Re-Inventory of Plant Collection: Original Source and Potency of Phytoacumulator in Purwodadi Botanical Garden

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Abstract. The Purwodadi Botanical Garden is one of Indonesia's most important ex situ conservation centers, preserving the diversity of tropical lowland dry-area plants. A reinventory of collections was carried out to update biodiversity data and assess species' potential to support further research programs, particularly the development of local phytoaccumulator plants. This study aims to analyze changes in collection composition between 2024 and 2025, examine the geographical distribution of collection origins across Indonesia, and identify plant species with potential as phytoaccumulators . Data analysis revealed an increase in the number of species from 1,833 in 2024 to 2,623 in 2025, while the number of specimens decreased from 11,061 to 10,195. Family-level diversity showed several dominant families that contributed substantially to the rise in species numbers. The geographical distribution of collections was visualized on a map of Indonesia to illustrate the regional origins of the collected species. In addition, six local plant species with potential as phytoaccumulator were identified, namely Pterocarpus indicus, Cerbera manghas, Spathodea campanulata, Mimusops elengi, Albizia saman, and Polyalthia longifolia, which can be utilized in phytoremediation and environmental conservation programs. The results of this study represent an initial step toward creating a database of local phytoaccumulator species in Indonesia and providing a foundation for further research and collection management focused on ecological function and sustainability.

1 Introduction

Purwodadi Botanical Gardens own role strategic as center ex situ conservation of plants tropical plains low dry in Indonesia [1]. This institution functioning as repository genetics, center research, as well as means supportive education preservation species local and study regional ecology [2]. As institutions that manage collection live, Purwodadi Botanical Gardens provide source reference important for study taxonomy, morphology, and function

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ecology as well as become a database for preparation of conservation and restoration programs for lowland habitats low dry and vulnerable to degradation [3].

The role of gardens highway as laboratory nature and center learning environment demand implementation management documented collections with Good so that function scientific and conservation can walk in a way effective [4].

Reinventory becomes activity important For guard mark scientific and conservation collection Because ensure completeness, accuracy, and currency of the required database researchers, managers, and stakeholders policy [5]. The database is not updated potential contain error identification taxonomy, duplication entries, as well as lack information origin geographical so that reduce mark collection For need research and retrieval decision conservation [6]. Initiative digitalization and improvement system information collection also becomes urgency in effort increase data accessibility as well as integration institutional in network garden highway national [7].

Activity reinventory the more relevant remember existence change condition environment good in natural habitat or in the garden highway, development knowledge taxonomy that can change nomenclature status species, as well as dynamics collection that causes addition or the exit specimen from collection. Change environment like conversion land, pollution, and climate change climate influence availability source genetics in nature, so that important ex situ collections For Keep going evaluated to remain represent diversity biogeography and taxonomy in a way adequate [8].

Likewise, changes emerging nomenclature consequence development taxonomy require update identity specimens to remain accurate for interest scientific [9].
Reinventory collection No only aim For ensure documentation and validity taxonomy, but also for strengthen its relevance to study applied, especially in development solution based plant like phytoremediation [10].

A number of study show that species trees and plants woody own potential significant in absorb and accumulate metal heavy, making collection garden highway as source candidate potential For remediation land polluted [11]. Considering part big study phytoremediation in Indonesia is still dominated by species aquatic or plant general, identification ability phytoaccumulation in local flora collection garden highway become step strategic For develop solution adaptive remediation to condition land tropical plains low [12].

Study previously at Purwodadi Botanical Gardens has highlight character morphology, zoning, and function ecosystem collection trees and species local, but information about potential functional like ability phytoaccumulation Not yet documented in a way comprehensive [13]. Limitations the become obstacle in develop research programs applied and implemented phytoremediation based species endemic or adaptive to condition land tropical plains low [14].

Reinventory accompanied by mapping potential ecological — for example ability accumulation metal heavy — will enrich mark use collection for study environment and conservation based evidence [15].

Mapping origin geographical collection become element important For evaluate regional representation in collection Purwodadi Botanical Gardens and for develop a collection strategy as well as conservation priority so that ex situ collections are able to reflect diversity Indonesian biogeography [16]. Information about origin specimens also contribute to the understanding variation related adaptive with tolerance plant to content metal heavy on the ground, potentially influence ability phytoaccumulation something species [17].

Study This do reinventory collection Purwodadi Botanical Gardens For map change composition collection between 2024 and 2025, review distribution geographical origin species collection, and identify potential species as phytoaccumulator For support study phytoremediation based species local. Updating collection data expected No only strengthen

role garden highway in conservation and research taxonomy but also open opportunity implementation collection as source Power ecological in mitigation pollution and rehabilitation land [18].

2 Research methods

2.1 Research Location

Study This was conducted at the Purwodadi Botanical Gardens (KRP), which is located on Jalan Surabaya–Malang Km. 65, District Purwodadi, Regency Pasuruan, East Java Province, Indonesia. KRP has wide approximately 85 hectares and is located at an altitude of 300 meters above sea level. surface sea . This area functioning as center ex-situ conservation for plant plains low dry, so that be one of location important in preservation diversity living conditions in Indonesia. climate at the location this is the average receiving rainfall Rain annual approximately 2,366 mm with temperature ranges from 22–32 °C, depending on with description general plant plains low dry .

2.2 Research Design

Study This use approach descriptive-comparative based on inventory data collection . Primary data was obtained from the collection database Purwodadi Botanical Gardens 2024 and 2025. With approach said, the changes composition collection interperiod can analyzed in a way systematic, covering amount species, number specimens, as well as structure its taxonomy.

2.3 Data Source

Primary data source study This obtained from the internal database of Purwodadi Botanical Gardens, which includes amount species and specimens every year, origin geographical collection, as well as classification taxonomy until level family. In addition, literature scientific and documents supporters used For strengthen analysis potential phytoaccumulators, especially those discussing content metal in the network plants, study phytoremediation species local, as well as character physiological and adaptation plants in their environment.

2.4 Procedure data processing

Procedure data processing is carried out in a number of stages, namely:

2.4.1 Comparison Collection

Recapitulation amount species and numbers specimen based on collection data 2024 and 2025. Furthermore analyzed change amount the For determine trend increase or decline types and specimens between year.

2.4.2 Analysis Composition Family

Vegetation observation was carried out by traversing the research area and recording all plant types found in the three strata: trees, undergrowth, and seedlings. Recorded data included species name (local and scientific), number of individuals, trunk diameter for tree strata, vegetation strata category, and surrounding environmental conditions that may affect plant growth. Species identification was performed using a plant identification application (Seek) and field identification books to ensure accuracy in species determination.

2.4.3 Analysis Distribution Geographical

Classification species according to origin regional collections (e.g. Sumatra, Java, Kalimantan, Sulawesi, Papua, etc.). Classification results the visualized in form map distribution in Indonesia using device soft mapping. This map describe pattern distribution collection in accordance origin geographical species.

2.4.4 Analysis Composition Family

Selection species potential as phytoaccumulator done based on review literature about content metal, history study phytoremediation or phytomining, as well as character physiological and adaptation ecologically to marginal land or contaminated. All criteria the integrated For produce more analysis comprehensive about change collection and potential phytoaccumulator in Purwodadi Botanical Gardens.

2.5 Software

Data analysis in study This done with utilise a number of device soft standard, namely Microsoft Excel for numerical data processing and compilation table recapitulation species and specimen . Next use of QGIS software for visualization map distribution geographical based on regional information, as well as Google Earth for preparation and verification map distribution species in the Indonesian region. The use of device soft the chosen use support effectiveness statistical data processing and mapping distribution collection in accordance need analysis study.

3 Results and discussion

3.1 Re-inventory of Plant Collection in Purwodadi Botanical Garden

On re-inventory of Collection Plant Purwodadi Botanical Gardens recorded amount species collection increase from 1,833 in 2024 to 2,623 in 2025, indicating increase as many as +790 types or 43.1%. On the other hand, the number specimen decrease from 11,061 to 10,195, a decrease of 866 specimens or around 7.8%, a common pattern happen when data collection undergoing a process of curation and deletion duplication.

Improvement amount species can caused by the presence of addition collection new, good through exploration field and exchange inter-agency, as practice standard in development of living collections. In addition, some improvement Possible originate from rediscovery or identification repeat to previous old collection Not yet own Name scientifically valid.

Change taxonomy can also add amount recognized species, because update synonyms or separation taxa proven impact significant in number species in a collection database. Decline

amount specimen possibility related with mortality plants, which can influenced by age plants, stress environment, disturbance weather extreme, as well as disease [5]. In addition to mortality, reduction specimens can also be happen consequence reorganization collections, such as removal, pruning, or deletion plants that do not Again in accordance with priority conservation. Another factor that has a significant influence is data cleaning, where deletion duplicates, specimen ID consolidation, and correct recording cause decline amount individual recorded although data quality improves.

Change This show that collection become richer in terms of taxonomy However more A little in a way amount individual, so that a number of species can be in condition vulnerability If only represented by a few specimen as well as confirm the need for a balanced management strategy between improvement diversity types and maintenance amount individuals per taxon For guard resilience collection term long.

3.2 Family-Based Biodiversity

Purwodadi Botanical Gardens recorded 139 families in his collection, which shows level diversity high and giving taxonomy proof that garden highway the functioning as ex-situ center for various group plant tropical . The existence of a number of family dominant namely Arecaceae, Fabaceae, Rubiaceae, Moraceae, and Annonaceae reflect pattern common in gardens highway tropical where large and ecologically important families tend to represented strong Because mark ecological and its use.

Condition habitat fertility (quality soil, nutrients, and micro -habitats) in the collection area and house glass is very influential ability maintain families said . Garden the highway that has management land and practice horticulture standardized capable look after more Lots individuals and species from families tropical compared to location with condition physical deficiencies suitable. Determination priority collection in the garden modern highways usually based on a combination criteria namely conservation status, value scientific or ethnobotany, representation geographical, and feasibility ex-situ maintenance. This approach help choose families and species that need get attention maintenance intensive [13].

Table 1. Family List Collection Purwodadi Botanical Gardens.

Acanthaceae	Cannaceae	Fabaceae	Moraceae	Proteaceae
Achariaceae	Capparaceae	Fagaceae	Moringaceae	Pteridaceae
Actinidiaceae	Cardiopteridaceae	Flagellariaceae	Musaceae	Putranjivaceae
Adoxaceae	Casuarinaceae	Gentianaceae	Myristicaceae	Rhamnaceae
Alismataceae	Celastraceae	Gnetaceae	Myrtaceae	Rhizophoraceae
Amaryllidaceae	Chloranthaceae	Goodeniaceae	Nelumbo nucifera	Rosaceae
Anacardiaceae	Chrysobalanaceae	Heliconiaceae	Nephrolepidaceae	Rubiaceae
Annonaceae	Clusiaceae	Hernandiaceae	Nyctaginaceae	Rutaceae
Apocynaceae	Combretaceae	Hypericaceae	Nymphaeaceae	Salicaceae
Araceae	Connaraceae	Hypoxidaceae	Olacaceae	Santalaceae
Araliaceae	Convolvulaceae	Icacinaceae	Oleaceae	Sapindaceae
Araucariaceae	Cornaceae	Iridaceae	Osmundaceae	Sapotaceae
Arecaceae	Costaceae	Lamiaceae	Oxalidaceae	Schisandraceae
Aristolochiaceae	Cupressaceae	Lauraceae	Pandaaceae	Schizaeaceae
Asparagaceae	Cyatheaceae	Lecythidaceae	Pandanaceae	Selaginellaceae
Asphodelaceae	Cycadaceae	Loganiaceae	Passifloraceae	Simaroubaceae
Aspleniaceae	Datiscaceae	Lycopodiaceae	Phyllanthaceae	Smilacaceae
Asteraceae	Davalliaceae	Lythraceae	Phytolaccaceae	Solanaceae
Athyriaceae	Dennstaedtiaceae	Magnoliaceae	Pinaceae	Stemaceae
Bignoniaceae	Dilleniaceae	Malpighiaceae	Piperaceae	Strelitziaceae

Bixaceae	Dioscoreaceae	Malvaceae	Pittosporaceae	Styracaceae
Blechnaceae	Dipterocarpaceae	Marantaceae	Poaceae	Tectariaceae
Boraginaceae	Dryopteridaceae	Marattiaceae	Podocarpaceae	Thelypteridaceae
Bromeliaceae	Ebenaceae	Melastomataceae	Polygalaceae	Thymelaeaceae
Burseraceae	Elaeagnaceae	Meliaceae	Polygonaceae	Urticaceae
Cactaceae	Elaeocarpaceae	Menispermaceae	Polypodiaceae	Verbenaceae
Calophyllaceae	Euphorbiaceae	Monimiaceae	Primulaceae	Viburnaceae
Cannabaceae	Zamiaceae	Zingiberaceae	Vitaceae	

Geographical location Purwodadi Botanical Gardens as garden highway tropical in Indonesia provides profit alone For accommodate family tropical Because condition climate local areas that approach natural habitats Lots taxa tropical, so that Lots species from family dominant the show good growth and reproduction in condition Purwodadi. However, the suitability climate No automatic ensure success term long for all taxa, some habitat- specific species or sensitive to variability temperature and humidity still need environment micro or treatment House glass specifically to be able to survive and thrive. Because the collection life usually represent a number of small individuals per species, management strategies that emphasize enrichment genetics like collection from different wild populations, breeding programs, and maintenance seed bank stock recommended For reduce risk lost variation genetics although diversity level family high.

Planning collection should include periodic monitoring to condition land or vegetation, analysis habitat needs per family, and prioritization species vulnerable . Steps This in line with a guide to modern living collections that aims combine mark conservation, research, and education.

3.3 Distribution of Collection Origins Based on Indonesian Region

Purwodadi Botanical Gardens recorded 139 families in his collection, which shows level diversity high and giving taxonomy proof that garden highway the functioning as ex-situ center for various group plant tropical.

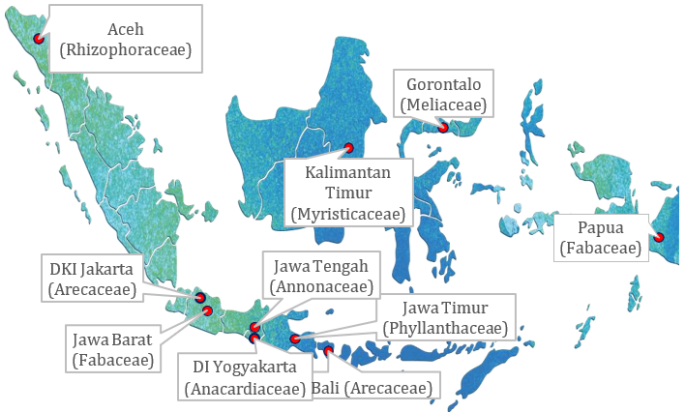

Figure 1. Map of Regional Origin Distribution of Collections Purwodadi Botanical Gardens.

Visualization distribution regional origin of the collection plants, as presented in Figure 1, shows pattern distribution geographically unrelated evenly distributed throughout Indonesia. This map in a way specific highlight provinces that become source main representative collection family the most dominant plants from each area.

The map shows that collection with domination taxonomy highest concentrated on the island of Java, especially West Java, East Java, and Central Java. West Java Province occupies position top as contributor largest and dominated by the Fabaceae family . The dominance of Fabaceae, which is known own diversity species height and potential phytoaccumulation in some genus, indicating focus strong collection to group taxonomy this. Meanwhile that, East Java, as province location Purwodadi Botanical Gardens, has domination Phyllanthaceae, and Central Java is dominated by Annonaceae . The concentration of This No only reflect diversity local, but also shows a sampling that tends to more intensive carried out in nearby areas, facilitating the collection and conservation process.

The map also shows contribution important from a number of other provinces outside island Javanese, although with intensity more collections low . For example, the East Kalimantan region is characterized by with domination *Myristicaceae* (Palapalaan), and collections from Bali is dominated by *Arecaceae* (palms). The difference domination family in every island This confirm that collection Purwodadi Botanical Gardens has succeed catch representation diversity taxonomy from ecosystem forest tropical different wetness. Designation specific families in each of these areas give instruction beginning regarding the saving area diversity genetics tall from potential families as phytoaccumulators, for example Myristicaceae is known own characteristic accumulation in several its species.

Collection from various regional shows existence priority collections in the Java region and focus on easily identifiable families accessed . This map can become runway For step conservation and research next, such as identify gap geographical (provinces that have not been represented) and planning expedition collections in the future. In addition, the distribution domination recorded family can become base For do studies phytoaccumulation more further, where the dominant families such as Fabaceae can become candidate main For testing ability absorption metal heavy [19].

3.4 Identification species potential as phytoaccumulative

3.4.1 Pterocarpus indicus

Pterocarpus indicus Willd., or more known as angsana, is growing trees tall and shady with mark high economic and ecological value . Trees This originate from the numerous Fabaceae family found in Southeast Asia, including Indonesia. Morphology the leaves compound pinnate odd with strands leaf shaped ellipse until oval and smooth surface . The stem sturdy and straight, with easy skin peeling . The flowers colored yellow bright and organized in bunches. Beauty as well as its adaptability make angsana often made into as tree shade city . In the context of ecology, system roots tree this is very extensive, allowing accumulation metal heavy in a way efficient from contaminated land .

The Plant List [19].

Kingdom	: Plantae
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Fabales
Family	: Fabaceae
Genus	: Pterocarpus
Species	: *Pterocarpus indicus* Willd.

(a) (b)

Figure 1. *Pterocarpus indicus* Willd (a) Appearance Tree, (b) Leaves and Stems

Measurement results surrounding environment tree show conditions that are quite ideal for support function physiological and phytoremediation plant This :

Table 2. Factor data environment at the location species Pterocarpus indicus.

Parameters taken	Mark
soil pH	7
Soil RH (%)	70
Temperature air (°C)	28.8
Air RH (%)	53
Intensity light (lux)	5770

Soil pH value neutral give optimal support for the metal ion absorption process, according to with findings [20] stated that that a pH between 6.5–7.5 supports bioavailability metal weight . Humidity currently until high on the ground and in the air also facilitates ion diffusion to root plant .

Following is capability data accumulation pollutant weight by Pterocarpus indicus from a number of study:

Table 3. Types of pollutants that can accumulated by *Pterocarpus indicus*.

Types of Pollutants	Plant Parts	Concentration (mg/kg)	Reference
Pb	Leaf	42.6	Yusuf *et al.*, 2020
Pb	Stem	37.9	Yusuf *et al.*, 2020
Zn	Roots and Leaves	51.4	Memon *et al.*, 2001
Cu	Network Vegetative	28.7	Singh *et al.*, 2015

This data strengthen proof that P. indicus can used For absorb Pb, Zn, and Cu from environment . The concentration is equivalent or more tall compared to plant accumulator from family others. Comparison with Dalbergia sissoo also from Fabaceae [17] shows that member family This in a way general own superiority physiological in absorb metal heavy Because system extensive lateral roots and activity metabolic high. In addition, a study by

[19] also showed that Fabaceae has efficiency in translocate metal from root to leaves, strengthen potential remediation term long.

3.4.2 Cerberus manghas

Cerbera manghas L., or Bintaro is tree from family Apocynaceae in abundance found in coastal and swampy areas tropical. Characteristics typical its morphology is leaf single shaped lancet long with spiral and surface arrangement shiny. The flowers fragrant, colorful white with touch purple in the part middle. The fruit poisonous, contains cerberin which is cardiotoxic. However, behind toxicity, plants This show resilience tall to stress abiotic and metal heavy. System roots plant This adapted with good on the ground watery salty and land with content metal high, making it candidate potential For remediation area coast and waste industry liquid [21].

Kingdom	: Plantae
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Gentianales
Family	: Apocynaceae
Genus	: Cerberus
Species	: *Cerbera manghas* L.

(a) (b)

Figure 3. *Cerbera manghas* L., or Bintaro (a) Appearance Tree, (b) Leaves.

Measurement results surrounding environment tree show conditions that are quite ideal for support function physiological and phytoremediation plant This :

Table 4. Factor data environment at the location species Pterocarpus indicus.

Parameters taken	Mark
soil pH	7.4
Soil RH (%)	80
Temperature air (°C)	31.3
Air RH (%)	43
Intensity light (lux)	2740

Condition little land base and temperature tall menh show that C. manghas can persist and remain show performance optimal biological conditions in habitats classified as extreme. According to [22], plants This own enzyme antioxidants tall like peroxidase and superoxide dismutase which protect cell from stress oxidative consequence metal weight and radiation light tall.

Following is capability data accumulation pollutant weight by *Cerbera maghas* from a number of study:

Table 5. Types of pollutants that can accumulated by *Cerbera maghas*.

Types of Pollutants	Plant Parts	Concentration (mg/kg)	Reference
Pb	Leaf	58.4r	Barathikannan *et al.*, 2018
Zn	Roots and Leaves	41.2	Lestari *et al.*, 2021
Cu	Leaf	32.5	Lestari *et al.*, 2021

Based on the data above, C. manghas show efficiency in absorb metal weight on various plant organs. Compared to with Avicennia marina [10], which is more limited in storage metal in the roots, C. manghas show accumulation active on leaves and stems easy harvested. Potential This important in context phytostabilization and phytoextraction.

3.4.3 Spathodea campanulata

Spathodea campanulata P. Beauv ., or African tulip, is a tree tropical from West Africa which was introduced to various area tropical including Indonesia because beauty its flowers and rapid growth. Its leaves compound and opposite, with a slightly rough surface rough, whereas the flowers big colored orange bright shaped funnel. Plant This own index tolerance pollution high air (APTI) and used wide as vegetation shade road [23;24].

Kingdom : Plantae
Division : Tracheophyta
Class : Magnoliopsida
Order : Bignoniaceae
Family : Spathodea
Genus : *Spathodea campanulata* P. Beauv.
Species : Bignoniaceae

(a) (b)

Figure 4. *Spathodea campanulata* P. Beauv (a) Appearance Tree, (b) Leaves.

Measurement results surrounding environment tree show conditions that are quite ideal for support function physiological and phytoremediation plant This :

Table 6. Factor data environment at the location species Pterocarpus indicus.

Parameters taken	Mark
soil pH	7.1
Soil RH (%)	100
Temperature air (°C)	27.6
Air RH (%)	60
Intensity light (lux)	1550

Very moist soil and temperature air cool support optimization of photosynthesis and transpiration processes, enabling plant This absorb pollutant gases with more effective . Humidity height also facilitates activity supporting enzymes neutralization of SO_2 and NO_2 in network leaves [17].

Following is capability data accumulation pollutant weight by *Spathodea campanulata* from a number of study :

Table 7. Types of pollutants that can accumulated by *Spathodea campanulata*.

Types of Pollutants	Plant Parts	Value/ Description	Reference
NO_2	Leaf	Absorbed through the stomata	[12]
SO_2	Leaf	Efficient moment humidity tall	[12]
CO	Leaf	APTI: 22.5 (category tall)	Memon *et al.*, 2001
PM2.5 & PM10	Surface leaf	Adsorption tall	[17;25]

Plant This own ability superior in absorb gases and particulates pollutant. High APTI value indicates resilience to stress pollution, and surface broad, textured leaves capable ensnare particulates with efficiency high . Comparison with Delonix regia shows that S. campanulata own performance more Good in absorption pollutant air [24], making it alternative superior For greening city.

3.4.4 Albizia saman

Albizia saman (Jacq.) Merr . (Trembesi) is plant originating from Central America and parts North of South America. Trembesi Now spread widespread in various tropical regions such as Samoa, Micronesia, Guam, Fiji, Papua New Guinea, including Indonesia. In Indonesia itself, the tree This known with Name different in each area, for example called wood colok in South Sulawesi, ki hujan in West Java, and munggur in Central Java. wide This show ability adaptation high rain tree to environment tropical, so that often utilized as tree shade in urban areas and land conservation [26]. Trees Rain tree have mark social important Because produce wood quality high and valuable rubber economy . In some countries, crops this is also utilized in a way traditional, one of them with boil part plant For made into a mixture of hot bath water that is believed to be Can help relieve symptom cancer stomach . According to [27], the following is classification botany from species *Albizia saman* :

Kingdom	: Plantae
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Fabales
Family	: Fabaceae
Genus	: Mimosoideae
Species	: Albizia

Albizia saman (Trembesi) is member the Fabaceae family is known as tree sized currently with title wide resemble umbrella . Its height Can reaches 15–25 meters, in crown diameter up to 30 meters, especially If grows in open areas . Trees This suitable for plains low (0–300 m above sea level) with rainfall Rainfall 600–3000 mm/ year . Trees Rain trees have trunks woody growth upright with monopodial and branching branches round easy rough peeling . The leaves compound, opposite, shaped like strands long, colored green old, and has thorns pinnate . The flowers compound, color gradation red young and white with conspicuous stamens, pistils like funnel and petals resemble bell . The fruit similar pod long rather curved colored chocolate old [28]. Trembesi Lots utilized as tree shade in urban areas because capable lower temperature environment . In addition, the leaves are also useful as feed livestock, and when This currently investigated as biogas sources [27].

(a) (b)

Figure 5. *Albizia saman* or Tree Trembsei (a) Appearance Tree, (b) Leaves and Stems

Environmental factors including component abiotic own role important in influence growth plants so they can grow optimally . Plants Can grow with Good if the environment support . In research this, some factor environment such as soil pH, humidity land and air, temperature air, and intensity light observed For know its suitability to growth Trembesi . Here This is factor data environment found at the location growth Rain tree in Purwodadi Botanical Gardens.

Table 8. Factor data environment at the location species Albizia saman (Trembesi).

Parameters taken	Mark
soil pH	7.1
Soil RH (%)	70
Temperature air (°C)	29.6

Air RH (%)	49
Intensity light (lux)	3580

Environmental data in Table 8. shows the soil pH. of 7.1, humidity land 70%, intensity light 3580 lux, humidity air 49%, and temperature air 29.6°C. neutral pH this is very appropriate with characteristics Trembesi which is generally grow good on the ground with neutral pH until A little acid, and capable adapt to land that experiences pH changes due to activity anthropogenic [29;30]. Humidity high soil (70 %) also supports plant water requirements this, which although tolerant to drought moderate, steady need humidity Enough For optimal growth [31]. Intensity light of 3580 lux indicates availability ray good sun, supportive need Rain tree as species that require light tall For photosynthesis and production biomass [32]. Temperature warm of 29.6°C and humidity 49% air is also considered ideal for species tropical like Rain tree, which grows optimally in the climate warm with humidity currently until high [33]. In general overall, condition environment the support growth healthy and potential phytoremediation from Albizia saman (Trembesi) at the location This . Based on characteristics morphology and condition supportive environment, Albizia saman (Trembesi) has potential very high phytoaccumulation to pollutant air, metal weight, and pollutants organic . The canopy is wide and lush as well as surface few leaves hairy making it very effective in catch particle dust in the air . This is supported by research [34], which explains that mark The Air Pollution Tolerance Index (APTI) is 9.85 which is classified as high, showing ability adaptation and effectiveness in absorb pollutant air . In addition, research by [35] showed existence lead (Pb) content in leaf Albizia saman (Trembesi) which grows in the area with Then cross solid, indicating his abilities in absorb metal heavy from air and land . Trees this is also known as absorber carbon dioxide (CO_2) efficiently, with estimate absorption reached 314.28 tons/ha in stands aged six year [33], and show response physiological to improvement CO_2 concentration in the atmosphere [30]. More further, his ability in survive and function in polluted soil waste oil used, as shown in research by [30], strengthens potential Albizia saman (Trembesi) in remediation pollutant organic . With field data and literature support Scientifically, Albizia saman (Trembesi) has been proven as very potential species For phytoremediation in the environment tropical like Purwodadi Botanical Gardens.

3.4.5 Mimusops elegi

Mimusops elengi L., or more known with Name local tree cape, is plant from family Sapotaceae are known own benefit pharmacological like antioxidant, antimicrobial, and anticancer [36]. Plants from family Sapotaceae This usually cultivated as plant ornamental, especially in India, because fragrant flowers and aesthetic appearance . Tree cape also functions as damper voice noise Because capable absorb wave voice through leaves and branches [37]. According to [38], the following is classification botany from species Mimusops elengi (Cape):

Kingdom	: Plantae
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Ericales
Family	: Sapotaceae
Genus	: Mimusops
Species	: *Mimusops elengi* L.

Mimusops elengi also known as tree cape or flower basket, have characteristics morphology that reflects character general from the order Ericales, such as form leaf ellipse until lancet with end pointed as well as flower with closed petals and corolla dense [39]. The fruit shaped round and has seeds inside, resembling variation fruit in the order group . Trees This sized currently with tall reach about 15 meters, has title shady rounded, leaf single with edge wavy, flower fragrant, and fruit round similar colored melinjo green moment young and changing become reddish when ripe [40]. Tree cape known as plant multipurpose Because almost all over parts of it, such as wood, leaves and flowers are used as material drug traditional . Plants This often found along edge roads and space areas open green Because its effective function as shade. With shady canopy and aesthetic shape, the cape also becomes choice favorite public For planted in the yard home . Its beauty and benefits make tree This own mark high ecological and functional.

(a) (b)

Figure 6. *Mimusops elegant or Tanjung Tree* (a) Appearance Tree, (b) Leaves and Stems

Environmental factors including component abiotic own role important in influence growth plants so they can grow optimally . Plants Can grow with Good if the environment support . In research this, some factor environment such as soil pH, humidity land and air, temperature air, and intensity light observed For know its suitability to Tanjung's growth . Following This is factor data environment found at the location growth of Tanjung in Purwodadi Botanical Gardens.

Table 9. Factor data environment at the location species *Mimusops elegant* (Cape).

Parameters taken	Mark
soil pH	7.1
Soil RH (%)	70
Temperature air (°C)	28.1
Air RH (%)	59
Intensity light (lux)	2590

Environmental data in Table 9. shows the soil pH. of 7.1, humidity land 70%, intensity light 2590 lux, humidity air 59%, and temperature air 28.1°C. Based on study [41], Mimusops elegant or Tanjung tree is known capable adapt with good in the environment urban areas that have temperature height and level sufficient humidity. Temperature air of 28.1 °C recorded in the data including in range temperature suitable tropical For optimal growth of the species this . Humidity air 59 % is also classified as support, remember tree This can increase humidity environment surrounding area.

Although intensity recorded light of 2590 lux including low If compared to with intensity sun full, Mimusops elengi (Cape) is known Enough tolerant to condition variable and constant lighting capable do photosynthesis in a way effective . In terms of planting media, soil pH of 7.1 which is neutral as well as humidity land 70% shows very ideal conditions for absorption nutrition and development root . With Thus, the combination factor environment the support conclusion that location study it is very appropriate For support growth and development Mimusops elengi (Cape) optimally .

Based on characteristics morphology and condition supportive environment, Mimusops elegant or Tanjung tree has potential big in absorb dust and metal weight in the environment urban. Characteristics morphological like wide surface large leaves, cuticle thick and shiny, and tight header make it effective catch particle dust from air . This is supported by [40] which shows that characteristics leaf as in Mimusops elengi (Cape) is very supportive arrest dust . This is also reinforced by [35] who stated that leaf Mimusops elengi (Cape) effective as absorbent particulates from emission vehicle motorized
. Therefore that, density Then cross own influence to plant stomata characteristics this, which is No direct increase his abilities absorb pollutant air like dust [42]. Mimusops elengi (Tanjung) also has potential absorb metal heavy, especially lead (Pb). The ability This supported by the system its deep roots as well as his abilities adapt to various type land [43]. added that a number of Tanjung tree can accumulate metal heavy such as Pb, Cd, and Zn even though in varying levels . Research by [15;35] shows that Pb levels in leaf Mimusops elegant increase along with height density Then cross, prove his role as effective Pb accumulator in areas with level pollution tall.

3.4.6 Polyalthia longifolia

Tree Glodokan (*Polyalthia longifolia* Sonn) is plant ornaments originating from from Sri Lanka and has long been used as tree shade in the area urban . Types of plants This often planted along road as part from the greening program Because his abilities in absorb pollution air [44]. Another advantage that it has glodokan is structure the roots that grow penetrate land in a way vertical, but No spread in a way aggressive to surface, so that No risky damage infrastructure like sidewalk or surrounding buildings . Due to the nature of ecological this tree Glodokan often made into choice main For planting along road and open areas green in the city . In addition to its function in reduce pollution and provide shade, Glodokan also has mark aesthetics tall from form the leaves are neat and hanging, so that often used as element decorative in design landscape city [45]. According to [46], the following is classification botany from species Polyalthia longifolia (Glodokan):

Kingdom	: Plantae
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Mognoliids
Family	: Annonaceae
Genus	: Polyalthia
Species	: *Polyalthia longifolia* Sonn

Polyalthia longifolia (Glodokan) is species included in the genus Polyalthia, which consists from about 120 species and spread wide in the area tropical such as Africa, South and Southeast Asia, Australia, and New Zealand New . Species This originate from India and Sri Lanka, and has Lots introduced as plant ornamental in various tropical countries Because

characteristics its interesting morphology . Plants This is tree always high green and capable grow until reach height of 15–20 meters. At this stage growth young, stem plant grow in a way straight with hanging branches, where the branches longest generally be in the section base stem . Growth pattern This form crown tree that resembles cone . The leaves own form oval until lanceolate, colored green old shiny with edge wavy and veined protruding leaves . P. longifolia flowers are colored green pale with petals wavy and only blossom for two to three week . Structure the flowers consists of over 20–25 carpels with an unpleasant stigma stalked. Fruit grow in groups in one bunch contains around 10–20 pieces initially colored green, then changed become purple or black when ripe, with form common fruit hollow [46].

(a) (b)

Figure 7. *Polyalthia longifolia or* Tree Glodokan (a) Trunk Tree, (b) Leaves.

Environmental factors including component abiotic own role important in influence growth plants so they can grow optimally . Plants Can grow with Good if the environment support . In research this, some factor environment such as soil pH, humidity land and air, temperature air, and intensity light observed For know its suitability to growth Glodokan . Here This is factor data environment found at the location growth Glodokan in Purwodadi Botanical Gardens.

Table10. Factor data environment at the location species Mimusops elegant (Cape).

Parameters taken	Mark
soil pH	7.2
Soil RH (%)	70
Temperature air (°C)	30.3
Air RH (%)	48
Intensity light (lux)	1230

Environmental data in Table 10. shows the soil pH. of 7.2, humidity land 70%, intensity light 1230 lux, humidity air 48%, and temperature air 30.3°C. Conditions environment place grow Polyalthia longifolia or Glodokan show good fit to characteristics ecologically . soil pH of 7.2 which is classified as neutral very supportive availability nutrition and activity important microorganisms for health root [47]. Humidity land by 70% including high and ideal for support optimal water absorption, which is important for the process of photosynthesis and growth . Although intensity light 1230 lux is classified as medium, Glodokan Still capable photosynthesize and adapt to location with shade partial [48]. Ability adaptive This allows plant still grow although No is at in condition lighting maximum, so that suitable planted in the area shady urban areas . Humidity air 48 % is sufficient support

normal transpiration without cause stress dryness of the leaves [49]. Temperature warm 30.3°C air in accordance with preference climate tropical *P. longifolia*, so that support activity metabolism and potential optimal growth [49], including in context its function as plant shade and absorber pollutants in the environment tropical .

Based on morphological data and studies library, *Polyalthia longifolia* (Glodokan) shows potential as effective phytoaccumulator in the environment urban . The header is lush as well as surface broad, smooth leaves making it very efficient in trap particle dust from air [49;50]. In addition, the species This own adaptation to pollution visible air from his abilities do assimilation carbon optimally in the area polluted [51;52]. The system deep and strong roots also support its potential in absorb metal heavy from land, although study more carry on Still required [48]. Previous studies find existence accumulation of lead (Pb), copper (Cu), cadmium (Cd), and zinc (Zn) in the tissue P. longifolia leaves in areas with Then cross dense [53]. However, the accumulation metal heavy the can cause decline level chlorophyll and disorders photosynthesis . Index Tolerance Air Pollution (APTI) in species this is also classified as high, showing his abilities stay under pressure pollution [54]. With Thus, Polyalthia longifolia (Glodokan) has mark high ecological and functional as element vegetation strategic in mitigation pollution air in urban areas .

4 Conclusion

Reinventory collection plants in the Purwodadi Botanical Gardens 2025 shows improvement amount species from 1,833 to 2,623, accompanied by decline amount specimen from 11,061 to 10,195, which indicates improvement taxonomic data accuracy through curation and deletion duplication although cause decrease individual collection . Analysis composition family show domination *Arecaceae, Fabaceae, Rubiaceae, Moraceae, and Annonaceae* as group taxonomy main, whereas mapping distribution geographical disclose concentration origin collection the biggest from the Java region, reflecting focus exploration in the area closest and at the same time show existence gaps in other collection areas in Indonesia. Research this also works identify six species potential as phytoaccumulators — *Pterocarpus indicus, Cerbera manghas, Spathodea campanulata, Albizia saman, Mimusops elengi*, and *Polyalthia longifolia*—which have ability absorb metal heavy and pollutant air so that relevant For effort phytoremediation and management environment based diversity life . Therefore that, the result reinventory This No only strengthen documentation ex situ conservation, but also opens up opportunity utilization collection plant as data sources and candidates species for remediation programs environment and strengthening function ecology garden raya in the future.

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