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Research Article

Conservation of Indigenous Traditional Food (Kurkuti) through Enumeration of the Ant-Host Plant Relationship

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Abstract: The present study investigates the conservation of the indigenous traditional food resource "Kurkuti", the red weaver ant, through the enumeration of its host plant associations in Mayurbhanj district, Odisha. Field surveys were conducted across diverse forested and fringe village habitats to document plant species supporting ant colonies. A total of 38 host plant species belonging to 23 families were recorded, with dominance of Anacardiaceae, Fabaceae and Moraceae, indicating their ecological suitability for nest construction and colony establishment. The study reveals that *Oecophylla smaragdina* utilizes a wide range of arboreal vegetation, reflecting its adaptability to varied habitat conditions, although higher nest abundance was observed in relatively undisturbed forest patches. Ethnobotanical interactions further highlighted the cultural importance of both Kurkuti and its host plants among indigenous communities. The findings emphasize that the persistence of this traditional food system is closely linked to the conservation of native vegetation and forest integrity. Habitat degradation and loss of key host plant species pose significant threats to ant populations and associated traditional practices. The study highlights the need for integrated conservation strategies combining habitat protection, sustainable use of forest resources and incorporation of indigenous ecological knowledge to ensure the long-term sustainability of this biocultural resource.

Keywords: Ant-plant interaction, forest ecology, host plant diversity, Mayurbhanj district, *Oecophylla smaragdina*, tribal knowledge systems

Introduction

The conservation of indigenous traditional foods is increasingly recognized as a vital component of biodiversity preservation, cultural identity and sustainable livelihoods (Ghosh et al., 2023). Among many tribal communities of eastern India, particularly in Odisha, the collection and consumption of red weaver ants (*Oecophylla smaragdina*), locally known as Kurkuti, represent a unique cultural practice (Jena et al., 2020). These ants and their brood are valued not only as a nutrient-rich food source but also for

their medicinal properties, forming an integral part of traditional knowledge systems (Offenberg, 2021). However, rapid environmental changes, deforestation and urbanization are increasingly threatening both the species and the ecological networks that sustain them (Ma et al., 2025). Weaver ants are arboreal insects that depend on a wide range of host plants for nesting, foraging and colony establishment (Rout et al., 2025). Their characteristic leaf nests are constructed by binding leaves together using larval silk, making the availability and diversity of suitable host plants a critical factor for their survival (Patel and Bhatt, 2020). The distribution and abundance of *O. smaragdina* are therefore closely linked to the structure and composition of local vegetation (Exélis et al., 2025). In forested landscapes such as those of the Mayurbhanj district, the presence of diverse tree species supports robust ant populations, which in turn sustain the traditional harvesting of Kurkuti by indigenous communities (Kumar et al., 2022a). Despite its ecological and cultural significance, Kurkuti remains under-documented in scientific literature, particularly in terms of its dependence on host plant diversity. Enumerating the host plants associated with weaver ants provides valuable insights into habitat requirements, species interactions and conservation priorities. Such documentation not only contributes to ecological understanding but also helps identify key plant species that must be protected to ensure the continuity of this traditional food resource. The conservation of Kurkuti, therefore, cannot be addressed in isolation; it requires an integrated approach that considers both the ant species and its host plant network. Protecting these host plants, many of which are economically and ecologically important, can enhance habitat stability and support sustainable harvesting practices. Furthermore, recognizing and incorporating indigenous knowledge systems into conservation strategies can promote community participation and long-term stewardship of natural resources. Therefore, the present study aims to explore the conservation of Kurkuti through the enumeration of ant-host plant relationships in the Mayurbhanj district of Odisha. Through documentation of the diversity of host plants and their spatial distribution, the study seeks to highlight the ecological linkages that underpin this traditional food system and to provide a scientific basis for its conservation and sustainable management.

Methodology

Field surveys were conducted across selected forest and fringe village areas of Mayurbhanj district, Odisha, during 2025-26, to enumerate host plants associated with Kurkuti (Figure 1). Study sites were chosen based on the prevalence of traditional Kurkuti collection practices and included multiple locations representing diverse habitat types such as forest interiors, village peripheries and roadside vegetation. Systematic surveys were carried out in different seasons to capture variations in vegetation and ant activity (Figure 2). Host plants were identified through direct observation of *O. smaragdina* nests on plants. Each plant bearing active nests was recorded as a host and details were documented (Rajagopal et al., 2019). Where necessary, voucher specimens were collected and later identified using standard floras and taxonomic keys, with nomenclature updated following the APG classification system (Saxena and Brahmam, 1994-1996; Kumar et al., 2022b; Nayak and Kumar, 2023). Ethnobotanical information, including local names and traditional knowledge, was gathered through informal interactions with indigenous communities (Jena et al., 2025).

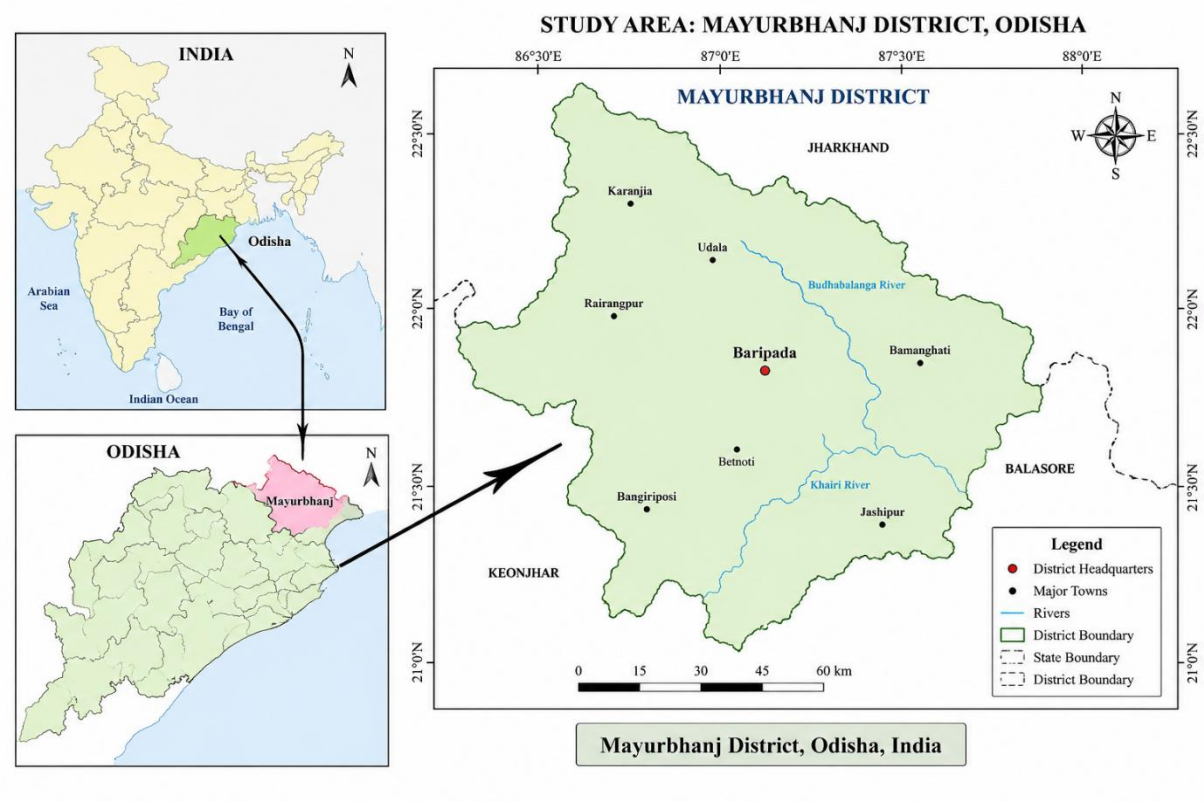

Figure 1: Location map of the study area showing the geographic position of Mayurbhanj district within Odisha state and India

Results and discussion

The present study documented a total of 38 host plant species associated with the red weaver ant, across different locations of Mayurbhanj district, Odisha (Table 1; Figure 3). These species were distributed among 23 families, indicating a high degree of host plant diversity supporting the ant populations. Such diversity reflects the ecological adaptability of *O. smaragdina* and its ability to utilize a wide range of arboreal substrates for nest construction and colony establishment. Among the documented families, Anacardiaceae and Fabaceae were the most represented, each contributing multiple host species, followed by Lecythidaceae, Moraceae, Lamiaceae and Ebenaceae. The dominance of these families suggests their structural suitability, particularly leaf size, flexibility and canopy architecture for nest formation. Species such as *Mangifera indica* and *Lannea coromandelica*, along with *Cassia fistula*, *Phanera vahlii* and *Saraca asoca*, were frequently observed hosting active nests, highlighting their importance in sustaining Kurkuti populations. The distribution pattern of host plants across locations such as Dudhijharan, Thakurmunda, Bangriposi and Karanjia indicates that Kurkuti is widely available in both forested and semi-disturbed habitats. The presence of host plants in village peripheries and roadside areas suggests that *O. smaragdina* can tolerate moderate anthropogenic disturbances. However, dense forest patches exhibited comparatively higher host plant richness and nest abundance, emphasizing the importance of intact forest ecosystems for maintaining stable ant populations. A notable observation is the predominance of tree species among the host plants, with relatively fewer shrubs and climbers. This preference can be attributed to the arboreal

nesting behaviour of *O. smaragdina*, which requires interconnected canopies and sturdy foliage for colony expansion. Additionally, the occurrence of host plants such as *Dendrophthoe falcata*, a hemi-parasitic species, indicates the ecological flexibility of the ants in utilizing diverse plant types.

Figure 2: Field survey conducted in Mayurbhanj district, Odisha

Table 1: Host plants of Kurkuti in Mayurbhanj district, Odisha

Scientific name	Tribal name	Family	Location
Artocarpus heterophyllus Lam.	Kanhar	Moraceae	Dudhijharan

Azadirachta indica A.Juss. (Figure 3a)	Nimba	Meliaceae	Siltia
Barringtonia acutangula (L.) Gaertn. (Figure 3b)	Hinjar	Lecythidaceae	Rairangpur
Buchanania lanzan Spreng. (Figure 3c)	Tarop	Anacardiaceae	Ramchandrapur
Calophyllum inophyllum L.	Polanga	Calophyllaceae	Purunapani
Careya arborea Roxb.	Kumbre	Lecythidaceae	Ambatola
Cassia fistula L.	Baneharlatia	Fabaceae	Jamukeshwar
Clerodendrum infortunatum L.	Barni	Lamiaceae	Bhuyanbasa
Combretum roxburghii Spreng.	Aten	Combretaceae	Badajodi
Couroupita guianensis Aubl.	Nagesar	Lecythidaceae	Dadhiasahi
Croton persimilis Müll.Arg.	Gote	Euphorbiaceae	Bisoi
Dendrophthoe falcata (L.f.) Ettingsh. (Figure 3d)	Manda	Loranthaceae	Chandua
Diospyros malabarica (Desr.) Kostel.	Makar kendu	Ebenaceae	Sarjomgada
Diospyros melanoxylon Roxb.	Tiril	Ebenaceae	Kantasala
Diospyros montana Roxb.	Gada terel	Ebenaceae	Jamda
Ficus benghalensis L.	Bare	Moraceae	Betnoti
Ficus religiosa L. (Figure 3e)	Hesak	Moraceae	Thakurmunda
Glochidion ellipticum Wight	Khakada	Phyllanthaceae	Bangriposi

Glochidion lanceolarium (Roxb.) Voigt	Khakada	Phyllanthaceae	Deuli
Gmelina arborea Roxb. ex Sm.	Kasmar	Lamiaceae	Karanjia
Holarrhena pubescens Wall. ex G.Don	Hat	Apocynaceae	Jashipur
Homonoia riparia Lour.	Gurjor	Euphorbiaceae	Mahuldiha
Ixora pavetta Andrews	Merommet	Rubiaceae	Pahadpur
Lagerstroemia speciosa (L.) Martyn	Sekra	Lythraceae	Jamdiha
Lannea coromandelica (Houtt.) Merr. (Figure 3f)	Doka	Anacardiaceae	Ambatola
Madhuca longifolia (L.) J.F.Macbr. (Figure 3g)	Mahua	Sapotaceae	Suleipat
Mangifera indica L. (Figure 3h)	Uli	Anacardiaceae	Thakurmunda
Miliusa tomentosa (Roxb.) Finet & Gagnep.	Ome	Annonaceae	Rasgobindpur
Ougeinia oojeinensis (Roxb.) Hochr.	Rot	Fabaceae	Dudhijharan
Phanera vahlii (Wight & Arn.) Benth. (Figure 3i)	Jom-lar	Fabaceae	Kaptipada
Saraca asoca (Roxb.) W.J.de Wilde	Husangid-ba	Fabaceae	Bhandan
Schleichera oleosa (Lour.) Oken (Figure 3j)	Baru	Sapindaceae	Udala
Semecarpus anacardium L.f.	Soso	Anacardiaceae	Tetulsahi
Shorea robusta C.F.Gaertn. (Figure 3k)	Sarjam	Dipterocarpaceae	Bangiriposi
Strychnos nux-vomica L. (Figure 3l)	Kochila	Loganiaceae	Manoharpur

Syzygium cumini (L.) Skeels	Jamun	Myrtaceae	Edelbeda
Terminalia chebula Retz.	Rola	Combretaceae	Champuda
Vitex negundo L.	Sinduari	Lamiaceae	Rengalbeda

Figure 3: Host plants of Kurkuti in Mayurbhanj district; a) *Azadirachta indica*, b) *Barringtonia acutangula*, c) *Buchanania lanzan*, d) *Dendrophthoe falcata*, e) *Ficus religiosa*, f) *Lannea coromandelica*, g) *Madhuca longifolia*, h) *Mangifera indica*, i) *Phanera vahlii*, j) *Schleichera oleosa*, k) *Shorea robusta* and l) *Strychnos nux-vomica*

Observations similar to the present study have been reported from other regions of India, where host plant architecture, canopy connectivity and foliage characteristics strongly influence nest establishment and colony persistence (Rajagopal et al., 2019; Patel and Bhatt, 2020). The findings are in close agreement with the pioneering work of Jena et al., (2020), who documented the traditional consumption and medicinal importance of red weaver ants among tribal communities of Mayurbhanj district. Their study established Kurkuti as an important indigenous food resource, rich in protein and widely used in the preparation of traditional chutney for treating common ailments such as cough, fever, loss of appetite and body pain. While the earlier study primarily emphasized the socio-cultural and nutritional significance of the species, the present investigation extends this understanding by demonstrating that the continuity of these traditional practices is directly dependent on the conservation of host plant diversity. Thus, preserving the vegetation supporting *O. smaragdina* colonies is equally important for safeguarding indigenous food traditions and associated cultural heritage. Recent ethnobotanical investigations in Mayurbhanj district have revealed exceptionally rich traditional knowledge associated with forest resources. Jena et al., (2025) documented extensive utilization of wild plant species by indigenous communities for food, medicine and livelihood support, emphasizing the continued dependence of tribal populations on forest biodiversity. The present study complements these findings by identifying host plant species that not only provide nesting substrates for *O. smaragdina* but also possess significant ethnobotanical value. Species such as *Madhuca longifolia*, *Mangifera indica*, *Buchanania lanzan*, *Syzygium cumini*, *Artocarpus heterophyllus* and *Shorea robusta* are simultaneously important for local livelihoods and for maintaining ant populations. This overlap suggests that conserving these multipurpose tree species would generate dual ecological and socio-economic benefits by supporting biodiversity while sustaining traditional food systems. The predominance of members of Anacardiaceae, Fabaceae and Moraceae as host plants observed in the present study is consistent with reports from other regions of India, where large-canopied tree species with flexible leaves provide favourable nesting conditions for *O. smaragdina*. Trees such as *Mangifera indica*, *Lannea coromandelica*, *Ficus benghalensis* and *Ficus religiosa* offer extensive branching patterns and interconnected canopies that facilitate colony expansion and long-term nest stability. Such structural characteristics are considered among the principal determinants of host plant selection by weaver ants and explain their repeated occurrence across different ecological landscapes. The study further highlights the importance of community participation in conserving Kurkuti habitats. Indigenous communities of Mayurbhanj have traditionally harvested red weaver ants without destroying colonies, allowing natural regeneration and recolonization. However, increasing deforestation, forest fragmentation, road expansion and unsustainable extraction of forest resources may reduce the abundance of suitable host plants, thereby threatening both ant populations and the associated traditional knowledge system. Similar concerns regarding habitat degradation and its influence on *O. smaragdina* distribution have been raised in recent ecological studies (Ma et al., 2025), emphasizing the necessity of habitat-based conservation approaches. From a conservation perspective, the present study provides one of the first comprehensive accounts of the ant–host plant relationship in Mayurbhanj district. While earlier investigations from the district primarily focused on the nutritional, medicinal and cultural importance of Kurkuti (Jena et al., 2020), this study establishes the ecological foundation

underpinning its persistence. The results demonstrate that conservation strategies should move beyond species-level protection and incorporate habitat restoration, enrichment planting of preferred native host species, and community-led forest management. Such integrated approaches would not only ensure the long-term survival of *O. smaragdina* populations but also contribute to the conservation of indigenous traditional food systems, forest biodiversity and the biocultural heritage of Mayurbhanj district.

Conclusion

The present study clearly demonstrates that the sustainability of *Oecophylla smaragdina* as a traditional indigenous food resource is strongly dependent on the availability and diversity of its host plants. The present documentation in Mayurbhanj district highlights a rich and functionally diverse host plant assemblage that supports stable ant populations in both forested and semi-disturbed landscapes. The predominance of key arboreal families such as Anacardiaceae, Fabaceae and Moraceae further emphasizes the ecological importance of structurally suitable vegetation in maintaining ant colonies. The study also reveals that Kurkuti is not merely an ecological entity but an integral component of local cultural heritage, closely linked with indigenous knowledge systems and rural livelihoods. However, increasing habitat alteration, deforestation and fragmentation of native vegetation pose significant threats to both host plant diversity and ant populations. The observed dependence of *O. smaragdina* on specific tree species highlights the urgency of conserving native flora to ensure the continuity of this traditional food practice. Therefore, effective conservation of Kurkuti requires an integrated approach that combines habitat protection, promotion of native tree species through agroforestry and incorporation of indigenous knowledge into biodiversity management strategies. Strengthening community participation in conservation initiatives will be crucial for sustaining both ecological balance and cultural heritage. This study thus provides a scientific basis for linking host plant conservation with the long-term preservation of an important cultural food resource in the region.

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