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Mangrove Identification on the Rainbow Bridge Coastal Coast Lamundre Village, Watubangga District, Kolaka Regency

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Abstract

The village of Lamundre is an area overgrown with a mangrove ecosystem of 4 hectares and is well developed on the coast. The area can be well overgrown with mangroves because of environmental conditions and other supporting factors such as muddy substrate, muddy sand in tidal transition areas, salty, brackish water and the presence of currents/waves that are classified as mangrove growing conditions. This study aims to determine the types of mangrove plants and environmental parameters on the abundance of mangrove species on the coast of the Rainbow Bridge, Lamundre Village, Watubangga District, and Kolaka Regency. This type of research is descriptive and qualitative by using mangrove samples on the roots, stems, leaves, flowers and fruit. The method used is Line Transect, which uses plots that are aligned on the main line (Basseline) that has been determined in the research area along 280m, the total number of plots is 10, with each plot of 10m x 10m. Based on the study's results on the identification of mangroves in the Pantai Pelangi Beach, Lamundre Village, Watubangga District, and Kolaka Regency, it shows that mangroves belong to 2 families and 7 species. The mangroves are from the *Rhizophoraceae* family namely *Rhizophora mucronata species, Rhizophora apiculata, Rhizophora stylosa, Ceriops decandra, Bruguira cyndrica, Bruguira ghymnorryza* and the *Soneratiaceae* family namely *Soneratia caseolaris.*

Keywords: Lamundre village, identification, mangrove

A. Introduction

Mangrove forest is a unique and distinctive ecosystems found in tidal areas in coastal areas, beaches, and small islands. In mangrove forests, there is a reciprocal relationship between abiotic components such as organic, inorganic, and climate compounds (tidal, salinity, etc.) with abiotic components such as producers (vegetation, plankton) and macro consumers (insects, fish, birds, crocodiles, etc.) (Selfianty et al., 2018).

According to Noor et al. (2006), mangrove forest vegetation in Indonesia has a high species diversity, with a recorded number of 200 species consisting of 89 tree species, 5 palm species, 14 liana species, 44 epiphytic species and 1 cycad. However, there are only approximately 47 plants species-specific to mangrove forests. At least in the mangrove forest, there is one important or dominant true plant species which is classified into 4 families, namely: Rhizophoraceae (Rhizophora, Bruguiera, Ceriops), Sonneratiaceae (Sonneratia), Avicenniaceae (Avicenia) and Meliaceae (Xylocarpus).

Kolaka Regency is one of the areas with mangrove forests located on the coast, which can support the community's economy and as a place to find out the types of mangrove plants. This area is one of the tourist attractions in the mangrove forest, which many residents visit. The location is quite wide, located on the coast by the side of the highway on the west; mangroves can grow and develop well on the coast, which is inundated with tidal water phenomena. Therefore, mangroves have adaptations in the form of tall and strong roots above the water. Geographical conditions make this coastal area potential to be overgrown with mangroves.

The role of mangroves is very important for the community. The lack of understanding of the community about the characteristics of mangroves causes this research to be important. To provide information and increase knowledge of the local community. To find out the types of mangroves and maintain their sustainability so that in the future, mangrove cultivation can be carried out to multiply the various types of mangroves on the Rainbow Bridge Coastal Coast, Lamundre Village, Watubangga Subdistrict.

B. Literature review

1. Mangrove Identification

Mangroves are forest vegetation that grows between tidal lines, so mangrove forests are also called tidal forests. Mangrove forests can grow on coral beaches, namely on dead coral reefs that are overgrown with a thin layer, overgrown with mud or on muddy beaches. Mangrove forests are found in coastal areas continuously or sequentially submerged in seawater and influenced by tides; the soil consists of mud and sand (Saparinto, 2007) Majid et al., (2016).

The mangrove forest is a tropical ecosystem that is unique in the environment and combines ocean and land formations. Due to the influence of the mainland sea, there is a complex interaction between chemical and biological properties. Mangroves depend on seawater (tidal) and freshwater as a source of food and silt (sedimentation) from upstream erosion as a substrate support material (Motoku et al., 2014).

2. Benefits of Mangroves

The most crucial benefit of mangroves for coastal areas is to connect land and sea. Mangroves are also a damper for natural phenomena caused by water such as abrasion, waves, and storms. They also can be a buffer for other marine life which is a source of livelihood for the community. (Koda, 2021).

Besides being useful as a green line, Mangrove plants also act as sources of carbohydrates, proteins, fats and secondary metabolites, so food development strategies need to be directed at the potential of regional resources and specific food sources (Handayani, S. 2018). Mangrove forests have multiple benefits and are an essential link in maintaining the balance of the biological cycle in water. The benefits of mangroves include physical benefits, including maintaining a stable coastline, protecting the coast from marine erosion or abrasion, seawater intrusion, holding and depositing mud and filtering polluted materials. Biological benefits as a place for breeding fish, and shrimp, nesting places for birds, natural habitat for various types of biota, shelter and spawning for various types of shrimp, fish and various other biotas (Hamuna et al., 2018)

3. Mangrove Identification

Identification, often called determination, is an activity to determine whether a plant is considered identical to a group of previously identified and named plants. If a plant is to be

identified, the first thing to do is study it from its morphological characteristics (such as position, shape, size, number, parts of leaves, fruit and flowers). The identification key is a series of questions whose answers must be found on the specimen to be identified. If all the questions in the identification key are answered in succession, it means that the name and place in the plant classification system to be identified can be known.

Identification aims to examine and analyze a thing or object in more depth, in this case, the identification of plants. Knowledge of identification, naming and classification alone (classical taxonomy) has not been able to answer or explain why plants are diverse, how their origins are and how they are related to each other. In order to be able to answer these problems, it is necessary to carry out an assessment of diversity and kinship, better known as Biosystematics (Experimental Taxonomy). In addition, the determination key is used to search for unknown plant or animal names. (Van Steenis, 2006) in Fahmi, MAF (2006)

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C. Method

1. Research design

This research was conducted for 1 month, in September-November. Data retrieval using the Line Transect method, namely by drawing a straight line along 280m and making 10 plots alternately with an area of 10mx10m in each plot.

This research was conducted at the Rainbow Bridge Coastal Coast, Lamundre Village, Watubangga District. This location is one of the areas overgrown with mangroves. It is the only mangrove area used for ecotourism in the Watubangga sub-district with the Rainbow Bridge that can attract visitors. In the mangrove area.

Identification was carried out using a mangrove introduction guidebook. In each plot, the number of mangroves was recorded and observed based on morphological characteristics (roots, stems, leaves, flowers and propagules).

2. Instrument

The research implementation process is carried out in two stages, namely:

1) Preparation phase

Conduct a field research site survey beforehand, as well as prepare the tools and materials needed at the time of the research.

2) The implementation stage consists of:

a. Determining the research location point

The research location was determined using the purposive sampling method (determination of the research location on purpose) after conducting a field survey.

b. Identify

To identify mangrove species on the coast of Pelangi Bridge, Lamundre Village, Watubangga District, and Kolaka Regency, mangrove samples were taken using the line transect method.

The steps for identifying mangroves are as follows:

1) Make the main line (Basseline) following the length of the coastal area along the 280m, and the distance between plot 1 and the other is 20m.
2) On the main line (Basseline) 10 plots are made with a size of 10mx10m. Plots are made alternately.
3) In each mangrove plot that has been selected, the number of individuals of each species found is recorded.
4) Take pictures of every part of the mangrove plant, such as roots, stems, leaves, propagules and flowers.
5) Identification using samples of twigs, leaves, fruit and flowers on mangrove plants.
6) Make a herbarium if needed.

3. Technique of Data Analysis

Data collection in this study was obtained through:

a. Observation

Observation is the retrieval of data obtained by observing directly in each study.

b. Field data sampling

Field data sampling are data obtained from what is seen, experienced and thought in the context of collecting data at the time of descriptive identification.

c. Documentation

Documentation is used to collect mangrove image data which is the research, obtained by observations.

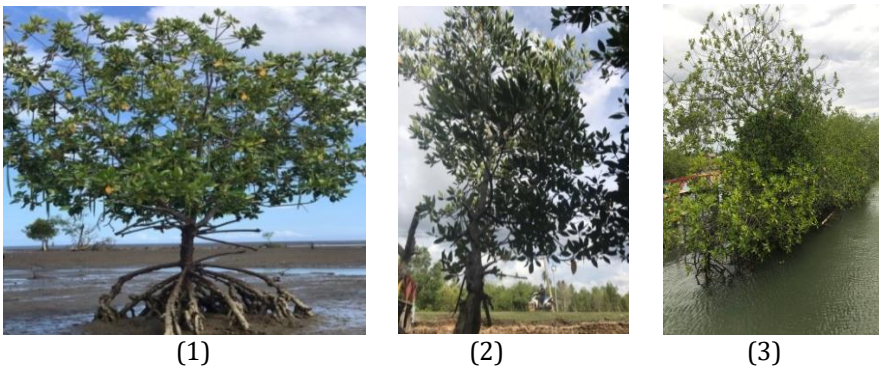
D. Results And Discussion

1. *Results*

Based on the results of the study on the identification of mangroves seen from morphological characteristics such as root, fruit, leaf, flower and stem forms with the Line Transect method and the laying of 10 research plots, mangroves were identified which belonged to 2 families and consisted of 7 species in the entire plot. The results of the mangrove identification are as follows:

Table 1. Types of true mangroves on the Rainbow Bridge Coastal Village, Lamundre Village, Watubangga District

No	Species	Local Name	Family	Total	Plot
1	*Rhizophora mocronata*	Beropa	*Rhizophoraceae*	67	1,2,3,5,6,7,8,9 ,10
2	*Rhizophora apiculata*	Beropa	*Rhizophoraceae*	15	1,2,3,5,7,9
3	*Rhizopora stylose*	Beropa	*Rhizophoraceae*	8	3,4,7
4	*Soneratiaceae caseolaris*	Bakko	*Soneratiaceae*	26	2,3,4,6,9,10
5	*Ceriops decandra*	Beropa	*Rhizophoraceae*	19	3,4,5,6
6	*Bruguira cyndrica*	Api-api	*Rhizophoraceae*	9	4
7	*Bruguira gymnorryza*	Beropa	*Rhizophoraceae*	24	4.5
Amount	7	3	2	168	10



(1) (2) (3)

(4) (5) (6) (7)

Figure 1. Seven species of Mangroves in Pelangi Beach, Lamundre Village, Watubangga District, Kolaka Regency (1)*Rhizhopora mucronate*, (2)*Rhizhopora apiculate*, (3)*Rhizhopora stylosa*, (4)*Sonneratia caseolaris,* (5) *Bruguiera cylindrica*, (6) *Ceriops decandra*, (7) *Bruguiera gymnorrhiza*

2. Discussion

a. Rhizophora mucronata

Based on the results of the identification of mangroves in Pelangi Beach, Lamundre Village, Watubangga District, the number of *Rhizhopora mucronata* species in plots 1,2,3,5,6,7,8,9 and 10 was 67 trees. This species is the most dominant species growing at the study site because of the substrate conditions and environmental factors that strongly support the growth of this type of mangrove. *Rhizhopora mucronata* generally grows in muddy, sandy substrate conditions.

Rhizhopora mucronata has shiny green leaves, black spots on the back, pointed ends, brownish stems, greenish-yellow flowers consisting of 4 petals, and green propagules up to 77cm long and has a type of prop roots.

b. Rhizophora apiculata

Based on the results of the identification of mangroves in the Pelangi Beach, Lamundre Village, Watubangga District, the number of *Rhizhopora apiculata* species in plots 1,2,3,5,7 and 9 was 15 trees. Substrate conditions and environmental factors support the growth of this type of mangrove. *Rhizhopora apiculata* generally grows in challenging, sandy, and not too muddy substrate conditions, commonly called primarily on zone 2. This type of mangrove is often found in tidal areas or on the coast of salty water.

Rhizhopora apiculata has dark green leaves, pointed ends, red shoots, brown stems, and flowers consisting of 4 yellowish-green petals, small elongated propagules, and purplish-green in rough colour texture and has a type of prop roots.

c. Rhizophora stylosa

Based on the results of the identification of mangroves in the Pelangi Beach, Lamundre Village, Watubangga District, the number of *Rhizhopora stylosa* species in plots 3,4 and 7 was eight trees. *Rhizhopora stylosa* was the least common species at the study site, possibly due to the spread of mangrove growth, so the species was found in other locations not included in the research plot. In addition, the condition of the substrate does not support the development of this type of mangrove. *Rhizhopora stylosa* generally grows in muddy, sandy substrate conditions or commonly referred to as being in tidal areas.

Rhizophora stylosa tree has a height of ± 15 m with a greyish-brown stems and root type of prop roots. The leaves are dark green with a tapered tip, and the underside is yellowish-green. *Rhizophora stylosa* flowers are yellowish-white, clustered, consisting of 4 petals with a complex and smooth texture, located in the middle. *Rhizophora stylosa* fruit is short, about 20cm in size, oval in shape, green in colour, and has nodules on the surface and tapered tips.

d. Sonneratia caseolaris

Based on the results of the identification of mangroves in the Pelangi Beach, Lamundre Village, Watubangga District, the number of species *Sonneratia caseolaris* in plots 2,3,4,6,9 and 10 was 24 trees. *Sonneratia caseolaris* is a species that grows a lot at the research site due to substrate conditions and environmental factors that support its growth. These mangroves are also found in river water which tends to contain more mud on the substrate. *Sonneratia caseolaris* can grow well on sandy, muddy substrates, commonly called mainly growing in zones 2 and 3, which are found in tidal areas with depths up to the knees of adults, which may rarely be overgrown with other types of mangroves.

Sonneratia caseolaris has a type of pencil roots. The leaves are round green, with the concave ends. The stem is light greyish brown with a tree height of up to 30 m. The red flowers consist of 6 petals. The fruit is green like an orange.

e. Bruguiera cylindrica

Based on the results of identification of mangroves in the Pelangi Beach, Lamundre Village, Watubangga District, the number of Bruguiera cylindrica species in plot four was nine. *Bruguiera cylindrica* was the least common species in the study area. *Bruguiera cylindrica* was not found in other fields because of its growth in clusters/side by side in coastal areas or spread out, so the species was found in different locations not included in the research plot. Another factor is the condition of the substrate that does not support the growth of this type. *Bruguiera cylindrica* generally grows on sandy substrate conditions.

The stems of the *Bruguiera cylindrica* tree are greyish brown with a complex and rough texture, and there are white spots. This type of mangrove has a kind of knee rootss. The leaves are shiny light green, medium size, with a length of about 8-10cm and a width of about 3cm, the surface of the leaf is smooth, and the back of the leaf has an uneven texture. The flowers have eight small petals, yellowish-white, and a black circle of ovules is in the middle of the petals. The fruit is elliptical with a tapered tip. The base of the fruit is green, and the centre to the bottom is purplish.

f. Ceriops decandra

Based on the results of the identification of mangroves in the Pelangi Beach, Lamundre Village, Watubangga Subdistrict, the species *Ceriops decandra* was identified in plots 3,4,5 and 6 with a total of 26 trees. This species is the most dominant species growing at the study site. This is because the substrate conditions and environmental factors strongly support the growth of this type of mangrove. *Ceriops decandra* generally grows in muddy sandy substrate conditions or commonly called mostly grows in zone 2 and is found in tidal areas.

The stems of *Ceriops decandra* are light brown to dark and finely textured. There are also grey spots on the branches. This mangrove has a type of butress roots. The leaves are glossy green, and the base is yellowish-green. The leaves are elliptical with rounded ends and tapered at the bottom. The flowers consist of 8 petals and are small in size. Green flower petals. When still in bud, the flowers are clustered in the form of small spheres. The fruit is elliptical, with a sharp-pointed tip and nodules. The base of the fruit is green, and the middle is purplish to brown, with a smooth texture.

g. Bruguiera gymnorrhiza

Based on the results of the identification of mangroves in the Pelangi Beach, Lamundre Village, Watubangga District, the number of *Bruguiera gymnorrhiza* species in plots 4 and 5 was 19 trees. *Bruguiera gymnorrhiza* is a species often found at the research site because of the substrate conditions and environmental parameters supporting its growth. *Bruguiera gymnorrhiza* generally grows on muddy, sandy substrate conditions in tidal areas.

The stems of *Bruguiera gymnorrhiza* are greyish brown. This mangrove has a type of knee roots. The leaves are shiny dark green, smooth texture, cylindrical with the tip and base of the leaf tapering while the middle is broad. Flowers of this type are red and have tapered lengthwise petals of as many as 9-16 pieces. The fruit is oval with a pointed tip. Dark green purplish has nine red fruit petals covering the base of the fruit like a flower.

E. Conclusion

Based on the study of Mangrove Identification on the Coastal Coast of Rainbow Bridge, Lamundre Village, Watubangga District, Kolaka Regency, it can be concluded that there are two families with seven mangrove species at that location. The *Rhizophoracae* family includes *Rhizophora mucronata, Rhizophora apiculata, Rhizhopora stylosa, Ceriops decandra, and Bruguiera cylindrica* and the *Soneratiaceae* family with the species *Soneratia caseolaris.* Therefore for further research, it is necessary to plant mangroves of different types. To increase the number of mangrove species, maintain their sustainability, and protect coastal areas from erosion.

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