



# Exploration of the Diversity of Trees and Its Implementation in the Plant Morphology Course

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**Abstract:** The campus as an educational facility is always designed to create comfort that can support the quality of learning in it so the concept of green open space has long been part of the development of the campus environment. This study aims to determine tree species on the FKIP Universitas Cenderawasih (UNCEN) Abepura Campus and their implementation in learning plant morphology in the Biology Education Study Program. This research uses an exploratory method. The results of research on the Uncen Abepura FKIP Campus environment found 13 species with 10 families in the category of trees with a diameter of 20 cm and above. These trees are scattered in various environments on the FKIP UNCEN Abepura Campus. The Arecaceae family consists of two tree species, namely *Cocos nucifera* L and *Livistona saribus* (Lour.) Marr. The Cupressaceae family consists of one type of tree, namely *Cryptomeria japonica*. The Sapindaceae family consists of two types of trees, namely *Filicium decipiens* (Wight & Arn.) and *Pometia pinnata*. The Fabaceae family consists of two tree species, *Albizia saman* (Jacq.) Merr, and *Tamarindus indica* L. The Moraceae family consists of one tree species, namely *Ficus benjamina*. The Lecythidaceae family consists of one tree species, namely *Barringtonia asiatica* (L.) Kurz. The Combretaceae family consists of one type of tree, namely *Terminalia catappa* L. The Anacardiaceae family consists of one type of tree, namely *Mangifera indica* L. The Oxalidaceae family consists of one type of tree, namely *Averrhoa carambola* L. The Clusiaceae family consists of one type of tree, namely *Calophyllum inophyllum* L. Implementation of This research is in the form of learning media in the form of a plant morphology practicum guide.

**Keywords:** Types of trees; University of Cenderawasih; Implementation of Biology Learning

## Introduction

Indonesia is the center of the diversity of flora and fauna in the world so it is recognized as a megabiodiversity country after Brazil and Congo. Abundant natural wealth can benefit the welfare of all Indonesian people. In addition, in particular, the very high diversity of Indonesian flora is part of the natural resources needed now and, in the future, (Suhartini, 2009) (Triyono, 2013). Plants in their existence in nature also have an important ecological role for other biotic components in the surrounding environment. Based on these ecological functions, plants are used as the main component in landscape management known as (RTH). Stable green open space in various forms in the form from city parks/forests, ecosystem parks/office

vegetation, and commercial buildings to vegetation in residential and settlement environments. The purpose of green open space is to harmonize and improve the urban, natural and man-made environment as well as the quality of a healthy, beautiful, clean and comfortable environment. Green Open Space also has various benefits and one of the benefits is as a center for research, education, and outreach.

The campus as an educational facility is always designed to create comfort that can support the quality of learning in it so the concept of green open space has long been part of the development of the campus environment. The form of green open space in the campus environment can be in the form of office environment parks, shade plants and some even have germplasm gardens. Therefore, the campus

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environment has long been a source of flora research, for example, a study of Unila Campus fern resources (Yulianty et al, 2010), examining the benefits of various tree species in the UNS Campus environment (Ariyanto et al, 2016), the diversity and distribution of valuable plants at the UKI Jakarta Campus (Silalahi, 2016). The FKIP Cenderawasih University (Uncen) campus in its environmental management also shows the existence of green open space in the form of office environment parks and shade plants. The existence of the green open space so far has supported the aesthetic function and comfort of the FKIP campus environment as a place of learning. However, the green open space has not been fully utilized as a means or source of learning and even the value of the information contained therein can be a source of research material as exemplified above. Therefore, the existence of green open space in the campus environment can be utilized as much as possible to support learning activities on campus through courses related to plant morphology.

Integrated Field Study (STL) is a part of activities related to academics and supports the student learning process, especially in the Biology Education Program. This activity is intended so that students not only receive teaching in the form of theories while sitting on the lecture bench but also can develop the abilities or competencies that must be possessed as a student. Students can learn how to implement the theories they have learned into an applied science. This research activity also provides direct experience to students about the actual situation in the field related to the object being studied, including ecology, biotechnology, zoology, botany, taxonomy, and other scientific studies.

Observation activities will be carried out not only for recreational purposes but also as research-based learning. Research-based learning aims to create a process of learning activities that focus on analysis, synthesis, and evaluation activities, as well as being able to improve the abilities of students and lecturers in the assimilation and application of knowledge. So that students will focus on several studies of plant morphology. Plant morphology is one of the subjects in Biology Education. In the study of plant morphology, students are trained to identify the morphological structures of various parts of the plant body (Lepiyanto, 2014; Gani & Arwita, 2020). This study aims to determine tree species on the FKIP Uncen Abepura Campus and their implementation in learning plant morphology in the Biology Education Study Program.

## Method

### *Time and Location of Research*

This study was carried out at the Faculty of Teaching and Education, Cenderawasih University in January 2022 (Figure 1).



Figure 1. Research Locations of FKIP Uncen Abepura Campus

### *Data collection technique*

The implementation of this research uses the Exploration Method, namely by exploring every corner of the location that can represent ecosystem types or vegetation types in the area studied by Rugayah (2004) (Randi et al, 2014). The objects studied were all tree species found in the research location on the Uncen Abepura FKIP Campus environment. Meanwhile, the tree that is the criterion for the object of this research is the level of a tree with a diameter at a breast height of 20 cm and above (Widiyanto et al, 2017; Karmilasanti & Fajar, 2020).

### *Data analysis*

The research data were analyzed descriptively qualitatively, in which the implementation only collects and analyzes non-numeric data.

## Result and Discussion

The results of the study at the FKIP Uncen Abepura Campus showed that there were 13 species with 10 families in the category of trees with a diameter of 20 cm and above. These trees are scattered in various environments on the FKIP Uncen Abepura Campus. The *Arecaceae* family consists of two tree species, namely *Cocos nucifera* L and *Livistona saribus* (Lour.) Marr. The *Cupressaceae* family consists of one type of tree, namely *Cryptomeria japonica*. The *Sapindaceae* family consists of two types of trees, namely *Filicium decipiens* (Wight & Arn.) and *Pometia pinnata*. The *Fabaceae* family consists of two tree species, *Albizia saman* (Jacq.) Merr, and *Tamarindus indica* L. The *Moraceae* family consists of one tree species, namely *Ficus benjamina*. The *Lecythidaceae* family consists of one tree species, namely *Barringtonia asiatica* (L.) Kurz. The *Combretaceae* family consists of one type of tree, namely *Terminalia catappa* L. The *Anacardiaceae* family consists of one type of tree, namely *Mangifera indica* L. The *Oxalidaceae* family consists of one type of tree, namely *Averrhoa carambola*.

L. The Clusiaceae family consists of one type of tree, namely *Calophyllum inophyllum* L. There are 6 main use categories including shade, ready-to-eat fruit, medicinal plants, ornamental plants, the furniture industry, and food spices.

**Table 1:** List of names of tree species obtained

Family	Species	Local name
Arecaceae	<i>Cocos nucifera</i> L	Kelapa
Arecaceae	<i>Livistona saribus</i> (Lour.) Marr	Palm kipas
Anacardiaceae	<i>Mangifera indica</i> L	Mango
Cupressaceae	<i>Cryptomeria japonica</i>	Cemara
Clusiaceae	<i>Calophyllum inophyllum</i> L	Bintangur/Nyamplung
Combretaceae	<i>Terminalia catappa</i> L	Ketapang
Fabaceae	<i>Tamarindus indica</i> L	Asam Jawa
Fabaceae	<i>Albizia saman</i> (Jacq.) Merr	Trembesi
Lecythidaceae	<i>Barringtonia asiatica</i> (L.) Kurz	Keben/Butun
Moraceae	<i>Ficus benjamina</i>	Beringin
Oxalidaceae	<i>Averrhoa carambola</i> L	Belimbing
Sapindaceae	<i>Filicium decipiens</i> (Wight & Arn.)	Kerai Payung
Sapindaceae	<i>Pometia pinnata</i>	Matoa

The shade category is a tree that has a morphological characteristic of an umbrella-like crown or a mountain-shaped crown with a relatively wide circular base. Both of these canopies provide a canopy for the space below so that the space under the canopies becomes shadier. In addition, the shape of the canopy serves the function of holding back the wind that passes through the area where the plant is located (Ariyanto et al, 2016). The shade tree category includes *Filicium decipiens* (Wight & Arn.), *Albizia saman* (Jacq.) Merr, *Ficus benjamina*, *Terminalia catappa* L, and *Calophyllum inophyllum* L. This is in line with research (Zayadi & Hayati, 2017) where a study found that *Filicium decipiens* (Wight & Arn.), *Albizia saman* (Jacq.) Merr, *Ficus Benjamina* has benefits as a shade. According to (Santoso et al, 2012) *Terminalia catappa* L has the same benefit as a shade.

Plants for fruit sources are edible species, including *Cocos nucifera* L, *Pometia pinnata*, *Leucaena leucocephala*, *Mangifera indica* L, and *Averrhoa carambola* L. This is in line with research (Sambori & Tanjung, 2009) where this study found that *Cocos nucifera* L, *Pometia pinnata*, *Leucaena leucocephala*, *Mangifera indica* L and *Averrhoa carambola* L have benefited as fruit-producing trees. Trees that are included as medicinal plants are trees whose parts, be they roots, stems, or fruit, including bark or leaves, are used as medicine, either consumed or used directly or through processing. The tree categories used as medicine include *Albizia saman* (Jacq.) Merr, *Ficus*

*benjamina*, and *Barringtonia asiatica* (L.) Kurz. This is in line with research (Ariyanto et al, 2016) where a study found that *Albizia saman* (Jacq.) Merr, *Ficus benjamina*, and *Barringtonia asiatica* (L.) Kurz has the benefits of trees as medicine.

The category of plants as ornamental plants are types that are sometimes used to decorate parks/land (outdoor). An important indicator in the selection of plants for ornamental plants is to have an aspect of their beauty. Tree categories as ornamental plants include *Cryptomeria japonica* and *Livistona saribus* (Lour.) Marr. This is in line with research (Ariyanto et al, 2016) where this study found that *Cryptomeria japonica* and *Livistona saribus* (Lour.) Marr has the benefits of trees as ornamental plants. Trees as materials for the furniture industry are types that can produce substances that can be used as industrial raw materials, such as wood for furniture materials. The categories of trees as industrial materials include *Terminalia catappa* L and *Pometia pinnata*. This is in line with research (Ariyanto et al, 2016) where this study found that *Terminalia catappa* L and *Pometia pinnata* have the benefits of trees as materials for the furniture industry.

**Table 2:** Tree circumference and diameter

Family	Species	Circumference (cm)	Diameter (cm)
Arecaceae	<i>Cocos nucifera</i> L	83	26.40
Arecaceae	<i>Livistona saribus</i> (Lour.) Marr	83	26.40
Anacardiaceae	<i>Mangifera indica</i> L	106	33.70
Cupressaceae	<i>Cryptomeria japonica</i>	72	22.9 0
Clusiaceae	<i>Calophyllum inophyllum</i> L	90	28.60
Combretaceae	<i>Terminalia catappa</i> L	63	20
Fabaceae	<i>Tamarindus indica</i> L	91	28.90
Fabaceae	<i>Albizia saman</i> (Jacq.) Merr	66	21
Lecythidaceae	<i>Barringtonia asiatica</i> (L.) Kurz	89	28.30
Moraceae	<i>Ficus benjamina</i>	108	34.40
Oxalidaceae	<i>Averrhoa carambola</i> L	63	20
Sapindaceae	<i>Filicium decipiens</i> (Wight & Arn.)	73	23.20
Sapindaceae	<i>Pometia pinnata</i>	72	22.90

A tree as a producer of spices/food seasonings is a tree that produces food seasoning ingredients such as its fruit for additional food seasoning. The tree category as a spice ingredient includes *Tamarindus indica* L. This is in line with research (Husna et al., 2022) where this study found that *Tamarindus indica* L has the benefits of trees as a producer of spices/food seasonings. Based on the data and description above, it can be said that in the



Uncen Abepura FKIP Campus environment the largest group of uses are trees with the benefit of being a shade, this means that almost half of the trees in the Uncen Abepura FKIP Campus environment play a role in environmental conditioning both as shadders, protection against exposure wind, as well as providing a microclimate for living things and the soil underneath and can be useful as a source of learning Biology.

Various types of plants found in the campus yard can be used as a source of learning Biology. Implementation or integration of the concept of biodiversity in learning Biology as an effort to foster literacy and environmental awareness for conceptually-based students (Apriana, 2012). Plant biomorphology in the campus yard can be applied to various subjects, for example, ecology, conservation, taxonomy, morphology, and so on. Integrating the context of learning materials according to surrounding environmental issues, various materials and learning methods can make it easier for students to solve environmental problems, form a caring character for the surrounding environment, and as a learning medium in carrying out Plant Morphology practicum. Various types of plants found in the FKIP UNCEN campus environment can be integrated into the Plant Morphology practicum. Observation of the external organs of plants found on the campus grounds can be integrated into the practical implementation of observing plant organs, both roots, stems, leaves, fruits, and flowers.

#### Implementation of Plant Morphology Learning

Based on the results of observations and identification of plants found in the Uncen Abepura FKIP Campus environment, they are as follows Coconut Tree (*Cocos nucifera* L.). When observing coconut trees, the morphology that can be seen is the stems and leaves. The roots, flowers, and fruit of the coconut tree could not be seen morphologically, because at the time of observation the roots were not visible, the flowers had not yet flowered and the fruit was difficult to reach (Figure 2).

Biologically, the coconut plant belongs to the Angiospermae (closed seed) plant of the Monocotyledon (single seed) type, the coconut tree has a root system, namely strong fibrous roots (Hadi et al, 2022). In general, coconut tree trunks grow straight up, with hollow stems like fibers, coconut trees are non-branched plants and have very rough bark. Coconut leaves have pinnate leaf reinforcement types and are single leaves. The leaves consist of stalks, midribs, and leaves with a stick in the middle. The flowers produced are bisexual compounds, namely male and female in one tree (Hadi et al, 2022). The fruit of the coconut tree is an edible fleshy fruit. Coconut fruit is protected by a layer of thick fibrous skin and consists of 3 namely the outer shell (Epicarp),

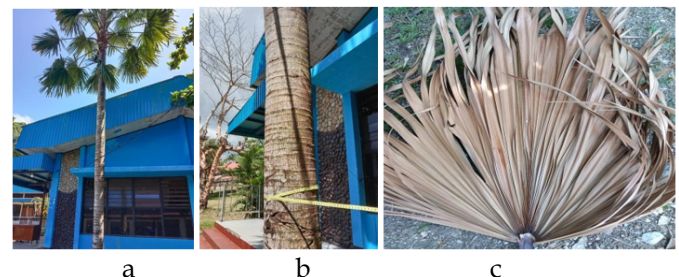
middle (Mesocarp), and innermost (Endocarp) (Hadi et al, 2022).



**Figure 2.** The appearance of the Coconut tree (*Cocos nucifera* L.) stature

#### Fan Palm Tree (*Livistona saribus* (Lour.) Marr)

The roots of the fan palm tree are classified as fibers that are not too branched and are brown in color. All Arecaceae families have a fibrous root system with a mine shape, which is stiff, hard, and large in texture (Laila, 2021). The trunk of the fan palm tree is classified as hard and woody, round in shape with a slightly rough surface to the touch (Figure 3).

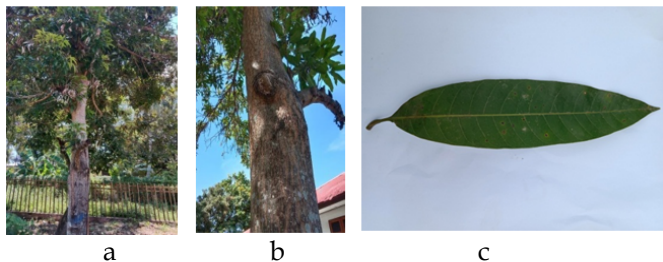


**Figure 3.** Fan Palm tree. a) The appearance of Fan Palm trees; (b) The appearance of Fan Palm tree trunks; (c) The appearance of Fan Palm dry leaves

The direction of growth of the stem is perpendicular to the trunk of the tree and has no branches and the surface of the trunk is segmented. The leaf is classified as a complete single because it consists of strands, stalks, and midribs. The leaf blade is semicircular in shape resembling a fan, the edge of the leaf is flat, the base of the leaf is rounded and the tip is pointed. The leaf surface is smooth, the bones are pinnate and the texture is thick. Fan palm tree flowers are small and yellow. Flowers are bisexual, namely, the male is in the form of pistils and the female is in the form of stamens. Meanwhile, the fruit of the fan palm tree is round and brown or black in color (Laila, 2021).

*Mango Tree (Mangifera indica L)*

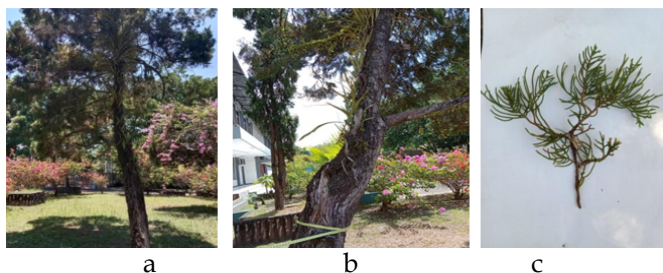
The mango tree has a taproot with a type of root that is branched and brown in color (Laila, 2021). The trunk is hard and woody, round in shape and the surface is rough, the direction of growth is upright, and has thick and rough bark and there are many small cracks and scales from the petioles (Figure 4).



**Figure 4.** Mango tree. (a) The appearance of a Mango tree; (b) The appearance of a Mango tree trunk; (c) The appearance of Mango leaves

*Fir Tree (Cryptomeria japonica)*

Taproot system with many branches. The roots are ivory or white in color (Susilo & Dhanita Putri, 2016). Stems hard and woody, round shape, slightly rough surface, growing direction upwards (Figure 5).

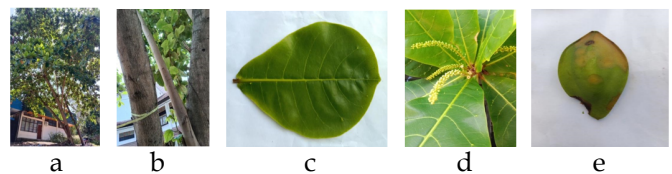


**Figure 5.** Fir tree (*Cryptomeria japonica*). (a) The appearance of a Pine Tree; (b) The appearance of a Fir Tree Trunk; (c) The appearance of Fir Leaves

Generally, many are branched and brown. It has compound leaves and belongs to incomplete leaves. The shape of the leaf blade is flat, the edge is serrated, the base is pointed and the tip is blunt. Leaf branches are conical to the side and scaly. Evergreen tree leaves are generally dark green. Evergreen tree flowers are included in a single flower. Female flowers are generally shaped like a bell at the base of the branch and male flowers are generally shaped like a double cup at the end of the branch (Laila, 2021).

*Ketapang Tree (Terminalia catappa L)*

This type of taproot and branches are cone-shaped and grows long and straight down (Laila, 2021). Stem hard and woody, round shape. The direction of growth of the stem is upright (Figure 6).



**Figure 6.** Ketapang tree (*Terminalia catappa L*). (a) The appearance of the Ketapang tree; (b) The appearance of Ketapang tree trunks; (c) The appearance of Ketapang leaves; (d) Ketapang flower appearance; (e) The appearance of Ketapang fruit

This type of taproot and branches are cone-shaped and grow long and straight down (Laila, 2021). Stem hard and woody, round shape. The direction of growth of the stem is upright. The sympodial branching system is basically difficult to determine. The stem is grayish brown with a rough and grooved brick surface. Single-leaf incomplete, oval-shaped strands, flat edges, pointed base while blunt tip. Smooth glossy leaf surface, pinnate bone, and thick texture. The leaves are sitting scattered but mostly gathered at the ends of the branches. The leaves are green when they are young and the old axils will turn orange then turn red and then fall. Flowers are small and white or yellow. Flowers are collected in grains that are at the ends of the branches. Ketapang tree flowers do not have a crown and have petals shaped like plates or bells that are white to cream in color. Compound inflorescence, where the female is under the grain while the male flower is above the grain. Compound true fruit is ovoid in shape and surrounded by a layer of juicy flesh. The fruit is green when it is young and will change color to brownish red when it is ripe. The outer skin of the seed is smooth and covered with fiber.

*Tamarind Tree (Tamarindus indica L)*

Tamarind has a taproot system that is branched and brown in color (Laila, 2021). It has a hard and woody stem that is round in shape, with a rough surface, the direction of growth is straight up, while the direction of growing branches there are those that are leaning up and there are flat (Figure 7).



**Figure 7.** Tamarind tree (*Tamarindus indica L*) (a) Appearance of Tamarind rees; (b) Appearance of Tamarind tree trunk; (c) Appearance of Tamarind leaves; (d) Appearance of Tamarind Flowers; (e) Appearance of Tamarind Fruit

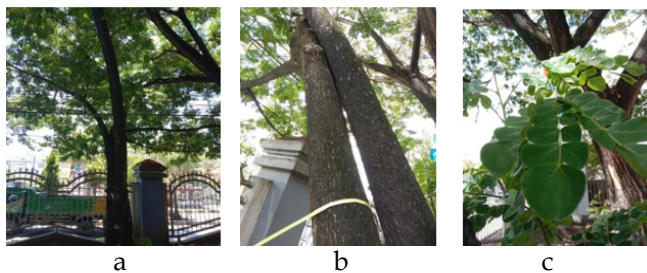
On the surface of the stem, there are many lenticels. The color of the tree trunk is light brown. Double pinnate compound leaves with incomplete type, pinnately boned with flat leaf edges. The leaves sit opposite each



other and are green. The shape of the leaf blade is oval, the base is rounded and the tip is blunt, the surface is smooth and the texture is thin. The inflorescence belongs to the complete and unlimited compound interest which is arranged in bunches that are found at the ends of the flowers. Flowers are bisexual (male and female). The stamens are the male genitalia and the pistils are the female genitalia. The flower crown is yellowish and has a pink tint. Stamens sit on the flower petals. The fruit belongs to a single true fruit that is pod-shaped and long, attached between the seeds and contains 5-10 seeds covered in the fruit flesh. The flesh is brown to dark brown or red. This tamarind fruit has a distinctive taste, which is sour when eaten.

*Trembesi Tree (Albizia saman (Jacq.) Merr*

The root system is tapped and forms branches and has a brown color (Abror, 2021). It has a woody trunk with a perpendicular growth direction, round branches, and a monopodial branching type (Figure 8).



**Figure 8.** Trembesi Tree (*Albizia saman (Jacq.) Merr*) (a) Appearance of Trembesi trees; (b) Appearance of Trembesi tree trunks; (c) Appearance of Trembesi leaves

The surface of the branches is rough and flaky and the color of the trunk is blackish brown. The leaves are located at the end of the stem and the leaf edges are flat. The base of the leaf is inclined, the tip is obtuse, the spine is pinnate, the type of compound leaf is even and the type is incomplete. Sitting leaves face to face, has a dark green leaf color, the shape of elongated round strands. The compound inflorescences are white below and pinkish above and have a corolla tube and stamens. The flower petals are shaped like a bell and the flower pistil is shaped like a funnel. The true fruit is compound, with the characteristics of the fruit in the shape of a pod, the length is straight, slightly curved, and has a blackish-brown color (Abror, 2021).

*Keben/Butun Tree (Barringtonia asiatica (L.) Kurz)*

Taproot system branched in large numbers (Laila, 2021). Hard-trunked and round-shaped woody. The surface of the stem is rough, the direction of growth of the stem is upright and the branching system is sympodial, that is, the main stem is difficult to determine (Figure 9).

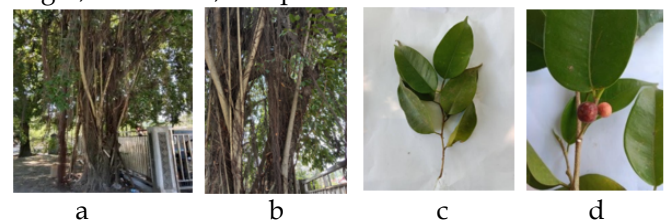


**Figure 9.** Keben/Butun tree (*Barringtonia asiatica (L.) Kurz*) (a) Appearance of the Keben tree; (b) Appearance of Keben tree trunks; (c) Appearance of Keben leaves; (d) Keben flower appearance; (e) Appearance of Keben fruit

Single leaf and classified as incomplete. The shape of the leaves is like an oval with flat leaf edges. The base of the leaf is blunt while the tip of the leaf is rounded. The surface of the Keben tree leaves is shiny, the veins are pinnate and the leaf texture is thick. Sitting leaves alternate between the big and the small. Young leaves are pink and when they are old they are yellow or pale orange. The inflorescence is classified as compound and completely androgynous (bisexual), that is, it has two sexes, male and female. Compound interests such as bunches appear at the ends of the branches. The petals are like a long green tube, the crown of the Jurong flower is white and the stamens and pistils are white with a reddish tip. Compound fruit with a shape like a tetrahedral. The surface of the fruit is smooth, and green when it is young and will turn brown when it is old.

*Banyan Tree (Ficus benjamina)*

The root system is a taproot and has many branches. The hanging roots which are near the main stem and which have a large size are usually attached and fused with the main stem so that the main stem of the banyan tree looks irregular (Laila, 2021). The tree trunk has hard and woody morphological characteristics, the trunk is round, the surface is rough, the direction of growth of the stem is upright, and has a sympodial branching system (Figure 10). The tree trunk is blackish brown and will emit hanging roots which are the hallmark of the banyan tree. Single leaf with flat edges, blunt base, and pinnate bones.



**Figure 10.** Banyan tree (*Ficus benjamina*) (a) The appearance of the Banyan tree; (b) the Appearance of a banyan tree trunk; (c) the Appearance of Banyan tree leaves; (d) the Appearance of the Banyan fruit

The shape of the leaf blade is oval and the leaf surface is shiny. The leaves are classified as incomplete with a tapered tip, have a thick texture and the leaves sit facing each other. The inflorescences are compound and grow in clusters and are protected by the flower base. The flowers grow in the armpits of the leaves all year

round and the flowers are inside the ovaries. The flower petals are funnel-shaped and white (Laila, 2021). Including compound pseudo-fruits, which are formed from compound interest, but all of them look like one fruit from the outside. Characteristics of the fruit are the round, purplish-red color when it is old. The fruit is in the axils of the leaves and belongs to the fruit buni.

*Carambola Tree (Averrhoa carambola L.)*

The taproot system has a base, stem ends, branches, fibers, feathers, and a cap (Wati, 2021). The star fruit tree has a stem that is round (cylindrical), and woody with an upward growth direction (Figure 11).

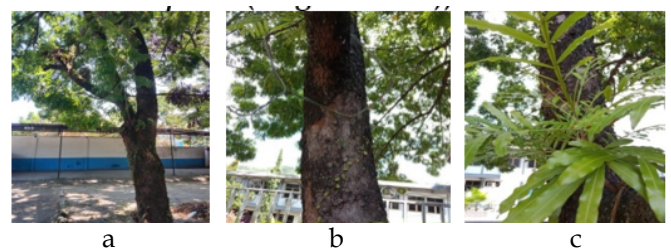


**Figure 11.** Carambola tree (*Averrhoa carambola L.*) (a) Appearance of Starfruit tree; (b) Appearance of Starfruit tree trunk; (c) Appearance of Carambola leaves; (d) Appearance of Starfruit flowers; (e) Appearance of Starfruit

The tree trunk is dark brown with a rough and cracked surface. In the sympodial branching type where the main stem is difficult to distinguish from branches because the direction of growth and size is almost the same. Odd pinnate compound leaves with oval-shaped leaves, pointed tips, flat edges, glossy upper surface, and opaque lower surface. The inflorescence is bisexual, which consists of stamens and pistils in one flower, and has parts such as petals, crowns, stamens, and pistils. The starfruit flower is a compound flower that grows in groups in the axillary bundles located on the stems and branches, the flowers are small and dark purple in color. The flowers are radially symmetrical with five flowers in multiples. This is reinforced by research (Pegassi, 2014) which states that the flowers of the starfruit tree, namely compound interest, are arranged regularly, purplish-red in color, coming out of the axils of the leaves, the tips of the branches and the branches. Flowering occurs throughout the year causing the fruit to know no season. Carambola belongs to the edible buni fruit, where there are five segments and includes a single true fruit which when it is young is green and when it is old it is yellow. Carambola fruit is oval-like and has a pointed tip, the seeds are flat and dirty white.

*Kiara Payung Tree (Filicium decipiens (Wight & Arn))*

A branched taproot system (Laila, 2021). Tree trunks are included in the round hard and woody stems. The surface of the stem is rough, the direction of growth of the stem is upright, and has a monopodial branching system (Figure 12).



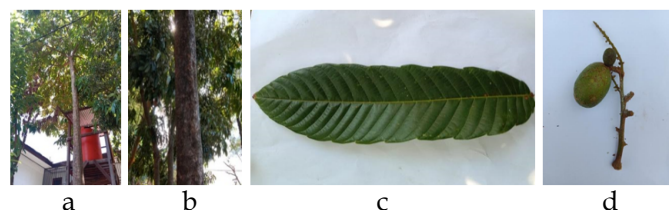
**Figure 12.** Kiara Payung Tree (*Filicium decipiens (Wight & Arn))* (a) The appearance of the Kiara Payung tree; (b) the Appearance of the Kiara Payung tree trunk; (c) the Appearance of Kiara Payung Tree leaves

It has many branches and resembles an umbrella and the stems are brownish-gray. Compound leaves and classified as incomplete leaves. Shape lanceolate leaves with wavy edges. The base of the leaf is pointed, while the tip is split, the surface is shiny, and the bones are pinnate and thick-textured, and dark green in color. Perfectly compound inflorescences arranged in yellowish-white panicles. Flowers come from the axils of the leaves adjacent to the ends of the branches. Flower jewelry consists of petals and flower crowns. Classified as compound fruit and stone fruit (Laila, 2021).

*Matoa Tree (Pometia pinnata)*

It has a root system, namely a taproot (Laila, 2021). Matoa is a type of plant with medium to very large size, buttresses (board roots), straight trunks with many branches, and round crowns. Dead outer skin 0.2-2 mm thick, light gray to red-brown, skin grooved shallow, peeling small (Figure 13).

Matoa wood is included in the medium class, rather heavy and rather durable, not resistant to termite attack. The leaves are alternate compound leaves, even-finned, long petioles, oval leaf shape with serrated edges, elliptical shape, and leaf base rounded. The color of the leaves is green and if it is old it will turn yellow. Matoa flowers are bisexual, which consist of stamens and pistils in one flower, by self-pollinating or cross-pollinating (Prosea, 1994) (Tarumingkeng et al, 2004). The fruit is round oval, has a smooth fruit skin, and is yellowish green to some red when ripe. The clear yellow flesh is covered by a white skin membrane. The taste of the fruit is sweet and smells good.

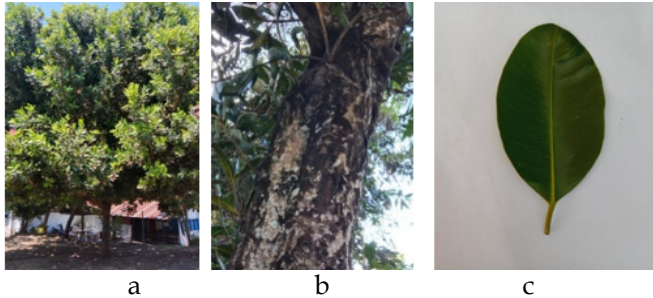


**Figure 13.** (a) The appearance of the Matoa tree; (b) the Appearance of Matoa tree trunks; (c) Appearance of Matoa tree leaves; (d) Appearance of Matoa fruit



*Bintangur/Nyamplung Tree (Calophyllum inophyllum L)*

Taproot system (Muderwan & Daiwataningsih, 2016). The stems are woody and strong. The benefits of wood can be used as a building construction material. The tree trunk grows straight up, has a grayish to a black color and the surface of the bark is scaly or flaky (Figure 14).



**Figure 14.** Bintangur/Nyamplung tree (*Calophyllum inophyllum L*) (a) The appearance of the Bintangur/Nyamplung Tree; (b) the Appearance of Bintangur/Nyamplung tree trunks; (c) the appearance of Bintangur or Nyamplung leaves

Single leaf, shiny, smooth surface, oval with a blunt tip, alternate opposite each other, flat edge with pinnate bone. It is a compound flower, forms bunches, flowers grow in the axils of the upper leaves, is androgynous, has four irregular petals, has many stamens, crooked stigmas, and partial stigmas. It has four oval-shaped crown leaves and is white. The fruit is thick yellow with seeds covered in a shell, the shape of the fruit is round and has a hard shell (Muderwan & Daiwataningsih, 2016). In line with research (Emilda, 2019) states that the young Bintangur/Nyamplung fruit is green and when it is old it is yellowish, if left for a long time it will have a wood-like color, the fruit belongs to the stone fruit category, the fruit is like a bullet with a small spout on the front and round fruit shape with a hard shell.

## Conclusion

There are 13 species with 10 families, namely the Arecaceae family consisting of two tree species, namely *Cocos nucifera* L and *Livistona saribus* (Lour.) Marr. The Cupressaceae family consists of one type of tree, namely *Cryptomeria japonica*. The Sapindaceae family consists of two types of trees, namely *Filicium decipiens* (Wight & Arn.) and *Pometia pinnata*. The Fabaceae family consists of two tree species, *Albizia saman* (Jacq.) Merr, and *Tamarindus indica* L. The Moraceae family consists of one tree species, namely *Ficus benjamina*. The Lecythidaceae family consists of one tree species, namely *Barringtonia asiatica* (L.) Kurz. The Combretaceae family consists of one tree species, namely *Terminalia catappa* L. The Anacardiaceae family consists of one tree species, namely *Mangifera indica* L. The Oxalidaceae family consists of one tree species, namely *Averrhoa carambola* L.

The Clusiaceae family consists of one tree species, namely *Calophyllum inophyllum* L. Types of plants in the FKIP UNCEN Campus yard as Biology learning media in the Plant Morphology course.

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