Distribution and Ethnobotanical Significance of Araceae Family Plants in Upper Assam, India

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Research

Abstract

Background: Aroids are a diverse group of plants under the Araceae family with ecological and ethnobotanical significance. Their potential for addressing food security and sustainable development remains underutilized due to the presence of antinutritional factors and limited public awareness. This study aims to document the distribution, traditional uses, and ecological roles of Aroids found in Upper Assam.

Methods: Field surveys were conducted from January 2022 to April 2024 across seven districts of Upper Assam. Data on local names, plant parts used, and ethnomedicinal applications were collected. Plant species were photographed, voucher specimens were collected, identified by experts and submitted to the herbarium at Dibrugarh University for future reference.

Results: The study identified 46 species of aroid belonging to 19 genera, which is categorized into cultivated, wild, and ornamental types. Ethnobotanical data showed diverse uses, including treatments of ailments and applications as famine food during environmental challenges like floods. Morphological variations in leaf structure and corm shapes provided an understanding of species diversity. Colocasia sp. and Xanthosoma sp. were found to be represented by highest number of species. Despite their significant nutritional and medicinal value, antinutritional factors remain a challenge, limiting broader acceptance.

Conclusion: Aroids play a crucial role in supporting biodiversity, cultural heritage, food and nutritional security in Upper Assam, offering a resilient solution to food security challenges. This study highlights the need for conservation, public awareness, and sustainable utilization to unlock their full potential for addressing global challenges and contribute to the growing understanding of aroids' role in traditional knowledge systems, highlighting their potential for sustainable food and medicinal resource development.

Keywords: Aroids, Araceae, Ethnobotanical, Ecological Distribution, Food Security, Ethnomedicine

Background

The Araceae family, commonly referred to as the Arum family or 'Aroids,' represents one of the most diverse groups of monocotyledons, second only to families like Poaceae, Orchidaceae, and Arecaceae in terms of diversity and species richness (Croat, 2019). This family encompasses 146 genera and approximately 3,645 species worldwide, characterized by their high species diversity and significant rates of endemism, which are closely linked to speciation processes (Abdullah *et al.* 2021). The abundance and distribution of Aroids are largely influenced by factors such as water availability and atmospheric humidity (Sungkajanttranon *et al*. 2018). The family has a global distribution with high generic diversity in Asia and species diversity in South America (Croat, 2019). This family is characterized by its remarkable species diversity, varied life forms, high endemism rates, and numerous undiscovered species. Araceae's ability to inhabit diverse habitats and biomes is attributed to its unique morphological and ecological adaptations (Croat, 2019). The economic importance of this family is noted, along with its phylogenetic relationships, fossil history, and cultivation practices (Tomlinson *et al*. 1998). In recent decades, significant increases have been observed in known Neotropical species, particularly in Central America (Croat, 2019). The development of computerized determination keys has facilitated the identification of potentially new species (Croat, 2019). Future research should focus on specific regions to further explore the family's diversity and potential (Croat, 2019).

The family, particularly taro (*C. esculenta*), plays a significant role in global food security and nutrition. Taro is a staple food for 400-500 million people worldwide, primarily in subtropical regions and developing countries (Vaneker & Slaats, 2012). It is rich in carbohydrates, protein, and essential nutrients like vitamins and minerals, surpassing other root crops in nutritional value (Temesgen, 2015). Taro's high zinc content makes it valuable in addressing widespread zinc deficiency (Temesgen, 2015). Various parts of the plant, including corms, leaves, and stems, are utilized for food, medicine, and other purposes (Mutaqin *et al*. 2018; Halligudi, 2013). In Indonesia, 20 species and 13 varieties of Araceae are cultivated in different agroecosystem types (Mutaqin *et al*. 2018). Despite its importance, taro remains underappreciated in Western food systems, primarily consumed by migrant communities (Vaneker & Slaats, 2012). Specifically addressing Araceae, a review highlighted the sustainable prospects of *Alocasia macrorrhizos* (L) G. Don and *Colocasia esculenta* (L.) Schott, noting their use as food sources and their rich phytochemical composition, including alkaloids and flavonoids (Das *et al*. 2022). Additionally, a new species of Sauromatum (Araceae) was discovered in Arunachal Pradesh, expanding our understanding of the family's diversity in Northeast India (Tiwari *et al*. 2021). Although not directly related to Araceae, ongoing research on monocot flora in Assam demonstrates continued botanical exploration in the region (Rao & Verma, 2024). In India, Aroids are well-documented in various regions, with studies indicating a significant presence of both wild and cultivated species. However, despite their ecological and economic potential, many species within the Araceae family are classified as neglected and underutilized crops. This underutilization is often attributed to the presence of antinutritional factors such as oxalates, phytates, and tannins, which have limited their broader adoption and research attention (Yuzammi, 2018; Wada *et al*. 2019).

Despite their widespread distribution and rich ethnobotanical applications, there remains a critical gap in region-specific studies on Aroids, particularly in Assam. While previous research has provided global and national perspectives, few studies have systematically documented the diversity, ecological significance, and cultural uses of Araceae in the Upper Brahmaputra Valley. This region, characterized by its rich biodiversity and unique cultural practices, presents an important opportunity to explore how Aroids contribute to local livelihoods and community resilience. Unlike prior studies that often emphasize a broad-scale perspective, this research highlights the nuanced interactions between Aroid species and indigenous knowledge systems, offering a region-specific analysis of their ecological and traditional significance.

Furthermore, as climate change and environmental uncertainties increasingly threaten local food security, understanding the potential of these underutilized plants is crucial. Many Araceae species, including *Colocasia* and *Xanthosoma*, serve as vital food sources, particularly during environmental challenges such as floods. However, despite their nutritional and medicinal potential, their broader acceptance remains limited due to the presence of antinutritional factors. By integrating ethnobotanical knowledge with species identification and morphological analysis, this study not only documents their distribution but also provides insights into their sustainable utilization. These findings hold significance for researchers and local communities, offering a framework for incorporating Aroids into food security initiatives, conservation efforts, and sustainable agricultural practices. Ultimately, this study contributes to a broader understanding of the ecological and economic potential of Araceae, paving the way for further research and conservation strategies to ensure the preservation of these invaluable resources for future generations.

Materials and Methods

Study area

The materials for the present study were collected from various places in seven districts in the southern part of the Brahmaputra Valley of Upper Assam, which includes Tinsukia, Dibrugarh, Charaideo, Sivasagar, Jorhat, Lakhimpur, and Dhemaji as shown in Figure 1.

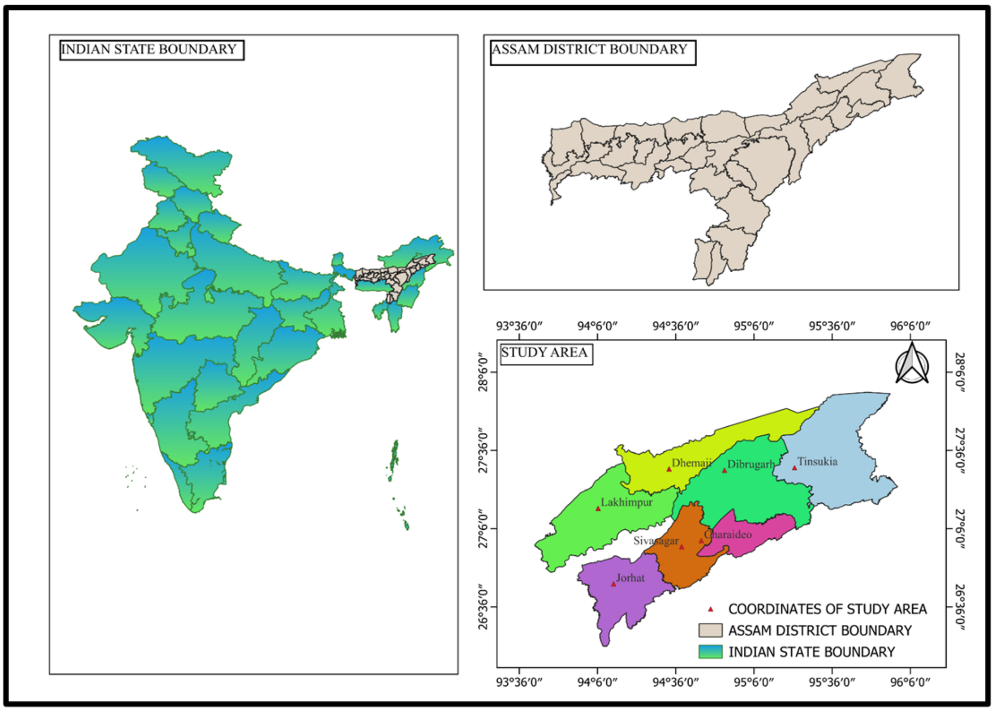


Figure 1. Map showing the selected districts (study site) of the Upper Assam using Google Earth (earth.google.com/static/multi-threaded/versions/10.55.0.1/index.html?.)

Ethnobotanical survey and data collection

Study design

Extensive field surveys were conducted from January 2022 to April 2024 across various seasons and habitats in Upper Assam to document Aroids. The study aimed to gather information on the local use, ethnomedicinal applications, and plant species associated with Aroids. A combination of structured questionnaires and interviews was used to capture relevant data.

Sampling method

A total of 2,093 local individuals, including village leaders and elders, were interviewed using a stratified random sampling method. The participants included 68.3% men and 31.7% women. Informants were selected based on their knowledge of local flora and their roles in the community.

Data collection

Data collection involved interviews guided by local informants to ensure accurate identification and collection of plant species (Figure 2). Information regarding local names, plant parts used, ethnomedicinal applications, and methods of utilization was documented by the help of a questionnaire-based survey. Each species was photographed in its natural habitat, collected, preserved, and processed following herbarium guidelines set by Das (2021). Specimens were planted in the departmental garden for further study.

Botanical identification

The collected specimens were identified by Dr. Rajib Gogoi, Scientist-F and Head of Office, Botanical Survey of India (BSI), Sikkim, using taxonomic keys, published floras, and databases such as *The Flora of British India, Vol VI* and the online resource *Plants of the World Online*. Additional support for species identification was provided by Mr. Brahmananda Patiri, Chief Conservator of Forest, Bodoland Territorial Council.

Specimen documentation

All plant specimens were submitted to the herbarium of the Department of Life Sciences, Dibrugarh University. Each specimen was assigned a voucher number for future reference and verification. The identified plant samples were cross-referenced with existing specimens, and valid plant names and author citations were confirmed through online databases.

Data validation and quality control

To ensure data accuracy, field observations were validated by cross-referencing with herbarium specimens and online databases. Ethical norms were followed during the study, with prior informed consent obtained from participants. Anonymity and privacy were maintained throughout the process.

Figure 2. Field survey and interview scheduled with local informants

Results

Field survey has identified 46 species of Aroid from 19 genera in Upper Assam, India. Among the surveyed districts, Jorhat recorded the highest number of Aroid species (38 species), followed by other districts with varying distributions (Figure 3). This variation may be attributed to differences in ecological conditions and cultivation practices across Upper Assam. Table 1 provides a comprehensive overview of the 46 recorded Aroid species, detailing their culinary, ornamental, and ethnomedicinal uses. The table categorizes species based on plant parts utilized, such as young leaves, petioles, and corms, along with their applications in traditional and decorative practices. Leaf morphology varied significantly across the recorded ornamental Aroids (Figure 4). While these plants have primarily been used for decoration, discussions with local people revealed their potential as ethnomedicine, with various ethnomedicinal properties being highlighted, which prompted this study. Among the species documented from this study, wild species had the highest representation, while cultivated species were primarily used for culinary purposes. Additionally, some species were found to be both wild and cultivated, demonstrating their adaptability to different environments. The distribution of species across different genera and their utilization is summarized in Figure 5. The survey documented the ethnomedicinal significance of these species, particularly *Homalomena aromatica*, known for its anti-inflammatory, analgesic, and antiseptic properties (Kehie *et al*. 2017). *Pothos scandens* and *Aglaonema commutatum* were also recognized for their potential in treating various diseases. Other research similarly showed its potential properties including curing cancer (Nair and Varkey, 2021; Sojeetra and Acharya, 2020). Similarly, *Pistia stratiotes* is used in Ayurvedic medicine for its diuretic and antibacterial properties (Arya *et al*. 2022). Despite the medicinal potential of these plants, public awareness remains limited due to insufficient data.

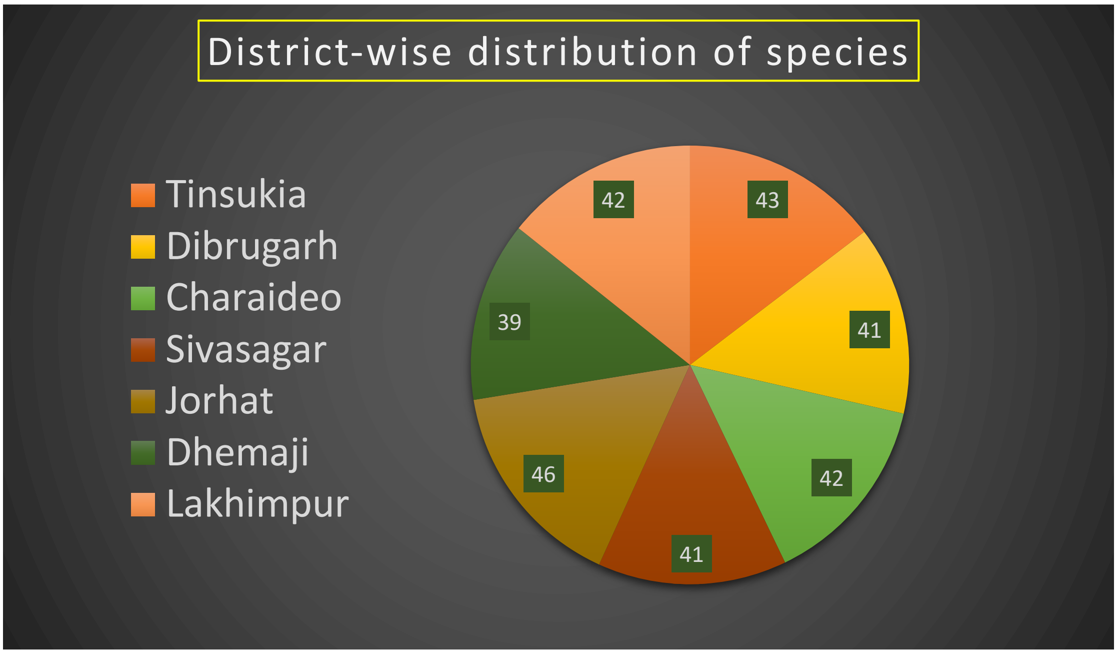


Figure 3. Showing district-wise distribution of species.

Several species belonging to the genus *Alocasia* were recorded, including *Alocasia indica, Alocasia mycorrhizos, Alocasia odora*, and *A. cucullata* (Loureiro) G.Don. These species exhibited distinct morphological differences. However, discussions with local people revealed that *A. indica, A. odora,* and *A. macrorrhizos* (Figure 6) were all referred to by the same name, **'bor kosu,'** meaning 'big leaves.' This generalization led the community to perceive them as wild and similar, despite their distinct uses. Notably, the corm of *A. indica* is entirely edible and can be consumed raw, offering significant medicinal benefits (Table 1). In contrast, *A. macrorrhizos* was considered toxic due to the tingling sensation experienced after consumption, leading to its neglect, despite its documented medicinal importance. Meanwhile, *A. odora* was found to have no attributed medicinal significance and was primarily used as livestock feed, particularly for pigs. Different plant parts of Aroids were utilized for various purposes, with corms being the most commonly consumed component, followed by young leaves and petioles. Ethnomedicinal applications were also reported for certain species (Figure 7), highlighting their significance beyond culinary use.

Figure 4. Distinct leaf morphologies exhibited by various ornamental plants belonging to the Araceae family.

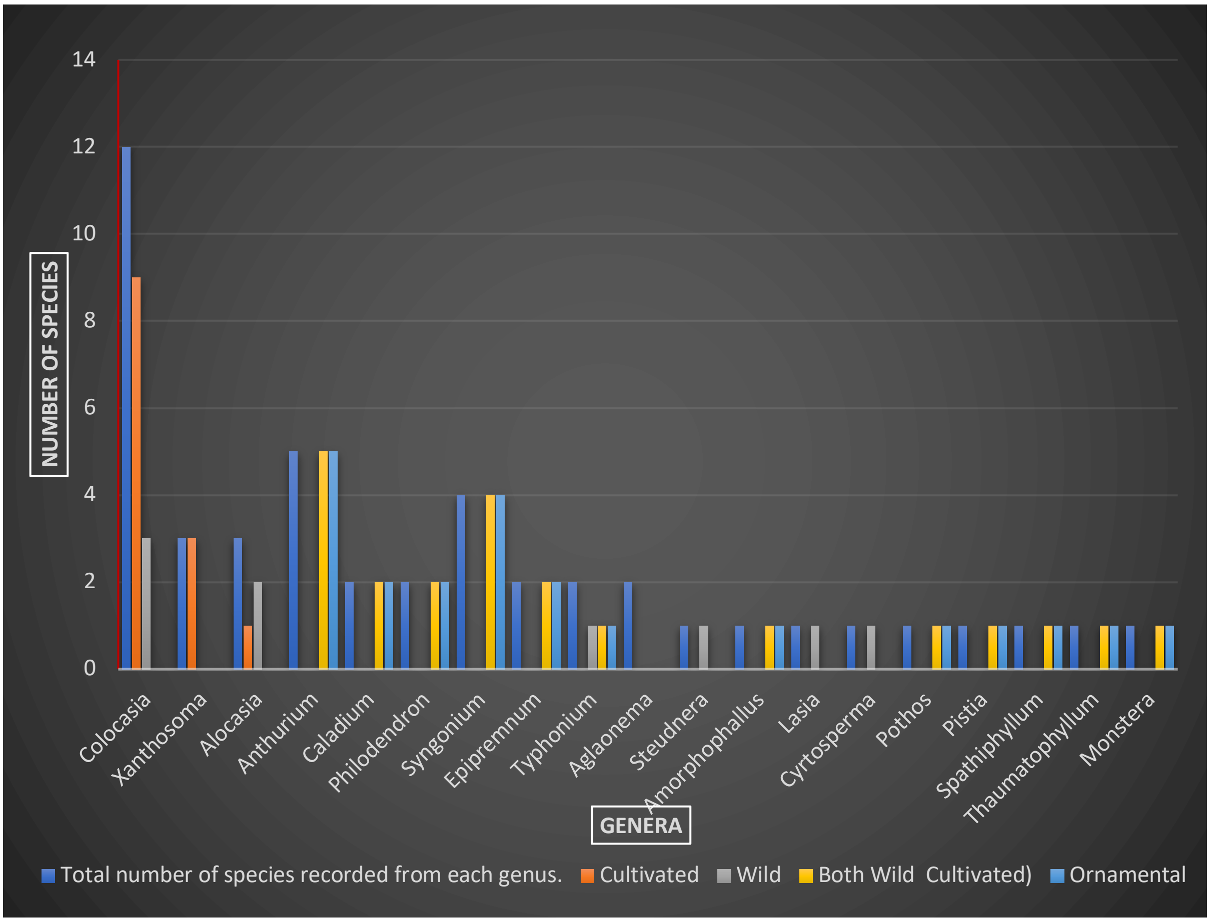


Figure 5. Showing the distribution of species across different genera and their utilization.

Regarding aroids, distinguishing the different species could be challenging, as indicated by the survey, as some people from the research region plainly could not identify the difference and instead named all the arum species "kosu" or "kochu". After interacting with the village heads, we discovered that while they appeared to be the same, the morphology of the foliar structure significantly differed. Although species from both the genera *Alocasia* and *Colocasia* look alike, the direction of the leaves is what distinguishes them significantly. The *Alocasia* leaves are facing upward and standing vertically. The leaves of these plants have a lustrous surface with a thick, waxy, and glossy texture and are mostly dark green with distinctive veins on the underside. The leaf shape is an arrowhead and can also be heart-shaped (Figure 6).

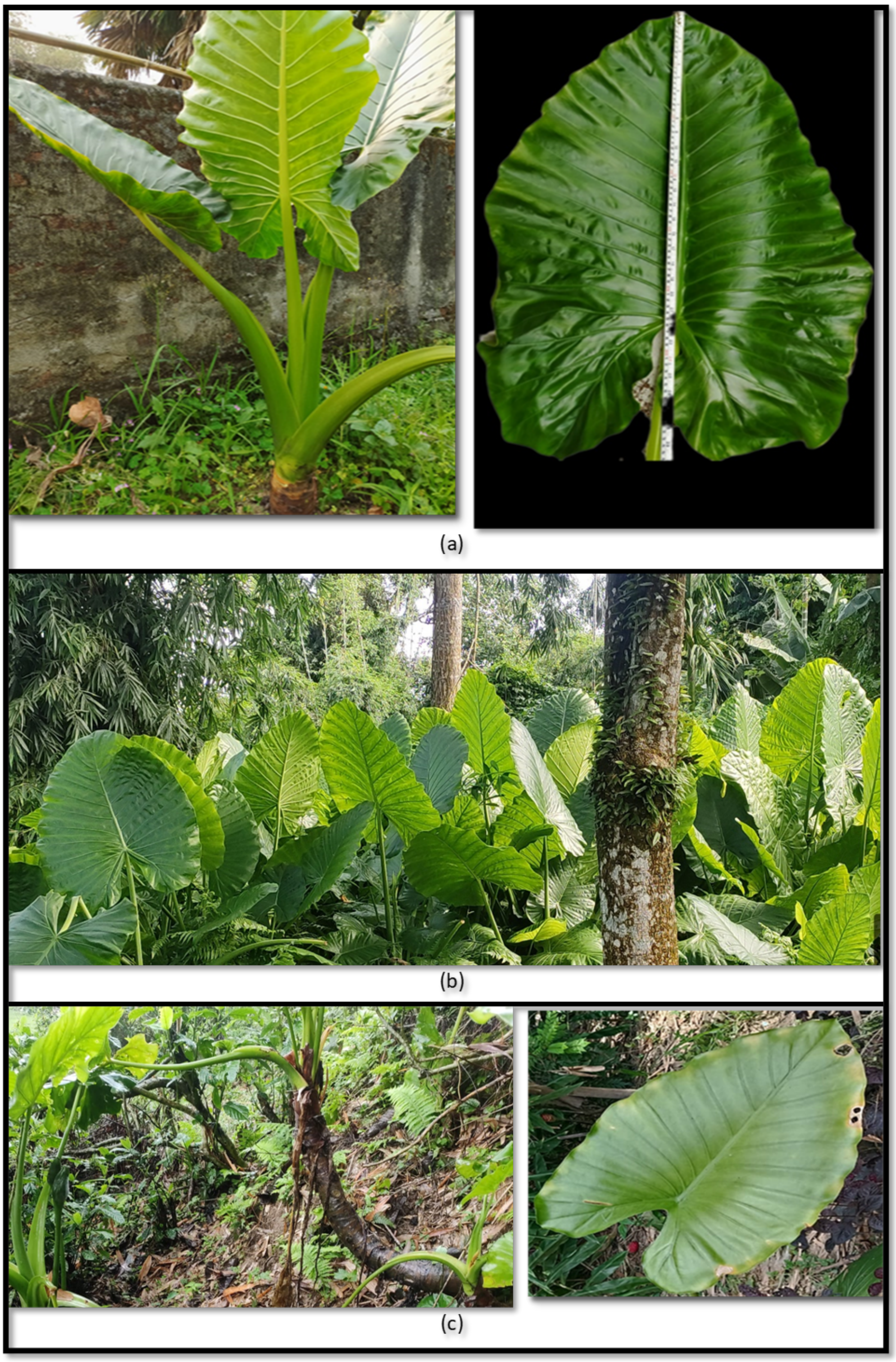


Figure 6. The figure highlights the distinct leaf morphologies exhibited by different species of *Alocasia*. (a) *Alocasia indica* (Lour.) Spach, (b) *Alocasia odora*, and (c) *Alocasia macrorrhizos* (L.) G. Don.

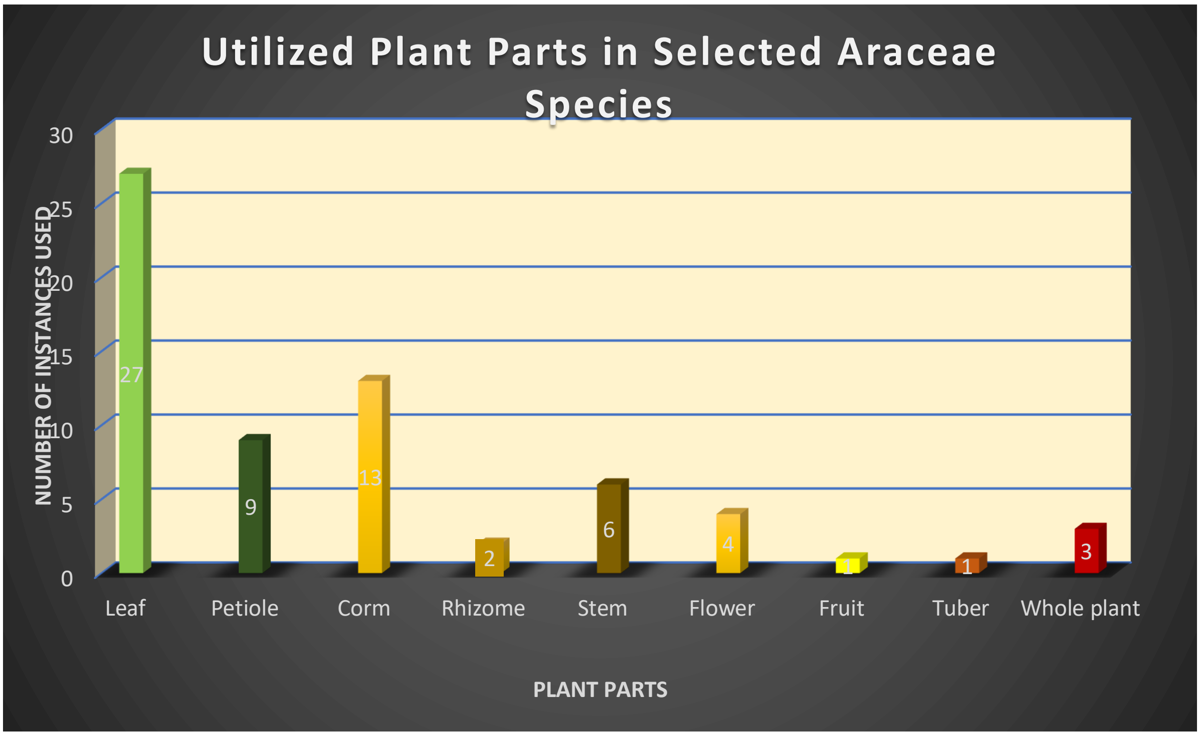


Figure 7. Various plant parts of selected Araceae species that are utilized, showing the number of times each part is referenced for use.

On the other hand, in *Colocasia* leaves, petioles grow down from the notch into the leaves, through which the leaves appear to droop downwards. They are primarily light green in color, matte finish, and have a slightly rougher texture, without many prominent veins. However, a variety of *Colocasia esculenta* plants, which are commonly known as "Teli kosu" in Assam, appear to be oily and have a glossy texture (Figure 8). Leaves of *Xanthosoma* sp., on the other hand, exhibit a drooping nature, and have an arrow-shaped elephant ear leaf (Figure 9). The leaves of *Xanthosoma violaceum* exhibit a green color surrounded by a black border. *Typhonium trilobatum* (L.) Schott, commonly known as "Chema kosu" or "Sema kosu" in Assam, has a distinct three-lobed foliar structure that differentiates it from other aroids. Leaf blades of *Lasia spinosa* (L.) exhibit finger-like projections that are 18-29 cm long when young. The leaves are divided into 5-8 pairs of lance-shaped lobes when matured and have a spiny stalk, which is why they are called spinosa. However, the leaf blades of *Cyrtosperma* sp. are oblong and have a shiny texture. Interestingly, both *Lasia spinosa* (L.) and *Cyrtosperma* sp. were found to occur in the same area as companions (Figure 10). Certain species can also be distinguished by their distinguishing characteristics, such as the presence of a black dot or stripes on the leaf of *Colocasia esculenta* with a black petiole, which differentiates this species from other *Colocasia* species (Figure 8).

The morphology of aroids' leaves has been a subject of extensive study, with a focus on both molecular and anatomical data. Cusimano *et al*. (2011) found that the molecular analysis of the Araceae family was well supported, with most clades having corresponded morphological or anatomical features. However, some relationships within the Aroideae subfamily were poorly supported. Mir (2020) and Sadik *et al*. (2019) both emphasize the substantial variation in form, color, and architecture of Aroid leaves, with Mir (2020) specifically noting differences in vegetative and blooming characteristics. Sadik *et al*. (2019) further explore the taxonomic significance of these variations, using a combination of morphological and molecular criteria to analyze inter-specific relationships. The family's high species diversity, habit diversity, and distribution are also underscored by Croat (2019) and Croat and Ortiz (2020) with the latter noting the family's broad spectrum of life forms and habitat diversity. These studies collectively accentuate the complexity and diversity of Araceae family leaves and the need for further research to fully understand their morphology.

Aroids produce structures called corms as part of their growth and reproductive processes. Corms are specialized underground storage structures that store nutrients and energy for plants (Tribble *et al*. 2022). The shapes of aroid corms can vary, and different species may exhibit distinct forms, which is clearly shown in Figure 11. Some common shapes associated with aroid corms are spherical corms that are found in *C. esculenta*, which have a black petiole and is commonly known as 'kola kosu', and in another *Colocasia* sp., commonly known as 'teli kosu'. These corms are roughly ball-shaped and often have compact and symmetrical structures. Ovoid corms are egg-shaped, with one end tapering to a point. This shape allows for the efficient storage of nutrients in a slightly elongated form found in a *Colocasia* sp. commonly known as Tekeli/Ghoti kosu in Assamese. (Ghoti- an ovoid round water pot). Some aroids produce corms with a rhizomatous structure. These corms are characterized by a horizontal, creeping growth pattern with nodes from which roots and shoots emerge, as observed in *X/ violaceum*. Some of them are long and elongated tube-like structures observed in *C. antiquorum* and *A. macrorrhizos*. Subglobose corms are mostly observed in *T. trilobatum*. Furthermore, cylindrical corms have a tubular shape resembling a cylinder. This allows for efficient storage of nutrients in a more elongated structure found in *A. indica*. Some aroids have corms that are lobed or segmented, with distinct divisions that give rise to the appearance of multiple connected sections found in a *Colocasia* sp. of different varieties commonly known as Panchamukhi Kosu (meaning five faces). Another shape that has been found is conical, cone-shaped, with a pointed or tapered end. This shape is less common but can be found in certain aroid species, such as *X. saggitifolium*. The specific shape of aroid corms can vary not only between species but also within a species or genus.Based on their vernacular names, we observe distinct differences: *Teli Kosu* is notable for the oily texture of its leaves, *Ghoti Kosu* for its oval pot-shaped corm. *Bhadoria Koru* grows exclusively in September, while *Bet Koru* stands out for its corm's texture and size. These characteristics suggest that the plants belong to different varieties, highlighting the need for further research.

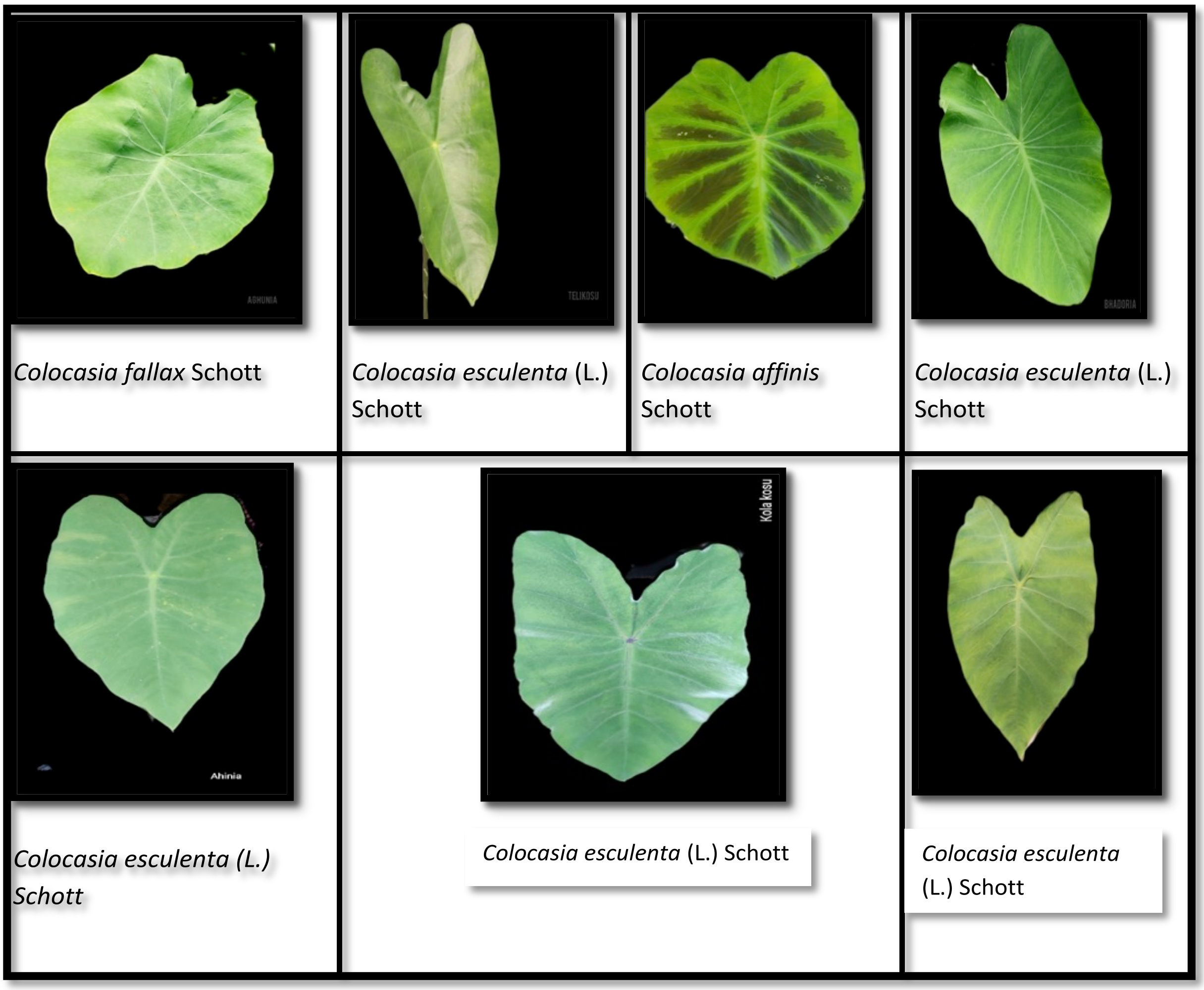
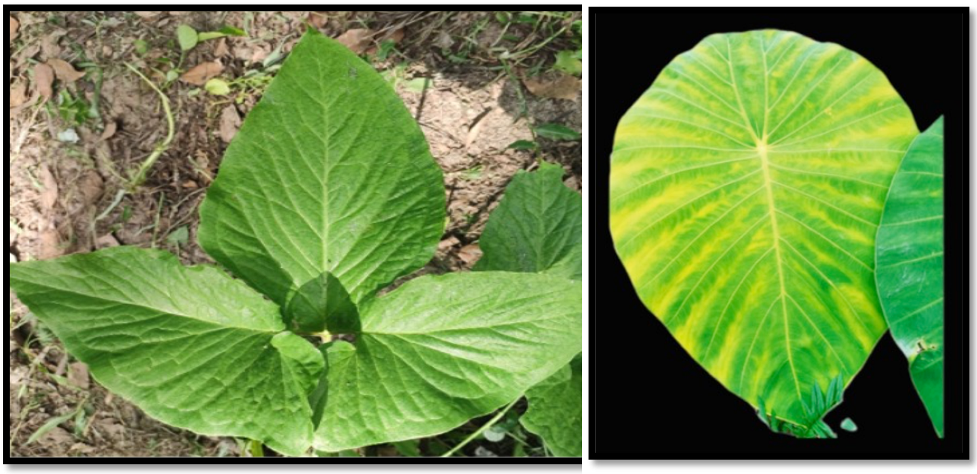


Figure 8. Different Leaf Morphologies of *Colocasia spp.*, showcasing variations in leaf structure observed across different species, some of which belong to *Colocasia esculenta* and others to related species.

(a) (b) (c)

Figure 9. Highlights the unique leaf morphologies exhibited by different species of *Xanthosoma*.(a) *Xanthosoma sagittifolium*, (b) *X. violaceum*, and (c) *X. robustum*.

Cyrtosperma sp. *Lasia spinosa* L. *Amorphophallus paeoniifolius* (Dennst.) Nicolson



Typhonium trilobatum (L.) Schott *Steudnera colocasioides* Hook.f.

Figure 10. Leaf morphology of other edible species in the Araceae family, exhibiting distinguishable features

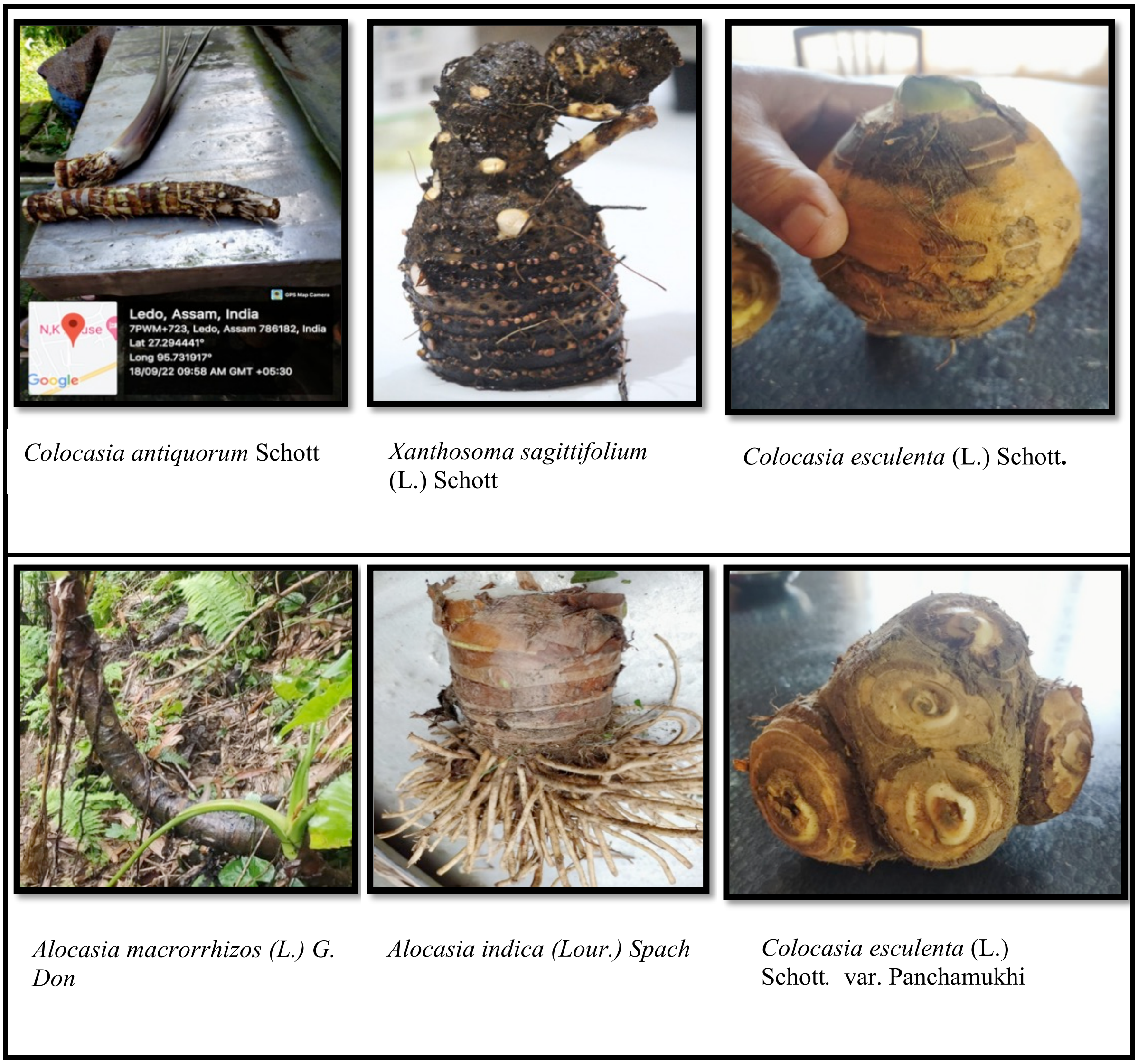


Figure 11. Clear morphological differences in the corms of nine different species of aroids, highlighting distinct features that can aid in species identification.

Table 1. Outlines key information on plant species, including their names, habitats, uses, and ethnomedicinal properties, as gathered from survey data.

Voucher specimen No.	Botanical names	Vernacular names	Habitat (Cultivated)/(Wild)	Parts used (Edible-E, Non-edible:- NE)	Modes of uses	Ethnomedicinal values of some non-edible parts of the plant
DULSC 502	*Colocasia esculenta* (L.) Schott.	**ahinia kosu**	Terrestrial herb (Cultivated)	Young leaf and petiole Corm (E)	Chopped and boiled with fish. Cooked with black pepper Curry	People use Petiole of this plant to prevent wounds and swelling. Because of its dietary content, it controls blood sugar levels in the body.
DULSC 503	*Colocasia esculenta* (L.) Schott.	**kola kosu (petiole black)**	Amphibian herb (Wild)	Leaf and petiole (E)	Chopped and boiled with fish along with tomato. Also consumed as curry with black pepper. Sometimes lemon is also added to avoid irritation	The plant treats bronchitis, rheumatism, gastroenteritis, neurological diseases, and diabetes. Crushed tubers are used for wounds, while petiole and leaf extracts address earache, blood poisoning, and vitiligo. Root extract with cow milk treats debility.
DULSC 501	*Colocasia boyceana* R. Gogoi & S. Borah	**boga kosu (petiole green)**	Amphibian herb (Wild)	Leaf and petiole (E)	Chopped and boiled with fish along with tomato.Also consumed as curry with black pepper Sometimes lemon is also added to avoid irritation	The plant is used to control blood sugar levels.
DULSC 499	*Colocasia affinis* Schott	**xil kosu**	Amphibian herb (Wild)	Petiole (E)	Petiole chopped and boiled. At last lemon/black pepper is added.	Antidiabetic and Antiallergic qualities
DULSC 515	*Xanthosoma robustum* Schott	**nila kosu**	Terrestrial herb (Cultivated)	Petiole and Young leaves (E)	Cooked with ginger, and pepper.	Shows antimicrobial and anti-inflammatory activities
DULSC 510	*Colocasia esculenta* (L.) Schott.	**teli kosu**	Amphibian herb (Cultivated)	Young leaf and petiole (E)	Boiled with pulses or with any other vegetables. Some people also add ghee to it.	Cure Anaemia

DULSC 496	*Alocasia macrorrhizos* (L.) G. Don	**maan kosu (toxic)**	Terrestrial herb (Wild)	-	No parts are edible	Leaves, Petiole and Rhizome: Used as a laxative, it has hepatoprotective, antifungal, antimicrobial, and antioxidant properties. It is also used for cough Vand snakebite detoxification.
DULSC 495	*Alocasia indica* (Lour.) Spach	**khua maan**	Terrestrial herb (Cultivated)	Corm(E)	Eat raw as chutney. Sometimes dried and preserved.	Used to cure arthritis
DULSC 513	*Steudnera colocasioides* Hook.f.	**adolia kochu**	Terrestrial herb (Wild)	Leaf , petiole, corm (E)	Boiled with pulses or with any other vegetables. Used lemon, and olive to remove the tingling ness	Antimicrobial and Analgesic properties
DULSC 504	*Colocasia esculenta (L.) Schott.* var. Panchamukhi.	**ponsomukhi kosu (five faced corm)**	Terrestrial herb (Cultivated)	Corm (E)	The corm is boiled. The shape of the corm remains intact.	Antifungal, antimicrobial, and antioxidant properties
DULSC 509	Colocasia esculenta (L.) Schott.	**ghoti kosu/tekeli kosu**	Terrestrial herb (Cultivated)	Corm (E)	Boiled with pulses.	Antifungal, antimicrobial, and antioxidant properties
DULSC 508	Colocasia esculenta (L.) Schott.	**lahi kosu**	Terrestrial herb (Cultivated)	Tender leaves and Corm (E)	Boiled with pulses or any other vegetables. Sometimes at last a little amount of lemon or black pepper is added.	Antidiabetic properties
DULSC 516	*Xanthosoma sagittifolium* (L.) Schott	**burmese kosu**	Terrestrial herb (Cultivated)	Petiole, Corm (E)	Boiled with pulses. As Curry where some people add ghee to it and some add lemon/tomato.	Leaf extract of this herb is used to treat fever and infection. Extract of leaf and petiole is used in wound healing. Petiole extract is used in Tuberculosis,
DULSC 497	*Alocasia odora* (G.Lodd.) Spach	**borai nukhua**	Terrestrial herb (Wild)	No parts are edible (NE)	-	Used to relieve pain.Used in the treatment of stomach aches. The paste of the rhizome is externally applied to join broken bones.

DULSC 498	*Amorphophallus paeoniifolius* (Dennst.) Nicolson	**ol kosu**	Terrestrial herb (Cultivated)/(Wild)	Corm (E)	Soaked before cooking to avoid irritation. The water is then drained. Then,it is boiled where again the water is drained. After that, this is consumed as curry, chopped, and used with gram flour. At last lemon and black pepper are added to avoid irritation.	Tuber of this herb is used to cure rheumatic pain
DULSC 514	*Typhonium trilobatum* (L.) Schott	**chema kosu**	Terrestrial herb (Wild)	Whole plant (E)	Used as fodder for pigs.	Used to relieve pain, anti-inflammatory and anti-diarrheal activities
DULSC 505	*Colocasia fallax* Schott	**aghunia kosu**	Terrestrial herb (Cultivated)	Corm (E)	Boiled with lentils, lemon is added at last, and sometimes black pepper. Also consumed in the form of vegetable	Antidiabetic and anti-inflammatory
DULSC 507	*Colocasia esculenta* (L.) Schott.	**bhadoria kosu**	Terrestrial herb (Cultivated)	Corm (E)	Boiled with lentils, lemon is added at last, and sometimes black pepper. Also consumed in the form of vegetable	Antidiabetic and antifungal
DULSC 512	*Lasia spinosa* (L.) Thwaites	**chengamora/ kaitia kosu**	Semi aquatic (Wild)	Leaves and rhizome(E)	Used as vegetables, and curry in some parts.	The rhizomes are used medicinally for treating, stomach aches, snake and insect bites, injuries, and rheumatism. Due to the presence of roughage and antioxidants, they are beneficial for hepatoprotective activity. They are also beneficial for people suffering from diabetes

DULSC 511	*Cyrtosperma* sp.		Semi aquatic (Wild)	Leaf, stem, rhizome (E)	After prolonged boiling it is roasted and then consumed.	Reduce inflammation
DULSC 517	*Xanthosoma violaceum* Schott	**dohi kosu**	Terrestrial herb (Cultivated)	Whole plant. (E)	As a curry, vegetable.	Cure anaemia, cure vitamin A deficiency
DULSC 500	*Colocasia antiquorum* Schott	**nol kosu/pani kosu**	Aquatic herb (Cultivated)	Petiole, corm (E)	Chopped and boiled with black pepper, and lemon.	Regulate blood sugar, reduce inflammation.
DULSC 506	*Colocasia esculenta* (L.) Schott.	**bet kosu**	Terrestrial herb (Cultivated)	Corm (E)	Boiled with pulses or any other vegetables. Sometimes at last a little amount of lemon or black pepper is added.	Show antidiabetic, antioxidant activity
DULSC 518	*Alocasia cucullata* (Loureiro) G.Don	-	Terrestrial herb (Wild)/(Cultivated)	Leaf, stem (E)	Ornamental, boiled and used in medicine	Used for wound healing and inflammation reduction
DULSC 519	*Anthurium andraeanum* Linden ex André	-	Terrestrial herb (Wild)/(Cultivated)	Leaf, flower(E)	Ornamental, sometimes used in traditional medicine	Air purification, reduces toxins indoors
DULSC 520	*Caladium bicolor* (Aiton) Ventenat	-	Terrestrial herb (Wild)/(Cultivated)	Leaf, corm (NE)	Decorative plant, corm sometimes cooked	Used in traditional medicine for skin conditions
DULSC 521	*Caladium* sp.	-	Terrestrial herb (Wild)/(Cultivated)	Leaf, corm (NE)	Decorative	Poisonous if ingested, but used in some folk remedies
DULSC 522	*Monstera deliciosa* Liebm	-	Climbing herb (Wild)/(Cultivated)	Leaf (NE), fruit (E)	Fruit is edible when ripe	Used in folk medicine for digestive issues
DULSC 523	*Philodendron* sp.	-	Climbing herb (Wild)/(Cultivated)	Leaf, stem (NE)	Ornamental	Used for air purification
DULSC 524	*Anthurium faustomirandae* Perez-Farr. & Croat	-	Terrestrial herb (Wild)/(Cultivated)	Leaf (NE)	Ornamental	Rarely used medicinally
DULSC 525	*Anthurium crystallinum* Linden & André	-	Terrestrial herb (Wild)/(Cultivated)	Leaf (NE)	Ornamental	Used for treating inflammation in some cultures
DULSC 526	*Syngonium angustatum* Schott	-	Climbing herb (Wild)/(Cultivated)	Leaf (NE)	Ornamental	Used for purification, removes toxins

DULSC 527	*Pothos scandens* D.Don Syn. P. cathcartii Scout	-	Climbing herb (Wild)/(Cultivated)	Leaf (NE)	Used in folk medicine	Anti-inflammatory properties
DULSC 528	*Syngonium macrophyllum* Engl.	-	Climbing herb (Wild)/(Cultivated)	Leaf (NE)	Ornamental	Believed to have air-purifying effects
DULSC 529	*Syngonium podophyllum* Schott var. White Butterfly	-	Climbing herb (Wild)/(Cultivated)	Leaf (NE)	Ornamental	Used in air purification
DULSC 530	*Epipremnum aureum Linden* ex André	**Money plant**	Climbing herb (Wild)/(Cultivated)	Leaf, stem (NE)	Ornamental, grown indoors	Purifies air, absorbs toxins
DULSC 531	*Aglaonema commutatum* Schott	**Chinese evergreen**	Terrestrial herb (Wild)/(Cultivated)	Leaf (NE)	Ornamental	Removes air pollutants
DULSC 532	*Pistia stratiotes* L.	**Water lettuce**	Aquatic plant (Wild)/(Cultivated)	Whole plant (NE)	Used in phytoremediation	Helps remove heavy metals from water
DULSC 533	*Aglaonema nitidum* (Jack) Kunth	-	Terrestrial herb (Wild)/(Cultivated)	Leaf (NE)	Ornamental	Used in traditional medicine for skin conditions
DULSC 534	*Spathiphyllum wallisii* Regel	**Peace lily**	Terrestrial herb (Wild)/(Cultivated)	Leaf, flower (NE)	Ornamental	Removes toxins from air, used in spiritual practices
DULSC 535	*Typhonium blumei* Nicolson & Sivad	-	Terrestrial herb (Wild)/(Cultivated)	Tuber, leaf (NE)	Used in herbal medicine	Treats respiratory issues
DULSC 536	*Epipremnum pinnatum* (L.) Engl	-	Climbing herb (Wild)/(Cultivated)	Leaf, stem (NE)	Ornamental, air purification	Anti-inflammatory properties
DULSC 537	*Thaumatophyllum bipinnatifidum* (Schott ex Endl.) Sakur., Calazans & Mayo	-	Terrestrial herb (Wild)/(Cultivated)	Leaf, stem (NE)	Ornamental	Used in traditional healing rituals
DULSC 538	*Syngonium auritum* (L.) Schott	-	Climbing herb (Wild)/(Cultivated)	Leaf (NE)	Ornamental	Believed to remove negative energy
DULSC 539	*Anthurium sanderianum* W.Bull	-	Terrestrial herb (Wild)/(Cultivated)	Leaf, flower (NE)	Ornamental	Used for decoration, air purification
DULSC 540	*Philodendron burle-marxii* G.M.Barroso	-	Climbing herb (Wild)/(Cultivated)	Leaf (NE)	Ornamental	Air purification, reduces toxins

Discussion

The present study provides a new perspective into the diversity, distribution, and ethnobotanical significance of Aroid species in Upper Assam, thereby enriching the current understanding of this underexplored plant group. This study contributes significantly to the existing body of research on Aroid species in Assam by providing a more comprehensive inventory and detailed documentation of their uses. While previous studies, such as those by Das *et al*. (2014) and Bora *et al*. (2016), focused on species diversity and medico-ethnobotanical uses, this research extends those findings by offering a broader geographic perspective and emphasizing the medicinal properties of species like *C. esculenta* and *A. paeoniifolius*. A comparative analysis with previous studies reveals notable differences and similarities in the diversity and distribution of Aroid species in Upper Assam. For instance, Das et al. (2014) documented 26 Aroid species belonging to 17 genera in the Nazira Sub-Division of Sivasagar district, with 32% being edible and 68% ornamental. In contrast, our study identified 46 species from 19 genera across Upper Assam, with Jorhat district alone recording 38 species. This broader geographic coverage highlights a significant increase in species count, possibly due to enhanced survey efforts and varying ecological conditions between the regions. Additionally, while Das et al. emphasized terrestrial and ornamental species, our findings extend to ethnomedicinal uses, particularly for species like *Homalomena aromatica* and *Pothos scandens*. These differences underscore the importance of comprehensive surveys to capture the full spectrum of Aroid diversity in Assam. Furthermore, earlier studies like those by Rao & Verma (1968) and Bora et al. (2016) focused on floristic studies and medico-ethnobotanical uses in localized areas. Our research builds upon these by providing a more extensive inventory and emphasizing the sustainable potential of Aroids in food security and disaster resilience. The findings also align with Croat's (2019) observations on the habitat diversity of Araceae but highlight specific regional adaptations such as the prevalence of flood-tolerant varieties in Assam. This study not only validates previous findings but also offers new insights into the ecological and medicinal significance of Aroids in Upper Assam.

From this survey, it was evident that Assam's population is predominantly composed of tribal communities, and most households consume Kochu as a regular part of their diet. In the context of Sustainable Development Goals (SDGs) and food security, Aroids hold immense potential in addressing global challenges such as zero hunger (SDG 2) and responsible consumption and production (SDG 12). Their flexibility and ability to thrive in diverse environmental conditions, including flood-prone areas, make them valuable crops for marginalized communities and disaster-prone regions. In some homes, we observed Kochu being consumed daily. But despite their significant medicinal potential, many Araceae plants are often avoided due to antinutritional factors like oxalates, phytates, and tannins, which can impair nutrient absorption and cause health issues (Sinha and Borkataky, 2023; Sakhale & Giri, 2019). Although specific cooking methods can reduce these factors, they are not widely known or practiced, highlighting the need for education and awareness campaigns. Aroids are a delicacy in Assam's tribal communities, despite their potential to cause itching, allergic reactions, and other discomforts (Pramod *et al*. 2021; Soris *et al*. 2020; Badadhe *et al*. 2023; Vikram *et al*. 2020). Consumed mainly by marginalized communities, they are valuable during floods and disasters (Pegu *et al*. 2018; Albaniah *et al*. 2023). However, identification challenges due to limited research and taxonomic ambiguity persist. This study validates and extends previous research, offering a comprehensive understanding of Aroid species in Assam and emphasizing the need for continued taxonomic studies and public awareness.

Conclusion

The study provides an in-depth examination of the ethnobotanical applications of Araceae family, or Aroids, in Upper Assam, emphasizing their diverse distribution, ethnomedicinal applications, and distinctive morphological variations. While the majority of the collected specimens were identified as *Colocasia* species, noticeable differences in leaf morphology and corm structure suggest the presence of distinct varieties, warranting further molecular studies to confirm their classification and genetic diversity. Despite the recognized health benefits of Aroids, public awareness about their full potential remains limited. Educational campaigns and community-driven initiatives should be implemented to promote traditional knowledge sharing and sustainable harvesting practices. Additionally, ex-situ and in-situ conservation strategies should be encouraged to preserve the genetic diversity of wild Aroid species, ensuring their continued ecological and cultural relevance.

Future research should focus on cultivation trials to enhance the palatability and acceptance of Aroids, particularly by identifying low-antinutrient varieties and developing improved agronomic practices. Investigating post-harvest processing techniques could also help in reducing the anti-nutritional factors, making Aroids more widely accepted as a food source. Furthermore, integrating Aroids into agroforestry systems could contribute to sustainable agriculture and biodiversity conservation.

The findings of this study contribute valuable insights into the dual nature of Aroids in human consumption, offering both nutritional benefits and challenges due to their anti-nutritional compounds. By combining scientific research, conservation initiatives, and public engagement, Aroids can be better utilized, not only for their nutritional and medicinal benefits but also as key elements in enhancing food security, biodiversity conservation, and cultural sustainability.

Declarations

Ethics approval and consent to participate: No special permit was required for this work.

Consent for publication: All participants shown in images gave theor consent to have the image published.

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Author contributions: DS carried out the entire study and prepared the initial draft of the manuscript. MB supervised the research, offered critical revisions, and contributed to the interpretation of the results. Both authors contributed equally to this work.

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