Jurnal Pembelajaran Dan Biologi Nukleus p-ISSN: 2442-9481
Vol 11 (2): 502 - 516, June 2025 e-ISSN: 2685-7332

Species of Woody Plants in Green Open Spaces of Medan State University

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Submitted February 03 Rd 2025 and Accepted May 23 Th 2025

Abstract

Background: *Universities play a critical role in the development of urban ecosystems, which include artificial forests, parks, and green open spaces. Medan State University is one of the campuses in Medan City, North Sumatra, that boasts a significant amount of green open space. In order to identify and prioritize the conservation of woody plant species, data collection is necessary.* **Methodology:** *The method employed exploration, which involves the recording of all woody plants and their presentation in a qualitative descriptive format.* **Findings:** *The data on woody plants in the green open spaces of Medan State University are categorized into 2 subdivisions, 48 families, and 146 species, as indicated by the study's findings.* **Contribution:** *Protective plants, medicinal plants, spices, fresh fruits, and ornamental plants are all utilized. It is anticipated that the findings of this investigation will serve as a reference for future research on woody plants in urban green open spaces.*

Keywords: *Green Open Space; Medan state university; Species; Urban Ecosystem; Woody plants*

https://doi.org/10.36987/jpbn.v11i2.6848

INTRODUCTION

Universities play a critical role in the urban ecosystem, serving as urban forests, parks, and green open spaces (A'yun & Purianto, 2020). The university's Green Campus initiative is designed to create an inviting, shaded, and visually appealing environment. The sustainability of resources and the enhancement of the quality of the environment on campus are inextricably linked to the collaboration between students, lecturers, and non-academic staff in the realization of a green campus (Islam & Dooty, 2015).

A green campus is a location that is conducive to sports, tourism, and the inhalation of fresh air in the urban environment (Artisna et al., 2018; Buana et al., 2018). Ex situ, universities are transformed into conservation areas for flora and fauna (Retnoningsih et al., 2023; Sanito & Keiluhu, 2017). Flora is a biotic component that is of paramount importance to the environment. It is not uncommon for universities to establish plant collections, including arboretums, within their campuses.

An arboretum is a garden collection of trees of varying species and conservation statuses (Napolion et al., 2017; Sanito & Keiluhu, 2017). Widyatmoko (2019) note that an arboretum primarily consists of woody plants. An arboretum or campus forest is a location where rare plants, including meranti, kruing, lagan, and others, are conserved. Fruit, medicinal, and spice plants are also stored at the arboretum, in addition to rare plants (Napolion et al., 2017). The role of plants as buffers for ecosystems and life provides humans with tangible, immeasurable benefits. The Arboretum of Lancang Kuning University (UNILAK) in Pekanbaru serves as a tourist attraction, research object, and educational area for the local community (Handayani et al., 2017; Sadjati et al., 2024). The clean air of the city is a result of the campus forests of the University of Indonesia (UI) in Depok and Tanjungpura University (UNTAN) in Pontianak, which function as water catchment areas and protected areas (Rahmawaty et al., 2016). The University of North Sumatra in the city of Medan uses teak trees as board materials (Rahmawaty et al., 2016). According to Mauliadi & Sinaga (2019), Medan State University (UNIMED) was previously referred to as a "green campus." The UNIMED area is characterized by a green open space that is dominated by a collection of trees and various ornamental plants, despite the absence of an arboretum.

Plants, including woody plants, have been extensively employed as biological resources for human purposes (Handayani et al., 2017; Mbaruku et al., 2024). Woody plants possess hard stems because their tissue structure is characterized by wood (Park, 2024). Woody plants are crucial elements of the ecosystem, agro-ecosystem, and conservation environment. People extensively employ these plants as building materials, paper raw materials, furniture, and as a source of life support in the forest. At present, plants are in danger of extinction. This decline is the result of habitat loss caused by human activities, including the conversion of forests into agricultural land and the excessive use of plants (Isajev et al., 2018; Widyatmoko, 2019). Universities like Medan State University will preserve at least a few plants due to the presence of green open spaces.

Research on plant species identification has been conducted at Medan State University by Mauliadi & Sinaga (2019) with the theme of identifying higher plant species. Something similar has also been done by Hartono et al., (2020) with the same research object at Campus II of the State Islamic University of North Sumatra. Based on the description above, it is necessary to conduct more specific research on plants in the green open spaces of Medan State University, namely woody plant species, with more detailed results. This research also serves as information for students or the public about the existence of woody plants, especially at Medan State University.

METHOD

Sample or Participant

In January 2025, the research was conducted in the green open space of Medan State University on Jalan Willem Iskandar Pasar V Medan Estate. The following items were employed: a Canon PowerShot SX420 camera, observation sheets, stationery, and a plant identification guidebook. Woody plants were employed in the green open space of Medan State University.

Plant Identification

Every woody plant found was identified using a plant identification guide. The books used were title "Field Guide to species of Restoration Plants (Indonesian language version)" by Desitarani et al., (2014), title "The Red List Dipterocarpaceae" by Khoo et al., (2023); title "1001 Garden Plants in Singapore" by Min et al., (2006), title "Field Guide to Flora: Spermatophytes of Pancoran Mas Grand Forest Park" (Indonesian language version) by Mustaqim et al., (2017), and title "Introduction to Trees" (Indonesian language version) by Ngakan (2007).

Procedure

The observations were conducted using the exploration method in the green open space at the State University of Medan. Every woody plant found was documented and collected for herbarium purposes, then identified based on morphology with the guidebook title "The Kew Plant Glossary" by Beentje (2016). The data analysis was presented in the form of qualitative descriptions.

RESULTS AND DISCUSSION

Based on the research results, Table 1 shows the species of woody plants in the green open space of Medan State University. Medan State University has an area of 546,661 m² with green open spaces in almost every yard of campus buildings (Mauliadi & Sinaga, 2019). Woody plants planted or growing on campus are of various species. Based on table 1 presented above, there are 146 species of woody plants from 48 families and two subdivisions.

Table 1. Species of woody plants in the green open space of Medan State University.

Subdivision	Family	Species	Local Name
Gymnospermae	Gnetaceae	*Gnetum gnemon* L.	Melinjo
	Araucariaceae	*Araucaria heterophylla* (Salisb.) Franco	Cemara Norfok
	Cupressaceae	*Juniperus chinensis* L.	Cemara Natal
		Thuja orientalis L.	Cemara Kipas
	Pinaceae	*Pinus merkusii* Jungh. & de Vriese	Pinus
Angiospermae	Arecaceae	*Areca catechu* L.	Pinang
		Arenga pinnata (Wurmb) Merr.	Aren
		Caryota mitis Lour.	Andudur

Subdivision	Family	Species	Local Name
		Cocos nucifera L.	Kelapa
		Cyrtostachys renda Blume	Palem Merah
		Dypsis lutescens (H.Wendl.) Beentje & J.Dransf.	Palem Kuning
		Dypsis decaryi (Jum.) Beentje & J.Dransf.	Palem Segi Tiga
		Elaeis guineensis A.Chev.	Kelapa Sawit
		Ptychosperma macarthurii H.Wendl.	Palem Makartur
		Rhapis excelsa (Thunb.) A.Henry	Palem Jari
		Roystonea regia (Kunth) O.F.Cook	Palem Raja
		Salacca zalacca (Gaertn.) Voss	Salak
		Veitchia merrillii (Becc.) H.E.Moore	Palem Putri
		Wodyetia bifurcata A.K.Irvine	Palem Ekor Tupai
	Asparagaceae	*Cordyline fruticosa* (L.) A.Chev.	Hanjuang
		Dracaena fragrans (L.) Ker Gawl.	Sri Gading
		Dracaena marginata Lem.	Pohon Naga
		Dracaena reflexa Lam.	Song of India
		Dracaena surculosa Lindl.	Bambu Jepang
		Yucca gloriosa L.	Tombak Raja
	Poaceae	*Bambusa vulgaris* Schrad.	Bambu
		Thyrsostachys siamensis Gamble	Bambu Thailand
	Strelitziaceae	*Ravenala madagascariensis* Sonn.	Pisang Kipas
	Araliaceae	*Polyscias balfouriana* (Hort.Sander.) L.H.Bailey	-
		Polyscias scutellaria (Burm.fil.) Fosberg	Mangkokan
		Schefflera arboricola (Hayata) Merr.	Walisongo
	Nyctaginaceae	*Pisonia alba* Span.	Kol Banda
	Dilleniaceae	*Dillenia indica* Blanco	Sempur
	Lecythidaceae	*Barringtonia asiatica* (L.) Kurz	Putat Laut
	Sapotaceae	*Manilkara kauki* (L.) Dubard	Sawo Kecik
		Manilkara zapota (L.) P.Royen	Sawo Manila
		Mimusops elengi L.	Tanjung
	Fabaceae	*Acacia auriculiformis* A.Cunn. ex Benth.	Akasia
		Adenanthera pavonina L.	Saga
		Bauhinia purpurea L.	Pohon Kupu-kupu
		Caesalpinia pulcherrima (L.) Sw.	Kembang Merak
		Calliandra tergemina (L.) Benth.	Kembang Blason
		Cassia alata L.	Ketepeng
		Delonix regia (Bojer ex Hook.) Raf.	Flamboyan
		Erythrina crista-galli L.	Dadap Merah
		Falcataria falcata (L.) Greuter & R.Rankin	Sengon
		Koompassia excelsa (Becc.) Taub.	Tualang
		Leucaena leucocephala (Lam.) de Wit	Petai Cina
		Pithecellobium dulce (Roxb.) Benth.	Asam Londo
		Pterocarpus indicus Willd.	Angsana

Subdivision	Family	Species	Local Name
		Samanea saman (Jacq.) Merr.	Terembesi
		Sesbania grandiflora (L.) Poir.	Turi
		Tamarindus indica L.	Asam Jawa
	Casuarinaceae	*Casuarina equisetifolia* L.	Cemara Pantai
	Apocynaceae	*Alstonia scholaris* (L.) R.Br.	Pulai
		Carissa carandas L.	Renda
		Nerium oleander L.	Bunga Mentega
		Plumeria acuminata W.T.Aiton	Kamboja
		Plumeria obtusa L.	Kamboja
		Tabernaemontana corymbosa Roxb.	Rombusa
		Wrightia antidysenterica (L.) R.Br.	Melati Tempel
		Wrightia religiosa (Teijsm. & Binn.) Hook.fil.	Anting Putri
	Rubiaceae	*Anthocephalus cadamba* (Roxb.) Miq.	Jabon
		Morinda citrifolia L.	Mengkudu
		Mussaenda erythrophylla Schumach. & Thonn.	Nusa Indah
		Serissa foetida (L.f.) Lam.	Snowrose
	Acanthaceae	*Sanchezia nobilis* Hook.fil.	Bunga Zebra
	Bignoniaceae	*Tecomaria capensis* (Thunb.) Spach	Tekomaria
	Lamiaceae	*Gmelina arborea* Roxb. ex Sm.	Jati Putih
		Peronema canescens Jack	Sungkai
		Tectona grandis Rao & Sahni	Jati
	Oleaceae	*Jasminum sambac* (L.) Aiton	Melati
	Verbenaceae	*Duranta erecta* L.	Teh-tehan
	Lauraceae	*Cinnamomum burmanni* (Nees & T.Nees) Blume	Kayu Manis
		Persea americana Mill.	Alpukat
	Annonaceae	*Annona muricata* L.	Sirsak
		Annona reticulata L.	Nona
		Annona squamosa L.	Srikaya
		Polyalthia longifolia (Sonn.) Thwaites	Glodokan Tiang
	Magnoliaceae	*Michelia champaca* Lour. ex Gomes	Cempaka
	Myristicaceae	*Myristica fragrans* Houtt.	Pala
	Achariaceae	*Pangium edule* Reinw.	Kepayang
	Clusiaceae	*Garcinia atroviridis* Griff. ex T.Anderson	Asam Gelugur
		Garcinia mangostana L.	Manggis
	Euphorbiaceae	*Acalypha wilkesiana* Müll.Arg.	Sablo
		Aleurites moluccanus (L.) Willd.	Kemiri
		Codiaeum variegatum (L.) Blume	Puring
		Excoecaria cochinchinensis Müll.Arg.	Sambang Darah
		Hevea brasiliensis (Willd. ex A.Juss.) Müll.Arg.	Karet
		Jatropha curcas L.	Jarak Pagar
		Macaranga tanarius Müller & Candolle	Marak
		Manihot esculenta Crantz	Singkong

Subdivision	Family	Species	Local Name
	Malpighiaceae	*Malpighia coccigera* L.	Kelingkit Taiwan
	Salicaceae	*Flacourtia inermis* Roxb.	Lobi-lobi
		Flacourtia rukam Zoll. & Moritzi	Rukam
	Bixaceae	*Bixa orellana* L.	Kesumba
	Dipterocarpaceae	*Hopea nutans* Ridl.	Cengal
		Shorea leprosula Miq.	Meranti Bunga
	Malvaceae	*Durio zibethinus* Murray	Durian
		Gossypium hirsutum L.	Kapas
		Hibiscus rosa-sinensis L.	Kembang Sepatu
		Hibiscus schizopetalus (Dyer) Hook.fil.	Kembang Sepatu
		Theobroma cacao L.	Kakao
	Muntingiaceae	*Muntingia calabura* L.	Kersen
	Thymelaeaceae	*Aquilaria malaccensis* Lam.	Gaharu
		Phaleria macrocarpa (Scheff.) Boerl.	Mahkota Dewa
	Combretaceae	*Terminalia catappa* L.	Ketapang
		Terminalia mantaly H.Perrier	Ketapang Kencana
	Lythraceae	*Lagerstroemia speciosa* (L.) Pers.	Bungur
	Myrtaceae	*Psidium guajava* L.	Jambu Biji
		Syzygium aqueum (Burm.fil.) Alston	Jambu Air
		Syzygium buxifolium Hook. & Arn.	Jambu Air Nasi
		Syzygium malaccense (L.) Merr. & L.M.Perry	Jambu Bol
		Syzygium myrtifolium Walp.	Pucuk Merah
		Syzygium polyanthum (Wight) Walp.	Salam
	Oxalidaceae	*Averrhoa bilimbi* L.	Belimbing Wuluh
		Averrhoa carambola L.	Belimbing
	Piperaceae	*Piper aduncum* L.	Sirihan
	Moraceae	*Ficus benghalensis* L.	Beringin India
		Ficus benjamina L.	Beringin
		Ficus elastica Roxb.	Karet Merah
		Ficus microcarpa L.fil.	Kimeng
		Artocarpus altilis (Parkinson) Fosberg	Sukun
		Artocarpus elasticus Reinw. ex Blume	Bendo
		Artocarpus heterophyllus Lam.	Nangka
		Artocarpus integer (Thunb.) Merr.	Cempedak
	Anacardiaceae	*Anacardium occidentale* L.	Jambu Monyet
		Bouea macrophylla Griff.	Gandaria
		Mangifera indica L.	Mangga
		Mangifera odorata Griff.	Kuini
	Burseraceae	*Canarium indicum* L.	Kenari
	Meliaceae	*Azadirachta indica* A.Juss.	Mimba
		Lansium domesticum Corrêa	Duku
		Melia azedarach L.	Mindi

Subdivision	Family	Species	Local Name
		Sandoricum koetjape (Burm.fil.) Merr.	Sentul
		Swietenia macrophylla G.King	Mahoni
		Swietenia mahagoni (L.) Jacq.	Mahoni
		Toona sinensis (A.Juss.) M.Roem.	Suren
	Rutaceae	*Citrus x aurantiifolia* (Christm.) Swingle	Jeruk Nipis
		Murraya koenigii (L.) Spreng.	Daun Kari
		Murraya paniculata (L.) Jacq.	Kemuning
	Sapindaceae	*Dimocarpus longan* Lour.	Kelengkeng
		Filicium decipiens (Wight & Arn.) Thwaites	Kiara Payung
		Nephelium lappaceum L.	Rambutan
		Pometia pinnata J.R.Forst. & G.Forst.	Matoa
	Solanaceae	*Solanum torvum* Sw.	Rimbang

The main subdivisions of woody plants in the green open space of Medan State University are *Gymnospermae* and *Angiospermae*. According to Dekaliyani et al., (2024), plants belonging to the Gymnospermae family have seeds that are visible due to their lack of fruit ovaries. Hartono et al., (2020) added that Gymnospermae are a group of plants with naked seeds. From Table 1 above, there are 4 families recorded in the green open area of Medan State University, namely Gnetaceae, Araucariaceae, Cupressaceae, and Pinaceae. The Gnetaceae family consists of only one species, namely *Gnetum gnemon* L., and Araucariaceae only one species, namely *Araucaria heterophylla* (Salisb.). Franco, Pinaceae also consists of one species, namely *Pinus merkusii* Jungh. & de Vriese, and the largest of the Cupressaceae family consists of 2 species, namely *Juniperus chinensis* L. and *Thuja orientalis* L.

Angiosperms are plants that produce true flower organs, have taproot or fibrous root systems, branched or unbranched stems, and wide, single, or compound leaves. They are also known as closed seed plants and have ovules that are always covered by ovules (Hartono et al., 2020; Taib & Dewi, 2013). According to Tewari et al., (2021), angiosperms are classified into two categories: monocotyledons and dicotyledons. The monocotyledon, or liliopsida, class is a collection of plants that possess one-leaf seeds (one cotyledon), stems with clear nodes, pinnate leaves, and occasionally ribbon-shaped leaves. The arrangement of petals and flower crowns typically consists of three, with the exception of 2, 4, or 6, and never five (Baumgardt, 1982). Monocots are characterized by a single cotyledon, stems with closed veins, leaves with parallel venation, and flowers with parts in multiples of 3 (Tewari et al., 2021). The monocot class comprises four families: *Arecaceae*, *Asparagaceae*, *Poaceae*, and *Strelitziaceae*, as indicated by the research findings.

In comparison to other monocot families, *Arecaceae* exhibits a high degree of morphological diversity (Uhl & Dransfield, 1987). The monocot group is the most significant filler for green open space at Medan State University. Documentation includes the following species: *Areca catechu* L., *Arenga pinnata* (Wurmb) Merr., *Caryota mitis* Lour., *Cocos nucifera* L., *Cyrtostachys renda* Blume, *Dypsis lutescens* (H.Wendl.) Beentje & J.Dransf., *Dypsis decaryi* (Jum.) Beentje & J.Dransf., *Elaeis guineensis* A.Chev., *Ptychosperma macarthurii* H.Wendl., *Rhapis excelsa* (Thunb.) A.Henry,

Roystonea regia (Kunth) O.F.Cook, *Salacca zalacca* (Gaertn.) Voss, *Veitchia merrillii* (Becc.) H.E.Moore dan *Wodyetia bifurcata* A.K.Irvine. The *Arecaceae* family is utilized in a variety of applications, including medicine, fresh fruit, drinks, sweets, ornamental plants, vegetables, boards, and household appliances (Nuryanti et al., 2015).

Figure 1. (a) strobilus *Gnetum gnemon* L.; (b) strobilus *Pinus merkusii* Jungh. & de Vriese; (c) *Thuja orientalis* L.; (d) fruit of *Areca catechu* L.; (e) *Cordyline fruticosa* (L.) A.Chev.; (f) *Bambusa vulgaris* Schrad.; (g) fruit of *Durio zibethinus* Murray; (h) flower of *Aquilaria malaccensis* Lam.; (i) fruit of *Manilkara zapota* (L.) P.Royen; (j) fruit of *Barringtonia asiatica* (L.) Kurz; (k) fruit of *Tamarindus indica* L.; (l) fruit of *Bouea macrophylla* Griff.; (m) fruit of *Casuarina equisetifolia* L.; (n) flower of *Wrightia antidysenterica* (L.) R.Br.; (o) flower of *Jasminum sambac* (L.) Aiton; (p) fruit of *Artocarpus heterophyllus* Lam.; (q) fruit of *Annona squamosa* L.; (r) fruit of *Garcinia mangostana* L.; (s) fruit of *Myristica fragrans* Houtt.; and (t) fruit of *Nephelium lappaceum* L.

Cordyline fruticosa (L.) A.Chev., *Dracaena fragrans* (L.) Ker Gawl., *Dracaena marginata* Lem., *Dracaena reflexa* Lam., *Dracaena surculosa* Lindl. dan *Yucca gloriosa* L. are the six species of Asparagaceae that are present in the vicinity of the Medan State University campus. According to Aisyah et al., (2023), these species serve as ornamental plants, medicinal plants, and land borders. The grass group, or *Poaceae*, is identifiable due to the distinct nodes on the stem. In the UNIMED green open space, only two species of *Poaceae* with woody stems are present: *Bambusa vulgaris* Schrad. and *Thyrsostachys siamensis* Gamble. *Ravenala madagascariensis* Sonn is the species in the *Strelitziaceae* family, which has the fewest species.

The classification of dicotyledons, or *Magnoliopsida*, is based on the transport tissue, which is characterized by the phloem being located on the outside and the xylem being located on the inside of the cambium. These plants have two cotyledons and either two, three, four, five, or infinite flower petals or corollas (Baumgardt, 1982). The majority of these species possess fused corollas and petals; however, they are occasionally discovered without petals (Tewari et al., 2021). The largest family of woody plants in the green open space of Medan State University is the dicotyledon class. A minimum of 40 families have been recorded and are illustrated in Table 1.

The *Araliaceae* family contains three species of woody plants: *Polyscias balfouriana* (Hort.Sander.) L.H.Bailey, *Polyscias scutellaria* (Burm.fil.) Fosberg and *Schefflera arboricola* (Hayata) Merr. *Pisonia alba* Span is the sole species in the *Nyctaginaceae* family. The *Dilleniaceae* family is comprised of only one species, *Dillenia indica* Blanco. The *Sapotaceae* family comprises three species, two of which are fruit plants: *Manilkara kauki* (L.) Dubard and *Manilkara zapota* (L.) P.Royen, and *Mimusops elengi* L., which serves as a protective plant. *Barringtonia asiatica* (L.) Kurz, a coastal plant from the *Lecythidaceae* family, was also discovered in the green open space of Medan State University. The *Fabaceae* family is a dicotyledon class that includes the most species at Medan State University. It is a group of legume plants (Irsyam & Priyanti, 2016). The species recorded include *Acacia auriculiformis* A.Cunn. ex Benth., *Adenanthera pavonina* L., *Bauhinia purpurea* L., *Caesalpinia pulcherrima* (L.) Sw., *Calliandra tergemina* (L.) Benth., *Cassia alata* L., *Delonix regia* (Bojer ex Hook.) Raf., *Erythrina crista-galli* L., *Falcataria falcata* (L.) Greuter & R.Rankin, *Koompassia excelsa* (Becc.) Taub., *Leucaena leucocephala* (Lam.) de Wit, *Pithecellobium dulce* (Roxb.) Benth., *Pterocarpus indicus* Willd., *Samanea saman* (Jacq.) Merr., *Sesbania grandiflora* (L.) Poir. and *Tamarindus indica* L.

The *Casuarinaceae* family encompasses Australian pine or *Casuarina equisetifolia* L. People often mistake this woody plant for *Pinus merkusii* Jungh. & de Vriese. The *Apocynaceae* family, which is defined as plants that grow perennially (El-Taher et al., 2019), is prevalent in the green open spaces of Medan State University. This family includes various shrub and tree species, such as *Alstonia scholaris* (L.) R.Br., *Carissa carandas* L., *Nerium oleander* L., *Plumeria acuminata* W.T.Aiton, *Plumeria obtusa* L., *Tabernaemontana corymbosa* Roxb., *Wrightia antidysenterica* (L.) R.Br. and *Wrightia religiosa* (Teijsm. & Binn.) Hook.fil.

Subsequently, the Rubiaceae family is a coffee family that exhibits unique flower characteristics, including five petals, five corollas, five stamens, and one pistil with a branched stigma (Sitompul et al., 2016). *Anthocephalus cadamba* (Roxb.) Miq.,

Morinda citrifolia L., *Mussaenda erythrophylla* Schumach. & Thonn. dan *Serissa foetida* (L.f.) Lam. are among the species discovered. The *Acanthaceae* family only discovered one species, *Sanchezia nobilis* Hook.fil. The only species of *Bignoniaceae* discovered was *Tecomaria capensis* (Thunb.) Spach.

The *Lamiaceae* family, which is present in the green open space of Medan State University, comprises all woody plants that have the potential to be utilized as building materials or boards (Anggraini et al., 2017). *Gmelina arborea* Roxb. ex Sm., *Peronema canescens* Jack dan *Tectona grandis* Rao & Sahni. are the species that have been recorded. Jasmine, or *Jasminum sambac* (L.) Aiton, is a member of the *Oleaceae* family.

The *Annonaceae* family is one of the most extensively utilized woody plant families, with fruit and medicinal applications (Hartono et al., 2020). *Annona muricata* L., *Annona reticulata* L., *Annona squamosa* L. dan *Polyalthia longifolia* (Sonn.) Thwaites are the species that have been documented in the green open space of Medan State University. There is only one species of plant in the *Verbenaceae* family: *Duranta erecta* L. The Lauraceae family includes popular species such as *Cinnamomum burmanni* (Nees & T.Nees) Blume dan *Persea americana* Mill. are widely used as spices, medicines, and fruit preparations and are among the most popular species in the Lauraceae family (Mulia et al., 2017). The *Magnoliaceae* and *Myristicaceae* families are also composed of a single species, *Michelia champaca* Lour. ex Gomes and *Myristica fragrans* Houtt.

Achariaceae is a woody plant that is still wild and is located in the green open land of Medan State University, specifically *Pangium edule* Reinw., which is commonly referred to as *Kepayang*. The *Clusiaceae* family, which is also referred to as the mangosteen family, comprises two species: *Garcinia atroviridis* Griff. ex T.Anderson and *Garcinia mangostana* L. *Acalypha wilkesiana* Müll.Arg., *Aleurites moluccanus* (L.) Willd., *Codiaeum variegatum* (L.) Blume, *Excoecaria cochinchinensis* Müll.Arg., *Hevea brasiliensis* (Willd. ex A.Juss.) Müll.Arg., *Jatropha curcas* L., *Macaranga tanarius* Müller & Candolle and *Manihot esculenta* Crantz. are also classified as the most woody plants found at UNIMED.

Malpighia coccigera L. is the sole species in the *Malpighiaceae* family. The Silicaceae family comprises *Flacourtia inermis* Roxb. dan *Flacourtia rukam* Zoll. & Moritzi. The *Bixaceae* family is a woody plant with a shrub or tree habitus and reddish sap (Qiner & Gilbert, 1990). Only one species, *Bixa orellana* L., has been identified. The *Dipterocarpaceae* family is a group of woody plants that contains the most protected species and is listed on the IUCN Red List. In the green open space of the State University of Medan, there are two species: *Hopea nutans* Ridl. and *Shorea leprosula* Miq (Khoo et al., 2023). *Durio zibethinus* Murray, *Gossypium hirsutum* L., *Hibiscus rosa-sinensis* L., *Hibiscus schizopetalus* (Dyer) Hook.fil. and *Theobroma cacao* L. are all examples of woody plants that are frequently observed in the vicinity of a residence or building.

The agarwood (*Aquilaria malaccensis* Lam.) and Mahkota dewa (*Phaleria macrocarpa* (Scheff.) Boerl.) species from the *Thymelaeaceae* family are also conserved, while *Muntingiaceae* is composed of only one species, *Muntingia calabura* L., at Medan State University. *Terminalia catappa* L. and *Terminalia mantaly* H.Perrier are the two species of plants that comprise the *Comberataceae* family. *Lagerstroemia speciosa* (L.) Pers. is the sole species in the *Lythraceae* family. *Myrtaceae* is referred to as guava due to its

persistent pistils, endless stamens, and stems that consistently peel off (Ritonga, 2019). The green open space of Medan State University is home to six distinct species, including *Psidium guajava* L., *Syzygium aqueum* (Burm.fil.) Alston, *Syzygium buxifolium* Hook. & Arn., *Syzygium malaccense* (L.) Merr. & L.M.Perry, *Syzygium myrtifolium* Walp. dan *Syzygium polyanthum* (Wight) Walp.

According to Raihandhany & Ramadian (2021), *Oxaliadaceae* is a starfruit family that is characterized by a sour taste in its organs. *Averrhoa bilimbi* L. and *Averrhoa carambola* L. are the two species. *Piper aduncum* L. is the sole species in the *Piperaceae* family. The *Moraceae* family, also known as the banyan group, is also prevalent in the green open spaces of Medan State University. This family includes *Ficus benghalensis* L., *Ficus benjamina* L., *Ficus elastica* Roxb., *Ficus microcarpa* L.fil., *Artocarpus altilis* (Parkinson) Fosberg, *Artocarpus elasticus* Reinw. ex Blume, *Artocarpus heterophyllus* Lam., and *Artocarpus integer* (Thunb.) Merr. *Anacardiaceae* are prevalent in tropical regions and, on average, possess economic value (Rizqita et al., 2023). *Anacardium occidentale* L., *Bouea macrophylla* Griff., *Mangifera indica* L., and *Mangifera odorata* Griff. are the four species that have been recorded. *Canarium indicum* L. is the sole species of *Burseraceae* or canaries.

The Meliaceae and Sapindaceae families are classified as woody plants that produce fruit and are frequently employed as building materials and boards (Ardila et al., 2022). *Azadirachta indica* is the species that is discovered in the green open spaces of Medan State University. *Azadirachta indica* A.Juss., *Lansium domesticum* Corrêa, *Melia azedarach* L., *Sandoricum koetjape* (Burm.fil.) Merr., *Swietenia macrophylla* G.King, *Swietenia mahagoni* (L.) Jacq., *Toona sinensis* (A.Juss.) M.Roem., *Dimocarpus longan* Lour., *Filicium decipiens* (Wight & Arn.) Thwaites, *Nephelium lappaceum* L. dan *Pometia pinnata* J.R.Forst. & G.Forst. are the three species of *Rutaceae*. One species of plant, *Solanum torvum* Sw., comprises the Solanaceae family.

Based on the data presented above, it can be concluded that the diversity of woody plant species in the green open space of Universitas Negeri Medan is influenced by abiotic and biotic factors (Hartono et al., 2020). Abiotic factors can be soil pH, water availability, minerals, environmental temperature, and various other factors. While biotic factors can be pollinators, bacteria in the soil, seed-dispersing animals, and others. The diversity of plant species is also influenced by the planting process chosen according to the needs of the park on campus, and there are still many woody plants that grow naturally (A'yun & Purianto, 2020; Sadjati et al., 2024; Sitompul et al., 2016; Widyatmoko, 2019).

CONCLUSION

The species of woody plants planted or growing naturally in the green open space of Medan State University are various. There are 2 subdivisions of woody plants, namely *Gymnospermae* and *Angiospermae*, which consist of 146 species from 48 families. The woody plants found in the green open space of Medan State University are in the form of protective plants, medicinal plants, fresh fruits, spices, and ornamental plants, and there are also protected plants such as *Aquilaria malaccensis* Lam., *Koompassia excelsa* (Becc.) Taub., *Hopea nutans* Ridl., and *Shorea leprosula* Miq. The results of the

study are expected to be a source of reference for further research on woody plants in urban green open space areas.

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How To Cite This Article, with *APA style* :

Ritonga, Y.E., & Harsono, T. (2025). Species of Woody Plants in Green Open Spaces of Medan State University. *Jurnal Pembelajaran dan Biologi Nukleus*, *11*(2), 502-516. https://doi.org/10.36987/jpbn.v11i2.6848

Conflict of interest : The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author contributions : All authors contributed to the study's conception and design. Material preparation, data collection and analysis were performed by all authors. The first draft of the manuscript was submited by [**Yusran Efendi Ritonga**]. All authors contributed on previous version and revisions process of the manuscript. All authors read and approved the final manuscript.