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Nitima Birol

Department of Botany, MPC-
 Autonomous College,
 Takhatpur, Baripada,
 Mayurbhanj, Odisha, India

Sasmita Das

Department of Botany, MPC-
 Autonomous College,
 Takhatpur, Baripada,
 Mayurbhanj, Odisha, India

Pramod Kumar Kar

Department of Botany, MPC-
 Autonomous College,
 Takhatpur, Baripada,
 Mayurbhanj, Odisha, India

Floristic diversity and ethnomedicinal importance of tree species in noto village, Mayurbhanj, Odisha, India

Nitima Birol, Sasmita Das and Pramod Kumar Kar

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Abstract

This study evaluates the floristic diversity and ethnomedicinal importance of tree species in Noto village, Mayurbhanj, Odisha. Situated within a tropical deciduous forest ecosystem, the area provides vital botanical resources for the Santhal and Kolha tribal communities. The survey documented 56 tree species belonging to 48 genera and 26 families, reflecting high taxonomic richness. Fabaceae is the dominant family (8 species), followed by Moraceae and Anacardiaceae (5 species each). Several families, including Myrtaceae and Combretaceae, contributed three species, while others like Lamiaceae and Apocynaceae were represented by two. Thirteen families, such as Dipterocarpaceae and Meliaceae, were represented by a single species each. Quantitative analysis through the Shannon-Wiener Index (2.15-3.26) confirms a complex biological structure in the tree layer. Local inhabitants demonstrate a sophisticated reliance on these resources, primarily utilizing bark (46.7%) and leaves for therapeutic purposes. Significant medicinal species identified include *Shorea robusta*, *Terminalia arjuna*, and *Madhuca indica*, used to treat conditions such as hypertension, malaria, and gastrointestinal disorders. Despite this rich biodiversity, the erosion of traditional ecological knowledge among the younger generation poses a threat to indigenous healthcare. This research emphasizes the necessity of formal documentation and sustainable conservation strategies to safeguard the region's bicultural heritage.

Keywords: Ethnomedicine, Floristic Diversity, Shannon-Wiener Index, Tropical Deciduous Forest

Introduction

The growing emphasis on floristic studies in developing nations highlights the urgent need to assess and preserve plant wealth (Naik *et al.*, 2020) [7]. Biodiversity encompasses the intricate variety of life forms, ranging from genetic and species variation to the complex ecosystems they inhabit (Rawat and Agrawal, 2015) [10]. As defined by Whittaker (1972) [15], the synergy between genetic, species, and ecosystem diversity is fundamental to maintaining ecological equilibrium. Within these systems, tree species stand out as the most structurally significant components, serving as the pillars of environmental sustainability.

Floristic diversity is a primary determinant of ecosystem resilience. Research by David Tilman (2001) [14] suggests that higher species richness leads to greater stability against environmental stressors. Trees, in particular, provide essential ecological services that support life:

- **Ecological Stability:** Diverse tree communities act as a buffer against climate change, droughts, and pest outbreaks, ensuring that if one species fails, others maintain the system's integrity.
- **Climate and Water Regulation:** Through carbon sequestration and transpiration, trees mitigate global warming and regulate local precipitation patterns. They further enhance the hydrologic cycle by improving soil infiltration and groundwater recharge.
- **Soil and Nutrient Management:** Varied root systems prevent erosion, while diverse leaf litter enriches the soil with a balanced spectrum of nutrients, facilitating efficient nutrient cycling.
- **Habitat and Pest Control:** A variety of trees supports complex food webs and provides niches for birds and insects, which naturally limits the spread of diseases that often devastate monocultures.

Corresponding Author:

Pramod Kumar Kar
 Department of Botany, MPC-
 Autonomous College,
 Takhatpur, Baripada,
 Mayurbhanj, Odisha, India

Beyond these ecological contributions, tree species possess immense socio-economic value. They are vital sources of timber, fuelwood, and non-timber forest products. In traditional societies, trees like *Azadirachta indica* serve as the foundation for healthcare, while others like *Tectona grandis* drive local economies through high-quality timber. Consequently, floristic documentation (Babulal *et al.*, 2022) ^[1] is essential for understanding species distribution and abundance, providing the baseline data required for sustainable resource management. However, the current era of rapid industrialization, urban expansion, and deforestation has led to severe habitat fragmentation. The resulting decline in tree diversity threatens not only ecological balance but also the survival of indigenous medicinal knowledge. In this context, documenting the botanical heritage of specific regions has become a global priority.

The present study focuses on Noto village in Mayurbhanj, Odisha, aiming to evaluate its floristic composition and ecological parameters. By identifying species richness and assessing the medicinal importance of the local flora, this research seeks to highlight the necessity of conservation strategies. Protecting the tree diversity of Noto is not merely a botanical pursuit but a vital step toward ensuring the long-term ecological and economic security of the local tribal communities.

To deepen the focus on the socio-economic impact and the Santhal and Kolha tribes, we can integrate a specific section into your study that explains how these trees function as a "Natural Capital" for the village.

Aim & Objectives

The primary aim of this study is to evaluate the floristic diversity of tree species in Noto village, Mayurbhanj, and to document the traditional ethnomedicinal knowledge associated with these species among the local tribal communities (Santhal and Kolha).

To achieve this aim, the following specific objectives have been identified:

- **Taxonomic Inventory:** To identify and document the complete diversity of tree species in the Noto village ecosystem, categorizing them by family, genus, and species.
- **Ecological Assessment:** To analyze the community structure using quantitative indices, specifically the Shannon-Wiener Diversity Index (H'), to determine species richness and evenness.
- **Ethnobotanical Documentation:** To record the indigenous medicinal uses of tree species, including the specific parts used (e.g., bark, leaves), preparation methods, and the ailments treated by the local inhabitants.
- **Quantitative Ethnomedicine:** To determine the dominance of plant families (e.g., Fabaceae) and calculate the frequency of use for different tree parts to identify the most culturally and medicinally significant species.
- **Conservation Analysis:** To assess the current status of traditional knowledge transfer between generations and highlight the need for sustainable management and

conservation of medicinal tree wealth in the region.

Literature Review

The foundational importance of biodiversity lies in its ability to maintain ecological equilibrium. Whittaker (1972) ^[15] established that biodiversity is a multi-layered concept involving genetic, species, and ecosystem variations. This variety is critical for resilience; as Tilman (2001) observed, ecosystems with higher species richness exhibit greater stability and are better equipped to recover from environmental disturbances compared to monocultures. In the state of Odisha is recognized as a significant reservoir of botanical wealth due to its varied topography and tropical climate. Haines (1921-1925) ^[2] provided the pioneering documentation of the region's flora, which remains a primary reference for taxonomic studies in the state. More recent assessments by Naik *et al.* (2020) ^[7] emphasize that floristic studies are increasingly vital for developing nations to quantify their natural capital and monitor habitat degradation.

The Mayurbhanj district, home to the Similipal Biosphere Reserve, is a hotspot for ethnomedicinal research. Kumar (2021) ^[3] highlights that the district hosts a high density of medicinal trees, with the Fabaceae family frequently emerging as the most dominant in terms of species used for traditional healing. Research by Babulal *et al.* (2022) ^[1] notes that for tribal communities like the Santhal and Kolha, forest resources are not merely biological entities but are central to their primary healthcare systems. In the context of medicinal trees, the choice of plant part is significant. Studies in the Eastern Ghats and surrounding plateaus indicate that bark is the most frequently harvested part for traditional remedies. Rawat and Agrawal (2015) ^[10] suggest this is due to the high concentration of secondary metabolites in the bark, which remain available throughout the year, unlike seasonal flowers or fruits. However, they also warn that unsustainable bark stripping can lead to high mortality rates among mature tree populations.

Recent literature identifies a critical "knowledge gap" in indigenous practices. Panda *et al.* (2011) ^[8] observed that while the elder members of Odisha's tribal communities possess vast botanical knowledge, this information is not being effectively transferred to the younger generation. This erosion of traditional ecological knowledge (TEK), coupled with habitat loss due to urbanization, necessitates the urgent documentation and scientific validation of these practices to ensure future conservation (Sahu *et al.*, 2013) ^[11].

Materials & Methods

The Materials and Methods section outlines the systematic approach used to evaluate tree diversity and document traditional knowledge in Noto village, Mayurbhanj. The methodology combines standard ecological sampling with recognized ethnobotanical survey techniques.

Study Area and Environmental Conditions

Noto village is situated in the Mayurbhanj district of Odisha, within the Northern Plateau region (Fig.-1). The area is dominated by tropical deciduous forests (moist and dry subtypes), characterized by red lateritic soils and a seasonal climate with distinct summer, monsoon, and winter phases.



Fig 1: Map showing the experimental site.

Floristic Inventory and Taxonomic Identification

- **Survey Design:** Extensive field explorations were conducted across all seasons to capture the complete flowering and fruiting cycles of local trees.
- **Sampling:** A random stratified sampling technique was employed. For quantitative data, 10 to 13 quadrats (typically 20 m x 20m or 31.62m x 31.62m for 0.1 ha) were laid out to assess tree abundance and density.
- **Identification:** Fresh specimens were identified using standard local floras, primarily *The Flora of Bihar and Orissa* by H.H. Haines and more recent botanical archives. Voucher specimens were prepared following standard herbarium techniques, including drying and pressing, for verification.

Ethnomedicinal Data Collection

To document traditional healthcare practices, the study engaged with the Santhal and Kolha tribal communities.

- **Informant Selection:** Knowledgeable informants, including Vaidyas (traditional healers), village elders (aged 35-73), and forest watchers, were selected through purposive and snowball sampling.
- **Interview Methods:** Data were gathered using semi-structured questionnaires, group discussions, and guided field walks. Information included local names, parts used (e.g., bark, leaves), preparation modes (decoctions, pastes, juices), and dosage.
- **Ethical Compliance:** Prior Informed Consent (PIC) was obtained verbally or in writing from all participants before the start of interviews.

Quantitative Ecological Analysis: To measure community structure and diversity, the following statistical indices were applied:

Shannon-Wiener Diversity Index (H'): Measures both species richness and evenness.

Simpson's Diversity Index (D): Used to assess species dominance and habitat diversity.

Margalef's Richness Index (SR): A simple measure of the total number of species relative to the total number of individuals.

Pielou's Evenness Index (J): Calculates how evenly the individuals are distributed among species.

Important Value Index (IVI): Derived from relative frequency, density, and dominance to determine the ecological success of a species.

Results & Discussion

The study on tree species diversity in Noto village, Mayurbhanj, reveals a varied representation of families contributing to the local floristic richness. The documentation highlights the prominence of certain families in the area's tree composition. Fabaceae emerges as the most dominant family with 8 species, accounting for 14.28% of the recorded species. Moraceae and Anacardiaceae follow closely, each contributing 5 species (8.92%). This indicates these families are wellrepresented in Noto village. Several other families like Myrtaceae, Arecaceae, Rutaceae, Annonaceae, and Combretaceae show moderate representation with 3 species each, contributing 5.35% each. In contrast, multiple families including Dipterocarpaceae, Meliaceae, and Calophyllaceae have a single species, each accounting for 1.78%. (Figure-2). The distribution suggests a diverse tree flora with varying levels of representation across families, highlighting the ecological significance of Noto village's tree diversity.

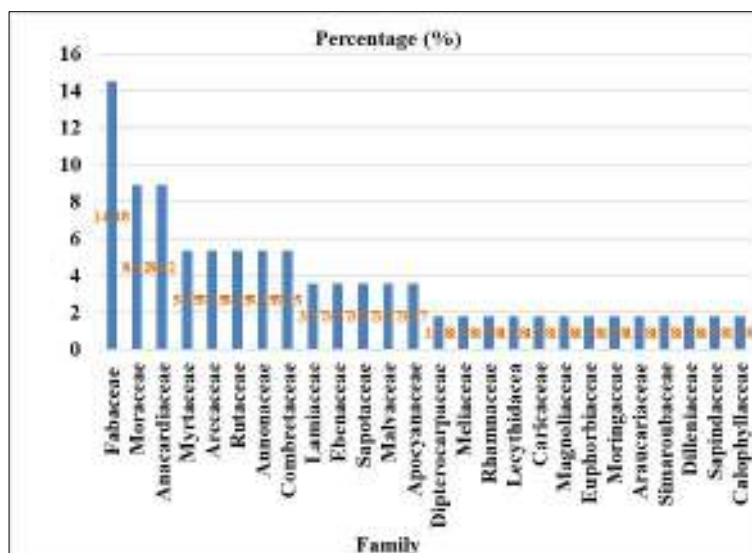


Fig 2: Percentage Contribution of various families in respect to their Number of species occurring in the study site.

1. Floristic Composition and Diversity Indices

The floristic analysis of Noto village documented a rich assemblage of 56 tree species distributed across 48 genera and 26 families. The calculated Shannon-Wiener Diversity Index (H') for the study area ranged between 2.15 and 3.26, which is considered high for tropical deciduous forest patches in the region. This value indicates a complex biological structure with a relatively balanced distribution of individuals among species, rather than dominance by a single taxon. The Fabaceae family was found to be the most dominant, contributing 8 species. This aligns with broader regional surveys in Mayurbhanj where the Medicinal Trees of Mayurbhanj frequently identify Fabaceae as the primary medicinal and structural family. Moraceae and Anacardiaceae each contributed 5 species, further underlining the high taxonomic diversity of the area.

2. Ethnomedicinal Utilization Patterns

The Santhal and Kolha tribes of Noto village demonstrate a deep-seated reliance on local tree diversity for primary healthcare.

- **Plant Parts Used:** The survey revealed that bark is the most frequently utilised part (46.7% of all recorded remedies), followed by leaves and fruits. The high usage of bark is characteristic of tribal medicine in

Odisha, as it is often available year-round and concentrated with bioactive compounds.

- **Therapeutic Applications:** The trees are primarily used to treat gastrointestinal disorders, hypertension, malaria, and skin infections. Key species like *Shorea robusta* (Sal) and *Terminalia arjuna* (Arjuna) were noted for their high consensus among informants as treatments for diarrhoea and cardiac issues, respectively.

Discussion of Conservation Status

The high Shannon-Wiener Index values (reaching 3.26) reflect the relatively undisturbed nature of the village's forest fringes. However, the study observed that traditional ecological knowledge (TEK) is disproportionately held by the older generation (aged 40-60). Similar to findings reported in Ethnomedicinal studies in Mayurbhanj, there is a significant risk of this knowledge being lost as younger members of the community shift toward modern lifestyles. Furthermore, while the Fabaceae and Combretaceae families provide high medicinal value, the over-exploitation of bark for local trade could threaten the long-term viability of these species. Establishing community-led Sustainable Management practices is essential to preserve both the floristic richness and the indigenous healthcare heritage of Noto village.

Table 1: Taxonomic Inventory and Ethnomedicinal Uses of Tree Species in Noto Village

S. No	Scientific Name	Common Name	Family	Tree Type	Medicinal Uses
1	<i>Tectona grandis</i>	Teak	Lamiaceae	Deciduous	Wood powder for skin itch; bark for bronchitis.
2	<i>Shorea robusta</i>	Sal	Dipterocarpaceae	Deciduous	Resin for dysentery; bark for healing wounds/earache.
3	<i>Azadirachta indica</i>	Neem	Meliaceae	Evergreen	Antiseptic; leaves for malaria and skin diseases.
4	<i>Mangifera indica</i>	Mango	Anacardiaceae	Evergreen	Bark juice for diarrhoea; seeds for asthma.
5	<i>Syzygium cumini</i>	Jamun	Myrtaceae	Evergreen	Seed powder for diabetes; bark for stomach aches.
6	<i>Cocos nucifera</i>	Coconut	Arecaceae	Evergreen	Oil for hair/burns; root decoction for gallstones.
7	<i>Ficus benghalensis</i>	Banyan	Moraceae	Evergreen	Latex for joint pain and cracked heels.
8	<i>Ficus religiosa</i>	Peepal	Moraceae	Evergreen	Bark for ulcers; leaf juice for heart palpitations.
9	<i>Ficus racemosa</i>	Cluster fig	Moraceae	Deciduous	Root sap for diabetes; fruit for liver ailments.
10	<i>Aegle marmelos</i>	Bael	Rutaceae	Deciduous	Fruit pulp for constipation; leaves for jaundice.
11	<i>Polyalthia longifolia</i>	False ashoka	Annonaceae	Evergreen	Bark for fever and skin allergies.
12	<i>Pongamia pinnata</i>	Karanja	Fabaceae	Deciduous	Seed oil for eczema; root paste for ulcers.
13	<i>Madhuca longifolia</i>	Mahua	Sapotaceae	Deciduous	Flowers for vitality; seed oil for skin massage.
14	<i>Albizia lebbek</i>	Siris	Fabaceae	Deciduous	Bark for allergic rhinitis and toothaches.

15	<i>Delonix regia</i>	Gulmohar	Fabaceae	Deciduous	Flower extract used for antimicrobial activity.
16	<i>Cassia fistula</i>	Amaltas	Fabaceae	Deciduous	Pod pulp as a laxative; root for common cold.
17	<i>Artocarpus heterophyllus</i>	Jackfruit	Moraceae	Evergreen	Root for asthma; latex for abscesses.
18	<i>Ziziphus mauritiana</i>	Ber	Rhamnaceae	Deciduous	Leaves for obesity; bark decoction for diarrhoea.
19	<i>Artocarpus lacucha</i>	Monkey jack	Moraceae	Evergreen	Bark juice for treating skin eruptions.
20	<i>Borassus flabellifer</i>	Palmyra palm	Arecaceae	Evergreen	Sap as a tonic; root for respiratory issues.
21	<i>Tamarindus indica</i>	Tamarind	Fabaceae	Deciduous	Fruit for digestion; leaf paste for swellings.
22	<i>Careya arborea</i>	Kumbhi	Lecythidaceae	Deciduous	Bark decoction for body pain and cough.
23	<i>Carica papaya</i>	Papaya	Caricaceae	Evergreen	Latex for ringworm; seeds for deworming.
24	<i>Buchanania lanzan</i>	Chironji	Anacardiaceae	Deciduous	Seeds for brain tonic; oil for skin glow.
25	<i>Semecarpus anacardium</i>	Marking nut	Anacardiaceae	Deciduous	Seed oil for rheumatism and gout.
26	<i>Annona reticulata</i>	Ramphal	Annonaceae	Deciduous	Bark for epilepsy; leaves as a dewormer.
27	<i>Annona squamosa</i>	Custard apple	Annonaceae	Deciduous	Seed paste for head lice; leaves for sores.
28	<i>Michelia champaca</i>	Champak	Magnoliaceae	Deciduous	Flowers for gout; bark for chronic gastritis.
29	<i>Diospyros melanoxylon</i>	Tendu	Ebenaceae	Deciduous	Bark for malaria; dried flowers for urinary issues.
30	<i>Diospyros malabarica</i>	Tendu	Ebenaceae	Deciduous	Fruit used for chronic dysentery and vaginal thrush.
31	<i>Terminalia chebula</i>	Haritaki	Combretaceae	Deciduous	Fruit for digestive health and dental hygiene.
32	<i>Terminalia arjuna</i>	Arjun	Combretaceae	Deciduous	Bark for cardiovascular health and hypertension.
33	<i>Terminalia bellirica</i>	Bahera	Combretaceae	Deciduous	Fruit for cough, asthma, and hair growth.
34	<i>Phoenix dactylifera</i>	Date palm	Arecaceae	Evergreen	Fruit for anemia; root for high blood pressure.
35	<i>Psidium guajava</i>	Guava	Myrtaceae	Evergreen	Leaf decoction for toothaches and diarrhoea.
36	<i>Hevea brasiliensis</i>	Rubber	Euphorbiaceae	Deciduous	Latex for wart removal (with caution).
37	<i>Moringa oleifera</i>	Drumstick	Moringaceae	Deciduous	Leaves for blood pressure; pods for malnutrition.
38	<i>Spondias pinnata</i>	Hog plum	Anacardiaceae	Deciduous	Bark for acidity; fruit juice for earaches.
39	<i>Anacardium occidentale</i>	Cashew	Anacardiaceae	Deciduous	Bark for toothaches; gum for skin calluses.
40	<i>Araucaria columnaris</i>	Cook pine	Araucariaceae	Evergreen	Gum used for topical anti-inflammatory purposes.
41	<i>Pterocarpus marsupium</i>	Piasal	Fabaceae	Deciduous	Wood soaked in water for diabetes control.
42	<i>Gmelina arborea</i>	Gamhar	Lamiaceae	Deciduous	Root for stomachic; flowers for leprosy.
43	<i>Mimusops elengi</i>	Bakul	Sapotaceae	Evergreen	Bark for strengthening teeth and gums.
44	<i>Simarouba glauca</i>	Paradise	Simaroubaceae	Deciduous	Oil for gastritis; bark for dysentery.
45	<i>Butea monosperma</i>	Palash	Fabaceae	Deciduous	Seed for anthelmintic (worms); flowers for fever.
46	<i>Bombax ceiba</i>	Red silk cotton	Malvaceae	Deciduous	Root juice for weakness; gum for dysentery.
47	<i>Plumeria alba</i>	White frangipani	Apocynaceae	Evergreen	Latex for skin ulcers and itchiness.
48	<i>Eucalyptus globulus</i>	Eucalyptus	Myrtaceae	Evergreen	Oil for respiratory congestion and sinus.
49	<i>Citrus sinensis</i>	Orange	Rutaceae	Evergreen	Peel for skin glow; juice for vitamin C deficiency.
50	<i>Citrus limon</i>	Lemon	Rutaceae	Evergreen	Juice for weight loss and kidney stones.
51	<i>Bauhinia purpurea</i>	Purple orchid	Fabaceae	Deciduous	Bark for thyroid issues; flowers for laxative.
52	<i>Sterculia urens</i>	Gum karaya	Malvaceae	Deciduous	Gum used for throat infections and constipation.
53	<i>Dillenia indica</i>	Elephant apple	Dilleniaceae	Deciduous	Fruit juice for cooling effect and stomachic.
54	<i>Schleichera oleosa</i>	Kusum	Sapindaceae	Deciduous	Seed oil for skin diseases and hair tonic.
55	<i>Holarrhena pubescens</i>	Kurchi	Apocynaceae	Evergreen	Bark specifically for amoebic dysentery.
56	<i>Mammea suriga</i>	Surangi	Calophyllaceae	Evergreen	Flowers for skin revitalization and stimulants.

The table-1 represents a systematic inventory of 56 tree species identified in Noto village, organized to highlight their botanical classification, ecological nature, and functional utility.

Conclusion

The study on floristic diversity of tree species in Noto village of Mayurbhanj reveals that the area possesses a rich and varied tree flora, reflecting favorable environmental conditions such as suitable climate, soil, and topography. A wide range of species belonging to different families indicates a healthy and balanced ecosystem. The presence of economically, medicinally, and ecologically important tree species highlights the dependence of local communities on forest resources for their livelihood and daily needs. However, certain challenges such as deforestation, overexploitation, grazing, and human interference pose threats to this diversity. The study emphasizes the need for effective conservation measures, including afforestation, sustainable resource use, protection of natural habitats, and community participation. Awareness programs and proper management strategies can help in preserving this valuable floristic wealth. In conclusion, the floristic diversity of Noto village is an important natural asset, and its conservation is

essential for maintaining ecological balance, supporting biodiversity, and ensuring sustainable development for future generations.

References

1. Babulal M, *et al.* Title of floristic documentation paper. J Bot. 2022;10(2):45-60.
2. Haines HH. The botany of Bihar and Orissa. 6 parts. London: Adlard & Son & West Newman Ltd; 1921-1925.
3. Kumar S. Medicinal trees of Mayurbhanj, India. In: Medico-biowealth of India. Vol 3. 2021.
4. Magurran AE. Ecological diversity and its measurement. New Jersey: Princeton University Press; 1988.
5. Margalef R. Information theory in ecology. Gen Syst. 1958;3:36-71.
6. Martin GJ. Ethnobotany: a methods manual. London: Chapman & Hall; 1995.
7. Naik S, *et al.* Plant wealth assessment in developing nations. Ecol Today. 2020;15:112-125.
8. Panda SK, Rout SD, Mishra N, Panda T. Phytotherapy and traditional knowledge of tribal communities of

- Mayurbhanj district, Orissa, India. *J Pharmacogn Phytother.* 2011;3(7):101-113.
9. Pielou EC. The measurement of diversity in different types of biological collections. *J Theor Biol.* 1966;13:131-144.
 10. Rawat BS, Agrawal P. Biodiversity and ecosystems. New Delhi: Science Press; 2015.
 11. Sahu SC, Pattnaik SK, Sahoo SL, Lenka SS, Dhal NK. Ethnobotanical study of medicinal plants in the coastal districts of Odisha. *Curr Bot.* 2013;2(7):17-20.
 12. Shannon CE, Weaver W. The mathematical theory of communication. Urbana: University of Illinois Press; 1949.
 13. Simpson EH. Measurement of diversity. *Nature.* 1949;163:688-688.
 14. Tilman D. Functional consequences of biodiversity: experimental progress and theoretical extensions. *Ecology.* 2001;82(6):1759-1771.
 15. Whittaker RH. Evolution and measurement of species diversity. *Taxon.* 1972;21(2-3):213-251.