Species of pandan (Pandanus sp) in Gorom Island, East Seram Regency

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Abstract The purpose of this study was to determine the Species of Pandan (Pandanus sp) in Gorom Island, East Seram Regency. The object used in this study was the external body structure of pandan plants (pandanus sp) such as fruit, flowers, leaves, stems and roots. This research was conducted directly by direct survey in the field and observing the species of pandan (Pandanus sp), this research includes observations on fruit, flowers, leaves, stems, and roots. Based on the results of the study found 6 species of pandan (Pandanus sp) that is: Pandan Duri, Pandan Mengkuwang, Pandan Kowang, Pandan Sepajam, Pandan Wangi dan Pandan Laut. Of these 6 species we can distinguish from the shape of the leaves, stem shapes, fruit shapes, and root shapes.

1. Introduction

Non-timber forest products (HHBK) have always played an important and large role in the forestry economy in developing countries [1]. No exception in Indonesia. This is inseparable from the many types of NTFPs that can be obtained from forests, both those derived from NTFP plants and from the use of NTFPs in general that meet the needs for food, energy and NTFP products that have become input as well as direct income for meeting the needs of many households and communities around the world [15].

In many countries, the total economic value of NTFPs is estimated to be able to contribute to state revenues as large, maybe even more, than that obtained from logs. In Indonesia alone, the economic value of NTFPs is estimated at 90% of the total economic value that can be generated from forest ecosystems [6]. So far, NTFPs seem to be underestimated and are only considered as forest products. However, in Indonesia, there is quite a lot of plant diversity available that can be used as raw materials for the handicraft industry, including plaiting. To produce woven products from plant materials, knowledge and experience are needed in knowing plants that have long and strong fibers. One of the varieties of plants that meet these two requirements is pandanus, which is a member of the pandan-pandanan (Pandanaceae) tribe, especially from the Pandanus clan.

The types of the Pandanus clan are members of the Pandanaceae with the most extensive distribution and range of habitats they occupy. These plants can be found ranging from sandy beaches to highland forests with an altitude of about 3500 m above sea level and ranging from secondary forests and grasslands with various soil patterns ranging from humid fertile wetlands, limestone, peat swamps to relatively dry and relatively dry sandy soils, poor in nutrients [10]. Several types of pandanus, namely Pandanus: P.tectorius, P.bidur, P.furcatus, the leaves produce plaits, pandanus mats, bags, or food
wrapping materials: P.amaryllifolius (fragrant pandanus), as a hair oil fragrance, scent certain dishes (pastries); P.edulis, the fruit is edible.

On Gorom Island, which is a small island, it also has a place to grow pandanus species. These types of pandanus are only found in Mamasa Hamlet and are also used by the community as a woven material, food fragrance. Until now there have not been many researchers on the types of pandanus, based on the description above, the aim of the study was to analyze "Types of Pandanus (Pandanus sp) in Gorom Island, East Seram Regency".

2. Methods
The research was conducted in Gorom Island, East Seram District, Wawasa Village. The research was carried out from July to August 2020. The object used in this study was the structure of the outer body of the pandanus plant (Pandanus sp) such as leaves, fruit, flowers, roots, stems. The types of data used in this study are primary data and secondary data. Primary data is data obtained from the use of pandan leaves by the community for management techniques. Secondary data, namely as supporting data related to the types of pandanus.

The data collection methods used in this research are: Field survey method is carried out directly by observing the species in the growing location of Pandanus (Pandanus sp), including:
A. Leaves consisting of: leaf position, leaf base, leaf surface and leaf bone
B. Trunk
C. Interest
D. Fruit
E. Roots

3. Results and discussion
3.1. Description of the types of pandanus (Pandanus sp)
Pandanus (Pandanus sp) is a group of monocot plants with the genus Pandanus. Most of the pandanus grows at an altitude of 1500 to 3500 masl on the coasts of the tropics [11]. Usually the most prominent thing about this difference can be seen from the leaves of this plant is characterized by elongated leaves (such as palm fronds or grass), often jagged edges. The roots are large and have supporting roots that support this plant. Pandanus fruit are arranged in round arrangements, like durian fruit, but there are only a
few types that have fruit. The size of this plant varies, from 50 cm to 5 meters. The greatest benefit of the equivalent plant (Pandanus sp) is the leaves. There are 6 types of pandan that are known in the community of Wawasa Village, namely: emar or pandan duri (Pandanus tectorius), hodan or pandan mengkuwang (Pandanus artocarpus), iro’ut or pandan kowang (Pandanus furcatus), gogit or sharp pandanus (Pandanus bicornis), pandan leaves or fragrant pandanus (Pandanus amaryllifolius), and large emar or sea pandanus (Pandanus tectorius), [11].

3.1.1. Types of Pandan Duri (Pandanus tectorius)
This type of pandanus does not have flowers or fruit, it lives widely in open areas in the lowlands and is usually used by the community around the research location to become a raw material for plaiting only when the raw material for pandan kowang starts to run out or is lacking. Pandanus is measuring 4-14 m high and usually grows at an altitude of 15 to 100 meters above sea level, and produces 10-300 leaves per stem per year, [11]. This pandanus has many green leafy branches with a length of 75-90 cm and a width of 4-5 cm, [8].

Based on the results of observations made on Pandan Duri, it has the following characteristics:

A. Leaves
Single leaf type, the position of the leaves in neat circular rows, build leaves or leaves an oval shape to a pointed tip, the base of the leaf is round and the tip of the leaf is tapered slightly rounded. The edges or edges of the leaves are spiny parallel, the surface of the leaves is smooth and uneven, the leaves are parallel and in a straight line, the leaves are parallel and in a straight direction (Figure 2).
B. Stem
The shape of the stem is short above the ground (Figure 3)

![Figure 4. Pandanus tectorius leaf stem shape](image)

C. Interest does not exist
D. No fruit
E. Roots
The roots are long supporting to the collection of leaves and have spines on the outside of the Root bark (Figure 4).

![Figure 5. Root Form of Pandanus Duri (Pandanus tectorius)](image)

3.1.2. Types of Pandan Kowang (Pandanus furcatus)
This type of pandanus does not have flowers or fruit, this pandanus grows in the lowlands to the highlands and is usually in rather shady places in the middle of the forest above 100-300 masl. This pandanus has a stem height reaching ± 11 m, erect, dirty white, has a single green leaf and lenset-shaped with pointed leaf tips and spiny leaf edges on the sides of the leaves and behind the leaves and the length of the leaves reaches 90-150 cm and 3- 5 cm, [13].
Based on the results of observations made on pandan kowang it has the following characteristics:

A. Leaves

- Single leaf type, the position of the leaves or the arrangement of the leaves in a row upward, the shape or shape of the leaves is oval to a sharp tip, the base of the leaf is rounded, the position of the leaves or the arrangement of the leaves is arranged in a straight line (Figure 6), the edges of the leaf edges are spiny and the leaf surface is wavy, bone the leaves are aligned straight and direction (Figure 7).

Shape

The shape of the stem is not perpendicular but sideways (Figure 7).
B. Fruit does not exist
C. Roots
The roots are elongated and attached to the stem and are smooth and not too long big.

3.1.3. Jenis Pandan Sepajam (Pandanus bicornis)
In the research location this type of pandanus species has fruit and lives in the lowlands from 15 to 90 meters above sea level, and is usually widely distributed near the sea along with the types of plants that grow on the coast, which are found in high locations of pandanus this sharp reaching 100 -120 cm with leaves 65-90 cm long, 2- 5 cm wide, and usually the leaves are used by the research location community as raw material for spare weaving or as a substitute for pandan mengkuwang but the product is not suitable and the color is dirty green so the people around the research location do not like to use the leaves as a woven material, [13].

Based on the results of observations made on pandan mengkuwang it has the following characteristics:
A. Leaves
The leaf edges are arranged in rows, the position of the leaves is arranged according to the branching, the base and tip of the leaves are rounded, the tips of the leaves are tapered, the surface of the leaves is smooth
and wavy, the edges of the leaves are not spiny and smooth, the leaves are smooth and not spiny, the bones of the leaves are straight in the form of fine threads following the leaves (Figure 9).

B. Trunk
The shape of the stem is circular and the diameter is large.
C. Interest was not found at the time of the study
D. Fruit
Single upright fruit shape and rounded egg (Figure 10).

D. Roots
The nature of the roots is quite large in length and diameter and also has spines on the outside, the type of roots is branched long and has a large diameter (Figure 11).
3.1.4. Jenis Pandan Mengkuwang (Pandanus artocarpus)
This type of mengkuwang pandanus is found in the research location, mostly in low to high plains, especially in areas near the sea, does not have flowers or fruit. This mengkuwang pandanus grows up to 15-150 meters above sea level, and grows together with other types on the coast, with leaves reaching 90-150 cm in length, 2-5 cm in width, [9]. Why is this pandanus used by the community in the research location because pandan mengkuwang is very strong and its long leaves can produce good quality products and long-lasting kaut, [1].

Based on the results of observations made on pandan duri has the following characteristics:
A. Leaves
The leaf type is single, the position of the leaves is tightly arranged and dense, the base of the leaves is wide and the tip of the leaf is tapered, the surface of the leaves is smooth and wavy, the edges of the leaf edges are not spiny and smooth and the leaves are smooth without spines, straight leaf bones and the shape of halur threads follow the leaves.
B. Trunk

C. Interest does not exist
D. No fruit
E. Roots
The shape of the roots is smooth, not too long and not too big (Figure 14)

3.1.5. Types of Fragrant Pandanus (Pandanus amarylliolius)
This type of pandanus does not have flowers or fruit, and is not used as a woven material. It grows in the research location at an altitude of 15 to 80 meters above sea level, with a height of no more than 1.5 cm, [8]. The leaf length reaches 80-110 cm and the leaves are 3-6 cm wide. This plant is developed by cutting the leaves, this pandanus is a pandanus with fragrant leaves only used for cooking, [8].
Based on the results of observations made on fragrant pandanus, it has the following characteristics:

A. Leaves
The leaves are single and neatly arranged, the shape of the leaves is long, the base of the leaf is round and the tip of the leaf is long, the edge of the leaf or leaf type does not have thorns but only at the end of the leaf there are small thorns, the surface of the leaves is wavy and the top is shiny, the leaf bones are long and straight along the length of the leaf.

B. Trunk
The shape of the stem is rounded but not too high just above the ground.

C. Interest does not exist
D. Fruit does not exist

E. Roots
The nature of the roots is supportive and some come out around the base of the trunk and branches, the type of root finely branched on the stem (Figure 16).

3.1.6. Type of Sea Pandan (Pandanus odorifer)
In general, what can be found in the research location, this type of sea pandanus grows above an altitude of 15-30 dpml. 125 meters, with a trunk that does not have thorns, grows in the form of a tree or shrub, has a lot of stems, with supporting roots around the base of the trunk and aerial roots from the branches. The length of the leaves is 70-100cm, and the width of the leaves is 3-5cm, with triangular and sharp
edges. It has a fruit where the characteristics of this fruit are a hanging compound fruit in the shape of a ball. The fruit is 2-5 cm in size, the fruit will be yellow orange when ripe, the center of the fruit wall is fibrous with lots of air space, usually lives wild in sandy forests, this pandanus thorn has long been known by coastal communities as a large and large pandanus, [8].

[Image of Pandan Laut (Pandanus odorifer) and its root shape]

Based on the results of research conducted on sea pandanus, it has the following characteristics:

A. Leaves
   Single leaf type, the position of the leaves or the arrangement of the leaves in a row following the branching, build or shape the leaves are oval to sharp edges, the base of the leaves is round and the tip of the leaf tapers slightly, the edges of the leaves are spiny parallel, the leaf surface is smooth and uneven, the leaf bones are parallel to the length of the leaf.

B. Trunk
   The shape of the trunk is large and has thorns on the bark

C. Interest

D. Fruit
   The shape of the fruit is round

E. Roots
   Types of supporting roots (Figure 18).
4. Conclusion
Based on the results of research conducted on Gorom Island, East Seram Regency, it can be concluded that:
1. There are 6 (six) types of pandanus (pandanus sp), namely: emar or pandan duri (*Pandanus tectorius*), iro’ut or pandan kowang (*Pandanus furcatus*), hodan or pandan mengkuwang (*Pandanus artocarpus*), Gogit or Pandan Sepajam (*Pandanus bicornis*), pandan leaves or fragrant pandan wangi (*Pandanus amaryllifolius*), and large emar or pandan laut (*Pandanus odorifer*). Among the 6 (six) types of pandanus (pandanus sp), there are 4 (four) types of pandan that are utilized, namely: Iro’ut or Pandan Kowang (*Pandanus furcatus*), Hodan or Pandan Mengkuwang (*Pandanus artocarpus*), Pandan Leaf or Pandan Wangi (*Pandanus amaryllifolius*), and Pandan Duri (*Pandanus tectorius*).

5. Acknowledgment
Further research is needed on the utilization and economic value of pandanus (*Pandanus* sp)

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