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Assessment of Biodiversity and Ethno-Medicinal Plants in the Durgi Section of Macherla Range, Nallamala Forest, Andhra Pradesh of India

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ABSTRACT

The present study focuses on the assessment of biodiversity and documentation of ethno-medicinal plants in the Durgi Section under the Macherla Range of Nallamala Forest, Andhra Pradesh. The Nallamala forests are ecologically rich and culturally significant, harboring diverse flora and supporting local tribal communities who rely on forest resources for health care and livelihood. Systematic field surveys were carried out between April-June,2025 using quadrat sampling for biodiversity assessment and semi-structured interviews for ethnobotanical study. A total of 30 plant species belonging to 6 families were recorded, identified as having ethno-medicinal value. These plants are traditionally used for treating ailments such as fever, skin infections, respiratory disorders, digestive problems, and bone fractures. Leaves and roots were the most commonly used plant parts, followed by bark and seeds. The findings highlight the importance of conserving both biological diversity and traditional knowledge systems, which are under threat due to overexploitation and habitat loss. The study emphasizes the need for community-based conservation, sustainable harvesting practices, and further pharmacological validation of the documented species.

Keywords: *Biodiversity, Ethnobotany, Medicinal Plants, Nallamala Forest, Durgi Section, Andhra Pradesh.*

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Introduction

Biodiversity is the foundation of ecosystem functioning, resilience, and productivity. Forest ecosystems, in particular, harbor a vast variety of species that contribute to ecological balance, nutrient cycling, carbon sequestration, and climate regulation. High biodiversity ensures ecological stability and provides goods such as timber, fodder, fruits, resins, and medicinal resources, which support both wildlife and human communities [1-2]. Tropical and dry deciduous forests of India are recognized as repositories of genetic resources, making their conservation vital for sustainable development and human well-being [3].

Ethnobotany, the study of the relationship between people and plants, plays a crucial role in understanding how indigenous and local communities use forest resources for food, medicine, and cultural practices [4]. Traditional knowledge of medicinal plants is passed down through generations and continues to form the basis of healthcare for rural and tribal populations in India [5]. The World Health Organization (WHO) estimates that nearly 80% of the population in developing countries relies on traditional medicine derived largely from plants for their primary healthcare needs (WHO, 2002). In Andhra Pradesh, particularly among tribal communities inhabiting the Eastern Ghats and Nallamala forests, medicinal plants form an integral part of primary healthcare practices [6].

The Nallamala Forest, part of the Eastern Ghats, is one of the largest contiguous dry deciduous forests in southern India, extending across Andhra Pradesh and Telangana. Ecologically, it is home to rich biodiversity, including endangered species such as the tiger (*Panthera tigris*), leopard (*Panthera pardus*), sloth bear (*Melursus ursinus*) and several endemic flora species [7]. The region is dominated byteak (*Tectona grandis*) and mixed deciduous forests, supporting medicinally important plants like *Terminalia chebula*, *Phyllanthus emblica*, *Rauvolfia serpentina,* and *Gymnema sylvestre* [8]. Culturally, the forest is inhabited by tribal communities such as the Chenchus, Yerukulas and Lambadas who are heavily dependent on forest resources for food, medicine, and livelihood [9]. These communities have accumulated rich traditional knowledge of medicinal plants, making the Nallamala forests not only ecologically but also ethnobotanically significant.

While several studies have been conducted on the flora and ethno-medicinal knowledge of the Nallamala forests [10-12], there remains a significant gap in localized assessments, particularly in the Durgi Section of Macherla Range, Andhra Pradesh. This area, despite being ecologically rich and culturally important, has received limited scientific attention compared to core areas of Nallamala such as Srisailam and Nagarjunasagar. The Durgi Section, with its unique microclimatic conditions and tribal settlements, may harbor undocumented medicinal plant diversity and traditional knowledge that is at risk of erosion due to modernization, habitat degradation, and declining intergenerational transfer of knowledge. Therefore, an "Assessment of Biodiversity and Ethno-Medicinal Plants in the Durgi Section of Macherla Range, Nallamala Forest,

Andhra Pradesh" is essential to plant diversity systematically. Record ethnomedicinal practices of local communities. Contribute to biodiversity conservation and sustainable utilization strategies. Preserve indigenous knowledge systems before they are lost.

Biodiversity, encompassing the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems, represents the foundation of ecosystem functioning and human survival [13]. Forest ecosystems, in particular, harbor a significant portion of global biodiversity and play a vital role in regulating ecological balance, sustaining livelihoods, and supporting cultural traditions [14]. Among these, tropical forests such as the Nallamala forest region of Andhra Pradesh are hotspots of both floral and faunal diversity, as well as centers of ethnobotanical knowledge preserved through indigenous communities.

The Nallamala forest**,** a prominent segment of the Eastern Ghats, extends across Andhra Pradesh and Telangana and is characterized by dry deciduous and mixed forest types with patches of scrub vegetation [15]. It forms part of the Nagarjunasagar-Srisailam Tiger Reserve (NSTR), one of the largest tiger reserves in India, which also serves as a repository of medicinal plants and non-timber forest products. The Durgi Section of the Macherla Range represents an ecologically sensitive zone within this forest landscape, supporting a mosaic of species that are ecologically, economically, and culturally significant.

Ethno-medicinal plants constitute an integral part of traditional healthcare systems, particularly in rural and tribal regions where modern healthcare access is limited. Globally, the World Health Organization (WHO) estimates that nearly 80% of the population in developing countries relies on plant-based medicines for primary healthcare (WHO, 2002). India, recognized as one of the twelve mega-biodiversity countries**,** harbors more than 7,500 medicinal plant species, of which many are concentrated in forest ecosystems [16]. In Andhra Pradesh, several indigenous communities such as the Chenchus, Yanadis, and Lambadas possess rich traditional knowledge about the use of local flora for treating ailments ranging from common fevers to chronic diseases [17].

Biodiversity and ethno-medicinal resources face multiple threats, including deforestation, habitat degradation, over-exploitation, climate change, and loss of indigenous knowledge [18]. The Nallamala forests, though relatively undisturbed compared to other regions, are increasingly exposed to pressures from developmental activities, fuelwood collection, grazing, and agricultural encroachments**.** Documenting biodiversity and ethno-medicinal plant knowledge from micro-sites such as the Durgi Sectionis therefore crucial for devising conservation strategies, sustainable utilization, and integration of indigenous knowledge into modern healthcare practices. Ecological data with ethnobotanical insights, this study seeks to contribute to the broader understanding of biodiversity conservation, sustainable forest management, and preservation of indigenous cultural heritage in Andhra Pradesh. The present study, entitled *"Assessment of Biodiversity and Ethno-Medicinal Plants in the Durgi Section of Macherla Range, Nallamala Forest, Andhra Pradesh,"* aims to: Assess the floral diversity and vegetation composition of the study area and analyze the ethnomedicinal uses of plants practiced by local and tribal communities.

Study Area

Regional setting**.** The Durgi Section lies within the Macherla Forest Range on the south-eastern flanks of the Nallamala Hills (Eastern Ghats), adjoining the Nagarjunasagar–Srisailam Tiger Reserve (NSTR) in Palnadu (formerly Guntur) district, Andhra Pradesh. The Nallamalas run north–south between the Krishna and Pennar rivers; their northern margin abuts the Palnadu basin, where Macherla and Durgi are located.

Durgi (nearest settlement/section HQ): ~16.4259° N, 79.5404° E, Macherla (range HQ town): ~16.4760° N, 79.4394° E. The study plots should fall within the reserved forest beats of the Durgi Section inside the broader Nallamala landscape described above. (Exact beat boundaries are administrative and not publicly mapped.)

Topography and geology

- The Nallamala Hills are an old, deeply weathered block of the Eastern Ghats with elevations typically ~200–1,100 m (avg. ~520 m), peaking near Bhairani Konda (~1,100 m) and GundlaBrahmeswara (~1,048 m). Terrain is dissected, with cuestas and plateaus giving way to narrow valleys draining toward the Gundlakamma and Krishna systems.
- Bedrock belongs chiefly to the Cuddapah (Kadapa) and Kurnool groups—quartzites, shales/siltstones, and sandstones—forming the structural and edaphic template for the forest.

Climate

- **Thermal regime.** Warm–hot through most of the year; nearby Markapur/Nallamala localities experience peak pre-monsoon highs in April–May (~40–41 °C; average May highs ~40–41 °C) and mildest conditions in Dec–Jan (highs ~28–29 °C).
- Rainfall. Rain is monsoonal, concentrated in SW monsoon (Jun–Sep) with supplemental rains from NE monsoon (Oct–Nov); typical annual totals across the Nallamala–Markapur belt are ~700–1,000 mm (diverse local estimates: ~800–1,300 mm depending on station and period).
- Local climate type (Durgi):BSh (hot semi-arid).

Soils: Along the Nallamala foothills and basins (Palnadu/Prakasam belt), the dominant soils include red loams, red sandy loams, black cotton soils**,** with red calcareous variants toward interior slopes; lateritic patchesoccur in parts of coastal-adjacent districts of the Eastern Ghats.

Vegetation (physiognomy and types): Within NSTR/Nallamala, the matrix is southern tropical dry mixed deciduous forest**,** intergrading locally with Hardwickia (Anjan)–Boswellia woodlands and Deccan thorn scrubon shallow, stony sites. Characteristic trees include *Anogeissus latifolia*, *Cleistanthus collinus*, *Terminalia spp*., *Pterocarpus marsupium, Hardwickia binata, Boswellia serrata, Tectona grandis***,** *Albizia spp*.**,** among others. Riparian and edaphic grasslands occur in pockets. People and communities: The Chenchu—a Particularly Vulnerable Tribal Group (PVTG) with deep forest-based livelihoods and rich ethnobotanical knowledge—are indigenous to the Nallamala landscape (Andhra Pradesh & Telangana). Contemporary studies document cultural change, migration pressures, and conservation engagement (e.g., as community protectors in tiger landscapes). Other Scheduled Tribes in the broader region include Yanadi and Yerukula in select districts.

Materials and Methods

1. Biodiversity Assessment

a) Sampling Design: To study the floristic diversity, a stratified random sampling method was adopted. The study area (Durgi Section, Macherla Range) was divided into ecological strata (based on vegetation type, elevation, and land use), and within each stratum, quadrats were laid systematically.

- **Quadrate Size and Number:**

For trees: 20 m × 20 m quadrats,For shrubs: 5 m × 5 m quadrats and For herbs: 1 m × 1 m quadrats and total of 50 quadrats were laid across different vegetation zones.

b) Transect Method: In addition to quadrats, line transects (100 m length, 10 m width) were used to document species occurrence, particularly rare and scattered species in undisturbed forest patches.

c) Species Identification: All plant specimens were collected, properly pressed, dried, and mounted on herbarium sheets following standard herbarium techniques [19]. Identification was carried out using:

- **Regional Floras** such as *Flora of the Presidency of Madras* [20], *Flora of Andhra Pradesh* [21].
- Verification with local experts and secondary literature.

d) Quantitative Analysis: For biodiversity assessment, the following indices were used:

Relative Density

Relative density is the numerical strength of a species in relation to the total number of individuals of all the species and was calculated as Relative density (RD).

$$\text{Relative Density} = \frac{\text{Number of Individuals of a species}}{\text{Number of individuals of all species}} \times 100$$

Forest Survey of India [22-23]

Abundance

$$\text{Abundance} = \frac{\text{Total number of Individual s of the species}}{\text{Total number of plots of occurrence}}$$

Dominance

Dominance= Density for a species x average basal area for species.

Basal Area

$$\text{BasalArea} = \frac{\sum \pi D^2}{4}$$

Relative Frequency

$$\text{Relative Frequency} = \frac{\text{Number of occurrence of a species}}{\text{Number of occurrence of all species}} \times 100$$

Relative Dominance

$$\text{Relative Dominance} = \frac{\text{Basalareaof a species}}{\text{Basalareaof all species}} \times 100$$

Importance value Index

Importance Value Index = Relative Dominance + Relative Density + Relative Frequency

3.1.9 Species diversity

$$\text{Shannon - Weiner Diversity Index}(H') = -\sum_{i=1}^{s}(P_i)(\log Pi)$$

Concentration of dominance

Concentration of dominance was measured by Simpson index (Simpson 1949)

$$e = \frac{H'}{\log(S)} \qquad d = s\frac{1}{\log N}$$

Equitability

Equitability (e) was calculated as suggested by [24] as

Species richness

- Shannon-Wiener Index (H') = –Σ (pi ln pi), where *pi* = proportion of individuals in species *i*.
- Simpson's Index (D) = Σ (pi^2), used to measure dominance.
- Evenness Index (J) = H'/ln S, where S = species richness.
- Importance Value Index (IVI) = Relative Density + Relative Frequency + Relative Dominance.

2. Ethno-Medicinal Documentation

- **a) Data Collection:** Ethno-medicinal data were collected through semi-structured interviews and participatory rural appraisal (PRA) techniques with tribal communities (Chenchus, Lambadas, Yerukulas and other local inhabitants) in and around Durgi Section.
- **Sample Size:** 12 informants (4 male, 5 female, 3 traditional healers) in the age group 30–75 years.
- **Language:** Interviews were conducted in Telugu and local dialects with the help of interpreters when required.
- **Ethical Consideration:** Prior Informed Consent (PIC) was obtained from all participants as per CBD and Nagoya Protocol guidelines.

b) Questionnaire Format: A structured schedule was used to collect information:

- Local name of the plant.
- Part(s) used (leaf, root, bark, seed, flower, fruit, whole plant).
- Mode of preparation (decoction, paste, infusion, powder, raw use).
- Method of administration (oral, topical, inhalation).
- Ailments treated (digestive, respiratory, skin, musculoskeletal, etc.).

3. Data Analysis

a) Ethno-Medicinal Indices

The collected data were analyzed using quantitative ethnobotanical indices:

- **Relative Frequency of Citation (RFC)** = FC/N,

$$\text{Frequencypercentage} = \frac{\text{Numberof sampleplotsin whichspecies occurred}}{\text{Totalnumberof sampleplotsstudied}} \times 100$$

Results

Biodiversity Findings

Table 1.1 Phytosociological structure of Tree Species in the Durgi Section of Macherla Division of the Nallamala Forest in Andhra Pradesh

Tree Species in the Durgi Section	BA	D	F	A	RD	RF	RDO	IVI	BA
Lagerstroemia parviflora Roxb	153.94	1.7	100	1.67	1.42	8.06	4.63	14.12	1.54
Acacia Chundra	168.95	4.3	33.33	13.00	3.70	2.69	5.09	11.48	1.69
Anogeissus latifolia	126.01	5.7	66.66	8.50	4.84	5.38	3.79	14.01	1.26
Bombax Ceiba	184.66	0.3	66.67	0.50	0.28	5.38	5.56	11.22	1.85
Buchanania Lanzan	197.72	1.3	66.67	2.00	1.14	5.38	5.95	12.47	1.98
Caria arborea	168.95	6.3	66.67	9.50	5.41	5.38	5.09	15.87	1.69
Cassia Fistula	207.82	4.7	33.33	14.00	3.99	2.69	6.26	12.93	2.08
Chloroxylon swietenia	153.94	13.0	100	13.00	11.11	8.06	4.63	23.81	1.54
Cleistanthus collinus	113.10	2.3	66.67	3.50	1.99	5.38	3.40	10.77	1.13
Dalbergia latifolia Roxb.	168.95	6.3	66.67	9.50	5.41	5.38	5.09	15.87	1.69
senna siamea	126.01	5.7	33.33	17.00	4.84	2.69	3.79	11.32	1.26
Grevillea sandragordon	153.94	8.0	33.33	24.00	6.84	2.69	4.63	14.16	1.54
Hardwickia binata Roxb	115.62	8.7	66.67	13.00	7.41	5.38	3.48	16.26	1.16
Lannea coromandelica	139.63	4.7	66.67	7.00	3.99	5.38	4.20	13.57	1.40
Madhuca longifolia	168.95	5.7	100	5.67	4.84	8.06	5.09	17.99	1.69
Strychnosnux vomica	159.86	4.0	66.67	6.00	3.42	5.38	4.81	13.61	1.60
Pterocarpus marsupium	162.86	1.7	66.67	2.50	1.42	5.38	4.90	11.70	1.63
Pterospermum xylocarpum	153.94	1.7	66.67	2.50	1.42	5.38	4.63	11.43	1.54
Shorea roxburghii /Anthoshorea roxburghii	113.10	2.7	66.67	4.00	2.28	5.38	3.40	11.06	1.13
Terminalia alata	120.76	3.7	66.67	5.50	3.13	5.38	3.63	12.15	1.21
Terminalia arjuna	164.37	4.7	100	4.67	3.99	8.06	4.95	17.00	1.64
Terminalia bellirica	146.69	3.0	66.67	4.50	2.56	5.38	4.42	12.36	1.47
Terminalia chebula	184.66	2.3	100	2.33	1.99	8.06	5.56	15.62	1.85
Ziziphus xylopyrus	156.88	2.0	33.33	6.00	1.71	2.69	4.72	9.12	1.57
Aegle marmelos (L.)	139.63	5.0	66.67	7.50	4.27	5.38	4.20	13.85	1.40
Sterculia guttata roxb	78.54	7.7	33.33	23.00	6.55	2.69	2.36	11.60	0.79
Cassia auriculata	126.01	5.0	33.33	3.75	6.06	7.51	20.24	33.81	1.26
Gmelina arborea	58.09	11.0	66.67	16.50	13.33	3.76	9.33	26.42	0.58
Grewia hirsuta	82.78	4.3	100	4.33	5.25	5.63	13.30	24.18	0.83
Ficus virens	24.63	2.3	100	2.33	2.83	5.63	3.96	12.42	0.25

B-Basalarea, D-Density (100 m. Sq), F-Frequency, A-Abundance, RD-Relative density, RF-Relative frequency, RDO-Relative basal area (Dominance), IVI, BA-basal area m^2/ha

Table 1.2 Phytosociological structure of Shrub Species in the Durgi Section of Macherla Division of the Nallamala Forest in Andhra Pradesh

Shurbs in Durgi Section	BA	D	F	A	RD	RF	RDO	IVI	BA
Epiphylum oxypetalum	48.60	9	100	9.00	10.91	5.63	7.81	24.35	0.49
Abutilon indicum	126.01	5	33.33	3.75	6.06	7.51	20.24	33.81	1.26
Anisomelea malabarica (L.)	71.38	3	33.33	2.25	3.64	7.51	11.46	22.61	0.71
Tribulus terrestis	153.94	10	100	10.00	12.12	5.63	24.72	42.48	1.54
Cadaba fruticosa L	113.10	3	100	3.00	3.64	5.63	18.16	27.43	1.13
Calotropis procera	82.78	4.33	100	4.33	5.25	5.63	13.30	24.18	0.83
Randia dumetorum	55.42	10.66	100	10.67	12.93	5.63	8.90	27.46	0.55
Cissus vitiginea L	68.42	2.33	100	2.33	2.83	5.63	10.99	19.45	0.68
Dodonaea viscosa (L.)	24.63	2.33	100	2.33	2.83	5.63	3.96	12.42	0.25
Grewia flavescens	46.97	10.66	100	10.67	12.93	5.63	7.54	26.11	0.47
Helicteres isora	104.47	2.33	33.33	1.75	2.83	7.51	16.78	27.12	1.04
Hibiscus ovalifolius	124.69	6.66	33.33	5	8.08	7.51	20.03	35.62	1.25
Tiliacora acuminata	106.90	9.33	66.66	14	11.31	3.76	17.17	32.24	1.07
Urena lobata	76.46	4.33	33.33	3.25	5.25	7.51	12.28	25.04	0.76
Vitex negundo	58.09	3.33	33.33	2.5	4.04	7.51	9.33	20.88	0.58
Tanner" s Cassia	84.95	8.66	33.33	6.5	10.51	7.51	13.64	31.66	0.85

B-Basalarea, D-Density (100 m. Sq), F-Frequency, A-Abundance, RD-Relative density, RF-Relative frequency, RDO-Relative basal area (Dominance), IVI, BA-basal area m^2/ha

Table 1.3. Phytosociological structure of Herb Species in the Durgi Section of Macherla Division of the Nallamala Forest in Andhra Pradesh

Herbs Durgi Section	BA	D	F	A	RD	RF	RDO	IVI	BA
Abutilon crispum	42.24	2.00	75.00	2.00	3.49	4.11	34.14	24.75	0.42
Argemone mexicana	50.27	2.67	75.00	2.67	4.66	4.11	40.63	12.41	0.50
Boerhavia diffusa	22.34	2.33	100.00	1.75	4.08	5.48	18.06	17.62	0.22
Corchorus olitorius	50.27	5.67	75.00	5.67	9.90	4.11	40.63	18.65	0.50
Corchorus trilocularis	78.54	3.00	100.00	2.25	5.24	5.48	63.49	39.15	0.79
Croton bonplandianum	58.99	1.67	50.00	2.50	2.91	2.74	47.69	22.34	0.59
Eclipta prostrata	68.42	3.00	100.00	2.25	5.24	5.48	55.31	20.03	0.68
Gomphrena globosa	50.27	3.33	100.00	2.50	5.82	5.48	40.63	51.94	0.50
Ruta graveolens	58.99	4.67	75.00	4.67	8.15	4.11	47.69	29.95	0.59
Leonotis nepetiifolia	50.27	6.00	75.00	6.00	10.48	4.11	40.63	30.23	0.50
Physalis minima	50.27	5.00	50.00	7.50	8.73	2.74	40.63	19.11	0.50
Polycarpea corymbosa	68.42	4.00	75.00	4.00	6.99	4.11	55.31	32.41	0.68
Rhynchosia minima	50.27	6.67	50.00	10.00	11.64	2.74	40.63	21.02	0.50
Sphaeranthus indicus	50.27	1.67	50.00	2.50	2.91	2.74	40.63	23.29	0.50
Triumfetta rhomboidea	50.27	4.00	75.00	4.00	6.99	4.11	40.63	16.73	0.50

B- Basalarea, D-Density (100 m. Sq), F-Frequency, A-Abundance, RD-Relative density, RF-Relative frequency, RDO-Relative basal area (Dominance), IVI, BA-basal area m^2/ha

Species Richness

A total of 30 plant species belonging to 5 families were recorded from the Durgi Section of Macherla Range, Nallamala Forest. These included:

- Trees: 30 species
- Shrubs:16 species
- Herbs: 19species

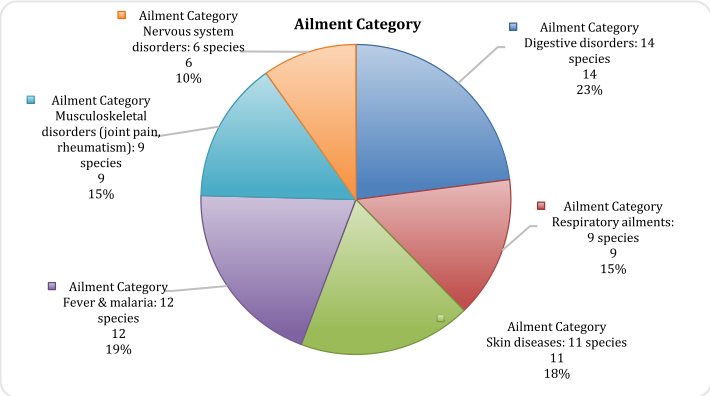
Families and Genera Distribution

- The dominant families recorded were Fabaceae (26 species), Euphorbiaceae (15 species), Asteraceae (12 species), Rubiaceae (6 species) and Apocynaceae (6 species).

2. Ethno-Medicinal Plants

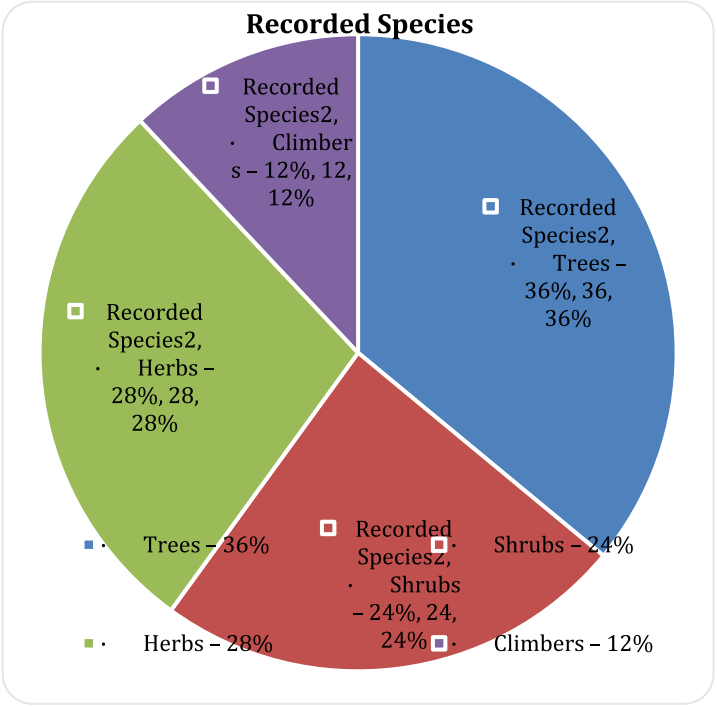
Number of Species per Ailment Category

below shows that maximum medicinal plants are used in treating digestive and respiratory ailments.



Growth Forms of Recorded Species

- Trees – 36%, Shrubs – 24%
- Herbs – 28%, Climbers – 12%



Percentage of plants used Plants parts are used

Leaves – 38%, Flowers – 3%, Roots – 22%, Bark – 14%, Fruits – 10%, Seeds – 4%, Whole Plant – 9%

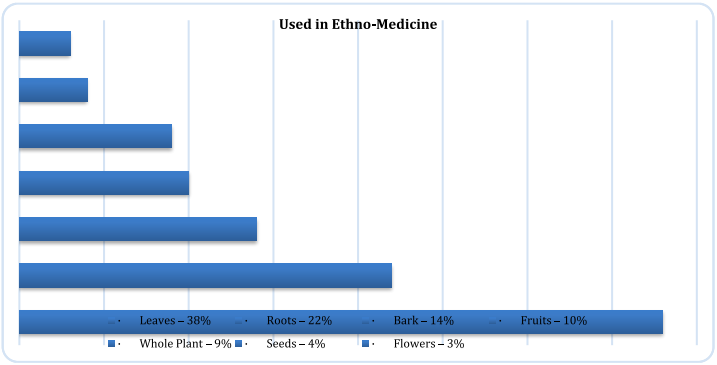


Table:1 Inventory of Ethno-Medicinal Plants: 42 recorded species, were identified as having ethno-medicinal importance. Ethno-medico botanical details. of plants used by local communities in K.K.Tanda Durgi section of Macherla rage Forest.

Species	Vernacular Name	Family	Habit	Parts Used	Treating Disease	Preparation
Andrographis paniculata	*Nelavemu*	*Acanthaceae*	Herb	Leaves	Fever	Making and using a paste using andrographus leaves, pepper, and garlic
Allium sativum L.	*Velluli*	*Amaryllidaceae*	Bulb	Shoot	Dysmenorrhea, Asthma, Tuberculosis, Joint Pains, Vomiting, Heart Problems	Consume raw
Lannnea coromandalica	*Gumpena*	*Anacardiaceae*	Tree	Leaves	Mouth ulcers	Five times a day, juice made from leaves is consumed.
Annona Reticulata	*Rama Phalam*	*Annonaceae*	Tree	Leaves	Dandruff	Annona and Palm leaves are cooked together to produce oil, which is then applied to the scalp.
Centella asiatica (L.)	*Saraswathi aku*	*Apiaceae*	Herb	Leaves	help increase memory and correction of stuttering.	
Alstonia scholaris L.	*Edakulapala*	*Apocynaceae*	Climber	Flower	Asthma, pain in the joints.	Dry flower powder mixed with pippallu or honey,
Wrightia tinctoria (Roxb.)	*Reppala*	*Apocynaceae*	Tree	Bark, Leaves	Effective treatment for diabetes and puerperal fever.	Paste
Phoenix sylvestris	*Eetha chettu*	*Arecaecae*	Tree	Leaves	Throat Infections	Leaf juice is extracted and used to treat.
Aristolochia braceteolata Lam.	*Gadidagadapa*	*Aristolochiaceae*	Herb	Leaves	wounds, eczema, and toothache.	Consume as Paste
Tridax procumbens L.	*Gaddi chamanthi*	*Asteraceae*	Herb	Leaves	Inflammation of the eyes, antiseptics, and wounds.	Paste
Cassine glauca (Rottb.)	*Niridi*	*Celestraceae*	Tree	Root	Snake bite	Paste
Cleome viscosa L.	*Kukkavominta*	*Cleomaceae*	Herb	Leaves	For a headache, a leaf paste was applied on the forehead.	Paste

Terminalia arjuna	*Tella maddi*	*Combretaceae*	Tree	Bark	Sprains	Juice derived from latex is consumed and utilized for 15 days.
Terminallia chebula Retz.	*Karaka*	*Combretaceae*	Tree	Fruit	A wound or ulcer treated with fruit pulp.	Fruit Pulp
Corallocarpus epigaeus (Rott.)	*Mukkudonda*	*Cucurbitaceae*	Climber	Leaves	Kidney Stones	Taken leaves are first dried to produce a powder, which is then consumed with water.
Coccinia grandis L.	*Chedu Donda*	*Cucurbitaceae*	Climber	Root	Diabetes can be cured by taking root paste with water.	Paste
Euphorbia antiquorum L.	*Brahma jemudu*	*Euphorbiaceae*	Shrub	Leaves	Cancer, Diabetes	Consume Raw
Phyllanthus amarus Schum&Thonn	*Nelausiri*	*Euphorbiaceae*	Herb	Whole Plant	Jaundice and Menstrual Problems	take the Juice of the Whole Plant with Buttermilk Rice Daily.
Phyllanthus emblica L.	*Nelli / Usiri*	*Euphorbiaceae*	Tree	Fruit	AIDS, Type 2 Diabetes, Gum Disease, and Eye Diseases.	Consume Raw
Butea monosperma	*Moduga*	*Fabaceae*	Tree	Gum	Jaundice	Every night, gum is taken and put on the eyes.
Albizzia lebback	*Dirisena*	*Fabaceae*	Tree	Tree Stem, Bark, and Root	psoriasis and snake bites	Stem bark extracts are taken directly orally and as a paste.
Bauhinia variegata L.	*Madapaku*	*Fabaceae*	Tree	Root	Dyspepsia or indigestion, and snake bite antidote.	Root decoction
Dalbergia latifolia Roxb.	*Jittagi / Iridi*	*Fabaceae*	Tree	Root	Leprosy	Paste
Entada rheedii	*Adavi chinta*	*Fabaceae*	Climber	Seeds	Puerperal fever	a mixture of seed powder and water.
Pterocarpus marsupium roxb.	*Yegisa*	*Fabaceae*	Tree	Leaves	Diabetes	Diabetes can be cured by ingesting a watery wood extract.
Gloriosa superba L	*Nabhi / Nagetigadda*	*Liliaceae*	Climber	Tubers	Treating Wounds	Paste
Strychnos potatorum	*Chilla*	*Loganiaceae*	Tree	Seeds	Insect Bites	Water-dipped seeds are applied topically to wounds.
Strychnos nux-vomicaL	*Musthi*	*Loganiaceae*	Tree	Seeds	Skin Problems	The seed is powdered and used 2 times a day.
Strychnos potatorum	*Chilla*	*Loganiaceae*	Tree	Seeds	Pimples	Seeds prepared like paste and paste is used for 2 times
Abuliton indicum (L.)	*Tutturubenda*	*Malvaceae*	Shrub	Roots	Menstrual Problems	To heal, roots are dried and utilized.
Azadirachta indica	*Vepa*	*Meliaceae*	Tree		Rheumatism, dental hygiene, and skin conditions.	Paste
Acacia leucophloea (Roxb.)	*Tella tumma*	*Mimosaceae*	Tree	Stem, Bark	Dropsy.	The stem bark decoction blended with pepper
Ficus benghalensis L.	*Marri*	*Moraceae*	Tree	Roots, Leaves	Problems with sterility, dental hygiene, nausea, high blood pressure, and ulcers	Raw
Ficu racemose L.	*Medi*	*Moraceae*	Tree	Leaves, fruits	Both diabetes and diarrhoea	Raw
Hemidesmus indicus(L.	*Sugandhapala*	*Periplocaceae*	Herb	Leaves	Cleans the blood and helps treat diabetes.	Paste
Aegle marmelos (L.)	*Maredu / Bilva*	*Rutaceae*	Shrub	Root, leaf	Jaundice, vomiting, and diarrhoea.	Raw
Madhuca longifolia (Koen.)	*Ippa*	*Sapotaceae*	Tree	Leaves	Stomachache	Paste
Datura metal L.	*Nalla ummetta*	*Solanaceae*	Herb	Leaves	Asthma	Paste
Vitex negundo.L	*Nallavavili*	*Verbanaceae*	Shrub	Leaves	Ulcers can be treated with a leaf extract. As an anthelmintic, you can use a mixture of lime water and extract from the leaves.	Paste
Aloe vera L.	*Kalabanda*	*Xanthorrhoeacea*	Herb	Leaves	Healing of wounds, reducing hair loss, and controlling snoring	Consume raw
Balanites aegyptiaca L.	*Gara*	*Zygophyllaceae*	Tree	Fruit	Fruits for the treatment of mouth ulcers, sleeping sickness, liver and spleen illnesses, and the roots for gastrointestinal discomfort and as a purgative.	Consume Raw
Tribulus terrestris L.	*Palleru*	*Zygophyllaceae*	Herb	Fruit	Stones in the urinary bladder can be dissolved by ingesting a mixture of boiled fruits, milk, and sugar. Pain in the waist and the joints can be alleviated by ingesting a fruit powder infused with ginger.	Powder

Biodiversity Assessment in the Durgi Section

The present study highlights the rich biodiversity of the Durgi section of the Macherla Range in the Nallamala Forest, documenting a wide variety of trees, shrubs, herbs, and climbers. The recorded species diversity aligns with earlier studies conducted in different regions of the Nallamala Forest, such as those by [25-27], which also emphasized the floristic richness and ecological importance of the region. The presence of multiple families, including Fabaceae, Euphorbiaceae, and Moraceae, indicates the ecological balance of tropical dry deciduous forests.

When compared to biodiversity surveys in other Indian forests, such as the Eastern Ghats [28] and Western Ghats [29], the Nallamala region shows moderate to high species richness but with a unique representation of endemic species.

Importantly, the identification of rare and threatened plants under the IUCN categories further underscores the conservation significance of the Durgi section.

Ethno-Medicinal Knowledge and Traditional Practices

The study also documents the rich repository of ethno-medicinal plants traditionally used by local tribal communities, especially the Chenchus, Lambadas, and other forest-dependent groups. Species such as *Azadirachta indica* (Neem), *Terminalia chebula* (Haritaki), *Tinospora cordifolia* (Guduchi), and *Gymnema sylvestre* (Gudmar) are widely utilized for treating ailments ranging from skin diseases and digestive disorders to respiratory infections and diabetes.

This aligns with findings from [29-30] who reported that more than 60% of local healthcare practices in Nallamala still rely on medicinal plants. Importantly, our documentation of plants and their uses adds to the growing body of ethnobotanical knowledge that may otherwise be lost due to modernization and cultural erosion. The specific ailment categories treated—such as digestive (highest number of species), skin-related, and respiratory diseases—reflect local health priorities and traditional adaptations.

Comparisons with other Studies

In comparison with other biodiversity and ethnobotanical surveys in Eastern Ghats [31] and Western Ghats [32] the Nallamala forests exhibit relatively higher medicinal plant density, likely due to their undisturbed habitat patches and strong cultural heritage of the Chenchus. Moreover, species such as *Withania somnifera* (Ashwagandha) and *Hemidesmus indicus* (Indian sarsaparilla), reported in this study, are also listed in the Ayurvedic Pharmacopoeia of India, thereby strengthening the scientific credibility of local knowledge.

Role of Traditional Knowledge in Sustainable Resource Management

Traditional knowledge plays a pivotal role in ensuring sustainable utilization of biodiversity. Local healers and elders act as custodians of medicinal knowledge, transmitting information orally across generations. Integration of this knowledge with modern conservation practices, as suggested by [33] can enhance sustainable forest governance. For instance, encouraging in-situ conservation through sacred groves and ex-situ cultivation of medicinally important species can reduce harvesting pressures from the wild.

The present study on the *Assessment of Biodiversity and Ethno-Medicinal Plants in the Durgi Section of Macherla Range, Nallamala Forest, Andhra Pradesh,* highlights the ecological and cultural significance of the region. The findings reveal that the Durgi Section is remarkably rich in biodiversity, hosting a wide array of flora, many of which possess vital ethno-medicinal value utilized by local tribal and rural communities. This richness underlines the importance of the area not only as a biological hotspot but also as a reservoir of indigenous traditional knowledge passed down through generations.

The documentation of ethno-medicinal knowledge in this study plays a crucial role in preserving traditional wisdom that is increasingly threatened by modernization, cultural erosion, and the declining transmission of oral traditions [34-35]. Systematic records of species and their uses can contribute to pharmacological research, validation of herbal remedies, and development of sustainable healthcare alternatives, while also safeguarding community heritage [36-41].

However, the study also brings attention to several conservation challenges such as deforestation, overharvesting of medicinal plants, uncontrolled grazing, forest fires, and habitat degradation, which pose threats to both biodiversity and the cultural landscape of the region [42-49] If unaddressed, these pressures may lead to the loss of rare and endangered plant species, as well as the gradual disappearance of ethnobotanical knowledge.

Conclusion

The Durgi Section of the Macherla Range stands as a unique repository of biodiversity and ethnomedicinal knowledge.

The documentation and conservation of these biological and cultural resources are critical not only for the ecological sustainability of the Nallamala forests but also for the preservation of traditional heritage that continues to support the livelihoods and healthcare of indigenous communities. The community-centered conservation strategies, fostering awareness, and ensuring protection of rare species, the region can serve as a model for sustainable forest and knowledge resource management in India.

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Fig 1: Quadrate analysis of Durgi Section

Fig 2: First author Recording field data

Fig 3: Tanner's cassia

Fig 4: Ziziphus mauritiana

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