Species Composition Of The Mangrove In Lambur Luar Village, East Sabak, Kabupaten Tanjung Jabung Timur, Indonesia

Lisna lisna, Ren Fitriadi, Jasmine Masyitha, Nurhayati

Abstract: The objective of the study was to describe the species composition of the types mangrove that grow in Lambur Luar Village, East Muara Sabak Sub District, East Tanjung Jabung District. The is the survey study and the data was analyzed descrively. The result shows that there were 13 species of mangrove were found in Lambur Luar Village belong to 5 families, and 13 species namely; Avicennia lanata, Avicennia marina, Aegiceras floridum, Bruguiera cylindrica, Bruguiera gymnorhiza, Bruguiera parviflora, Bruguiera sexangula, Rhizophora apiculata, Rhizophora mucronata, Rhizophora stylosa, Sonneratia alba, Xylocarpus granatum and Xylocarpus moluccensis.

Keywords: Mangrove species, Types, spread of mangroves and lambur luar village

1 INTRODUCTION

Mangrove forest is a typical forest type located along the coast or river estuary that is affected by tidal water. Types of vegetation growing in mangrove forest must be able to adapt to changing conditions (1). Mangrove forest ecosystem is a major ecosystem in supporting coastal life due to its productivity and complexity of the typical ecology environment, it leads to exceptionally complex functions of mangrove ecosystem in terms of physic, ecology, economy and socio-culture (2). The ecosystem of mangrove area on the coast of East Jambi Beach located in Lambur Luar Village of East Tanjung Jabung is a distinctive area as it is located in the coastal area and there is a surrounding traditional settlement. This area is demographically and geomorphology unique with original natural scenery, so it is potential to be built as a natural tourism and local culture of East Tanjung Jabung. However, the mangrove forest has been spoilt since local people take the woods (illegal logging). Therefore, it is necessary to maintain the function of mangrove forest for conservation in terms of maintaining and protecting the mangrove forest ecosystem. For the sake of more accurate data regarding types of mangrove, this study aims to identify the types of mangrove in East Tanjung Jabung Beach, Jambi. Result of the study can be used as an input for the stakeholders to manage mangrove ecosystem in East Tanjung Jabung Beach in an integred and sustainable manner.

2. RESEARCH METHODS

Time and site

Location of the study was in Lambur Luar Village, East Muara Sabak Sub District, East Tanjung Jabung District, Jambi. The study was conducted from April to Mei 2017. This study used descriptive method. Type of the study was survey with exploration technique. Population of the study was all species of mangrove plant that grow in Lambur Luar Village, East Muara Sabak Sub District, East Tanjung Jabung District.

- *Lisna, Ren Fitriadi, Jasmin Masyitha and Nurhayati as a lecturer at Animal Facukty, University of jambi, Indonesia*
- *Corespofaculty, Universitas Of Jambi. Indonesia, email: renfitriadi@yahoo.com*

Sample of the study was selected species of mangrove plant that represent total population of mangrove in Lambur Luar Village, East Muara Sabak Sub District, East Tanjung Jabung District. Materials and instruments used in the study were refractometer to measure water salinity, pH paper to measure water pH, stationery to make a note of the data result, machetes to cut vegetation sample, camera for documentation device, life form for identification aids, thermometer to measure water temperature, label for sample marking, sample plastic for sample container and drop pipette to take water sample. Procedure of the study was started with preparation, preliminary survey to observe the condition of research location. Preparing materials, instruments and also other necessities. Taking notes of physical condition of the study location. Taking sample of each mangrove plant type, the sample was then put into marked sample plastic to be identified. Identifying the types of mangrove plant and writing down the identification result in the observation table.

Data Analysis

Identification and Description of Each Mangrove Species

Identification of the mangrove plant was carried out by the aids of relevant books and sources. The identification data was then analyzed descriptively by making description and classification of the mangrove plant

RESULTS AND DICUSSION

Species of Mangrove Plants in Lambur Luar Village

The types of mangrove plant found during the research are presented in Table 1.

Table 1. *Mangrove Species in Lambur Luar Village*

No	Spesies	Famili
1	Avicennia lanata	Acanthaceae
2	Avicennia marina	Acanthaceae
3	Aegiceras floridum	Myrsinaceae
4	Bruguiera cylindrical	Rhizophoraceae
5	Bruguiera gymnorhiza	Rhizophoraceae
6	Bruguiera parviflora	Rhizophoraceae
7	Bruguiera sexangula	Rhizophoraceae
8	Rhizophora apiculata	Rhizophoraceae
9	Rhizophora mucronata	Rhizophoraceae
10	Rhizophora stylosa	Rhizophoraceae
11	Sonneratia alba	Lythraceae
12	Xylocarpus granatum	Meliaceae
13	Xylocarpus moluccensis	Meliaceae

Description and classification of each mangrove species in Lambur Luar Village.

Based on the observation and identification result of a range of mangrove species found in Lambur Luar Village, it can be classified and described as follow:

A. Avicennia lanata

Classification

Kingdom : Plantae
Divisi : Angiosperms
Kelas : Eudicots
Ordo : Lamiales
Family : Acanthaceae
Genus : Avicennia
Spesies : Avicennia lanata

Figure 2. *Avicennia lanata*

Description

Avicennia lanata grows on the muddy plains, river banks, dry areas and is tolerant of high salinity. Its bark looks like dark shark skin, the color ranges from brown to black. The leaf has salt gland, the leaf underside is yellowish white and there are smooth, elliptical hairs which tip is rounded and slightly tapered. The flowers cluster at the end of the bunch and emit a rancid or fetid smell. The fruits are heart-shaped with small, vivid point at the tip, the color is yellowish green. There are smooth hairs on the fruit surface (looks like flour).

B. Avicennia marina

Classification

Kingdom : Plantae
Divisi : Thacheophyta
Kelas : Magnoliopsida
Ordo : Sapindales
Famili : Avicenniaceae
Genus : Avicennia
Spesies : Avicennia marina

Figure 3. *Avicennia marina*

Description

Avicennia marina is one of the most common species found in tidal habitat. The bark is smooth dotted green-grey and peeled in small parts. The top surface of the leaf is covered by concave-shaped gland spots. The undersides of the leaf is white or light grey, elliptical or round elongated, egg-shaped which tip is tapered to round. The flowers look like trident which are clustered at the end of the bunch. The fruits are slightly rounded which color is greyish green. There are smooth hairs on the fruit surface (as there is flour) and the tip of the fruit is somewhat sharp as beak. There are several advantages of this plant i.e. the leaves are used to cure burning skin. Resin coming out of the bark is used as contraception. The fruit is edible. The wood produces high quality paper material (3).

C. Aegiceras floridum

Classification

Kingdom : Plantae
Divisi : Angiospermophyta
Kelas : Magnoliopsida
Ordo : Primulales
Famili : Myrsinaceae
Genus : Aegiceras
Spesies :Aegiceras floridum

Figure 4.*Aegiceras floridum*

Description

Aegiceras floridum grows in mangrove area, sandy seashore and also riverbank, it also grows on the corrosive substrate as documented. The plant is tolerant to high salinity. The outer bark is grey to brown, it has crevice and numbers of lenticels. The leaves are skinned, it is reversed ovoid with rounded tip, the upper side is bright and shiny green while the underside is pale green and sometimes reddish. Lots of flowers hangin a bunch like lanterns, eachflower stalk/stem is 4 – 6mm long. The fruit is somewhat straight, green to red. The fruit is quickly fall off and contains only one seed lengthwise.

D. Bruguiera cylindrica

Classification

Kingdom : Plantae
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Myrtales
Famili : Rhizophoraceae
Genus : Bruguiera
Spesies : Bruguiera cylindrical

Figure 5. *Bruguiera cylindrical*

Description

Bruguiera cylindrical grows agglomerate in large numbers, usually on clay behind the Avicennia zone, or in the middle of mangrove vegetation towards the sea. This species also has the ability to grow on soil/substrate which is newly formed and not suitable for other species. The bark is relatively smooth, grey and has a small number of lenticels. The upper surface of the leaf is bright green while the underside is ellipse-shaped with slightly pointed tip, yellowish green. The flowers cluster, appearing at the end of the bunch (bunch length: 1 – 2cm). The outer side of the lower flower usually has white hairs. The fruit is hypocotyl (often mistaken as "fruit), it is cylindrical elongated, and many of them are curvy. Nearby bottom part of the fruit is green and the tip is purplish green.The fruit bottom is attached to the petals.

E. Bruguiera gymnorhiza

Classification

Kingdom : Plantae
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Myrtales
Famili : Rhizophoraceae
Genus : Bruguiera
Spesies : Bruguiera gymnorhiza

Figure 6. *Bruguiera gymnorhiza*

Description

Bruguiera gymnorhiza grows in low salinity and dry areas, as well as land that has good aeration. This species is tolerant to both protected areas and that with direct sun exposure. The bark has lenticels, its surface is either smooth or rough, the color is dark grey or brown (changeable color). The leaves are skinned, it is green on the upper layer and yellowish green on the underside with black spots (some are not). The leaves shape is ellipse or ellipse-lancet. The flowers are hanging. Fruit is spiral circle, rounded lengthwise, it is 2 – 2.5 cm long. The fruits are straight hypocotyl, blunt and purplish dark green.

F. Bruguiera parviflora

Classification

Kingdom : Plantae
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Myrtales
Famili : Rhizophoraceae
Genus : Bruguiera
Spesies : Bruguiera parviflora

Figure 7.*Bruguiera parviflora*

Description

Bruguiera parviflora grows on suitable substrates including mud, sand, brackish soil and that having high salinity. The species has dotted bark, grey or dark brown, it is cracked and slightly bulging at the base of the tree. The leaf is black spotted at the bottom and turns into yellowish green as the age increases. The leaf shape is ellipse and it has tapered tip. Flowers are clustered at the end of the bunch (bunch length: 2 cm). The spiral circular fruit is 2 cm long, cylindrical hypocotyl, slightly curved, and yellowish green.

G. Bruguiera sexangula

Classification

Kingdom : Plantae
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Myrtales
Famili : Rhizophoraceae
Genus : Bruguiera
Spesies : Bruguiera sexangula

Figure 8. *Bruguierasexangula*

Description

Bruguiera sexangula grows along waterways and coastal ponds, on various substrate types that are not frequently stagnant. The bark is smooth or rough, light brown-grey, it has large lenticels, and a bulging base of stem. The leaves are somewhat thick, skinned, and has black spots at the

underside. This species has elliptical leaves which the tip is tapered. The flower is located in the armpit of the leaf. The hypocotyl fruits narrow at both tips.

H. Rhizophora apiculata

Classification

Kingdom : Plantae
Divisi : Spermatophyta
Kelas : Dicotiledone
Ordo : Myrtales
Famili : Rhizophoraceae
Genus : Rhizophora
Spesies : Rhizophora apiculata

Figure 9.*Rhizophora apiculata*

Description

Rhizophora apiculata grows on muddy, smooth, deep soil and it is stagnant during normal tide. This species cannot grow on harder substrates mixed with sand. The bark is dark grey and the color changes. The leaves are skinned, dark green, light green on the middle and reddish at the underside. The leaves shape is elliptical narrows which the tip is tapered. Bisexual flowers, yellowish flower heads located on the stem which is <14 mm long. The rough fruit is rounded elongated, pear-like and brown. It is cylindrical hypocotyl, has nodules and orange-green.

I. Rhizophora mucronata

Classification

Kingdom : Plantae
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Malpighiales
Famili : Rhizophoraceae
Genus : Rhizophora
Spesies : Rhizophora mucronata

Figure 10. *Rhizophora mucronata*

Description

Rhizophora mucronata grows in the same area as R. apiculata but is more tolerant of harder substrate and sand. Generally grows in clusters, near or at the tidal embankment and creek, rarely grows in areas far from tidal water. The bark is dark or black and there is a horizontal crevice. The leaves are skinned and the stalk is green, 2.5 – 5.5 cm long. The leaves shape is widened ellipse or elongated round and pointed leaf tip. The flower head stalk is like a forking branch, bisexual, each of it is attached to an individual stalk which is 2.5 – 5 cm in length. The oval or egg-shaped fruits are 5 – 7 cm long, brownish green, it is often rough at the base, monocotyl. It is cylindrical hypocotyl, rough and has nodules.

J. Rhizophora stylosa

Classification

Kingdom : Plantae
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Malpighiales
Famili : Rhizophoraceae
Genus : Rhizophora
Spesies : Rhizophora stylosa

Figure 11. *Rhizophora stylosa*

Description

Rhizophora stylosa grows in various habitats in tidal areas, mud, sand and stone. The bark is smooth, creviced, grey or black. It has a tap root which length is up to 3 m and an aerial root that grows from the lower branch. The leaves are skinned, spotted regularly on the underside. The green leaf stalk is 1 – 3.5 cm long, the leaf is 4 – 6 cm long. The leaves shape is widened ellipse with tapered tip. The flower head stalk is like a forking branch, bisexual, each of it is attached to an individual stalk which is 2.5 – 5 cm in length. The pear-shaped fruit contains 1 fertile seed, brown. It is cylindrical hypocotyls with slightly smooth nodules. The cotyledon neck is greenish yellow when it is mature.

K. Sonneratia alba

Classification

Kingdom : Plantae
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Myrtales
Famili : Lythraceae
Genus : Sonneratia L.f
Spesies : Sonneratia alba

Figure 12. *Sonneratia alba*

Description
Sonneratia alba is not tolerant of fresh water for long periods. It is able to grow on the soil mixed with mud and sand, sometimes on rocks and corals. The bark is dark white or brown, it has smooth longitudinal crevice. The root is wire-shaped in the underground and it appears in the surfaces as a dull cone-shaped root and the height is 25 cm. The leaves are skinned which have an undeveloped gland at the base of the leaf stalk. The reversed ovoid shape of the leaves has round tip. The flowers are bisexual, the stalk is dull and 1 cm long. The fruit is sphere-shaped, stalk at the tip and the base is wrapped in flower petals. The fruit contains many seeds (150 – 200 seeds) and they will not open when it is ripe.

L. Xylocarpus granatum

Classification
Kingdom : Plantae
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Sapindales
Famili : Meliaceae
Genus : Xylocarpus
Spesies : Xylocarpus granatum

Figure 13. *Xylocarpus granatum*

Description
Xylocarpus granatum grows along the tidal riverbanks, the land edge of the mangroves, and other less salty brackish environments. The bark is thin, peeled off and yellowish light brown, while in young branches, the bark is furrowed. The leaves are quite thick, they are arranged in pairs (generally 2 pairs per stalk) and some are aloof. The leaves shape is ellipse or reversed ovoid and the tip is round. Flowers consist of two genders (bisexual) or female only. The flower bunches (2 – 7 cm long) appear from the base (armpit) of the petiole and the flower stalk is 4 – 8 mm long. The fruit is sphere-shaped (or coconut), weight can be 1 – 2 kg, skinned and brownish green. The fruits are hanging on the branch near the ground surface and somewhat hidden.

M. Xylocarpus moluccensis

Classification
Kingdom : Plantae
Divisi : Magnoliophyta
Kelas : Magnoliopsida
Ordo : Sapindales
Famili : Meliaceae
Genus : Xylocarpus
Spesies : Xylocarpus moluccensis

Figure 14. *Xylocarpus moluccensis*

Description
Xylocarpus moluccensis has smooth bark, while the main stem surface has streaks as it is deeply scratched. The leaves are thinner than X. granatum, they are arranged in pairs. The leaves shape is elliptical-reversed ovoid and pointed tip. The flowers consist of two genders (bisexual) or female only. The fruit is round like Bangkok guava and green, skinned surface and inside there are 4 – 10 pieces of tetrahedral-shaped seeds.

Parameter of Water Quality in Mangrove Area
The result of physical and chemical parameters measurement of Lambur Luar Village water can be seen in Table 2.

Table 2. *Result of physical and chemical parameters measurement of Lambur Luar Village water*

Time	Temperature	pH	Salinity
05.00 WIB	27.67	7.00	30.30
08.00 WIB	28.50	7.00	29.00
12.00 WIB	28.30	7.30	28.67
16.00 WIB	30.00	8.00	29.30
20.00 WIB	28.50	8.00	33.67

Temperature
Based on the measurement result, water temperature of Lambur Luar Village ranged from 27.67 – 30 ^{o}C. The highest temperature was 30 ^{o}C at 16.00 WIB (West Indonesian Time), while the lowest temperature was 27.67 ^{o}C at 05.00 WIB

Mangroves in the East Coast of Sumatra grow at monthly average temperature which ranges from 26.3 ^{o}C to 28.7 ^{o}C in December (4).) The optimum temperature range for the growth of some mangroves species, i.e. Avicennia marina grows well at the optimum temperature of 18.0 – 27.0 ^{o}C; Rhizophora stylosa, Ceriop sp., Exceocoria agallocha and Lumnizera racemosa showed the highest fresh leaf growth at a temperature of 26.0 – 28.0 ^{o}C, the optimum temperature of Bruguira spp. was 27.0 ^{o}C, that of Xilocarpus sp. ranged from 21.0 – 26.0 ^{o}C (5).

pH

Range of water pH in the mangrove ecosystem of Lambur Luar Village was 7.00 – 8.00. The highest pH was obtained the measurement time of 16.00 and 20.00 WIB. Figure 16 shows that the distribution of pH in the mangrove ecosystem of Lambur Luar Village is still within the normal range for mangrove growth. Aquatic organisms can live in neutral pH water with a tolerance range from weak acid to weak base (6). The ideal pH for the aquatic organisms' life generally ranges from 7 to 8.5.

Salinity

Water salinity ranges from 28.67 – 33.67 ‰. The highest salinity was 33.67 ‰ measured at 20.00 WIB and the lowest was 28.67 ‰ measured at 12.00 WIB (Figure 17). Adaptation to salinity is one of the limiting factors to the growth of mangrove ecosystem. The water salinity range in Lambur Luar Village is still within the tolerance limit for the mangrove survival, so that the existing mangroves are able to adapt and develop well. Mangroves can live and flourish in coastal area which salinity ranges from 10.0 to 30.0 ‰, but there are several mangrove species which can grow under high salinity condition (7).

Conclusion

There are 13 species of mangrove found in Lambur Luar Village i.e. Avicennia lanata, Avicennia marina, Aegiceras floridum, Bruguiera cylindrica, Bruguiera gymnorhiza, Bruguiera parviflora, Bruguiera sexangula, Rhizophora apiculata, Rhizophora mucronata, Rhizophora stylosa, Sonneratia alba, Xylocarpusgranatum and Xylocarpus moluccensis. Based on the measurement result at different time, water temperature in Lambur Luar Village ranged from 27.67 to 30 ^{o}C, water pH range was 7.00 - 8.00, while water salinity ranged from 28.67 to 33.67 ‰. in part by a grant from XYZ.

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