

IDENTIFICATION OF MAIN ORGANS AND MODIFICATION OF GREEN LEAF PLANTS

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ABSTRACT

Plant diversity is not only seen morphologically, but can also be distinguished anatomically. Anatomical features can be distinguished as support and reinforcement for classifying plant species. This study aims to observe the morphology of the shape of the plant organs and to observe the anatomy of the constituent tissues of the plant organs. The types used were 19, which are representatives of the main organs that make up plants, namely roots, stems and leaves, while other modified organs are flowers, fruits and seeds.

The research method used is descriptive method with a qualitative approach through observation of 19 different plant species. To obtain valid research results, samples were taken of several plants that have in common, namely plants that have green leaves.

The results showed that the 19 types of plants observed had similarities in the characteristics of their leaves, which were green and there were also similarities in the main organs that make up the plants, namely roots, stems and leaves and in other modified organs such as flowers, fruits and seeds. However, there are some plants that do not have these characteristics but are not included in this study.

Keywords: main organ, modified organ, green leaf plant

PRELIMINARY

Cells are the smallest structures that make up the body of living things that have certain functions. All life functions are regulated and take place in cells, consisting of organelles that have specific functions, between animal cells and plant cells there are several differences [11].

Clumped cells form a network that has the same shape and function to form tissues in plants consisting of three types, namely blood tissue consisting of parenchyma, skelerenchyma and collenchyma. The tissue will remain there until the plant grows up. Transport tissue consists of xylem and phloem. Xylem functions as a carrier of water from the roots to the leaves, while the phloem functions to transport the products of photosynthesis

throughout the body. Mature tissue consists of tissues that function to protect the plant body [11].

Based on seed plants consisting of two types, namely dicots and monocots, there are differences in the structure between dicots and monocots, a significant difference can be seen with the naked eye, some are using a microscope [11].

Plants are composed of various organs, such as roots, stems and leaves. These organs have their respective functions in the activities carried out by the plant itself. In addition, plants are also found in fruit, flowers and seeds. As a support for the next life for plants. Fruits, flowers and seeds function as reproductive organs for plants [11].

An organ is a collection of several tissues that have a specific purpose or role in the body. Plant organs are divided into vegetative and generative organs. The vegetative organs are roots, stems and leaves. The generative organs are flowers, fruits and seeds. In the leaves there is a cell organelle that is not found in animal cell organelles, namely plastids which contain chlorophyll. Therefore, in this report will be discussed more specifically about the organs that make up the plant body [11].

Basically the plant body is composed of 3 main parts, namely the root (Radix), stem (Caulis) and leaves (Folium). Plants that pay attention to the differentiation of the 3 main parts are grouped in the cormophyta group (chromus plants). Chromus is a plant body that is only owned by ferns and seed plants. Other parts of the plant body can be seen as the embodiment of one or two main parts that have undergone changes in form, nature or function. The parts of the plant organs that were observed were [1]:

Roots have developed so that from the main root, branch roots come out which will later branch again. From this branching, the roots can be divided into the following parts [6]:

- a. Root neck: Collum
- b. Root tip: Apex radicalis
- c. Root stem: Corpus radicalis
- d. Root branches: Radix lateralis
- e. Root fibers: Fibrilla radicalis
- f. Root hairs: Pillus radicalis
- g. Root cap: Calyptra

In general, there are two forms of root systems in plants, namely [6]:

- a. Taproot: Radix primaria
- b. Fibrous roots: Radix adventitia

Its development does not come from root institutions, but can come from other organs, such as leaves and stems, because of some functions (such as storing food), roots can change shape. Some forms that

are commonly found are spear shape (fusiform) and top shape (napiformis) [6].

The stem is one of the most important organs in plants, where it attaches and grows other organs. The stem has nodes (books) where other organs are attached such as leaves and intermodus (segments) which are located between two nodes [10].

Leaves have three common parts:6

- a. Vagina : leaf sheath
- b. Petiolus : leaf stalk
- c. Lamina : leaf blade

Complete leaves, if in one leaf has all three parts above. Conversely, if the leaf is incomplete, if in one leaf it does not have one part [6].

Leaf sheets, stems and leaves have certain characteristics that can sometimes be used to identify a plant, while certain parts are modified into other forms and function the same as the parts they replace.

The leaf blade has very interesting characteristics in a plant. Naturally, it is very difficult to find exactly the same leaf sheet, even within one individual, because of these characteristics and properties, often the leaf blade can be used as an important characteristic in grouping a plant [1].

The characteristics and properties of leaves that are very important and need attention include [11]:

- a. Leaf characteristics [6]

Circumscriptio: Common part of the leaf

Apex: Leaf tip

Base: leaf base

Nervatio/venatio: The arrangement of the bones of the leaves

Margo: leaf edge

Intervenium: Leaf flesh

- b. Leaf properties, such as leaf surface and leaf color.6

Based on the fertilization process, in addition to seed development, it also stimulates the body and ovary

development. These ovaries continue to develop and mature into fruit [20].

The fruit is sometimes found still leaving parts of the flowers that do not fall. Some parts of the flower that are often found on the fruit are: the protective leaf (Bractea), the petal (Calyx), the pistil (Stylus) and the stigma (Stigma) [20].

Fruit that only occurs from the ovary and there is no part of the flower that develops like a fruit, a true fruit is formed, whereas if the flower part develops so that it resembles a fruit, a pseudo fruit will be formed [20].

Flowers are one of the generative organs that become the main distinguishing character in the process of grouping plants. This selection is because the character of the flower is believed not to be easily changed by environmental influences, thus in certain types the flower parts are modified into other forms and function the same as the replaced parts [20].

In general, in one flower there are the following parts [6]:

- a. Flower stalk: Pedicellus
- b. Flower base: Receptaculum

RESEARCH METHODS

In this study used a qualitative descriptive approach. This type of descriptive research is a research method that utilizes qualitative data and is described descriptively. This type of descriptive research is usually used to observe a phenomenon or situation. The phenomenon observed in this study is related to the identification of the constituents of the main organs of plants and the composition of modified organs in plants that have green leaves. This study uses 19 samples of green leaves which will be described as follows:

- a. Leaf
 - Jatropa leaves
 - Aloe vera leaf
 - Cassava leaves
 - Guava leaves

- Corn leaves
- cat's whiskers
- puzzle leaves
- b. Root
 - croton root
 - kale root
- c. stem
 - Cassava stem Batang
 - Corn stalks
 - kale stem
 - croton stem
- d. Flower
 - bougainvillea flowers
 - Frangipani flower
 - Hibiscus flower
- e. rhizome
 - Ginger rhizome
 - Turmeric rhizome
- f. Bulbs
 - Onion bulbs
 - Garlic Bulbs
 - Carrot tubers

RESEARCH RESULT

In this study, the following steps were carried out:

1. Prepare the tools and materials needed
2. Observing each material that is sampled
3. Describe each sample that has been observed
4. Determine the organ parts of the sample

The results of the observations made in this study are by identifying the plant structure empirically, then making observations on the plants that will be sampled. The plants observed were obtained from the research location, namely in Gorontalo City and one of the considerations in selecting the sample was the ease of finding all the materials and tools used to support this research, observations were carried out for about 14 days starting from the preparation of tools and materials. used to generate a complete report. The focus of observation is on plants that have green leaves with the

characteristics of having green leaves, roots, and stems.

DISCUSSION

Jatropha leaves

Jatropha leaves have finger veins, green colored leaves with a pale surface compared to a bright upper surface, have thick leaves and have a tapered leaf tip [6].

Jatropha leaves have green leaf color but the color of the lower leaf surface is paler, the flowers produced are compound flowers with greenish-yellow color and green fruit when young and will turn brownish yellow or black when ripe [9].

Figure 1 below presents the morphology of Jatropha leaves.



Figure 1. Jatropha Leaves

Guava leaves

The leaves of this guava plant are round or oval with a light green to dark color. The edges of the evenly distributed leaves with a diameter of 2-3 cm are equipped with leaf veins ranging from 5-10 in one leaf. The leaves of this plant are useful for carrying out the process of photosynthesis.6 The following Figure 2 presents the morphology of Guava leaves.



Figure 2. Guava Leaves

Single guava leaves, crossed opposite each other on horizontal branches as if arranged in two rows in one plane. Short-stemmed 3 mm to 7 mm. The shape of the guava leaves is slightly oval, the base is rounded, the edges of the guava leaves are flat (integer), the tips of the guava leaves are pointed (actus). The color of the young guava leaves is gray when they are dark purple. The veins are pinnate (penninervis) and yellowish green [15].

Aloe vera leaf

Aloe vera leaves are tuber-shaped and elongated strands, the leaves are thick and boneless, have thorny or serrated leaf edges that are blunt and colorless and have a tapered leaf tip [6]. Figure 3 below presents the morphology of Aloe Vera leaves.



Figure 3. Aloe Vera Leaf

Aloe vera leaves 30-50 cm long, stems round, white, not woody. The leaves are 30-50 cm long, 3-5 cm wide, thick fleshy, gummy yellow, green. Compound flowers, panicle form at the

end of the stem, protective leaves 8-15 mm long, six stamens, pistil sticking out or attached to the base of the anthers, pistil stalk in the form of threads, small pistil, the tip of the crown spreading orange or red The fruit is a box, 14-22 cm long, vegetated, whitish green color. The seeds are small and black. The roots are yellow fibers [16].

Frangipani flower

The structure of the frangipani flower on the flower has a compound flower shape, funnel petals with a four-part flower crown and has a variety of colors. The pollination process is assisted by wind or other animals [6].



Figure 4. Cambodian Flowers

The color variations of frangipani flowers have their own beauty, the roots and stems are also in the form of a unique and interesting weevil [23].

bougainvillea flowers

Bougenvil flowers consist of flowers, flower stalks, pistils, pistil stalks, stamens and anthers [6].



Figure 5. Bougenvil flower

Bougenvil plants have characteristics of flowers that can be divided into two types, namely the original flowers are tubular, small and 2 cm long, and white in color, while the fake flowers look beautiful, arranged in dense and dangling tanks, white, red orange and other colorful [8].

Cassava stem Batang

Cassava stems have high segments reaching more than 3 meters, when still young cassava stems are green. The cassava stem is hollow and the contents are white, soft pith with a structure resembling a cork [6].



Figure 6. Cassava Stem

Cassava has stems with a diameter of 12-25 mm, grooved surface with greenish-yellow stems and no branches [6].

croton stem

The stem of the croton is round, woody, hard and many branched and greenish brown [6].



Figure 7. Stem Puring

The stem of the croton is round, woody, hard and many branched and greenish-brown in color. Croton leaves have various shapes, ranging from round to oval, oval, oblong, or ribbon. The shape of the croton leaf edges also varies, some are flat, wavy or twisted. The tips of the croton leaves are pointed or blunt. Croton leaves are arranged alternately or face to face and sit on the main stem segment [6].

croton root

The croton root is a black taproot. Croton roots have root hairs at the root [6].



Figure 8. Root Croton

The root of the croton plant is a taproot and is light yellow in color. Croton plants have a height of up to 4 m [6].

Rice straw

Rice stalks have soft stems that are green and slightly watery [6]. The stem is composed of several segments. The segments are empty ridges which are

closed at both ends by books. These segments have unequal lengths. The shortest segment is at the base of the stem, while the second segment, third segment, and so on are longer than the segment that precedes it. In the lower book of the segment, the midrib leaves that bind the segment to the upper book. Right at the top of the book, the tip of the midrib shows a branching where the shortest branch becomes the leaf tongue and the longest and largest part becomes the petal leaf which has ear lobes on the left and right [22].



Figure 9. Rice Stems

Garlic

The bulb of garlic is the structure of garlic consisting of a thin skin that wraps around the garlic bulb, the flesh of the garlic bulb is white.



Figure 10. Garlic Bulbs

Garlic bulbs are composed of several cloves, each of which is wrapped in a thin membrane which is actually a leaf sheath

so that it looks like a large tuber. The size and number of garlic cloves depends on the variety. The number of cloves for each tuber is different depending on the variety. Local varieties of garlic are usually composed of 15-20 cloves per tuber [13].

Shallot

The bulbs of shallots are bulbous because they are part of the bulbs in layers. The tubers are round and reddish in color. The shape of the seeds is slightly flat when young, it is clear or white. The tubers are round and reddish in color.



Figure 11. Onion Bulbs

The roots of the shallot plant have fibrous roots with a shallow root system and scattered branches, the leaves are cylindrical in shape with small holes and a pointed tip, the shape of the seeds is flat, when young they are clear or white, but when they are old they turn black.

Ginger rhizome

Ginger rhizome has an irregular circular shape, has dark brown skin [6].



Figure 12. Ginger Rhizome

The shape of the rhizome is generally fat, slightly flat and looks knuckled, the ginger rhizome has a rather thick skin that wraps around the flesh of the rhizome, whose skin is easily peeled off [14].

Ginger rhizome

The skin of turmeric is brownish in color which wraps around the rhizome of turmeric and on the skin of the rhizome there are still root fibers in turmeric [6].



Figure 13. Ginger Rhizome

The inner color is orange yellow or the center is paler [19].

Carrot tubers

Carrot tubers have a reddish color, have fibrous roots, have an elliptical shape with a tapered tip [6].



Figure 14. Carrot Bulb

This plant is a shrub that grows upright, has a tap and fibrous root system, short stems, wet, round and generally green. The root tubers are orange in color and have a sweet taste [7].

Hibiscus flower

Hibiscus flowers consist of flower stalks, protective leaves, flower base, flower petals, pistils and stamens [6].



Figure 15. Hibiscus flower

Single hibiscus leaves, oval in shape with rough jagged edges and finger hibiscus leaf bones, tapered ends, single flowers with segmented flower stalks, flower colors are red, orange, yellow, white and so on [5].

puzzle leaves

The leaves of the nut have stiff leaves forming a line, hairless, the surface color is green and the tip is tapered [6].



Figure 16. Leaf Puzzle

The leaves of the puzzle 4-10 are crowded at the base of the stem, with the leaf midrib covered under the ground, reddish brown, the leaf blade is midline with the upper surface of a shiny dark green color, the leaf tip is tapered, the blade width is 2-6 mm [4].

cat's whiskers

The leaves of the cat's whiskers have an oval leaf shape, the edges of the leaves of the cat's whiskers are evenly distributed and have a light green leaf color [6].



Figure 17. Cat's Whisker Leaf

The leaves of the cat's whiskers are single, ovoid oval, pointed or blunt at the ends, lanceolate, elliptical or elongated, smooth-haired, serrated edges, pointed ends and bases, thin, the size of the leaves of the cat's whiskers is 2 cm to 10 cm long and the width of the leaves cat's whiskers 1 cm to 5 cm, green leaf veins of cat's whiskers along the edge of thin or glabrous hair, where both surfaces are speckled due to the presence of very large number of glands, stalk length 7 cm to 29 cm [3]

Corn leaves

Corn leaves have leaf blades, corn leaf bones and the surface is quite slippery and has little hair, the edges of the corn leaves are evenly distributed and the ends of the corn leaves are tapered [6].

Corn leaves are elongated, have the characteristics of a ribbon (ligulatus), pointed leaf tips (acutus), flat leaf edges (integer) [18].



Figure 18. Corn Leaves

kale root

The roots of kale consist of root bones, root stems, root branches, root hairs and have root branches [6].



Figure 19. Kale Root

The roots of the kale plant grow creeping with quite a lot of branching. The root system is tapped with root branches that spread in various directions [17].

Conclusion

As for what can be concluded from this practicum, namely by observing the parts of plant organs empirically. We can know the parts of the plant by observing it directly, besides that we can determine the parts of the plant. The main organs that make up plants are roots, stems and leaves, while other modified organs are flowers, fruits and seeds. Furthermore, as a recommendation from researchers that it is better for further researchers to pay more attention to the parts of the plant organs that are observed, not only plants with green leaves but other types of plants. Diversity of plant species includes morphological, anatomical, physiological components, plant cultivation methods

and phytochemical compounds contained in these plants. The morphological characteristics of each species are almost similar, starting from the roots, stems and leaves, because they are still in the same family. Morphologically the leaf consists of three midribs or upih (vagina), stalk (petiol) and leaf blade (lamina), and the leaf tissue structure consists of three tissue systems, namely epidermal tissue, mesophyll tissue and vascular tissue. Stomata are modifications of epidermal tissue that play a role in regulating the entry and exit of air and water in leaves.

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