CHECKLIST OF *ALOCASIA* (SCHOTT) G. DON (ARACEAE) SPECIES OF THE PHILIPPINES: DIVERSITY, THREATS AND CONSERVATION CONCERNS

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Abstract: *Alocasia* (Schott) G.Don is the genus with the most extensive species representation among the Araceae family discovered in the Philippines. This review paper aims to determine the diversity, morphology, uses, distribution, habitat, and conservation status of *Alocasia* species in the Philippines, assess the current threats and problems pertaining to *Alocasia* species in the country, and propose a conservation framework to address the identified threats and problems. A systematic literature review has been conducted using Google Scholar and ScienceDirect, supplemented by data from the Co's Digital Flora of the Philippines, IUCN Red List, and DAO 2017-11. The results show that the Philippines is home to 15 *Alocasia* species, 12 of which are endemic. These species are commonly used as ornamental plants and have various medicinal and cultural uses. However, there are *Alocasia* species which are facing severe threats of extinction, with three classified as Critically Endangered, one as Endangered, and one as Vulnerable. The taxonomy of the *Alocasia* genus has been revised based on morphological and anatomical characteristics, but there is a lack of molecular phylogenetic studies. The review reveals the need for further research on the taxonomy, medicinal properties, and conservation of *Alocasia* species in the Philippines. Recommendations include conducting molecular phylogenetic studies, developing comprehensive taxonomic monographs, exploring the phytochemical and toxicological properties of *Alocasia* species, strengthening conservation efforts through regulation and monitoring, and promoting collaboration among experts to ensure the sustainable management of this unique and valuable genus.

Keywords: *Alocasia*, conservation, medicinal properties, Philippines, taxonomy

Introduction:

The aroid family, known as Araceae, encompasses more than 3700 species spread across the globe, comprising 107 genera (Erlinawati 2010; Arbain et al. 2022). The family displays remarkable heterogeneity, with a significant proportion of aroid species being climbers and epiphytes in tropical rainforests. Additionally, numerous species have associations with aquatic or semi-aquatic habitats (Müller and Guzzon 2023). In

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the Philippines, the Araceae family is found to consist of approximately 25 different genera, and it is estimated that there are around 150 species within this family in the country (Medecilo and Madulid 2013).

Alocasia (Schott) G.Don, a genus under Araceae family, encompasses over 110 species that predominantly thrive in the understory of perhumid, subtropical, and tropical lowland forests (Arbain et al. 2022). According to Hay (1998), there are 31 species identified in Malesia and Sulawesi alone. However, it is important to note that numerous species still await formal descriptions (Boyce 2008). Certain species within the *Alocasia* genus exhibit epiphytic growth, clinging onto trees, while others have the ability to propagate underwater (Ma et al. 2020). The growth forms of these species exhibit a wide range, spanning from small herbaceous plants to robust specimens with thick stems and large leaves (Nauheimer et al. 2012). The distribution of the *Alocasia* genus spans tropical Asia, Southeast Asia, and the Malesian region, with a notable concentration of species diversity in Borneo, which serves as its primary center of abundance (Müller and Guzzon 2023). According to Medecilo and Madulid (2013), *Alocasia* is the genus with the most extensive species representation among the Araceae plants discovered in the Philippines. The country is recognized as the second most species-rich region in Malesia, following Borneo (Hay 1999).

Alocasia species has been utilized for various economic purposes, primarily as a source of food, with different parts of the plant, including the leaves and the entire plant itself, being consumed depending on the specific species. Additionally, *Alocasia* serves as a popular ornamental plant in Filipino households, adding aesthetic value to indoor and outdoor spaces (Ongpoy 2015). *Alocasia* holds significant horticultural value and plays a crucial role in agriculture across tropical and subtropical regions of Asia (Manner 2011). Many species of *Alocasia* possess rhizomes that serve as a valuable source of starch, and their leaves are utilized as animal feed. Moreover, certain species are specifically cultivated as ornamental plants due to their attractive features (Steiner 1960).

The objectives of the review paper are to (1) determine the diversity of *Alocasia* species in the Philippines, (2) assess the current threats and problems, and (3) propose a framework for *Alocasia* conservation.

Materials and methods:

A systematic review of the literature was performed in this study. To investigate the morphology, uses, habitat, current scenario, and threats and problems pertaining to *Alocasia* species in the Philippines, a comprehensive literature search was conducted using Google Scholar and Science Direct. The search was initiated by entering the keywords "*Alocasia* species Philippines" and "*Alocasia*" in the search bar to retrieve relevant scholarly articles, and other pertinent publications. The search results were critically reviewed, and preference was given to articles that specifically addressed the desired aspects of *Alocasia* species in the Philippines. To determine the diversity and distribution of *Alocasia* species in the Philippines, Co's Digital Flora of the Philippines (CDFP) (Pelser et al. 2011, onwards) was utilized as a reference source. Additionally, reputable sources such as the International Union for Conservation of Nature (IUCN 2024) Red List and DAO 2017-11 (DENR 2017) were consulted to assess the conservation status of these species.

Results and discussion:

Alocasia Diversity

In the Philippines, there are 15 species of *Alocasia*, with 12 being endemic, and 3 being native. The endemic species are *Alocasia boyceana*, *A. culionensis*, *A. heterophylla*, *A. maquilingensis*, *A. micholitziana*, *A. nycteris*, *A. portei*, *A. ramosii*, *A. sanderiana*, *A.*

scalprum, *A. sinuata*, and *A. zebrina*. *A. atropurpurea*, *A. clypeolata*, and *A. macrorrhizos* are the native species (Fig. 1, Annexes).

Many *Alocasia* species are primarily grown and used as ornamental plants (Steiner 1960; Medecilo and Madulid 2013; Ongpoy 2017; Beligolo and Buenavista 2023). These species are appreciated for their attractive foliage and are cultivated for their aesthetic appeal. Moreover, *A. macrorrhizos* also enjoys both medicinal and traditional uses. It is used to treat conditions such as diabetes, pus in the ears, jaundice, and constipation (Rahman et al. 2012). Moreover, it is an important food plant in the Visayan region, particularly in Samar and Leyte (Medecilo and Madulid 2013). The tubers and leaves of *A. macrorrhizos* are consumed and it is also employed as animal fodder (Nauheimer et al. 2012). *A. sanderiana* holds cultural and traditional significance. The leaves of this species are used for toothache by the Matigsalug tribe of Marilog district, Davao City (Ongpoy 2015).

Additionally, *A. sanderiana* has antibacterial properties (Guevara and Garcia 2018). The predominant usage of *Alocasia* species is as ornamental plants. However, *Alocasia macrorrhizos* stands out for its multiple uses, including medicinal, food, and fodder purposes. *Alocasia sanderiana* also has cultural and traditional utilization in addition to being grown as an ornamental plant. Likewise, *Alocasia* species have additional traditional, cultural, or medicinal uses.

It can be observed that some species are widely distributed across multiple provinces or islands in the Philippines, while others are more localized. *A. heterophylla* has the highest distribution, occurring in 29 provinces or islands, including Alabat, Balabac, Basilan, Cebu, Jolo, Albay, Bataan, Camarines Norte, Camarines Sur, Ilocos Norte, Isabela, La Union, Laguna, NCR, Pampanga, Pangasinan, Quezon, Rizal, Sorsogon, Zambales, Cotabato, Davao, Davao Oriental, South Cotabato, Mindoro, Negros, Panay, Polillo, and Samar. *A. macrorrhizos* is found in 18 provinces or islands, including Batan, Homonhon, Leyte, Bataan, Benguet, Cagayan, Ifugao, Laguna, Mountain Province, Pampanga, Quezon, Rizal, Sorsogon, Zamboanga Sibugay, Mindoro, Palawan, Panay and Polillo. *A. culionensis* is found in 14 provinces or islands, including Balabac, Basilan, Busuanga, Culion, Jolo, Leyte, NCR, Sorsogon, Davao, Mindoro, Palawan, Panay, Siasi, and the Sulu Archipelago. On the other hand, there are species with lesser distribution. *A. nycteris* is only found in Panay Island, *A. portei* is restricted to Camarines Sur, Laguna, and Quezon Province, while *A. scalprum* is limited to Dinagat and Samar Island.

There are provinces or islands in the Philippines with many *Alocasia* species. Sorsogon is mentioned in the distribution of *A. clypeolata*, *A. heterophylla*, *A. macrorrhizos*, *A. maquilingensis*, *A. nycteris*, *A. ramosii*, and *A. sinuata*. Leyte is listed in the distribution of *A. macrorrhizos*, *A. maquilingensis*, *A. micholitziana*, and *A. sinuata*. Laguna is mentioned in the distribution of *A. heterophylla*, *A. macrorrhizos*, *A. maquilingensis*, *A. micholitziana*, *A. portei*, *A. ramosii*, and *A. sinuata*. Quezon is listed in the distribution of *A. heterophylla*, *A. macrorrhizos*, and *A. zebrina*. The island of Panay has the distribution of *A. culionensis*, *A. maquilingensis*, *A. micholitziana*, *A. ramosii*, and *A. zebrina*. On the other hand, among the provinces listed with *Alocasia* distribution, Batangas is mentioned only once as having *A. zebrina*.

The *Alocasia* species of the Philippines generally thrive in tropical rainforest environments, with the majority of species preferring lowland to mid-elevation habitats.

A number of *Alocasia* species demonstrate a clear preference for moist, watery environments within the broader tropical rainforest ecosystem. Several are found growing along the banks of rivers and streams, such as *A. macrorrhizos* which is described as common in such riparian areas from sea level up to 500 meters in elevation.

Others, like *A. ramosii*, are noted to occur specifically in lowland rainforests near streams. Some *Alocasia* even thrive in the damp, shaded conditions of forest ravines, as is the case for *A. sanderiana*. Additionally, *A. culionensis* is found on the damp ground of lowland rainforests, while *A. nycteris* can colonize disturbed secondary forests near the wet environments of rice fields. This affinity for moist habitats, whether near permanent water sources or in perpetually damp microhabitats, appears to be an important adaptation that allows certain *Alocasia* species to exploit a wider range of tropical forest niches compared to their more drought-tolerant counterparts.

A few species, however, show more specialized habitat requirements. For example, *A. atropurpurea* and *A. sinuata* are associated with limestone substrates and karst landscapes, demonstrating an adaptation to grow on rocky, calcareous soils. In contrast, most other *Alocasia* thrive in a typical rainforest soil conditions. Elevation-wise, the genus spans a range from sea level up to around 1500 meters, with the majority occurring below 500 meters. A notable exception is *A. micholitziana*, which is found at higher elevations of 1200-1500 meters, which suggesting that it is adapted to cooler, montane rainforest environments. Some *Alocasia* species, like *A. culionensis*, *A. heterophylla*, and *A. ramosii*, are quite habitat-specific, thriving only in particular lowland rainforest settings. In contrast, others such as *A. nycteris* appear to be more adaptable, able to colonize disturbed secondary forests and even roadside clearings in addition to primary forest habitats.

Threats and Problems associated with Philippine *Alocasia*

The taxonomic revision of *Alocasia* was initially conducted by Engler and Krause in 1920. Subsequently, regional revisions were undertaken by various taxonomists, such as Nicolson (1987) for Sri Lanka, Hay and Wise (1991) for East Malesia and Australasia, Noltie (1994) for the Himalayas, Hay (1998) for West Malesia and Sulawesi, Hay (1999) for the Philippines, and Boyce (2008) for Thailand. However, these taxonomic revisions were primarily focused on the "alpha" level of taxonomy (Medecilo and Madulid 2013). Hay and Wise (1991) divided the Australasian *Alocasia* species into five groups, while Hay (1998) categorized the West Malesian and Sulawesi species into six groups. Currently, there is a modern monograph of the genus *Alocasia* documented in the Philippines, in a research conducted by Medecilo and Madulid (2013). Their research paper provided an analysis and evaluation of the classification and distinguishing characteristics of *Alocasia* species. The review encompassed various aspects, including external morphology, internal leaf anatomy, and palynological (pollen) characteristics. Although there have been advancements in the taxonomy of *Alocasia* species in the Philippines, primarily focusing on external morphology, internal leaf anatomy, and palynological characteristics, there is currently a lack of molecular phylogenetic studies. It is necessary to conduct investigations involving plastid and nuclear phylogenies to further understand the genus.

Alocasia thrives in regions characterized by a tropical climate, and in many of these countries, indigenous populations have developed ethnopharmaceutical practices associated with the genus (Ongpoy 2017). Out of the 15 species of *Alocasia* found in the Philippines, *A. macrorrhizos* and *A. sanderiana* are notable for their medicinal and traditional uses. *A. macrorrhizos* is employed in the treatment of various ailments such as diabetes, ear infections, jaundice, and constipation, as documented by Rahman et al. (2012). Moreover, it holds significant culinary importance in the Visayan region, particularly in Samar and Leyte, where both the tubers and leaves are consumed as food sources, and it also serves as animal fodder, as mentioned by Nauheimer et al. (2012). On the other hand, the leaves of *A. sanderiana* are utilized by the Matigsalug tribe of Marilog

district, Davao City, for relieving toothache (Ongpoy 2015).

Known for its various therapeutic properties, *A. macrorrhizos* has been the subject of several studies. Wang and Ng (2003) discovered its antifungal effects, while Mandal et al. (2010) found that both the leaves and rhizomes (roots) possess antioxidant properties. Rahman et al. (2012) demonstrated that the rhizomes (roots) exhibit antioxidant and antidiabetic properties. Additionally, Zhao (2008) highlighted its potential as an antitumor agent. The leaves of *A. macrorrhizos* were also found to have hepatoprotective properties (Patil et al. 2011), and anticancer properties (Fang et al. 2012). On the other hand, *A. sanderiana* has been found to possess antibacterial properties (Guevara and Garcia 2018). Continuing research on *Alocasia* species, especially those that have not been extensively studied for medicinal purposes, holds significant importance in drug discovery. This is particularly true for endemic species like *A. sanderiana* in the Philippines, where limited research has been conducted thus far. The remaining 13 species of *Alocasia* in the Philippines, which have not undergone phytochemical tests and assays, present an opportunity for exploration to uncover their properties and ascertain their potential for medicinal purposes and drug development.

There have been reports of neurotoxicity associated with the sapotoxin found in the tuber of *A. macrorrhizos* (Chan et al. 1995). Additionally, fatal food poisoning cases have been documented following the ingestion of *A. macrorrhizos* fruit, which exhibits symptoms similar to cyanogenic glycoside poisoning (Goonasekera et al. 1993). These instances of poisoning may be attributed to the presence of plant raphide crystals, specifically calcium oxalate, known to cause irritation (Beasley 1999). Similar toxic effects, attributed to calcium oxalate crystals, have also been reported for *A. sanderiana* (Ongpoy 2015). Furthermore, another potentially toxic compound discovered in *A. macrorrhizos* is lectin, which has shown toxicity towards insects (Pan et al. 2007). Exploring the *Alocasia* genus for medicinal properties holds great promise due to the abundance of unexplored indications and constituents awaiting discovery. However, it is crucial to emphasize the importance of conducting toxicity studies alongside the investigation of medicinal properties (Ongpoy 2017).

The *Alocasia* genus consists of tropical plants characterized by their predominantly large and visually striking leaves (Ongpoy 2017). Due to this distinctive feature, they are commonly known as Elephant's ear plants (Mahr n.d.). It is the reason why most of them are used as ornamental such as the different *Alocasia* species of the Philippines (Tab. 1, Annexes). In a recent study conducted by Beligolo and Buenavista (2023) on the trade of ornamental plants in Valencia City, Bukidnon, Philippines, a total of 140 morphotypes belonging to 60 genera and 33 botanical families were identified. Among the traded ornamental plants, the aroids or arums from the Family Araceae were the most sought after. Within the *Alocasia* genus, several species were observed, including *A. clypeolata* (Green shield alocasia), *A. macrorrhizos* (Elephant's ear), *A. micholitziana* (Green velvet alocasia), *A. sanderiana* (Kris plant), and *A. zebrina* (Zebra alocasia). The study also noted the presence of six threatened ornamental plants in the trade, with three of them being endemic *Alocasia* species in the Philippines (*A. micholitziana*, *A. sanderiana*, *A. zebrina*). The surge in demand for ornamental plants, including *Alocasia*, can be attributed to their visually appealing foliage, which has gained popularity on social media platforms (Beligolo and Buenavista 2023). In the Philippines, the trend of glamorized gardening has been fuelled by influential celebrities and social media personalities who have amassed millions of followers (Canuto et al. 2020). The growing public interest in ornamental plants has led to an increased demand for rare and endemic species, which has resulted in the illegal poaching of plants from the wild. For instance, in Digos City, plants facing threats were collected from

various areas such as Bukidnon, Sarangani, Cotabato, and Davao (Cabaobao et al. 2021).

Conservation Concerns

Conservation Status of Philippine *Alocasia*

Several *Alocasia* species are facing severe threats of extinction in the wild (Tab. 2). The IUCN Red List classifications highlight three *Alocasia* species as Critically Endangered - *A. atropurpurea*, *A. sanderiana*, and *A. sinuata*. This is the highest level of extinction risk, which means that these species are facing an extremely high probability of becoming extinct in the immediate future. DAO 2017-11 data provides additional concerning information. *A. micholitziana* and *A. zebrina* are listed as Vulnerable, *A. sanderiana* is classified as Endangered. Several *Alocasia* species in the Philippines lack available conservation status information in the sources provided, namely *A. boyceana*, *A. clypeolata*, *A. culionensis*, *A. heterophylla*, *A. macrorrhizos*, *A. maquilingensis*, *A. nycteris*, *A. portei*, *A. ramosii*, and *A. scalprum.*

Conservation Framework for Philippine *Alocasia*

Figure 2 illustrates the comprehensive framework developed to address the threats and problems associated with *Alocasia* species in the Philippines. The framework consists of eight interconnected components centered around the main focal point of comprehensive studies and conservation of *Alocasia* species in the country. These components, namely taxonomic research, thorough monograph, phytochemical studies, toxicity assessments, conservation and sustainable trade, sustainable gardening, collaboration and knowledge sharing, and conservation status assessment, serve as the foundational pillars of the framework. Each component plays a crucial role in achieving the overarching objective of research and conservation efforts for *Alocasia* species.

Table no. 2 Philippine *Alocasia* Species with Conservation Status

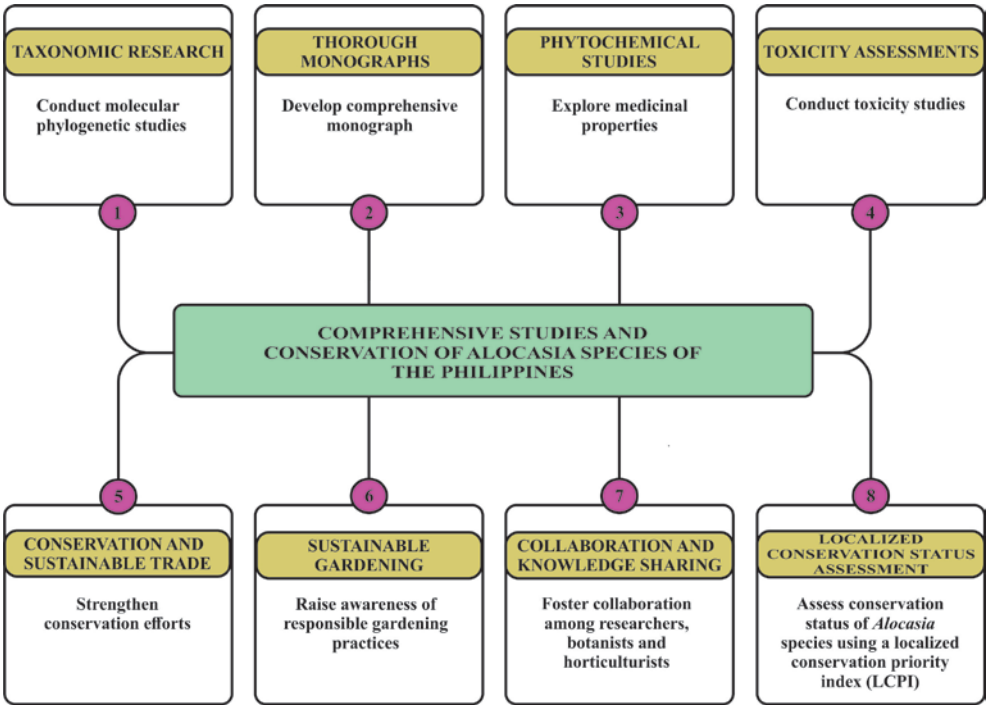
Species	Conservation Status	
	IUCN	DAO 2017-11
Alocasia atropurpurea	Critically Endangered	-
Alocasia micholitziana	-	Vulnerable
Alocasia sanderiana	Critically Endangered	Endangered
Alocasia sinuata	Critically Endangered	-
Alocasia zebrina	-	Vulnerable

Currently, there is a lack of molecular phylogenetic studies on *Alocasia* species in the Philippines. To enhance our understanding of the genus, it is crucial to investigate plastid and nuclear phylogenies to establish evolutionary relationships and clarify species boundaries. Building upon the research conducted by Medecilo and Madulid (2013), further comprehensive monographs should be undertaken to provide a detailed analysis of *Alocasia* species present in the Philippines. This should include comprehensive information on contemporary taxonomic studies.

While some medicinal properties of *Alocasia* species, particularly *A. macrorrhizos* and *A. sanderiana*, have been studied, there is a need to explore the potential therapeutic benefits of other species. Phytochemical screening should be conducted on the remaining 13 species of *Alocasia* in the Philippines to uncover their medicinal properties and evaluate their potential for drug development. In addition, given the reports of neurotoxicity associated

with *Alocasia* species, particularly *A. macrorrhizos* and *A. sanderiana*, it is essential to conduct comprehensive toxicity studies. These studies should focus on identifying potentially toxic compounds, such as calcium oxalate crystals and lectin, and assessing their effects to ensure the safe use of *Alocasia* species.

Figure no. 2 Framework for addressing the gaps with *Alocasia* species of the Philippines



Given the threat of illegal collection and trade of endemic *Alocasia* species, conservation efforts should be strengthened. This includes enforcing existing legislation, such as Republic Act 9147, which prohibits the illegal collection of wild plants, and regulates the collection and trade of threatened species. The local government and relevant agencies such as the Department of Trade and Industry (DTI) and the Department of Environment and Natural Resources (DENR) should conduct thorough inspections and verification procedures to ensure the provenance of ornamental plants being sold. This is necessary to establish regulations and oversight mechanisms for the sustainable trade of wild plants like *Alocasia*, specifically those harvested from the forests. It is essential to actively monitor and report various online marketing and selling platforms, such as Facebook marketplace, pages, and groups, to the relevant authorities. This proactive approach is crucial in combating activities related to the illicit trade of plants. Moreover, promoting sustainable gardening practices can help reduce the demand for wild-collected *Alocasia* species. Public awareness campaigns should emphasize the importance of purchasing plants from reputable sources and avoiding the acquisition of illegally sourced or threatened species. Moreover, encouraging collaboration and knowledge sharing among experts in the field can contribute to a better understanding of *Alocasia* species in the Philippines. This can be achieved through partnerships, workshops, and conferences focused on taxonomy,

phytochemistry, conservation, and sustainable trade.

The framework includes an assessment of the conservation status of *Alocasia* species that have not yet been evaluated by the IUCN (International Union for Conservation of Nature) or in the DAO 2017-11 report. This assessment may utilize a Localized Conservation Priority Index (LCPI) developed specifically for the local context (Buot et al. 2024a, 2024b). The LCPI will provide a more accurate and nuanced understanding of the conservation needs of *Alocasia* species at the local level within the Philippines. It will consider factors such as the species' distribution, population size, habitat, threats, and cultural significance across the Philippine archipelago. This localized approach will help identify *Alocasia* species that require urgent conservation attention. The LCPI results can inform decision-making and guide the allocation of resources and conservation efforts to ensure the long-term survival of this ecologically and culturally important genus in the wild in the Philippines.

Through the implementation of this framework, it can effectively tackle threats and problems associated with *Alocasia* species in the Philippines. This will facilitate a deeper understanding of the genus, enable the conservation of species, and responsibly harness their medicinal and economic potential in a sustainable manner.

Recommendations

It is recommended to implement a comprehensive framework to address threats and problems associated with *Alocasia* species in the Philippines. Targeted surveys and explorations be conducted in under-studied provinces and islands of the Philippines. This will lead to the discovery of new *Alocasia* species or distribution, and the development of a comprehensive database and inventory of the genus. The establishment of a localized conservation priority index to assess the status of *Alocasia* species at the local level be conducted. The integration of these localized assessments with the IUCN Red List and DAO 2017-11 will give a more holistic and accurate understanding of the conservation status of *Alocasia* species. This will enable the identification of the species that require immediate conservation attention or interventions. It is also recommended to implement community-based education and training programs to raise awareness and empower local communities in *Alocasia* conservation efforts. This will encourage community members to become active stewards of *Alocasia* conservation, participating in monitoring, data collection, and the reporting of illegal activities. Moreover, increased collaboration between government agencies, research institutions, and local stakeholders will ensure the effective implementation and enforcement of *Alocasia* conservation efforts. It further recommends creation of a comprehensive online platform or database and the establishment of regular regional or national-level workshops, conferences, and symposia to enhance knowledge-sharing and collaborative efforts. These initiatives will facilitate the exchange of research findings, conservation data, and best practices related to *Alocasia* species, while also fostering partnerships with academic institutions, botanical gardens, and international organizations to leverage global expertise and resources for *Alocasia* research and conservation.

Conclusions:

There is a critical need for further research and conservation efforts to better understand and protect the diverse *Alocasia* species found in the Philippines. The Philippines is home to 15 *Alocasia* species, 12 of which are endemic, making the genus ecologically and culturally important in the region. However, there are *Alocasia* species in the country that are facing severe threats of extinction, with some already classified as critically endangered or endangered. The lack of comprehensive molecular phylogenetic studies and

taxonomic monographs on the genus in the Philippines has hindered a deeper understanding of the evolutionary relationships and species boundaries. Addressing these knowledge gaps through enhanced research on the taxonomy, medicinal properties, and toxicology of *Alocasia* species is crucial. Equally important are strengthened conservation efforts, including enforcing legislation, regulating the collection and trade of these plants, and developing a localized conservation priority index to guide targeted protection measures. Promoting collaboration and knowledge sharing among experts can also contribute to the sustainable management of *Alocasia* species in the Philippines. The implementation of the above multifaceted framework in the Philippines can effectively tackle the challenges in *Alocasia* research and conservation, ultimately preserving this unique and valuable genus for the benefit of present and future generations.

Rezumat:

LISTA DE VERIFICARE A SPECIILOR DE *ALOCASIA* (SCHOTT) G. DON (ARACEAE) DIN FILIPINE: DIVERSITATE, AMENINȚĂRI ȘI PROBLEME DE CONSERVARE

Alocasia (Schott) G.Don este genul cu cea mai extinsă reprezentare a speciilor din familia Araceae descoperite în Filipine. Această lucrare de analiză își propune să determine diversitatea, morfologia, utilizările, distribuția, habitatul și starea de conservare a speciilor *Alocasia* din Filipine, să evalueze amenințările și problemele actuale referitoare la speciile *Alocasia* din țară și să propună un cadru de conservare pentru a aborda amenințările și problemele identificate. A fost efectuată o revizuire sistematică a literaturii de specialitate utilizând Google Scholar și ScienceDirect, completată cu date din Co's Digital Flora of the Philippines, IUCN Red List și DAO 2017-11. Rezultatele arată că în Filipine trăiesc 15 specii de *Alocasia*, dintre care 12 sunt endemice. Aceste specii sunt utilizate în mod obișnuit ca plante ornamentale și au diverse utilizări medicinale și culturale. Cu toate acestea, există specii de *Alocasia* care se confruntă cu amenințări grave de dispariție, trei dintre acestea fiind clasificate ca aflându-se în pericol critic de dispariție, una în pericol de dispariție și una ca fiind vulnerabilă. Taxonomia genului *Alocasia* a fost revizuită pe baza caracteristicilor morfologice și anatomice, dar există o lipsă de studii filogenetice moleculare. Revizuirea relevă necesitatea unor cercetări suplimentare privind taxonomia, proprietățile medicinale și conservarea speciilor de *Alocasia* din Filipine. Recomandările includ efectuarea de studii filogenetice moleculare, elaborarea de monografii taxonomice cuprinzătoare, explorarea proprietăților fitochimice și toxicologice ale speciilor *Alocasia*, consolidarea eforturilor de conservare prin reglementare și monitorizare și promovarea colaborării între experți pentru a asigura gestionarea durabilă a acestui gen unic și valoros.

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Annexes:

Figure no. 1: *Alocasia* species with conservation status in IUCN and/or DAO 2017-11: *Alocasia micholitziana* (a), *Alocasia sanderiana* (b), *Alocasia sinuata* (c), and *Alocasia zebrina* (d). (Source: Pelser et al. (2011 onwards))


a.
Photo Credit: D. L. Nickrent (Co's Digital Flora of the Philippines – https://www.philippineplants.org/)


b.
Photo Credit: Kierr Jasper Sancover

c.
Photo Credit: Wally Suarez


d.
Photo Credit: P.B. Pelser & J.F. Barcelona

Table no. 1 Diversity, Morphology, Uses, Distribution, and Habitat of *Alocasia* Species in the Philippines

	Species	Morphology	Use	Distribution	Habitat	Reference
1	*Alocasia atropurpurea*	Robust caulescent herbs having a massive growth	Used as ornamental plant	Benguet, Ifugao, Mountain Province, Ryukyu Isls.	As part of a wider karst landscape, it grows on the limestone in an open roadside habitat	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Ongpoy (2017) www. aroidpedia.com
2	*Alocasia boyceana*	Moderately robust herbal growth form, stems erect to decumbent	Used as ornamental plant	Cebu, Jolo, Bataan, Cotabato, Misamis Oriental, Negros Tawi-tawi	Low to medium elevation rainforest, occasionally on limestone	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Ongpoy (2017) www. aroidpedia.com
3	*Alocasia clypeolata*	Small herbs having entire leaf margins with globose lower spathes	Grown as ornamental plant	Surigao, Lesser Sunda Isls.	80 meters above sea level in rocky soil on a steep slope near the edge of a forest	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Steiner (1960) Beligolo and Buenavista (2023) www. aroidpedia.com
4	*Alocasia culionensis*	Moderately robust herb having erect to decumbent stems	Used as ornamental plant	Balabac, Basilan, Busuanga, Culion, Jolo, Leyte, NCR, Sorsogon, Davao, Mindoro, Palawan, Panay, Siasi, Sulu Archipelago	Lowland rain forest situated on moist, shaded terrain	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Ongpoy (2017) www. aroidpedia.com
5	*Alocasia heterophylla*	Small herbs with triangular entire leaves	Used as ornamental plant	Alabat, Balabac, Basilan, Cebu, Jolo, Albay, Bataan, Camarines Norte, Camarines Sur, Ilocos Norte, La Union, Laguna, NCR, Pampanga, Pangasinan, Quezon, Rizal, Sorsogon, Zambales, Cotabato, Davao, Davao Oriental, South Cotabato, Mindoro,	Dipterocarp forest, or lowland rain forest, to ca. 300 meters above sea level	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Ongpoy (2017) www. aroidpedia.com

				Negros, Panay, Polillo, Samar		
6	*Alocasia macrorrhizos*	Trunk forming massive pachycaul growth habit developing a grayish brown bark	Used to treat diabetes, pus in the ears, jaundice, and constipation An important food plant in the Visayan region particularly in Samar and Leyte Cultivated for its tubers and leaves, which is also used as animal fodder Used as ornamental plant	Batan, Leyte, Bataan, Benguet, Cagayan, Ifugao, Laguna, Mountain Province, Pampanga, Quezon, Rizal, Sorsogon, Zamboanga Sibugay, Mindoro, Palawan, Polillo	Prevalent from sea level to 500 meters near riverbanks and other moist areas; can be found along riverbanks and streams from sea level to 800 meters, as well as in low wet disturbed and secondary forests, mesic valleys, ancient gardens, and cultivated lands	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Rahman et al. (2012) Medecilo and Madulid (2013) Nauheimer et al. (2012) Beligolo and Buenavista (2023) Useful Tropical Plants Database (2024)
7	*Alocasia maquilingensis*	Robust caulescent herbs, with massive growth form	Used as ornamental plant	Leyte, Laguna, Sorsogon, Bukidnon, Davao, Lanao, Zamboanga, Zamboanga Sibugay, Panay, Poneas	On low- to medium-elevation slopes in primary rain forests	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Ongpoy (2017) www. aroidpedia.com
8	*Alocasia micholitziana*	Moderately robust herbal growth form having strongly undulated leaf margin	Used as ornamental plant	Apayao, Benguet, Ifugao, Laguna, Mountain Province	Found in primary and secondary forests, as well as in roadside clearings at altitudes of approximately 1200 to 1500 meters	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Beligolo and Buenavista (2023) www. aroidpedia.com
9	*Alocasia nycteris*	Moderately robust herbal growth form with deeply undulate leaf margin	Used as ornamental plant	Panay	Present in remnant lowland and secondary forests; often found in rocky areas; prefers shaded locations along roadsides and also grows in disturbed secondary forests near rice fields	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Ongpoy (2017) www. aroidpedia.com
10	*Alocasia portei*	Trunk forming massive pachycaul growth with the mature plant	Used as ornamental plant	Camarines Sur, Laguna, Quezon Province	In low- and medium-altitude secondary and remnant primary	Pelser et al. (2011 onwards) Medecilo and Madulid

		developing a grayish brown bark			forests	(2013) Ongpoy (2017)
11	*Alocasia ramosii*	Small herbs with narrowly triangular leaves	Used as ornamental plant	Camarines, Laguna, Quezon, Rizal, Sorsogon, South Cotabato, Negros, Panay	Lowland rain forest up to 400 meters above sea level, frequently close to streams	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Ongpoy (2017) www. aroidpedia.com
12	*Alocasia sanderiana*	Moderately robust herb with erect to decumbent stems and deeply undulate leaf margin	Leaves used for toothache by the Matigsalug tribe of Marilog district, Davao City. Antibacterial Grown as ornamental plant	Agusan, Agusan del Norte, Lanao, Lanao del Norte, Misamis Oriental, Surigao	Low-elevation moist ravines with an old forest	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Ongpoy (2015) Guevara and Garcia (2018) Steiner (1960) Beligolo and Buenavista (2023) www. aroidpedia.com
13	*Alocasia scalprum*	Small herb with narrowly lanceolate blade and entire leaf margins	Grown as ornamental plant	Dinagat, Samar	Forest floor located beneath the canopy of trees	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Steiner (1960)
14	*Alocasia sinuata*	Small herb having a bullate and deeply coriaceous blade	Grown as ornamental plant	Leyte, NCR, Surigao, Palawan	Limestone forest	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Steiner (1960)
15	*Alocasia zebrina*	Moderately robust herb with erect to decumbent stems and entire leaf margins	Grown as ornamental plant	Alabat, Biliran, Leyte, Batangas, Camarines Sur, Ifugao, Laguna, Quezon, Sorsogon, Bukidnon, Davao del Sur, South Cotabato, Samar	Low- to medium-elevation rainforest	Pelser et al. (2011 onwards) Medecilo and Madulid (2013) Steiner (1960) Beligolo and Buenavista (2023) www. aroidpedia.com