatore, Tamil Nadu. The ethnobotanical data collected through interview were documented alphabetically with their binomial, vernacular names, ecological status, parts used and medicinal uses. The floristic list in the understory of shola including botanical name, families, ecological status, plant parts used and mode of administration is summarized in Table 1.

RESULTS AND DISCUSSION

Table 1: The list of herbaceous species present in the shoals of Nilgiris with their ecological status and Medicinal uses

S. No.	Botanical Name	Family	Ecological Status	Parts Used	Medicinal Uses	Mode of Administration
1.	<i>Achyranthes bidentata</i> Blume.	Amaranthaceae	Common	Roots, spike and leaves	Asthma, antidote, contraceptive and night blindness	Paste, juice
2.	<i>Acmella calva</i> (DC.) R. K. Jansen	Asteraceae	Common	Inflorescence	Tooth ache	Oil
3.	<i>Ageratum conyzoides</i> L.	Asteraceae	Common	Leaves	Psoriasis	Leaf paste
4.	<i>Ageratum houstonianum</i> Mill.	Asteraceae	Common	Leaves	Wound healing	Leaf paste
5.	<i>Agrostis pilosula</i> Trin.	Poaceae	Endemic	Aerial parts	Fodder	-
6.	<i>Anaphalis elliptica</i> DC.	Asteraceae	Endemic	Whole plant	Fever	Powder
7.	<i>Asparagus fysoni</i> J. F. Macbr.	Asparagaceae	Endemic, rare and threatened	Tubers	Tonic	Powder
8.	<i>Asparagus racemosus</i> Willd.	Asparagaceae	Common	Tubers	Stimulant	Powder
9.	<i>Biophytum sensitivum</i> DC.	Oxalidaceae	Common	Whole plant	Stimulant, chest complaints and stomachache	Powder
10.	<i>Calanthe triplicata</i> Ames.	Orchidaceae	Common	-	-	-
11.	<i>Cardamine africana</i> L.	Brassicaceae	Common	Leaves and flowers	Psoriasis	Paste
12.	<i>Cayratia pedata</i> (Lam.) Gagnep. var. <i>glabra</i> Gamble	Vitaceae	Endemic, Endangered and rare	Whole plant	Antiseptic, cancer, ulcer and refrigerant	Paste
13.	<i>Cayratia pedata</i> (Lam.) A. Juss. Ex Gagnep.	Vitaceae	Common	Whole plant	Antiseptic	Paste
14.	<i>Centella asiatica</i> Urban.	Apiaceae	Common	Whole plant	Skin diseases	Paste
15.	<i>Cynoglossum zeylanicum</i> Thunb.	Boraginaceae	Common	Roots	Jaundice	Powder
16.	<i>Cyrtococcum deccanense</i> Bor.	Poaceae	Common	Aerial parts	Fodder	-
17.	<i>Desmodium scalpe</i> DC.	Fabaceae	Common	-	-	-
18.	<i>Disporum leschenaultianum</i> D. Don.	Convallariaceae	Common	Tubers	Antidote	Paste
19.	<i>Eragrostis cilianensis</i> (All.) Vignolo.	Poaceae	Common	Aerial parts	Fodder	-
20.	<i>Eragrostis nigra</i> Ness ex Steud.	Poaceae	Common	Aerial parts	Fodder	-
21.	<i>Euphorbia rothiana</i> Spreng.	Euphorbiaceae	Common	Latex	Boils and acne	As Latex
22.	<i>Gaultheria fragrantissima</i> Wall.	Ericaceae	Endemic	Leaves	Arthritis	Oil
23.	<i>Girardinia diversifolia</i> (Link.) Friis.	Urticaceae	Common	Roots and leaves	Stimulant, headache, swollen joints and fever	Root Powder

24.	<i>Helichrysum bracteatum</i> (Vent.) Andrews.	Asteraceae	Common	Whole plant	Bleeding	Paste
25.	<i>Hydrocotyle javanica</i> Thunb.	Apiaceae	Common	Leaves	Blood purifier	Powder
26.	<i>Justicia simplex</i> D. Don.	Acanthaceae	Common	Leaves	Cooling, aperients and small pox in children	Paste
27.	<i>Laportea terminalis</i> Wight	Urticaceae	Common	Roots and leaves	Blind abscesses	Powder
28.	<i>Leucas vestita</i> Benth.	Lamiaceae	Common	-	-	-
29.	<i>Neonitis indica</i> (DC.) Lewis.	Rubiaceae	Endemic	-	-	-
30.	<i>Oberonia verticillata</i> W.	Orchidaceae	Common	-	-	-
31.	<i>Ophiopogon intermedius</i> D. Don.	Haemodoraceae	Common	Tuber	Liver and kidney complaints	Powder
32.	<i>Oplismenus burmannii</i> Beauv.	Poaceae	Common	Whole plant	Pregnancy	Decoction
33.	<i>Oxalis latifolia</i> Kunth.	Oxalidaceae	Common	Whole plant	Astringent, antiseptic and anemia	Paste
34.	<i>Oxalis spiralis</i> G. Don.	Oxalidaceae	Common	-	-	-
35.	<i>Parochetus communis</i> Buch.-Ham. ex. D. Don.	Fabaceae	Common	-	-	-
36.	<i>Passiflora calcaratus</i> Linn.	Passifloraceae	Common	Stem and root	Cyanogenetic	Powder
37.	<i>Passiflora edulis</i> Sims	Passifloraceae	Common	Fruits	Edible	-
38.	<i>Passiflora leschenaultia</i> DC.	Passifloraceae	Common	-	-	-
39.	<i>Phytolacca octandra</i> L.	Phytaloccaceae	Common	Tender leaves	Edible	Cooked
40.	<i>Pilea angulata</i> Blume.	Urticaceae	Common	Aerial parts	Fodder	-
41.	<i>Plantago erosa</i> Wallich.	Plantaginaceae	Common	Leaves and Seeds	Antiseptic, gastric troubles and haematuria	Powder
42.	<i>Pouzolzia bennettiana</i> Wight	Urticaceae	Common	Whole plant	Cuts and fracture	Paste
43.	<i>Pouzolzia bennettiana</i> Wight var. tomentosa	Urticaceae	Common	Leaves	Antiseptic	Leaf Extract
44.	<i>Ranunculus diffusus</i> DC.	Ranunculaceae	Common	Leaves and stem	Rheumatism	Powder
45.	<i>Rubus racemosus</i> Roxb.	Rosaceae	Endemic	Fruits	Edible	-
46.	<i>Scutellaria violacea</i> B. Heyne ex Benth.	Lamiaceae	Common	Leaves	Rheumatism	Leaf Powder
47.	<i>Senecio candicans</i> DC.	Asteraceae	Common	-	-	-
48.	<i>Smilax aspera</i> L.	Smilacaceae	Common	Whole plant	Intestinal diseases	Powder
49.	<i>Strobilanthes foliosus</i> (Wight) T. Anderson.	Acanthaceae	Endemic	Leaves	Antiseptic	Paste
50.	<i>Strobilanthes kunthianus</i> (Nees) T. Anderson ex Benth	Acanthaceae	Common	Leaves	Diuretic and ornamental	-
51.	<i>Toddalia asiatica</i> (L.) Lam. var. floribunda Gamble	Rutaceae	Common	Roots and fruits	Fever and rheumatism	Powder
52.	<i>Viola serpens</i> Wall. ex Ging.	Violaceae	Common	Whole plant	Antipyretic, cough and cold	Powder
53.	<i>Zehneria mysorensis</i> Wight & Arn.	Cucurbitaceae	Common	Fruits	Blood purifier	Fruits

The monthly average minimum temperature varied from 15.2°C to 26.9°C. The monthly average maximum temperature ranged between 16.3°C and 27.8°C. The relative humidity in the study area during the study period was between 81% and 98% as recorded at

3 p.m and 42% and 78% at 7a.m. The monthly rainfall values ranged from 0 to 370 mm. The total rainfall for the year 2010 (Jan to Dec) was 1199 mm. The soil in Thiashola is slightly acidic with sandy loam texture. The pH of the soil ranged between 6.1 to 6.5 (Fig. 2). The

ever available moisture in surface soil is one of the characteristic features of Thiashola.^[6,13]

The study revealed that out of 53 species enumerated (Table 1), 36 have been recognized as medicinally important plant species. An attempt was made to list out the dominant families. Asteraceae with 6 species, Poaceae with 5 species, Utricaceae with 5 species and the rest of the many families are represented with lesser number of species. Since, the study shola is coming under hot spot regions of world, high degree of endemism is available. Inventory showing the number of genera and species belonging to all 28 families (Figure

4). Among the plants studied orchid, *Calanthe triplicata* showed the highest density. The *Centella asiatica*, *Hydrocotyle javanica* and grasses are present with higher density. In the other extreme, many medicinally important species like *Acmella calva*, *Anaphalis elliptica*, *Cayratia pedata*, *Cayratia pedata* var. *glabra*, *Oxalis spiralis* and *Parochetus communis* have always present with low densities. The poor reproductive potential with less seed output, higher demand, shorter viability, improper dormancy, lower regeneration and weaker competitive ability may lead the species with low density in the communities.



Asparagus fysoni J. F. Macbr.



Hydrocotyle javanica Thunb.



Anaphalis elliptica DC.



Parochetus communis Buch.- Ham. ex. D. Don



Acmella calva (DC.) R. K. Jansen



Calanthe triplicata Ames.

Figure 4. Snapshots of some of the surveyed species

Though the sholas are under intensive habitat protection by the inclusion in Nilgiri Biosphere Reserve region, some of the species are facing threats from local public

and herb gatherers. The species like *Achyranthes bidentata*, *Asparagus fysoni* and *Asparagus racemosus* are uprooted for their medicinal roots, tubers, spike and

spadix to sell in local markets. Similarly, the species like *Acmella calva* and *Centella asiatica* are exploited illegally by the local people.

CONCLUSION

Medicinal plants play an important role in our day-to-day life and the demand on natural drugs is progressing in the global arena. Nature provides us a natural pharmacy for curing and preventing ailments with medicinal plants. Due to indiscriminate exploitation and lack of awareness on the part of humans, the valuable plant wealth is deteriorating fast. The loss of genotypes of medicinal plants and the non-availability of raw drugs would detrimentally affect the quality and efficacy of medicines, of traditional health care systems and accordingly their credibility. Therefore very urgent and crucial steps need to be taken for conserving the precious gifts of nature. From the documented data cultivation is suggested for the species, *Achyranthes bidentata*, *Acmella calva*, *Asparagus fysoni*, *Centella asiatica* and *Gaultheria fragrantissima* in degraded shola and other suitable habitats in Nilgiris to meet the demand and also to conserve these species. These species may lose their ecological importance further and may become rare elements due to some intrinsic and extrinsic factors. However, long-term studies on their sociological behaviour are required to confirm this fact. Hence, it is suggested that in addition to habitat protection, priorities must be given for these species so as to protect the genetic stock and species as well.

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