Traditional Knowledge and Ethnobotanical Utilization of Edible Plants in the Repong Damar Agroforestry System, Pesisir Tengah, Lampung, Indonesia

Nur Fikhadillah[1], Duryat[1*], Hari Kaskoyo[1], Trio Santoso[1]

[1]*Department of Forestry, Faculty of Agriculture, Universitas Lampung, Bandar Lampung, Indonesia, 35141*

Received: 19 October 2025

Accepted: 09 December 2025

***Correspondent Email:** duryat.1978@fp.unila.ac.id

Abstract: *This study examines the biodiversity and traditional utilization of wild edible plants within the Repong Damar agroforestry system of Pesisir Tengah, Lampung. Local communities in the region rely heavily on forest-based food resources, yet scientific documentation of edible plant diversity and associated knowledge remains limited. The research aimed to analyze the biodiversity of edible plants, identify their traditional uses, and describe plant parts and processing techniques applied by local communities. Vegetation analysis was conducted using stratified sampling across two Repong Damar management zones, while ethnobotanical data were collected through snowball sampling and semi-structured interviews. The results revealed a total of 43 plant species across various growth stages, with Anthoshorea javanica showing the highest Important Value Index. Communities utilized 28 wild edible plant species, predominantly harvesting fruits and leaves due to their availability and non-destructive nature. Traditional processing was dominated by cooking techniques such as boiling and steaming, while certain species, such as Dioscorea hispida, required fermentation-based detoxification. These findings highlight the ecological richness and cultural significance of edible plant use in Repong Damar, emphasizing the importance of preserving traditional knowledge systems for food security and sustainable agroforestry management.*

Keywords: *Repong Damar; ethnobotany; wild edible plants; traditional knowledge; agroforestry*

1. INTRODUCTION

Local communities across Indonesia continue to rely heavily on wild edible plants to meet their nutritional, cultural, and livelihood needs. Ethnobotanical studies in several regions reveal extensive use of wild plant resources, although many species remain underutilized. In Aceh, for instance, 86 species of wild vegetables have been documented, yet only a portion is actively consumed by local people (Adnan et al., 2023). Among the Malay community in Belitung District, 181 food plant species are utilized 59% of which are wild plants including fruits, vegetables, spices, and staple foods (Chikmawati et al., 2023). Similarly, in Bengkulu, 73 wild edible fruit species have been recorded, dominated by tree species, indicating strong dependence on forest resources (Suwardi et al., 2023). Despite this richness, low awareness, limited utilization, and shifting food preferences contribute to the underuse of many potential wild food species.

Traditional ethnobotanical knowledge, which supports these practices, is simultaneously experiencing rapid erosion due to modernization, socio-economic transitions, and cultural changes. Younger generations are becoming increasingly disconnected from ancestral knowledge systems, as observed among the Waorani in Ecuador and traditional agro-pastoral communities in Central Italy (Weckmüller et al., 2019; Mattalia et al., 2021). Similar trends are reported in Indonesia, where declining engagement in traditional practices has reduced the transmission of ethnobotanical knowledge (Hariyadi et al., 2024). This knowledge loss is further compounded by environmental degradation, forest fragmentation, and declining biodiversity—conditions that threaten ecosystem stability and reduce the availability of wild edible plants (Singh et al., 2024; Yaseen et al., 2024). Together, these interconnected issues challenge the sustainability of community-based agroforestry systems.

Extensive ethnobotanical research conducted in other regions of Indonesia has demonstrated the diverse ways in which local communities manage and utilize plant resources. Among the Malay people in Belitung, 181 plant species are used for culinary, medicinal, and cultural purposes, with coconut and rice holding strong socio-cultural significance (Chikmawati et al., 2023). The Malay community in Sambas Regency employs 61 medicinal plant species, largely from the Zingiberaceae family, with usage patterns shaped by socio-economic factors such as age and gender (Loresa et al., 2023). In the Minangkabau region, 154 plant species have been documented within traditional knowledge systems, while the Kenyah Umaq Jalan Tribe utilizes 25 spice species in their culinary traditions (Hendra & Oktaviani, 2020). These studies highlight the rich ethnobotanical diversity across Indonesian ethnic groups and

demonstrate how cultural and ecological contexts influence plant utilization.

Beyond ethnobotanical studies, research on Indonesia's agroforestry systems—particularly the Repong Damar system in West Lampung—has emphasized their ecological and socio-economic importance. Repong Damar is characterized by structurally complex forest gardens dominated by Shorea javanica, with previous studies documenting 56 plant species across 30 families within these systems (Santoso et al., 2023). Management practices are guided by local wisdom, involving structured stages such as land clearing, planting, and long-term maintenance based on customary regulations (Oktarina et al., 2022). Agroforestry systems in Sumatra further contribute to food security and environmental stability by diversifying crop production and reducing pressure on natural forests (Duffy et al., 2021). However, despite the growing body of research on Repong Damar's ecology, management, and economic value, no study has specifically examined the diversity and traditional utilization of wild edible plants within Repong Damar in the Pesisir Tengah region of Lampung. This gap highlights the novelty of the present research.

The urgency of this study lies in the need to document and preserve traditional knowledge related to wild edible plants, which plays a vital role in sustaining biodiversity, food security, and cultural identity. Repong Damar represents a unique community-based agroforestry system where ecological functions, cultural heritage, and livelihood strategies intersect, making the documentation of edible plant use essential for its long-term sustainability (Hariyadi et al., 2024). Therefore, this research aims to analyze the diversity of wild edible plants in the Repong Damar system of Pesisir Tengah, identify their traditional uses by local communities, and describe the plant parts utilized and traditional processing techniques.

2. MATERIALS AND METHODS

2.1 Study Period and Location

This research was conducted from October to November in the Repong Damar area of Pesisir Tengah, Pesisir Barat, Lampung Province. The study site represents a community-based agroforestry system dominated by *Shorea javanica* and characterized by stratified forest structure and long-established traditional management practices. The geographical location of the research area is illustrated in Figure 1.

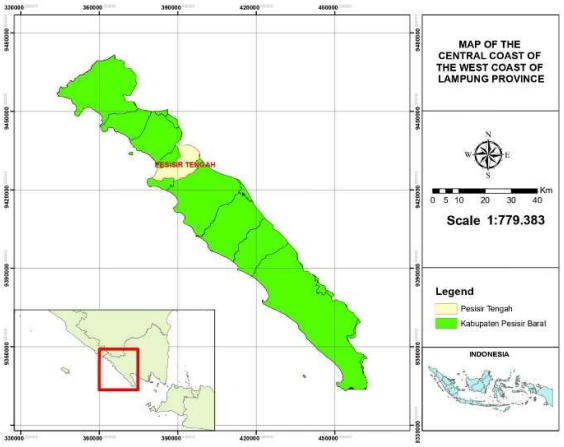

Figure 1. Map of the Study Location in the Repong Damar Area, Pesisir Tengah, Lampung

2.2 Research Sampling Design

This study applied two main sampling approaches consisting of vegetation analysis and ethnobotanical, each designed to capture ecological diversity and traditional knowledge regarding edible plant use.

2.2.1 Vegetation Sampling

Vegetation sampling was conducted using a stratified sampling approach, which divided the Repong Damar landscape into two strata: (1) areas outside conservation zones, and (2) areas within limited-production forests, following the structure described in the study site overview. The stratified sampling method was selected because Repong Damar exhibits heterogeneous vegetation composition and varying management histories. Stratification ensures that species distribution, stand structure, and diversity patterns across different management types are adequately represented. This method also minimizes sampling bias and improves accuracy in calculating species composition and Important Value Index (IVI).

2.2.2 Ethnobotanical Sampling

Ethnobotanical data were collected using the snowball sampling method, which is appropriate for identifying knowledgeable community members who possess traditional expertise regarding wild edible plants. Snowball sampling was selected because ethnobotanical knowledge is unevenly distributed within communities and is often concentrated among elders, gatherers, and long-practicing farmers. This method enables researchers to trace networks of local experts and ensures comprehensive documentation of edible plant knowledge, processing techniques, and cultural practices.

2.3 Data and Observed Parameters

The data collected consist of ecological observations and ethnobotanical information, each representing different parameters measured in the field.

2.3.1 Vegetation Data (Biodiversity Observations)

Vegetation data were recorded within sampling plots and included the following parameters: Plant species identity; Number of individuals per species; Tree height; Diameter at breast height (DBH).

2.3.2 Ethnobotanical Data

Ethnobotanical parameters were gathered through semi-structured interviews and direct observations and included: Local and scientific names of edible plant species; Plant parts used (e.g., fruit, leaves, bark, tubers); Traditional processing and preparation techniques (e.g., cooking, fermentation, raw consumption)

2.4 Field Procedures

Data collection was conducted in two stages corresponding to the two sampling approaches.

2.4.1 Vegetation Data Collection

Vegetation data collection involved (1) delineating sampling strata and constructing sampling plot maps, (2) establishing plots within each stratum, and (3) recording ecological parameters listed in Section 2.3.1. Each individual plant encountered in the plots was measured for DBH, height, and growth stage, while species identity was recorded using field identification guides and local expert verification. These measurements were later used to determine species richness, abundance, and the Important Value Index (IVI), following standard vegetation analysis protocols.

2.4.2 Ethnobotanical Data Collection

Ethnobotanical data were collected by interviewing community members identified through snowball sampling. Interviews explored edible plant knowledge, traditional uses, harvesting techniques, and culinary practices. Observations were conducted during forest visits with informants to verify plant identification and processing techniques.

2.5 Data Analysis

The vegetation data were analyzed to determine species diversity and ecological importance. The Important Value Index (IVI) was calculated based on species relative density, frequency, and dominance to assess ecological significance within the Repong Damar system. Diversity analysis included classification of species by growth stage and identification of dominant taxa.

Ethnobotanical data were analyzed descriptively to identify the number of wild edible plant species used, the most frequently utilized plant parts, and the dominant processing methods. Species were categorized according to usage type (e.g., fruit, vegetable, spice, tuber), preparation technique, and cultural relevance. This analysis enabled the identification of key edible species and patterns of traditional plant use within the local community.

3. Results and Discussions

3.1 Edible-Plant Biodiversity in Repong Damar

The species composition and ecological importance of plants across different growth stages in the Repong Damar system of Pesisir Tengah are presented in Table 1, which includes species distribution and Important Value Index (IVI) values derived from vegetation sampling.

Table 1. Species Composition and Important Value Index (IVI) in Repong Damar

No.	Local Name	Scientific Name	Importance Value Index (IVI) of Plant Species at Different Growth Stages in Repong Damar (%)			
			Tree	Pole	Sapling	Seedling
1	Kayu talas	*Litsia sp.*	6,10	8,63	16,28	14,23
2	Cengkeh	*Syzygium aromaticum*	-	-	11,87	3,02
3	Damar	*Anthoshorea javanica*	113,65	75,96	59,92	60,76
4	Duku	*Lansium domesticum*	28,13	13,48	19,95	25,59
5	Kakahwa	*Amaioua intermedia*	4,02	6,75	20,27	3,02
6	Rilik	*Curcuma sp.*	-	-	-	3,02
7	Kerbang	*Artocarpus*	7,76	-	-	6,58
8	Tupak	*Baccaurea racemosa*	4,23	12,39	15,14	5,52
9	Bayur	*Pterospermum javanicum*	3,48	-	-	3,56
10	Kayu sepat	*Macaranga triloba*	-	8,53	-	3,02
11	Durian	*Durio zibethinus*	64,58	29,25	16,30	10,67
12	Rarebu	*Actinodaphne glabra*	3,26	6,97	17,57	7,64
13	Pulai	*Alstonia scholaris*	11,17	29,65	18,92	3,02
14	Medang seluag	*Alseodaphne bancana*	-	3,39	-	4,09
15	Haneban	*Vitex pinata*	4,06	-	4,85	6,05
16	Balik angin	*Leucosyke sumatrana*	4,63	3,32	19,73	6,58
17	Jambu	*Helicia robusta R.Br.*	-	-	-	4,62
18	Surian	*Ficus fistulosa*	2,03	7,23	3,79	3,56
19	Sungkai	*Peronema canescens*	6,10	9,84	13,52	3,02

Table 1. continued

No.	Local Name	Scientific Name	Importance Value Index (IVI) of Plant Species at Different Growth Stages in Repong Damar (%)			
			Tree	Pole	Sapling	Seedling
20	Nanasi	*Ficus fistulosa*	-	-	3,51	5,15
21	Kayu lada	*Macaranga sp.*	-	7,69	11,76	-
22	Simpur	*Dillenia excelsa (Jack) Gilg*	-	-	7,45	-
23	Jengkol	*Pithecelobium jirringa*	2,03	-	3,79	-
24	Handitak	*Elaeocarpus littoralis*	-	-	3,93	-
25	Kulut	*Aglaia argentea Bl.*	4,06	-	4,44	-
26	Gaharu	*Aquilaria malaccensis*	-	-	4,73	-
27	Kuwaw	*Archidendron bubalium*	-	10,18	5,48	-
28	Kakapung	*Zanthoxylum caribaeum*	2,03	-	3,67	-
29	Ingu-ingu	*Sauravia leprosa*	-	4,07	5,12	-
30	Kanihai	*Glochidion sp.*	-	-	3,82	-
31	Melinjo	*Gnetum gnemon*	-	4,54	-	-
32	Manggis	*Garcinia laterifolia*	2,20	3,55	-	-
33	Petai	*Parkia speciosa*	2,30	23,81	-	-
34	Kayu salai	*Glochidion obscurum*	-	4,13	-	-
35	Angsor	*Clausena excavata*	-	7,21	-	-
36	Heling	*Glochidion rubrum*	-	4,07	-	-
37	Nyari	*Hydnocarpus pentandrus*	-	3,73	-	-
38	Asam kandis	*Garcinia parvifolia*	6,69	-	-	-
39	Kerbang kubung	*Macaranga tanarius*	3,13	-	-	-
40	Tima	*Croton argyratus Blume*	6,10	-	-	-
41	Angsot	*Cananga odorata*	2,03	-	-	-
42	Halinyau pulan	*Drypetes paxii*	2,03	-	-	-
43	Pala	*Myristica fragrans*	2,03	-	-	-

The biodiversity of plant species within the Repong Damar system of Pesisir Tengah is reflected in the vegetation sampling results, which documented 43 plant species across multiple growth stages. This diversity demonstrates the ecological richness that characterizes the damar-based agroforestry landscape. *Anthoshorea javanica*, the culturally and economically significant resin-producing species, exhibited the highest Important Value Index (IVI) with a value of 113.65% at the tree stage, highlighting its central role in the structure and functioning of the forest garden. The presence of additional key species such as Durio zibethinus, Lansium domesticum, Actinodaphne glabra, and Palaquium rostratum contributes to a multi-layered forest canopy that supports ecological stability and resource availability. The coexistence of seedlings, saplings, poles, and mature trees indicates a robust and continuous regeneration process, which is critical for sustaining long-term forest productivity.

The moderate dominance of A. javanica observed in this study contrasts with findings from community forest systems in Nanggala and Gunungkidul, where higher dominance values often reflect simplified forest structures with reduced species diversity. In such systems, strong dominance by a single species tends to limit ecological heterogeneity and resilience. In contrast, the Repong Damar's balanced species composition supports a healthier ecological mosaic. This aligns with broader agroforestry literature indicating that multi-strata arrangements in tree-based systems promote higher ecological functionality, including regeneration potential and microhabitat diversity (Santos, 2022; Udawatta et al., 2019). The diversity observed in Repong Damar thus evidences its ecological robustness, sustained by both natural processes and traditional management practices.

Biodiversity patterns in Repong Damar are also comparable to those documented in other ethnobotanically rich regions of Indonesia. For example, ethnobotanical research in Belitung recorded 181 plant species used by Malay communities, while 73 wild fruit species were identified in Bengkulu (Chikmawati et al., 2023; Suwardi et al., 2023). Although these studies focus on ethnobotanical richness rather than structural forest diversity, they illustrate similar reliance on diverse plant resources. However, Repong Damar differs due to its integrated agroforestry orientation, where biodiversity is intentionally maintained through cultural norms, customary laws, and sustainable extraction practices. This management system often achieves biodiversity levels comparable to natural forests, echoing findings from agroforestry research in tropical Asia and Africa that highlight enhanced floral and faunal richness in agroforestry compared to monocultures (Mulatu & Hunde, 2020).

From a structural perspective, the multi-layered canopy and mixed-species composition within

Repong Damar contribute directly to forest regeneration and ecological stability. Studies have shown that structural complexity enhances ecosystem functions, such as carbon storage, soil protection, microclimate regulation, and habitat provision (Astiani & Ripin, 2016; Eyasu & Gebrewahid, 2024). The presence of fruit-bearing trees in Repong Damar increases food resources for wildlife, promotes seed dispersal, and supports nutrient cycling, further reinforcing biodiversity regeneration cycles. This mirrors findings from agroforestry systems globally, where diverse canopy structures provide ecological niches for multiple species, enhancing both plant and animal diversity (Udawatta et al., 2019).

The causal factors underlying this biodiversity can be linked to traditional ecological knowledge and the long-standing cultural significance of damar management. Generations of farmers have cultivated and protected A. javanica while simultaneously maintaining associated fruit and timber species. This culturally embedded approach prevents monoculture development and aligns with agroforestry principles that emphasize ecological harmony and sustainable livelihoods. In contrast, commercialized monocultures in other parts of Sumatra often show reduced species richness and simplified forest structure, supporting the conclusion that traditional systems like Repong Damar more effectively preserve biodiversity (Duffy et al., 2021).

The ecological implications of high biodiversity in Repong Damar are substantial. Diverse plant communities mitigate vulnerability to pests, diseases, and environmental fluctuations, contributing to long-term resilience. Biodiversity also enhances ecosystem services crucial for community survival, including food provision, medicinal resources, and material supplies. As demonstrated by other mixed fruit gardens and resin-based forest systems, such diversity also connects ecological resilience with cultural heritage and local identity (Santos, 2022; Eyasu & Gebrewahid, 2024). Therefore, the biodiversity recorded in Repong Damar not only illustrates a functioning ecological system but also highlights the importance of sustaining traditional agroforestry landscapes for future forest conservation and community livelihood security.

Overall, the diversity of 43 species, moderate dominance of *Anthoshorea javanica*, and multi-strata forest structure affirm that Repong Damar is an ecologically resilient, culturally grounded, and biodiversity-rich agroforestry system..

3.2 Traditional Utilization of Wild Edible Plants

The list of wild edible plant species utilized by local communities in the Repong Damar system is presented in Table 2, which includes information on the identity of edible species and the plant parts commonly harvested for consumption.

Table 2. Wild Edible Plant Species and Utilized Plant Parts in Repong Damar

No	Local Name	Scientific Name	Plant Part Used	Management Practice
1	Kuau	*Archidendron bubalium*	Fruit	Cooked
2	Sarbebak	*Blumea balsamifera*	Stem	Cooked
3	Gadung	*Dioscorea hispida*	Tuber	Fermented
4	Lempuyang	*Zingiber aromaticum*	Tuber	Eaten raw; Cooked
5	Jabung	*Etlingera elatior*	Fruit Flower	Cooked
6	Tenggawi	*Homalomena sagittifolia*	Stem	Cooked
7	Pakis	*Diplazium esculentum*	Leaves Stem	Cooked
8	Melinjo	*Gnetum gnemon*	Leaves Fruit	Cooked
9	Sepang	*Caesalpinia sappan*	Bark	Cooked
10	Daun salam	*Litsea lanceolata Koesterm.*	Leaves	Used as seasoning
11	Kayu manis	*Cinnamomum burmanii*	Bark	Used as seasoning
12	Jamur damar	*Fungia sp.*	Mushroom	Cooked
13	Jamur nangka	*Fungia sp.*	Mushroom	Cooked
14	Jutang	*Crassocephalum crepidioides*	Leaves Fruit	Eaten raw; Cooked
15	Sesumbuk	*Alpinia purpurata*	Fruit	Eaten raw
16	Sasuti	*Calamus ornatus* Blume	Fruit	Eaten raw; Used as seasoning
17	Daduruk	*Melastoma candidum*	Fruit	Eaten raw
18	Tupak	*Breyinia microphylla*	Stem Fruit	Eaten raw

Table 2. continued

No	Local Name	Scientific Name	Plant Part Used	Management Practice
19	Sepangluh	*Staurogyne elongata (Nees) Kuntze*	Leaves	Eaten raw; Cooked
20	Kecombrang	*Etlingera elatior*	Fruit	Cooked
21	Rebung	*Bambusoideae*	Shoot	Cooked
22	Talas	*Homalomena sagittifolia*	Tuber	Cooked
23	Pala	*Myristica fragrans*	Leaves Fruit	Used as seasoning
24	Petai	*Parkia speciosa*	Fruit	Eaten raw; Cooked
25	Jengkol	*Pithecelobium jirringa*	Fruit	Eaten raw; Cooked
26	Nangka	*Artocarpus heterophyllus*	Fruit	Eaten raw; Cooked
27	Handawik	*Dioscorea hispida Dennst*	Tuber	Cooked
28	Jamur melinjo	*Fungia sp.*	Mushroom	Cooked

The traditional utilization of wild edible plants by communities in the Repong Damar system reflects a deeply rooted cultural relationship with forest biodiversity. Based on the ethnobotanical data collected, local households regularly utilize 28 wild edible plant species, with fruits and leaves representing the dominant plant parts harvested for daily consumption. These species contribute significantly to food availability throughout seasonal cycles, reinforcing the community's dependence on forest resources as a natural food reservoir. The reliance on fruits such as *Durio zibethinus*, *Lansium domesticum*, and wild forest fruits demonstrates the importance of perennial species in sustaining food supply, especially in remote forested areas where market access is limited.

The dominance of fruits and leafy vegetables in the local diet is consistent with ethnobotanical patterns reported across Indonesia. For instance, communities in Aceh utilize 86 wild vegetable species, while those in Belitung and Bengkulu depend on 181 and 73 wild edible plants respectively, with fruits forming the largest proportion of their edible plant resources (Adnan et al., 2023; Chikmawati et al., 2023; Suwardi et al., 2023). Similarly, the Minangkabau and Pakis Baru communities also demonstrate strong reliance on wild fruits and leafy greens for both nutritional and cultural purposes (Cahyanti et al., 2024; Umartani & Nahdi, 2021). These similarities highlight a broader ethnobotanical trend in which forest-based communities across the Indonesian archipelago integrate wild edible plants into everyday diets, relying on them as essential components of traditional food systems.

From a causal perspective, the prevalence of fruits and leaves in the Repong Damar food system can be attributed to their abundance, ease of access, and non-destructive harvesting characteristics. Fruit-bearing trees remain productive for decades and do not require continuous replanting, making them highly efficient in labor-limited agroforestry contexts. The abundance of fruit species in Repong Damar mirrors the ecological structure of forest gardens globally, where perennial fruit trees are key contributors to nutrient cycling, shade regulation, and microhabitat creation (Mulatu & Hunde, 2020; Udawatta et al., 2019). Leaves, on the other hand, offer flexibility in daily cooking practices and can be harvested sustainably without harming long-term plant growth, making them indispensable for routine meals.

The cultural significance of wild edible plants also shapes utilization patterns. Many wild fruits, such as durian and duku, hold strong ceremonial and social value, often being shared during community gatherings or exchanged as gifts during harvest seasons. These cultural practices reinforce ecological stewardship, as households maintain mixed fruit and resin-producing stands not only for subsistence but also for cultural continuity. Research in culturally-managed agroforestry landscapes suggests that such traditions stabilize species composition by encouraging long-term preservation of multipurpose trees, thereby enhancing biodiversity retention (Santos, 2022; Astiani & Ripin, 2016). In Repong Damar, traditional norms discouraging destructive harvesting further ensure the sustainability of edible plant populations.

Comparatively, the richness of edible plant use in Repong Damar exhibits patterns similar to other resin or fruit-based forest systems, yet with distinctive characteristics rooted in the damar management system. In regions like Belitung and Bengkulu, wild edible plants grow naturally without the structured management found in Repong Damar. In contrast, the damar system actively integrates fruit-bearing species within a deliberate management framework that combines ecological and cultural objectives. This makes Repong Damar unique among Indonesian agroforestry systems, resembling complex homegarden structures described in African and Asian tropical landscapes, where species

diversity is intentionally preserved to maximize both ecological benefits and daily subsistence (Eyasu & Gebrewahid, 2024).

The implications of these traditional utilization patterns extend beyond food provision. The availability of diverse edible plants enhances household food security, particularly during lean seasons when agricultural crops are scarce. Moreover, wild edible plants contribute micronutrients that may otherwise be difficult to obtain from cultivated crops alone. Studies show that diverse wild food systems increase dietary resilience and reduce dependency on imported or market-based foods, making them essential for rural survival strategies (Mulatu & Hunde, 2020). In Repong Damar, the reliance on multiple species for daily consumption reflects a food system that is both diversified and ecologically grounded.

Finally, the extensive use of wild edible plants also reinforces the importance of preserving traditional knowledge. As modernization and lifestyle changes continue to threaten cultural transmission as documented among other indigenous communities (Hariyadi et al., 2024), the knowledge of edible plant identification, seasonal availability, safe harvesting, and culinary preparation becomes increasingly vulnerable. The rich edible plant repertoire in Repong Damar is therefore not only an ecological asset but also a cultural heritage that underpins community identity and resilience. Ensuring its continuity is essential for sustaining both the ecological integrity of Repong Damar and the livelihoods of the communities who depend on it.

3.3 Processing Techniques and Plant Parts Used

The patterns of plant-part utilization and processing techniques practiced by local communities in the Repong Damar system reflect the deep cultural and ecological knowledge embedded within this agroforestry landscape. Based on the ethnobotanical findings, the most frequently used plant parts are fruits and leaves, followed by tubers, young shoots, and other minor edible structures. These preferences indicate an intimate understanding of seasonal availability, safe harvesting methods, and long-term sustainability. The reliance on fruits such as durian and duku highlights the importance of perennial tree species in ensuring consistent access to nutrient-rich foods across years, regardless of agricultural fluctuations.

The dominance of fruits and leaves mirrors patterns found in other Indonesian ethnobotanical systems. In Belitung and Bengkulu, fruit-bearing trees form the backbone of traditional diets, while leafy greens contribute essential vitamins and minerals (Chikmawati et al., 2023; Suwardi et al., 2023). Similar preferences are reported among communities in Aceh, Minangkabau, and Pakis Baru, where wild fruits and vegetables are central to culinary traditions and daily nutrition (Adnan et al., 2023; Cahyanti et al., 2024). These parallels reinforce the idea that the use of fruits and leaves is not only ecologically efficient but culturally entrenched across various ethnolinguistic groups.

Processing techniques among Repong Damar communities primarily involve simple cooking methods, including boiling, steaming, and sautéing. These techniques are favored due to their practicality, ability to improve digestibility, and cultural familiarity. This pattern is consistent with observations from other agroforestry-based societies, where cooking serves as the primary method for preparing wild edible plants (Mulatu & Hunde, 2020). Cooking also plays a critical role in reducing antinutritional factors present in leafy greens and enhancing the palatability of certain forest foods. Moreover, these practices ensure the safe consumption of wild species, especially those with bitter or fibrous textures.

More complex techniques are applied to species that require special handling, the most notable being the fermentation-based detoxification of *Dioscorea hispida* (gadung). This multi-step method soaking, washing, and fermenting reflects sophisticated biochemical knowledge that has been transmitted through generations. Fermentation practices like this have been reported in other Indonesian regions, especially where communities utilize wild tubers containing cyanogenic compounds (Umartani & Nahdi, 2021). Such processing not only ensures safety but also transforms toxic species into valuable food sources during periods of scarcity. This knowledge exemplifies how cultural adaptation enables communities to maximize the usability of forest resources without compromising health.

From a causal perspective, the choice of processing techniques is influenced by ecological conditions, cultural norms, and risk-management strategies. Fruits and leaves require minimal processing and are harvested in a non-destructive manner, aligning with sustainable forest stewardship principles embedded in Repong Damar customary law (Oktarina et al., 2022). Tubers, while less commonly used, become essential fallback foods due to their caloric density and availability during food shortages. This hierarchical use of resources reflects a culturally mediated food security strategy, consistent with global findings that agroforestry communities rely on multi-tiered plant parts to maintain dietary resilience (Eyasu & Gebrewahid, 2024).

Comparatively, the processing diversity in Repong Damar resembles the food-processing patterns observed in other complex agroforestry systems worldwide, particularly those with high fruit-tree compositions and mixed-species stands. In African parkland systems and Asian

homegardens, cooking, boiling, and fermentation are similarly used to improve safety, enhance flavor, and extend shelf life (Udawatta et al., 2019; Santos, 2022). These similarities suggest that traditional culinary practices evolve in tandem with ecological landscape structures, enabling communities to adapt to their specific resource bases.

The implications of these findings highlight the importance of safeguarding traditional ecological knowledge associated with plant use and processing. These practices not only ensure food safety and dietary diversity but also represent cultural identity, intergenerational heritage, and local innovation. However, such knowledge faces increasing threats from modernization, reduced forest access, and shifting dietary preferences (Hariyadi et al., 2024). In the context of Repong Damar, the erosion of specialized techniques such as gadung fermentation could lead to the loss of valuable adaptive strategies that support community food security during environmental or economic stress.

Overall, the dominance of fruits and leaves, the reliance on simple yet culturally meaningful cooking practices, and the retention of specialized processing techniques underscore the community's dynamic relationship with forest biodiversity. These practices reveal an intricate balance between ecological sustainability, cultural continuity, and daily livelihood needs, affirming the critical role of traditional knowledge in shaping long-term food systems within the Repong Damar agroforestry landscape.

4. CONCLUSIONS

This study documented the biodiversity of wild edible plants within the Repong Damar agroforestry system in Pesisir Tengah, identifying a total of 43 plant species across various growth stages, with *Anthoshorea javanica* exhibiting the highest ecological importance. The vegetation structure reflects a balanced and resilient forest garden supported by long-term community management practices.

Local communities utilize 28 wild edible plant species as part of their daily food system, with fruits and leaves being the most commonly harvested components. These species contribute significantly to dietary diversity and demonstrate the continued relevance of forest-based food resources in community livelihoods.

Traditional processing techniques primarily include cooking methods such as boiling and steaming, while certain species most notably Dioscorea hispida require specialized procedures such as fermentation for safe consumption. These practices reflect deep-rooted traditional knowledge that ensures both the safety and cultural continuity of edible plant use. Overall, the findings highlight the ecological richness, cultural importance, and adaptive culinary knowledge embedded within the Repong Damar system, underscoring the need to preserve these traditions for future sustainability.

The implications of these findings underscore the importance of preserving traditional ecological knowledge as a foundation for sustainable forest management, biodiversity conservation, and strengthening community-based food systems. Maintaining the Repong Damar agroforestry system is not only crucial for ecological integrity but also for safeguarding cultural heritage and enhancing local resilience in the face of modernization and environmental change.

ACKNOWLEDGMENTS

We would like to express our sincere gratitude to all individuals and institutions who supported the completion of this research. Special appreciation is extended to the community members and key informants in Pesisir Tengah for their valuable knowledge and assistance during fieldwork in the Repong Damar area. We also acknowledge the support from the Department of Forestry, Faculty of Agriculture, Universitas Lampung (UNILA), which greatly facilitated the research and preparation of this manuscript. Finally, we are grateful to the reviewers for their constructive comments and suggestions that significantly improved the quality of this article.

REFERENCES

Adnan, A., Navia, Z. I., Baihaqi, B., & Baihaqi, B. (2023). The diversity and traditional knowledge of wild edible vegetables in Aceh, Indonesia. *Ethnobotany Research and Applications*, 26. https://doi.org/10.32859/era.26.49.1-16

Astiani, D., & Ripin, R. (2016). The roles of community fruit garden (tembawang) on maintaining forest structure, diversity and standing biomass allocation: an alternative effort on reducing carbon emission. *Biodiversitas Journal of Biological Diversity*, *17*(1). https://doi.org/10.13057/biodiv/d170148

Cahyanti, F. A., Eskundari, R. D., & Purwanto, A. (2024). Wild Edible Plants as an Alternative Food Source for The Community of Pakis Baru Village, Nawangan, Pacitan. *Jurnal Biologi Tropis*, 24(2), 352-367. https://doi.org/10.29303/jbt.v24i2.6779

Chikmawati, T., Sulistijorini, S., Djuita, N. R., Prasaja, D., Miftahudin, M., & Fakhrurrozi, Y. (2023). Ethnobotany of food plants utilized by Malay Ethnic in Belitung District, Indonesia. *Biodiversitas*, 24(5). https://doi.org/10.13057/biodiv/d240552

Duffy, C., Toth, G. G., Hagan, R. P., McKeown, P. C., Rahman, S. A., Widyaningsih, Y., ... & Spillane, C. (2021). Agroforestry contributions to smallholder farmer food security in Indonesia. *Agroforestry*

Systems, 95(6), 1109-1124. https://doi.org/10.1007/s10457-021-00632-8

Eyasu, G., & Gebrewahid, Y. (2024). Potential of Agroforestry Practices on Woody Species Diversity and Composition: Implication for Conservation of Indigenous Trees in Selected Districts of Tigray, Northern Ethiopia. *Asian Journal of Research in Agriculture and Forestry*, *10*(4), 88–100. https://doi.org/10.9734/ajraf/2024/v10i4319

Hariyadi, B., Lahmuddin, A., Alrasyid, M. H., Tira, B. S., Ihsan, M., Yelianti, U., & Waskito, E. (2024). Unraveling The Threads of Tradition: The Transformation of Kepayang (Pangium edule Reinw.) Ethnobotanical Knowledge in Sarolangun, Central Sumatra. *Media Konservasi*, 29(4), 675. https://doi.org/10.29244/medkon.29.4.675

Hendra, M., & Oktaviani, M. (2020). Etnobotani Rempah Tradisional Masyarakat Dayak Kenyah Umaq Jalam di Kecamatan Segah Kabupaten Berau. *Jurnal Pendidikan Matematika dan IPA*, 11(2), 333-344. https://doi.org/10.26418/jpmipa.v11i2.40977

Loresa, D., Yusro, F. and Mariani, Y., 2023. Pemanfaatan tanaman pekarangan sebagai bahan obat tradisional oleh Battra Suku Melayu di Desa Samustida Kabupaten Sambas. *Jurnal Serambi Engineering*, 8(2), 5046-5055. https://doi.org/10.32672/jse.v8i2.5550

Mattalia, G., Sõukand, R., Corvo, P., & Pieroni, A. (2021). "We became rich and we lost everything": ethnobotany of remote mountain villages of Abruzzo and Molise, Central Italy. *Human Ecology*, 49(2), 217-224. https://doi.org/10.1007/s10745-020-00209-6

Mulatu, K., & Hunde, D. (2019). Agroforestry: a supplementary tool for biodiversity conservation and climate change mitigation and adaptation. *system*, *9*(19), 54-66. https://doi.org/10.11648/J.IJEE.20200503.11

Oktarina, N., Nopianti, H., & Himawati, I. P. (2022). Kearifan lokal dalam pengelolaan Repong Damar Pekon Pahmungan Kecamatan Pesisir Tengah Kabupaten Pesisir Barat Lampung. *Satwika: Kajian Ilmu Budaya dan Perubahan Sosial*, 6(1), 73-91. https://doi.org/10.22219/satwika.v6i1.19609

Santos, M. (2022). Why Do Agroforestry Systems Enhance Biodiversity? Evidence From Habitat Amount Hypothesis Predictions. *Frontiers in Ecology and Evolution*, 9. https://doi.org/10.3389/fevo.2021.630151

Santoso, T., Paridduar, R., & Bintoro, A. (2023). Plant diversity under traditional agroforestry system of repong damar in Pesisir Barat District, Lampung Province, Indonesia. *Biodiversitas Journal of Biological Diversity*, 24(8). https://doi.org/10.13057/biodiv/d240849

Singh, P. K., Singh, R., & Vishwakarma, R. C. (2024). The taxonomic diversity and conservation status of endemic plant species in the Gangetic Plains of Prayagraj. *International Journal for Research in Applied Science and Engineering Technology (IJRASET)*, 12(7), 356–362. https://doi.org/10.22214/ijraset.2024.63576

Suwardi, A. B., Syamsuardi, S., Mukhtar, E., & Nurainas, N. (2023). The diversity and traditional knowledge of wild edible fruits in Bengkulu, Indonesia. *Ethnobotany Research and Applications*, 25. https://doi.org/10.32859/era.25.15.1-17

Udawatta, R. P., Rankoth, L. M., & Jose, S. (2019). Agroforestry and biodiversity. *Sustainability*, 11(10), 2879. https://doi.org/10.3390/su11102879

Weckmüller, H., Barriocanal, C., Maneja, R., & Boada, M. (2019). Factors affecting traditional medicinal plant knowledge of the Waorani, Ecuador. *Sustainability*, 11(16), 4460. https://doi.org/10.3390/su11164460

Yaseen, U., Khan, M.Y., Zia, M.S., Ahmad, Z., Ahmad, B., & Younas, M. (2024). The loss canopies, damaged soil: evaluating the interconnected effects of deforestation and agroforestry decline on soil health. *J Agric Biol*, 2, 17-30. https://doi.org/10.55627/agribiol.002.01.0840