

Tuber crop diversity and utilization among selected indigenous tribal communities of Kerala: A literature review

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Abstract

Tuber crops are one of the major sources of nutrition for the indigenous populations in Kerala. This study aims to provide a comprehensive ethnobotanical overview of tuber crop utilization, identifying species diversity, documenting traditional medicinal applications, assessing cultural significance and evaluating their vital contribution to food security among various tribal groups. This review provides detailed insight into the utilization of tuber crops among tribal communities through a systematic analysis of available literature. Data extraction prioritized the ethnobotanical uses of both native and cultivated tuber crops. The review evaluated their availability, integration into daily tribal life and critical role in sustaining food security, particularly during periods of seasonal food scarcity. The study yielded comprehensive data about the utilization of approximately 30 different tuber species among diverse communities including the *Kadar*, *Kattunaikka*, *Kuruma*, *Paniya*, etc., who extensively utilize a wide array of tubers, predominantly *Dioscorea* species, *Amorphophallus paeoniifolius* (Dennst.) Nicolson and *Colocasia esculenta* (L.) Schott. These resilient crops provide essential calories during food shortages and hold significant medicinal value. Furthermore, these tribes demonstrate sophisticated traditional ecological knowledge. The *Kadar* tribe practices sustainable harvesting by replanting the tuber's upper portion for continued regeneration, while the *Kattunaikka* employ complex detoxification methods to make toxic species like *Dioscorea hispida* Dennst. safe for human consumption. Tuber crops are indispensable natural resources deeply integrated into the sustenance, healthcare and cultural frameworks of Kerala's tribes. Documenting these sustainable foraging and processing practices is vital for preserving traditional knowledge and ensuring continued regional food security.

Keywords: Ethnobotany, Ethnomedicine, Food Security, Starchy foods, Traditional Knowledge

1. Introduction

Ethnobotany is a critical interdisciplinary field that explores the multifaceted relationship between humans and the plant kingdom. This field encompasses the study of traditional knowledge systems that deals with use of native flora, their cultural significance within societies and the intricate ecological interactions that underpin these relationships. Tuber crops are the second largest cultivated group of food crops after cereals in tropical countries and have a higher position in food security due to their high caloric nature (Lebot, 2019). In these tropical countries, tubers are often considered staple foods owing to their wide availability and nutritional value. Their inherent resilience to diverse environmental conditions, including drought and poor soil quality, further underscores their importance for food

security, particularly among vulnerable populations (Directorate of Agricultural Development and Farmers' Welfare, 2019).

Kerala, a state located in southwestern India, is renowned for its rich biodiversity. The state is home to a diverse group of tribal communities, each possessing unique cultural heritages and traditional knowledge derived from generations of experience and practice. The intersection of this biodiversity with the presence of numerous tribal groups creates a fertile ground for ethnobotanical research—especially studies of tuber crops. These crops have historically played an important role in the livelihoods, dietary patterns and cultural practices of Kerala's tribal communities. This review aims to provide a comprehensive

overview of the ethnobotany of tuber crops in Kerala, focusing on their diverse uses among different tribal communities. The objectives include identifying the range of tuber crops utilized, documenting their traditional applications across various tribal groups, investigating the traditional knowledge and practices associated with these crops, exploring their cultural significance and analysing available data on their consumption patterns. This review provides a deeper understanding of the relationship between tribal communities in Kerala and the tuber crops that are integral to their livelihoods.

2. Materials and methods

A comprehensive literature review framework was designed to systematically compile and analyse ethnobotanical data regarding the utilization of tuber crops by indigenous tribal communities in Kerala. Secondary data and reference materials were predominantly sourced through extensive academic database searches (eFlora of India, n.d.; India Biodiversity Portal, n.d.; India Flora Online, n.d.). These databases consulted include Scopus, Clarivate Analytics, Web of Science, ScienceDirect and Google Scholar. Physical reference materials were collected from university libraries, notably the University of Kerala, Thiruvananthapuram. In addition, digital literature and academic dissertations were retrieved from online repositories such as Shodhganga to ensure a robust collection of peer-reviewed articles, books and ethnobotanical surveys.

The collected literature was screened and categorized based on data type. The study focuses on the utilization of tuber crops among the tribal communities. Studies reporting substantial information on tuber crop utilization were prioritized for inclusion. Relevant keywords were identified and linked to the literature searches to streamline data retrieval and interpretation. The collected literature was screened with particular emphasis on ethnobotanical uses of native and cultivated tuber crops among tribal communities, including the *Kadar*, *Kattunaikka*, *Kuruma* and *Paniya* tribes. During data extraction, primary attention was given to the following thematic areas:

2.1. Cultural and lifestyle influences

The review documented how traditional ecological knowledge, folklore and beliefs associated with tuber cultivation and foraging influence the daily lives and resource use practices of indigenous communities.

2.2. Availability and sourcing

Data were collected regarding the availability of tuber crops to the populations and their sources, categorizing them as either harvested from natural forest ecosystems (e.g., wild yam species) or cultivated in homestead gardens and traditional shifting agricultural systems.

2.3. Contribution to food security

A key component of the literature analysis was the contribution of tuber crops to food security among tribal communities. The methodology prioritized studies

highlighting the high-caloric sustenance of these tubers particularly emphasizing their resilience under environmental stress and their role in reducing food insecurity during periods of seasonal scarcity.

The compiled data were subsequently synthesized to evaluate the overall nutritional, medicinal and socioeconomic contributions of tuber crops to indigenous communities.

3. Results and discussion

3.1. Diversity of tuber crops in Kerala: Native and cultivated varieties

Kerala's agricultural sector supports the cultivation of diverse tuber crops that are vital to local cuisine and rural economies. (DADFW, 2019). Major tuber crops cultivated in the state include tapioca (*Manihot esculenta* Crantz), various species of yam, including greater yam (*Dioscorea alata* L.) lesser yam (*D. esculenta* (Lour.) Burkill.) and elephant foot yam (*Amorphophallus* spp.), as well as taro (*Colocasia esculenta* (L.) Schott), sweet potato (*Ipomoea batatas* (L.) Lam) and coleus (*Coleus rotundifolius* (Poir.) A. Chev. & Perrot). Additionally, crops such as arrowroot (*Maranta arundinacea* L.) and tannia (*Xanthosoma sagittifolium* (L.) Schott) are also cultivated, although less extensively (Directorate of Agricultural Development and Farmers' Welfare, 2019). These species contribute significantly to the state's agricultural system; and are widely utilized by the tribal communities.

Tribal communities use these tubers not only for food purposes but also for medicinal purposes. Asha and Nair (2002) documented seven species of *Dioscorea* used by the *Kani* tribe. Among these, one species, *D. oppositifolia* L. was rarely cultivated, while two species *D. wallichii* Hook f. and *D. tomentosa* J.Koenig ex Spreng. were uniformly distributed, with the remaining species being found occasionally. Additional reports on nutritional usage of species like *Colocasia esculenta* (L.) Schott and *A. paeoniifolius* (Dennst) Nicolson were reported among *Mullu Kuruman* tribe of Wayanad district by Anju and Kumar (2024). Murugesan *et al.* (2024) conducted an ethnobotanical study among the tribal populations of Kollam district. The study documented nine tuber crop species used by three different tribal communities: *Mannan*, *Urali* and *Paliyan*. Some of the tuber crops documented included *Asparagus racemosus* Wild. which is used as a lactation stimulant for cattle; *C. esculenta* used as a food source and as a hair growth stimulant; *Plumbago zeylanica* L. and *Curculigo orchoides* Gaertn. used as post-natal conditioning medicine; *M. arundinacea* used for urinary retention; and *Maerua oblongifolia* Forssk. (A. Rich.), used for treating cough and stomach pain. Sasidharan *et al.* (2024) explored the traditional herbal knowledge in the Palakkad region and documented 88 plant species belonging to 45 families. Among these, they reported their different species of tuber crops: *A. racemosus*, *A. muelleri* Blume and *Solanum tuberosum* L. Venkatesan *et al.* (2021) conducted a quantitative analysis of medicinal plants used by the tribal

communities of Munnar, Idukki and documented use of tubers like *A. racemosus* as a remedy for stomach ulcers. Kumar and Jnanesha (2022) explored tribal medicines of India and recorded the use of aerial yam (*D. bulbifera* L.).

Athira *et al.* (2023) investigated medicinal plant use among the Muthuvan tribe of Malappuram and documented the use of *Holostemma ada-kodien* Schult. commonly known as *paal kizhangu*. Sheeba *et al.* (2020) reported in their study on ethnomedicinal practices among tribes of Muthanga, Wayanad district, the use of *Adenia hondala* (Gaertn.) W.J.de Wilde as a treatment for hernia. Chithra and Geetha (2021) noted ethnobotanically important plants used by the Kattunaikka and Paniya tribes of Nilambur Forest in Malappuram district. The study documented 79 plant species belonging to 75 genera and 45 families and identified four different tuber species: *A. racemosus*, *C. orchoides*, *Gloriosa superba* L. and *H. ada-kodien*.

Narayanan *et al.* (2011) comprehensively studied wild edible plants used by the Kattunaikka, Paniya and Kuruma tribes of Wayanad district and documented the use of 24 different tuber crops among these three different tribes. These crops include 18 species of *Dioscorea*, while the remaining species include *A. hondala*, *Aponogeton appendiculatus* H.Bruggen, *A. racemosus*, *Hellenia speciosa* (J. Koenig) S.R.Dutta., *Ipomoea mauritiana* Jacq and *Pecteilis gigantea* (Sm.) Raf. The 18 species of *Dioscorea* are documented exclusively from the Kattunaika tribes and they call these tubers *kalasu*.

Apart from gathering wild varieties of tuber crops, tribal populations are also actively cultivating different varieties of tubers for both economic and domestic purposes. Balakrishnan *et al.* (2023) documented 14 varieties of tubers being cultivated by indigenous groups of the southern part of the Western Ghats.

3.2. Importance of tubers among indigenous communities

Root and tuber crops are important to agriculture, food security and income for 2.2 billion people in developing countries. These species produce large quantities of dietary energy and have stable yields under difficult environmental conditions (Lebot, 2019). Kerala's agricultural landscape and natural forests exhibit a remarkable variety of tuber crops, encompassing both widely cultivated species and those that are lesser known or found in the wild (Mukherjee *et al.*, 2015).

Tuber crops have a long-standing and significant presence in Kerala's agriculture and food systems. Historically, they have been crucial for both human and animal consumption and certain species also possess industrial applications. Tapioca once held a position as a primary food crop in the state and was cultivated extensively (Prakash *et al.*, 2018). Among the major cultivated tuber crops are several species of yams belonging to the genus *Dioscorea*, including *D. alata*, *D. esculenta*, *D. bulbifera* L., *D. oppositifolia* and *D. pentaphylla* L. (Mukherjee *et al.*, 2015). These yams, known locally by various names such as *Kachil*, *Kavathu*

and *Noorankizhangu*, are favoured for their nutritional content and culinary versatility. *C. esculenta*, or taro, commonly referred to as *chembu*, is also extensively cultivated for its edible corms and leaves, with numerous varieties adapted to different growing conditions (Sreedevi *et al.*, 2020). *A. paeoniifolius* commonly known as elephant foot yam, or *chena*, is another tuber crop of importance. Elephant foot yam is favoured among the tribal communities for its nutrient density and excellent shelf life. It is also comparatively easier to cultivate and requires minimal maintenance. It also provides a high yield relative to the cultivation effort required. *I. batatas* commonly known as sweet potato, occupies a special place in tribal cuisines owing to its abundance and nutritional value and known as *sakaravalli kizhangu* among the tribal communities, sweet potato is often cultivated or gathered from the wild. It possesses a sweet and starchy flavour and is rich in beta carotene. Like sweet potatoes, *C. rotundifolius* commonly known as Chinese potato or *koorka*, is often cultivated in homestead gardens and serves as an important vegetable in local cuisine (Sreedevi *et al.*, 2023). Furthermore, the forests of Kerala harbour a variety of wild tubers, particularly within the genus *Dioscorea*, which are traditionally collected by tribal communities and provide essential food sources, especially during periods of seasonal food scarcity.

3.3. Ethnobotanical uses of tuber crops by tribal groups

Tribal groups throughout Kerala place great ethnobotanical value on a variety of wild yam (*Dioscorea*) species, which are an essential source of starchy food, particularly during times of food scarcity (Anooj and Beevi, 2020). Wayanad district, one of the tribal-dominated districts of Kerala, exhibits a rich diversity of *Dioscorea* species. Balakrishnan and Kumar (2016) studied the sustainable use of wild yams by tribal communities in Kerala. The study documented approximately 22 species of *Dioscorea* in the Wayanad region, the majority of which are edible and provide vital sustenance for forest-dwelling tribes. The Kadar, Malayar and Malamalar tribes, inhabiting regions such as Parambikulam and Vazhachal, prefer highly nutritious *Dioscorea* species, including *D. pentaphylla* (*nooran kizhangu*), *D. belophylla* (Prain) Voigt ex Haines (*chandana kizhangu*) and *D. oppositifolia* (*kanjira kizhangu*). These communities traditionally collect these tubers after the monsoon season, typically between November and February and prepare them for consumption through boiling or by cooking them directly over an open fire. Certain *Dioscorea* tubers with a sour taste undergo a specific preparation method involving peeling, boiling in water with turmeric and salt and subsequent consumption after draining the water.

Some groups of the Kadar tribe have also developed specialized tools for tuber digging. They also possess extensive knowledge regarding the tuber's location within the forest and stages of maturity (Rajasree, 2016). The Kuruma tribe traditionally uses the boiled tuber of *A. hondala* as a treatment for hernia. Elephant foot yam (*A. paeoniifolius*) has documented medicinal applications

among the *Kattunaikka* tribe, where the dried corn is mixed with curd and ingested as a cure for jaundice. Arrowroot (*M. arundinacea*) powder is traditionally utilized by the *Koraga* tribe as a remedy for osteoporosis, typically taken with sugar (Chaithra, 2024). These specific medicinal applications of tuber crops demonstrate a traditional understanding of their therapeutic potential that extends beyond their nutritional value as food sources.

3.4. Traditional knowledge and practices

Many tribal communities in Kerala engage in traditional agricultural practices, which include the cultivation of tuber crops in their homestead gardens and, in some instances, the practice of shifting cultivation (Bushra, 2021). Before major societal transformations, the *Kadar* tribe, who were traditionally hunter-gatherers, did not typically engage in agriculture but instead relied on the collection of tubers from the surrounding forests (Critical Ecosystem Partnership Fund, 2011). Tribal communities in Kerala possess intricate knowledge about the optimal times for harvesting wild tubers from the forest. According to Rajasree (2016), the *Kadar* communities inhabiting the Parambikulam and Vazhachal regions demonstrate highly advanced traditional ecological knowledge regarding the temporal dynamics of tuber foraging. Specifically, they have identified the post-monsoon and early winter months spanning November through February as the optimal phenological window for harvesting these resources. The communities are adept at recognizing precise locations and altitudes where specific tubers occur and can also determine the maturity and size of the tuber by observing the thickness and health of their climbers. Notably, the *Kadar* community practices a sustainable harvesting technique: they carefully harvest the lower portions of the tuber for consumption while ensuring the regeneration of the plant by replanting the upper portion along with the climber back into the same pit.

Narayanan et al. (2011) observed that the *Kattunaikka* tribe has developed specific techniques for processing toxic *Dioscorea* species, such as *D. hispida* Dennst. This process involves carefully chopping the tubers, wrapping them in a white cloth and then immersing them in running water in streams for over 24 hours before they are deemed safe for cooking and consumption. The authors also recorded that the *Kattunaikka* communities, dependent on wild *Dioscorea* for their food, classify each member of this genus based on characteristics like edibility, taste, colour, size, direction of growth, fibre content, cooking properties and occasionally, the pattern of underground proliferation. Most of these tubers are collected from the interiors of evergreen forests, wayside bushes, or marshy, humid areas. The *Kattunaikkas* communities collect *Dioscorea* tubers from almost all these places, although more frequently from the forests and other such unmanaged habitats. Among the different species of *Dioscorea*, *D. pentaphylla* is the most consumed tuber. As the name indicates, *nalla* means safe or good to eat. The tuber is single, less fibrous, smooth and pasty when cooked and has a desirable taste. Chaithra (2024) reported *Koraga* tribes using *M. arundinacea* or arrowroot (*koova*), as a

remedy for osteoporosis. The tribe consumes the dried powder mixed with sugar as a remedy.

3.5. Cultural significance and associated beliefs

Tubers such as tapioca, elephant foot yam, *Colocasia*, yam and sweet potato hold a significant place in the food culture of Kerala. These plants are of greater significance to tribal communities, as they constitute an important component of their daily diet and nutritional intake. The *Vettakurumar* tribe holds specific beliefs and stories associated with the collection and utilization of wild tubers. One notable belief is that an individual should refrain from touching his or her nose with a knife when venturing into the forest to gather tubers. This practice is rooted in the idea that such an action will negatively impact the cooking process, rendering even a large quantity of tubers difficult to cook properly. Furthermore, the *Vettakurumar* people believe in a close and symbolic relationship between the sprouting of a tuber from the ground and the growth and development of a person, suggesting a deep connection between their lives and the natural world around them (Syam, 2022). These traditional beliefs and folklore surrounding tuber crops illustrate the intricate spiritual and practical connection that tribal communities maintain with their environment. Such beliefs often serve as guidelines for their interactions with these natural resources, fostering respect and promoting sustainable practices that ensure the continued availability of tubers for future use.

There are about thirty-one species of tuber crops (Table 1) mentioned among different literature, along with their uses for the tribal communities. These uses range from dietary to pharmaceutical in nature. Most of the tubers has specialised names among different tribal communities based on their taste, growth habits or usefulness.

4. Conclusion

Drawing upon the conducted literature review, it is evident that tuber crops hold substantial ethnobotanical significance for the indigenous tribal communities residing in Kerala. This significance is rooted in the multifaceted relationship these communities maintain with a diverse array of tuber species, which are harvested from natural forest environments or cultivated within homestead gardens and through traditional agricultural practices. As documented across the sources, various tribal communities, including the *Mullu Kuruman*, *Mannan*, *Urali*, *Paliyan*, *Kattunaikka*, *Paniya*, *Kuruma*, *Muthuvan*, *Kadar*, *Malayar*, *Malamalasar*, *Koraga* and *Vettakurumar* tribes, utilize a wide spectrum of tuber species. This utilization extends significantly beyond nutrition to encompass notable medicinal applications. About 31 different tuber species with wide range of applications discussed among different literature were noted and tabulated (Table 1). This comprehensive traditional knowledge also encompasses detailed understanding of optimal harvesting periods and locations, maturity identification cues (such as observing climber characteristics) and the implementation of sustainable harvesting techniques, exemplified by the *Kadar*

Table 1. Tuber crops used by the indigenous tribes of Kerala State

Sl. No.	Scientific name	Common name	Usage/distribution	Tribes
1	<i>Adenia hondala</i> (Gaertn.) W.J.de Wilde (Plate 1a)	<i>Karimuthukk</i>	Used as a medicine for hernia.	Used by various communities, Tribes of Muthanga, Wayanad, <i>Kuruma</i> (uses boiled tuber), <i>Kattunaikka</i> , <i>Paniya</i> .
2	<i>Amorphophallus muelleri</i> Blume (Plate 1b)	<i>Kattu Chena</i>	Used as medicine for jaundice.	Tribes not specified in this context.
3	<i>Amorphophallus paeoniifolius</i> (Dennst) Nicolson (Plate 1c)	<i>Chena</i>	Cultivated, widely accepted for culinary purposes, used for its nutritional value, favoured for nutrient density, excellent shelf life, easy cultivation, minimal maintenance and good yield, used as medicine for jaundice.	Popular among tribal communities, favoured among the tribal group, used by various communities, <i>Mullu Kuruman</i> (nutritional usage), <i>Kattunaikka</i> (cure for jaundice using dried corm mixed with curd).
4	<i>Aponogeton appendiculatus</i> H. Bruggen (Plate 1d)	<i>Kotti Kizhang</i>	Endemic, aquatic tuber species of southern Western Ghats.	<i>Kattunaikka</i> , <i>Paniya</i> and <i>Kuruma</i>
5	<i>Asparagus racemosus</i> Wild. (Plate 1e)	<i>Shatavari</i>	Used as Medicine for lactation stimulation, used as medicine for stomach ulcers.	Used by various communities, <i>Mannan</i> , <i>Urali</i> and <i>Paliyan</i> (lactation stimulant for cattle), tribal communities of Munnar, Idukki (remedy for stomach ulcers) and <i>Kattunaikka</i> , <i>Paniya</i> & <i>Kuruma</i> .
6	<i>Coleus rotundifolius</i> (Poir.) A. Chev. & Perrot (Plate 1f)	<i>Koorkka/ Koova Kizhang</i>	Cultivated, widely accepted for culinary purposes, serves as an important vegetable in local cuisine.	Popular among tribal communities, often cultivated in homestead gardens.
7	<i>Colocasia esculenta</i> (L.) Schott (Plate 1g)	<i>Chembu</i>	Cultivated, widely accepted for culinary purposes, extensively cultivated for its edible corms and leaves, used for its nutritional value, used as Medicine for hair growth.	Popular among tribal communities, Used by various communities, <i>Mullu Kuruman</i> (nutritional usage), <i>Mannan</i> , <i>Urali</i> and <i>Paliyan</i> (food crop, hair growth stimulant).
8	<i>Curculigo orchoides</i> Gaertn. (Plate 1h)	<i>Nilappana</i>	Used as Medicine for post-natal conditioning.	Used by various communities, <i>Mannan</i> , <i>Urali</i> and <i>Paliyan</i> , <i>Kattunaikka</i> , <i>Paniya</i> .
9	<i>Dioscorea alata</i> L. (Plate 1i)	<i>Kachil/ Kavathu</i>	One of the most cultivated among tribal population.	Popular among all tribal groups.
10	<i>Dioscorea belophylla</i> (Prain) Voigt ex Haines (Plate 1j)	<i>Kachil</i>	Preferred variety	<i>Kadar</i> , <i>Malayar</i> and <i>Malamalasar</i> (prefer - 'Chandanakizhangu')
11	<i>Dioscorea bulbifera</i> L. (Plate 1k)	<i>Kattu Kachil</i>	Cultivated, used in tribal medicine.	Tribal communities (general)
12	<i>Dioscorea esculenta</i> (Lour.) Burkill (Plate 1l)	<i>Nana Kizhang</i>	Cultivated, widely accepted for culinary purposes, crucial for both human and animal consumption, favoured for their nutritional content and culinary versatility, essential source of starchy food, particularly during times of food scarcity.	Popular among tribal communities as significant source of daily nutrition.
13	<i>Dioscorea hispida</i> Dennst. (Plate 1m)	<i>Venni Kizhang</i>	Potentially toxic, requires detoxification/processing techniques to be safe for consumption.	<i>Kattunaikka</i> (specific techniques for detoxification, e.g., immersing in running water for over 24 hours).
14	<i>Dioscorea oppositifolia</i> L. (Plate 1n)	<i>Kanjiram Kizhang</i>	Most precious edible tubers for the <i>Kani</i> tribe (Asha and Nair, 2002).	<i>Kadar</i> , <i>Malayar</i> and <i>Malamalasar</i> (prefer - 'Kanjirakizhangu')

15	<i>Dioscorea pentaphylla</i> L. (Plate 1o)	Noora Kizhang	Cultivated, preferred variety, most consumed.	Kadar, Malayar and Malamalar (prefer - 'Noorankizhangu'), Kattunaikkas (most consumed - 'Nallanoora')
16	<i>Dioscorea pubera</i> Blume (Plate 2a)	Nadunooli	Food source. Used only after detoxification in hot water.	Kanikars of Western Ghats
17	<i>Dioscorea</i> spp.	Other Wild <i>Dioscorea</i> species	Essential food sources, especially during seasonal scarcity, have great ethnobotanical value, provide vital sustenance for forest-dwelling tribes. Traditional collection, Classification based on characteristics.	Tribal communities (general), Kattunaikka (18 species documented exclusively, called Kalasu), Paniya (documented 18 species with Kattunaikka), Kuruma (documented 18 species with Kattunaikka), Kadar (traditionally rely on collection, possess intricate knowledge, practice sustainable harvesting), Vettakurumar (have beliefs associated with collection and utilisation).
18	<i>Dioscorea tomentosa</i> J.Konig ex Spreng. (Plate 2b)	Inthikkachil/ Nooli	Uniformly distributed, culinary	Mentioned in context of a study on Kanikkars and wild yams.
19	<i>Dioscorea wallichii</i> Hook. f. (Plate 2c)	Vara Kizhangu/ Neduvan	Uniformly distributed, culinary	Mentioned in context of a study on Kanikkars and wild yams.
20	<i>Gloriosa superba</i> L. (Plate 2d)	Menthonni	A treatment for ailments such as Ulcer, intestinal worms, infertility, wounds and other skin problems.	Kattunaikka and Paniya
21	<i>Hellenia speciosa</i> (J. Konig) S.R.Dutta (Plate 2e)	Aanakkoova	Documented usage	Kattunaikka, Paniya and Kuruma
22	<i>Holostemmaadakodien</i> Schult. (Plate 2f)	Adapathiyar/ Paal Kizhangu	Documented as a medicinal plant.	Muthuvan, Kattunaikka and Paniya
23	<i>Ipomoea batatas</i> (L.) Lam. (Plate 2g)	Madhura Kizhang	Cultivated, widely accepted for culinary purposes and having earned a special place in tribal cuisines owing to their abundance and nutritional value, they are often cultivated or gathered from the wild.	Popular among tribal communities, Tribal population (sakaravalli Kizhangu, special place in cuisines), Used by various communities.
24	<i>Ipomoea mauritiana</i> Jacq. (Plate 2h)	Paal Muthukk	Documented usage	Kattunaikka, Paniya and Kuruma.
25	<i>Maerua oblongifolia</i> Forssk. (A. Rich.) (Plate 2i)	Bhoomichakkara Kizhang	Used as Medicine for cough and stomach pain	Used by various communities, Mannan, Urali and Paliyan
26	<i>Manihot esculenta</i> Crantz (Plate 2j)	Maracheeni	Food crop, widely accepted for culinary purposes, once held the position as the primary food crop and contributes to a significant source of daily nutrition.	Popular among most tribal communities, tribal populations
27	<i>Maranta arundinacea</i> L. (Plate 2k)	Kochikkoova	Cultivated sporadically, widely accepted for culinary purposes, used as Medicine for urinary retention, used as Medicine for osteoporosis	Popular among tribal communities, used by various communities, Mannan, Urali and Paliyan (remedy for urinary retention), Koraga (remedy for osteoporosis, using dried powder with sugar)
28	<i>Pecteilis gigantea</i> (Sm.) Raf. (Plate 2l)	Kallu Chedi	Documented usage	Kattunaikka, Paniya and Kuruma
29	<i>Plumbago zeylanica</i> L. (Plate 2m)	Vella Koduveli	Used as medicine for post-natal conditioning.	Used by various communities, Mannan, Urali and Paliyan
30	<i>Solanum tuberosum</i> L. (Plate 2n)	UrulanKizhang	Documented usage.	Kattunaikka, Paniya and Kuruma
31	<i>Xanthosoma sagittifolium</i> (L.) Schott (Plate 2o)	Pala Chembu	Seen cultivated, albeit sporadically.	Popular among tribal communities.

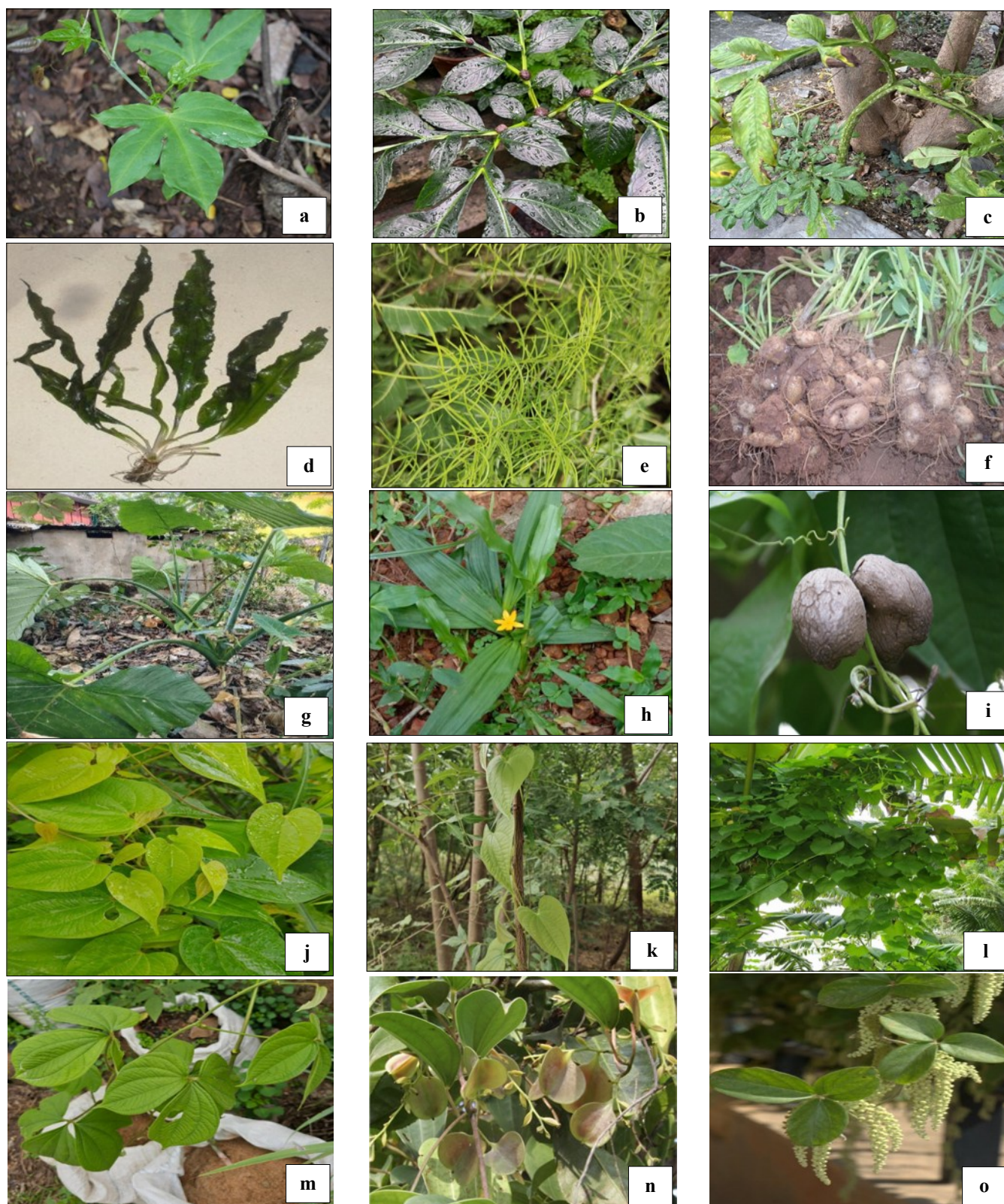


Plate 1. (a). *Adenia hondala* (Gaertn.) W.J.de Wilde (Source: Wikimedia Commons, n.d. - (CC)BY-SA); (b). *Amorphophallus muelleri* Blume; (c). *Amorphophallus paeoniifolius* (Dennst) Nicolson; (d). *Aponogeton appendiculatus* H. Bruggen (Source: eFlora of India, n.d.); (e). *Asparagus racemosus* Wild.; (f). *Coleus rotundifolius* (Poir.) A. Chev. & Perrot (Source: Wikimedia Commons, n.d.- (CC)BY-SA); (g). *Colocasia esculenta* (L.) Schott; (h). *Curculigo orchoides* Gaertn; (i). *Dioscorea alata* L. (Source: eFlora of India, n.d.); (j). *Dioscorea belophylla* (Prain) Voigt; (k). *Dioscorea bulbifera* L.; (l). *Dioscorea esculenta* (Lour.) Burkill; (m). *Dioscorea hispida* Dennst.; (n). *Dioscorea oppositifolia* L.; (o). *Dioscorea pentaphylla* L. (Source: India Biodiversity Portal, n.d.)

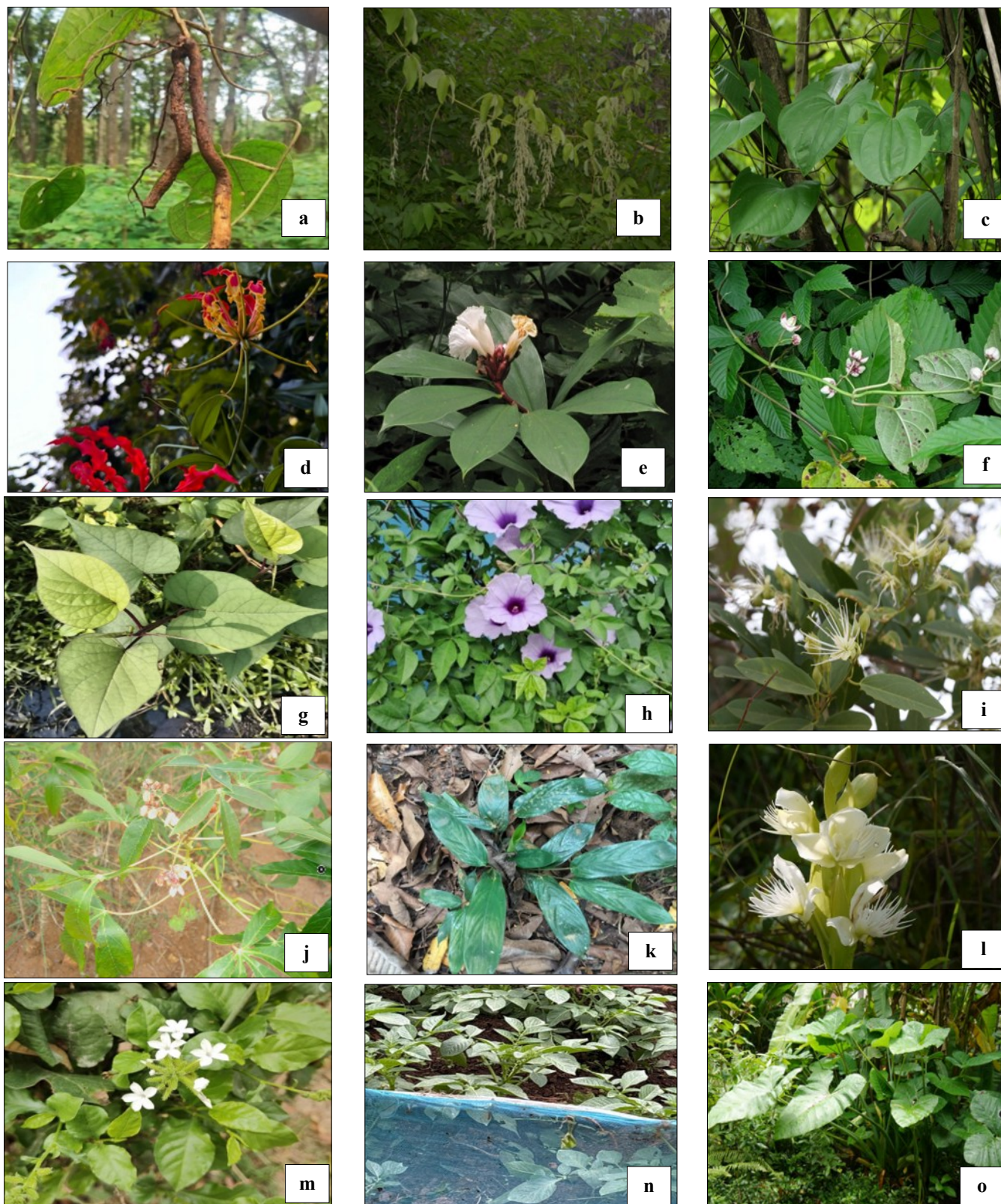


Plate 2. (a). *Dioscorea pubera* Blume; (b). *Dioscorea tomentosa* J.Konig ex Spreng. (Source: India Biodiversity Portal, n.d.); (c). *Dioscorea wallichii* Hook.; (d). *Gloriosa superba* L.; (e). *Hellenia speciosa* (J. Konig) S.R.Dutta; (f). *Holostemma adakodien* Schult. (Source: eFlora of India, n.d.); (g). *Ipomoea batatas* (L.) Lam; (h). *Ipomoea mauritiana* Jacq. (i). *Maerua oblongifolia* Forssk. (A. Rich.) (Source: India Biodiversity Portal, n.d.); (j). *Manihot esculenta* Crantz (Source: Sankara et al., 2019); (k). *Maranta arundinacea* L.; (l). *Pecteilis gigantea* (Sm.) Raf. (Source: Wikimedia Commons, n.d - (CC)BY-SA); (m). *Plumbago zeylanica* L. (Source: India Biodiversity Portal); (n). *Solanum tuberosum* L. (o). *Xanthosoma sagittifolium* (L.) Schott (Source: India Biodiversity Portal, n.d.)

tribe's practice of tuber replanting. They use the lower tuber portion for consumption, while replanting the upper climber part back into the same pit. The cultural significance of tuber crops is further underscored by associated beliefs and folklore, reflecting a profound and symbiotic relationship between the tribal communities and their natural environment.

The resilience of tuber crops to environmental stressors positions them as critical components of food security, particularly for vulnerable populations and during periods of seasonal food scarcity. Beyond providing essential caloric intake, tubers are intricately woven into the dietary patterns, economic livelihoods and cultural frameworks of numerous tribal groups across the state. The implications of these findings are also critical for modern resource management, as tribal practices demonstrate highly advanced, eco-conscious foraging strategies. Documenting and preserving these traditional applications are highly relevant for the future; it provides essential academic insights that can inform global sustainable utilization strategies, drive targeted biodiversity conservation efforts and guide future ethnobotanical research.

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