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STUDY OF MANGROVE COMMUNITY STRUCTURE IN UJUNG BATU BEACH WATER, FLORES SEA, JENEPONTO DISTRICT

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ABSTRACT

This study aims to examine the density, frequency and closure of mangrove areas. In addition, it also analyzed the ecological index (index of diversity, uniformity, and dominance) of mangrove vegetation in the waters of Ujung Batu, Flores Sea, Jeneponto Regency. This research was conducted using the 10 x 10 m^2 transect plot method. The data obtained were analyzed to determine the density, frequency, closure and important value index (IVI) as well as to analyze the diversity index, uniformity and dominance index. The results of this study are; mangrove communities in the waters of the Ujung Batu, Flores coast, consists of types *Avicennia alba*, *A. marina*, *A. officinalis*, *Sonnneratia alba* and *Rhizophora stylosa*. *A. alba* dominates at the three observation stations (I, II and III). This is marked by the high importance (IVI) at all levels. The diversity index (H ') at the study site ranged from 0.36 - 0.51, indicating a low level of diversity. The Simpson dominance index (SDI) ranges from 0.34 to 0.54, indicating that one of the species (*A. alba*) dominates the mangrove area in the study site.

1. INTRODUCTION

Coastal has a strategic meaning because it is a transitional area between terrestrial and marine ecosystems, with unique characteristics, as well as a large biological production content and environmental services. This resource wealth attracts various parties to regulate and utilize it, which is a sectoral resource as a contributor to the economic sector in development activities, forestry, fisheries, industry, mining, and tourism.

The ecological function of mangrove forests, among others; coastline protectors, preventing sea water intrusion, habitats, feeding grounds, spawning ground, nursery and nurseries for various aquatic biota and microclimate regulators. While the economic function, among others, as a producer of raw materials for charcoal, and medicine. The overall condition of mangrove forest in South Sulawesi is already quite bad, although it is not as bad as the condition of mangrove forests in Jakarta. The area of mangrove forests in South Sulawesi Province continues to decrease, especially being displaced by pond and settlement areas. The reduction in the area of mangrove forests is an indicator of the threat of mangrove forests from coastal areas in Indonedia. Did not even rule out the next few years, mangrove forests that are part of the coastal ecosystem suffered severe damage that threatens the survival of marine life and even humans.

The length of the coast of South Sulawesi is approximately 1000 km from West to East, but the area of mangrove forests is only about 30.000 ha. To reach the ideal size of mangrove forest, the South Sulawesi region needs 50.000 ha of mangrove forest (South Sulawesi Forest Service, 2006). Mangrove forests in the waters of the Ujung Batu coast, Flores Sea, Jeneponto Regency as part of the mangrove forest area of South Sulawesi have a very important role, especially as access to aquaculture and settlements of the surrounding coastal communities.

This study aims to analyze the density, frequency, and closure of the mangrove ecosystem, as well as assess the ecological index (diversity index, uniformity, and dominance) of mangrove vegetation in the waters of Ujung Batu Flores Sea, Jeneponto Regency. The results of the study are expected to be a source of information for the management of coastal areas to ensure the condition and sustainability of the ecosystem.

2. RESEARCH METHODS

2.1. TIME AND LOCATION

This research was conducted in June to July 2019. The research location was in the mangrove ecosystem area of Ujung Batu Village, Tamalatea District, Jeneponto Regency. Analysis and identification of samples is carried out in the field.

2.2. TOOLS AND MATERIALS

The tools used in this study include; a rope to make transects and plots, a thermometer to measure water temperature, a hand-refractometer to measure water salinity, litmus paper to measure water pH, a roll meter to measure distances between stations, an identification book to identify the type of mangrove obtained, stationery to record data, and GPS (global positioning system) to determine the location of stations. And the material used is seawater and mangrove samples as the object of study.

2.3. DETERMINATION OF STATION LOCATION

Stations are conceptually determined and stations are determined based on coordinates using GPS. Determination of the station point is determined from the mangrove vegetation closest to the mainland.

Figure 1: Map of research location

The sampling stations (Figure 1) are distinguished as follows: a) station I is located in the vicinity of residential areas where there are many aquaculture and mangrove crab fishing activities, b) station II is located around the farm site, and c) station III is located around the river estuary.

$$RF_i = \left(\frac{F_i}{\sum F}\right) \times 100\%$$

Note: RFi = i-type relative frequency, Fi = i-type frequency, ∑ F = Number frequency for all types

2.5.6. CLOSURE TYPE

Closure of type (C_i) is the area of closure of the i-th type in a particular unit (Bengen, 2001):

$$C_i = \frac{\sum BA}{A}$$

Note: C_i = Closure type, BA = Stem diameter at breast height, A = Total area of sampling area (m^2).

2.5.7. RELATIVE CLOSURE

Relative closure (RC_i) is the ratio between i-type closure and total area of closure for all types with the formula (Bengen, 2001):

$$RC_i = \left(\frac{C_i}{\sum C}\right) \times 100\%$$

Note: RC_i = relative closure (%), C_i = closure of the i type, ∑ C = total closure for all types.

2.5.8. IMPORTANT VALUE INDEX

Important value index (IVI) is the sum of relative density (RD_i), relative frequency (RF_i), and i-type relative closure (RC_i) of mangroves (Andy Omar, 2018), with the formula:

$$IVI = RD_i + RF_i + RC_i$$

The importance of a species ranges from 0 to 300. This important value provides an overview of the influence or role of a mangrove species in an ecosystem.

2.5.9. DIVERSITY INDEX

Species diversity can be said as heterogeneity of species and is a characteristic of species structure. The formula used to calculate diversity is the Shannon Diversity Index, which is:

$$H' = -\sum(p_i)(\log_2 p_i) \text{ and } p_i = \frac{n_i}{N}$$

Note: H '= Shannon diversity index, ni = number of individual species i, N = total number of mangrove individuals.

2.4. DATA COLLECTION TECHNIQUES

Mangrove vegetation data collection includes the number of trees (mangroves with trunk diameter> 10 cm), saplings (2 cm <trunk diameter <10 cm), and seedlings (trunk diameter <2 cm). Tree data collection is carried out using quadratic transects measuring 10 m x 10 m (Soerianegara and Indrawan, 1998). The types of mangroves obtained were identified and counted for each species.

Sediment substrate was taken with a paralon pipe and filter. Substrate samples which are soil texture are sieved and separated into three fractions namely sand, mud, and clay (Buchanan, 1971). The texture was then analyzed in the Laboratory of the Faculty of Marine and Fisheries Sciences, Hasanuddin University. Data on the temperature, salinity, and pH of waters are obtained using a thermometer, a hand refractometer and litmus paper.

2.5. DATA ANALYSIS

2.5.1. SPECIES COMPOSITION

The types of mangroves found at the study site were identified using a guide book (Noor et., Al, 2006).

2.5.2. SPECIES DENSITY

Species density (D_i), i.e. the number of i-type stands in a unit area (Bengen, 2001), is known by the formula:

$$D_i = \frac{n_i}{A}$$

Note: D_i = i-th density, ni = total number of individuals of i-th type, A = Total sampling area (m^2).

2.5.3. RELATIVE DENSITY

Relative density is calculated using the formula (Andy Omar, 2018):

$$RD_i = \left(\frac{n_i}{\sum n}\right) \times 100\%$$

Note: RD_i = relative density (%), ni = total number of a type, $\sum n$ = total number of all types.

2.5.4. SPECIFIC FREQUENCY

Type frequency (F_i) is calculated using the formula:

$$F_i = \frac{p_i}{\sum p}$$

Note: F_i = Frequency of i-th type, p_i = Number of sample plots where i-th type is found, $\sum p$ = Number of total sample plots created.

2.5.5. RELATIVE FREQUENCY

The relative frequency (RF_i) is calculated using the formula:

2.5.10. UNIFORMITY INDEX (EVENNES INDEX)

Uniformity can be interpreted as the spread of individuals between different species and can be obtained from the relationship between diversity (H ') and maximum diversity. To find uniformity, uniformity index is used using the formula:

$$J' = \frac{H'}{H_{max}'} = \frac{H'}{\log_2 s}$$

Note: J = Shannon uniformity index, H'= Shannon diversity index, H' max = Maximum uniformity index value, S = Number of mangrove species.

Uniformity index values range between 0 and 1. If the index is close to 0 means that uniformity among species in low communities that reflect the wealth between individuals possessed by each species is very much different. Conversely, if close to 1, it means uniformity between species can be said to be relatively evenly distributed or in other words it can be said that the number of individuals in each species is relatively similar, the difference is not too striking (Lund, 1979).

2.5.11. SIMPSON DOMINANCE INDEX

Simpson dominance index is used to determine the presence or absence of dominance of certain species, with the formula:

$$I = \frac{\sum n_i(n_i - 1)}{N(N-1)}$$

Note: I = Simpson dominance index, S = number of taxa / types of mangrove category, ni = Number of i-th species, n = total number of mangrove individual.

Simpson's dominance index ranges between 0 and 1 with the understanding that, if close to 0 (zero), it means that in the observed community structure there are no speies that extreme dominate the community. This shows that the condition of community structure is in a stable condition, prime environmental conditions and there is no ecological pressure (stress) on the biota / species in the habitat in question. If the dominance index approaches 1 (one), it means that in the community structure observed species are found that dominate other species. This reflects the community structure in an unstable state, ecological stress occurs.

3. Results

3.1. SPECIES COMPOSITION

The composition of mangrove species found on the coast of Ujung batu, Tamalatea District, Jeneponto Regency, there are 5 types of mangroves (Table 4), namely: *Avicennia aba, Avicennia marina, Avicennia officinalis, Sonneratia alba, and Rhizopora stylosa.*

Table 1: Types of mangroves found in Ujung Batu beach, Flores Sea, Jeneponto Regency

Station	Species	Vegetation Level		
		Tree	Puppies	Seedling
I	*Avicennia alba*	+	+	+
	A.marina	+	+	+
	Sonneratia alba	+	-	+
	Rhizopora stylosa	+	+	-
II	*A. alba*	+	+	+
	A. marina	+	+	+
	A. officinalis	+	+	-
	Sonneratia Alba	+	-	+
III	*A. alba*	+	+	+
	A. marina	+	+	+
	A. officinnalis	+	+	-
	Rhizopora Stylosa	+	-	-
	Sonneratia alba	+	+	-

Note: + = There are types of mangroves i
= There is no type I

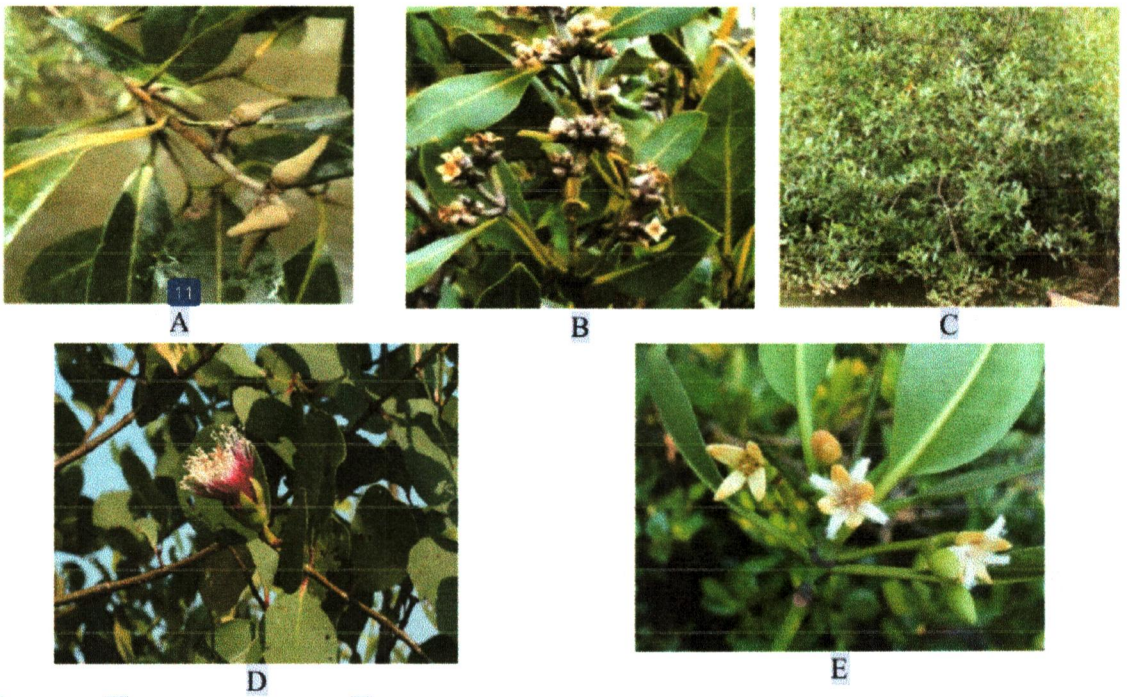

Figure 2: Type of mangrove is found in the waters of Ujung Batu, Flores Sea, Jeneponto Regency (a. *Avicennia alba*, b. *A. marina*, c, *A. officinalis*, d. *Sonneratia alba*, e. *Rhizophora stylosa*).

Based on the 3 research stations, on the coast of Ujung Batu, Flores Sea, Jeneponto Regency, a graph of the percentage of mangrove species abundance was obtained as follows. There are 4 types of mangroves at Station I with the following successive percentages; a) *Avicennia alba* 61%, b) *A. marina* 18%, c) *Sonneratia alba* 14%, and d) *Rhizophora stylosa* 7% (Figur 3a). At station II also found 4 consecutive mangrove compositions with the following abundance percentages; a) *Avicennia alba* 72%, b) *A. marina* 17%, c) *A. officinalis* 4%, and d) *Sonneratia alba* 7% (Figure 3b). And at station III found composition of 5 species of mangroves with a percentage

of abundance in a row are: a) *A. alba* 50%, b) *A. marina* 33%, c) *A. officinalis* 7%, d) *Rhizophora stylosa* 7%, and e) *Sonneratia alba* 3% (Figure 3c).

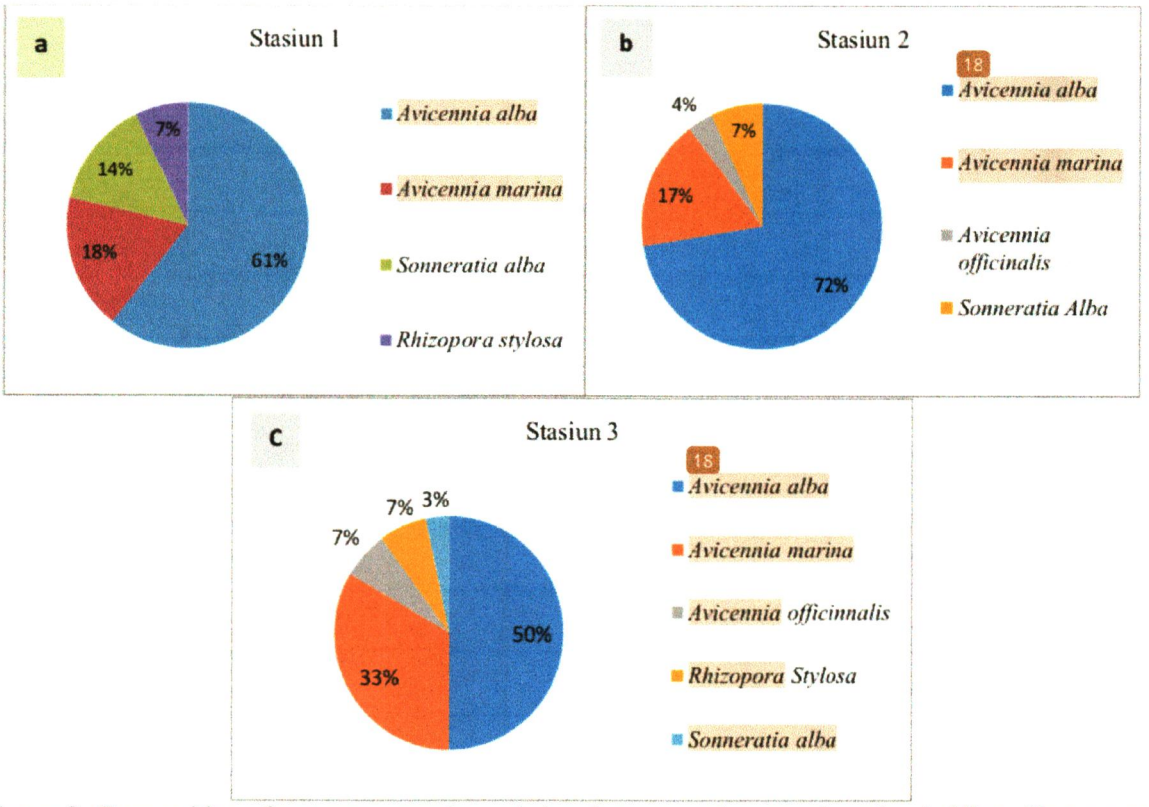

Figure 3: Composition of mangrove species and abundance at each research station in Ujung Batu coastal waters, Flores Sea, Jeneponto Regency

3.2. SPECIES DENSITY AND RELATIVE DENSITY

Based on the research station at the research location, the density (D_i) and reative density (RD_i) of each type of mangrove can be seen in the following Table 2.

Table 2: Species density and relative mangroves at 3 research stations in Ujung Batu Beach, Flores Sea

Mangrove species	Station 1			Station 2			Station 3		
	n_i	D_i	RD_i	n_i	D_i	RD_i	n_i	D_i	RD_i
Avicennia aba	17	0,04	60,71	21	0,05	72,41	15	0,04	50,00
A. marina	5	0,01	17,86	5	0,01	17,24	10	0,03	33,33
A. officinalis	-	-		1	0,01	3,45	2	0,01	6,67
Sonneratia alba	4	0,01	14,29	2	0,01	6,90	1	0,00	3,33
Rhizopora stylosa	2	0,01	7,14	-	-	-	2	0,01	6,67

3.3. SPECIFIC FREQUENCY AND RELATIVE FREQUENCY

Based on the research station at the research location, the specific frequency (F_i) and relative frequency (RF_i) of each type of mangrove can be seen in the following Table 3.

Table 3: Relative frequency and mangrove specific frequency at 3 research stations in Ujung Batu Beach, Flores Sea

Mangrove species	Station 1			Station 2			Station 3		
	n_i	F_i	RF_i	n_i	F_i	RF_i	n_i	F_i	RF_i
Avicennia aba	17	1.00	11.11	21	0.25	11.11	15	0.20	9.09
A. marina	5	0.75	33.33	5	0.75	33.33	10	0.80	36.36
A. officinalis	-	-	-	1	0.25	11.11	2	0.20	9.09
Sonneratia alba	4	0.25	11.11	2	1.00	44.44	1	0.20	9.09
Rhizopora stylosa	2	0.25	44.44	-	-	-	2	0.80	36.36

3.4. Closure Type and Relative Closure

Based on the research station at the research location, the closure type (Ci) and relative closure (RCi) of each type of mangrove can be seen in the following Table 4.

Table 4: Closure type and relative closure at 3 research stations in Ujung Batu Beach, Flores Sea

Mangrove species	Station 1			Station 2			Station 3		
	n_i	C_i	RC_i	n_i	C_i	RC_i	n_i	C_i	RC_i
Avicennia aba	17	27.38	5.23	21	2.85	11.48	15	7.03	7.74
A. marina	5	5.74	12.68	5	3.98	16.03	10	1.77	30.81
A. officinalis	-	-	-	1	0.24	0.96	2	0.57	2.49
Sonneratia alba	4	9.77	21.58	2	17.74	71.53	1	1.35	5.93
Rhizopora stylosa	2	2.36	60.51	-	-	-	2	12.10	53.03

3.5. IMPORTANT VALUE INDEX, DIVERSITY INDEX, EVENNES INDEX, AND SIMPSON

3.5.1. DOMINANCE INDEX

Based on the research station at the research location, the Important Value Index (IVI), diversity index (H^1), evennes index (E), and Simpson dominance index (SDI) of mangrove community can be seen in the following Table 5.

Table 5: Important value index at 3 research stations in Ujung Batu Beach, Flores Sea

Mangrove species	Station 1			Station 2			Station 3		
	IVI	P_i	Pi*LogPi	IVI	P_i	Pi*LogPi	IVI	P_i	Pi*LogPi
Avicennia aba	23.48	0.07	-0.13	29.48	0.07	-0.08	20.7	0.03	-0.15
A. marina	63.87	0.18	-0.13	66.61	0.17	-0.13	100.5	0.33	-0.16
A. officinalis	-	-	-	15.52	0.03	-0.05	18.5	0.07	-0.08
Sonneratia alba	46.98	0.14	-0.12	188.39	0.72	-0.10	21.8	0.07	-0.08
Rhizopora stylosa	165.6	0.61	-0.08	-	-	-	139.4	0.50	-0.05
Diversity index (H^1)	0.52								
Evennes index (E)	0.16								
Dominance index (SDI)	0.35								

3.6. ENVIRONMENTAL PARAMETERS

Water quality parameters include: the degree of acidity (pH), salinity, temperature, and texture of the soil or mangrove substrate. The results of measurements of these water quality parameters are listed in Table 6, while the results of substrate texture analysis are listed in Table 7.

Table 6: Range and average measurement of mangrove ecosystem water quality during the study in Ujung Batu Coastal Waters, Flores Sea, Jeneponto Regency.

Station	Temperature (°)		Salinity (‰)		Acidity (pH)	
	Range	Average	Range	Average	Range	Average
I	28 – 29	28.25 ± 0.5000	33 – 34	33.25 ± 0.5000	7 – 8	7.7500 ± 0.5000
II	28 – 31	29.75 ± 1.2583	30 – 33	31.75 ± 1.2583	7 – 8	7.7500 ± 0.5000
III	30 – 31	30.25 ± 0.5000	30 – 32	30.75 ± 0.9574	7 – 8	7.7500 ± 0.5000

Table 7: Substrate texture of mangrove ecosystems in Ujung Batu Beach, Flores Sea, Jeneponto Regency

Station	Component (%)			Texture Class
	Sand	Dust	Clay	
I	17	41	42	Clay
II	35	44	21	Clay
III	21	44	35	Clay Platters

4. DISCUSSION

4.1. SPECIES COMPOSITION

Avicennia alba species were found at each observation station at the study site. *A. alba* grows on clay substrate and adheres with a salinity of 33 - 34 ppt, temperature around 28-31 °C and acidity level 7-8 (Table 6). *A. alba* has root that is shaped like a finger and has a grayish stem color and a smooth bark surface. Leaves of the type *A.alba* have an elliptical shape and very smooth surface. Leaf length measurements found at the observation station ranged from 6.72 - 10.23 cm and leaf widths ranged from 2.41 - 4.98 cm. The fruits of *A.alba* are conical and yellowish green (Fig. 2a).

Noor *et. al.* (2006) have explained that *A.alba* forms a horizontal root system and complicated root breaths. The root of the breath is usually thin, finger-shaped (or like asparagus) covered by lenticels. The outer bark is grayish or dark brownish, some overgrown with small bumps, while others sometimes have a smooth surface. In the old stems, thin powder is sometimes found. The surface of the leaves is smooth, the upper part is shiny green, pale, lancet-shaped (like acacia leaves) sometimes elliptical, while the tip is tapered with a size of 10 x 4 cm., fruits such as cones or chilies or cashews, light greenish yellow with a size of 4 x 2 cm.

A. marina was found growing and developing at each observation station at salinity of 30 - 34 ppt and temperatures of 28 - 31 ° C with clayey substrate (Table 6). The fruits of A. marina are round and small in size. The leaves are shiny green and slightly rounded with a length ranging from 7.08 - 10.36 cm and a width ranging from 3.04 - 5.79 cm (Fig. 2b). Halidah (2014) said that the Avicennia marina fruit is ovoid shaped like a mango, the tip of the blunt fruit is 1 cm long, the upper surface of the leaves is shiny green and the lower surface is gray and gloomy green. Vegetation in the form of shrubs or trees with a height of 12 m, sometimes reaching 20 m, compound type flowers with 8-14 flowers per stem. grows on muddy soils on river banks, dry areas and tolerant of high salinity.

A. officinalis was found to grow and develop at a fairly high salinity of 30 - 32 ppt and water temperatures between 28 - 31 ° C at the observation site with clayey substrates. The mangrove leaves are dark green on the upper surface and yellowish green on the bottom. The length of leaves in this species ranges from 8.06 - 9.34 cm and widths between 4.03 - 5. 22 cm. The fruit is heart-shaped and yellowish green (Fig. 2c). According to Noor et. al. (2006), in general *A. officinalis* has thin, finger-shaped root and breath roots which are covered by a number of lenticels. The outer bark has a smooth surface grayish green to brownish gray with lenticels. The leaves are dark green on the top surface and yellowish green or greenish gray on the bottom. The concave leaf's upper surface is covered by glandular spots. Inverted ovate leaf shape where the tip of the leaf rounds and narrows towards the handle of the stem with a leaf size of 9.5 x 5 cm. The local name of *A. officinalis* is api-api, papi, marahuf. This

species belongs to the Avicenniaceae tribe, including major mangrove components. The type has a root of breath like a pencil (Kitamura et., Al, 1997).

Sonneratia alba was found at each observation station at the observation site. This species grows and develops in clayey substrate types with a salinity range of 30 - 34 ppt and water temperatures between 28 - 31 ° C. The leaves are round and green and the fruit is ball shaped and also green. Leaf length ranges from 9.07 - 10.44 cm and width 5.17 - 7.32 cm (Table 6).

According to Sugiarto and Willy (1996) *S. alba* grows on muddy substrates, the bark is creamy green to brown with fine cracks on the surface. *S. alba* has peg root (pneumatophore) which is seen when the sea water is receding, thick leaves are oval shaped bright green and located opposite each other (opposite). Flowering cider is quite a lot, there is at the end of the branches and white. Ball-shaped fruit that is grayish green with a diameter of 5-7.5 cm. This plant can be used as a wood ribs and elbows boat (Fig. 2d). *S. alba* is found in the esrtuary region with sandy substrate. According to Bengen (2004), *S. alba* can grow well in sand, mud, or sandy mud sub-locations.

Rhizophora stylosa was found growing and developing at station 1 and station 3 with clay and clay substrates with salinity of water ranging from 30 - 34 ppt and temperature 28 - 31 ° C (Table 6). The leaves of *R. stylosa* are about 9.70 -11.36 cm in length and width ranging from 4.04 - 6.32 cm. The fruit of R. stylosa is long and has a pointed tip (Fig. 2e). According to Backer (1965) *R. stylosa* leaves have a smooth surface, glossy, tapered tip, oval shape with a widening in the middle, measuring 8 -12 cm long, the bottom surface of the leaf bone greenish, black spots uneven. Branched garlands 2-3 times, located under the leaves, each branch 4-16 single flowers, petals 4, ivory yellow, crown 4, whitish, stamens 8, stems pistil clearly, length 0.4 - 0.6 cm. R. stylosa fruit has elongated shape with a size of 20-60 cm.

The high composition of mangrove species in the study site was *A. alba* (70%). The abundance of Avicennia is due to its ability to adapt to relatively high-water salinity (30-34 ppt). According to Noor et. al. (2006) *Avicennia sp.* is a clan that has the ability to tolerate a broad range of salinity compared to other clans. The lowest species composition was owned by *R. stylosa* type at station 1 and station 3 which was 7% and *S. alba* type at station 3 was 3%. At least species are found because both types of mangroves are less able to grow and develop at high salinity (Noor et. al., 2006).

4.2. DENSITY

Based on observations of the type of *A. alba* has a very high density that is 72.41 ind. m-2. Noor, et al. (2006) said that the types of *Avicennia* sp. generally live in coastal areas with relatively high salinity of sea water. Type *A. marina* is a type of mangrove which also has the second highest density obtained at the observation site. Type *A. marina* has a very high adaptability to aquati environments with high salinity. The texture of sandy clay substrate makes mangrove species of *Rhizophora mucronata, R. apiculata, Avicennia sp., Sonneratia sp.* and *B. gymnorrhiza* can adapt and even in extreme conditions due to storms and big waves (Giesen et., al, 2007).

4.3. FREQUENCY

The results of the analysis of the relative frequency of mangroves that have been obtained at the study site at the tree level, the highest is *A. alba* (44.44%) while the lowest relative frequency is *A. officinalis, S. alba* and *R. stylosa* which is 9.09%. The high frequency of *A. Alba*, due to its adaptive power which is tolerant of the high-salinity marine environment, according to Noor (1999), *Avicennia* sp. is a clan that has the ability to tolerate a broad range of salinity compared to other clans.

4.4. CLOSURE

In general, mangrove closure at Station 1 is 45.25% higher compared to other stations. This is because the mangrove at station I h a larger trunk circumference so that it affects the closure. *A. alba* has a high relative closure, this shows that *A. alba* type dominates the mangrove community in the study site.

4.5. IMPORTANT VALUE INDEX

Based on observations obtained the highest IVI value in type *A. alba* (Table 5). This can be interpreted that the type of *A. alba* has an important role in the ecosystem. Bengen (2000) states that the high IVI shows that mangroves have a very large role and function in the ecosystem. Some organisms such as fish, crabs, shrimps, mollusks and others in this ecosystem need mangrove litter as food, and vegetation as a shelter, foraging and spawning.

4.6. ECOLOGICAL INDEX

Based on the results of research conducted in Ujung Batu Beach, Jeneponto Regency, the results of the ecological index are as follows: Diversity Index (H') = 0,52, Uniformity Index (E) = 0,16, and Simpson Domination Index (SDI) = 0,35 (Table 5).

Based on Odum (1993) criteria, the value is included in the low category, this can be seen from the few types of mangroves obtained from the observation site and the presence of one type of mangrove dominates. The low value of the diversity index is due to community activities in utilizing the mangrove area such as searching for mangrove crabs and also logging for the opening of ponds. Maiti and Chowdhury (2013), stated that the opening of ponds for aquaculture, overexploitation and increased pollution loads is one of the activities that contribute the most to the causes of mangrove ecosystem degradation, and this will spur the destruction of habitats and biodiversity in the region.

The diversity value of a community is very dependent on the number of species and the number of individuals found in the community. The diversity of types of a community will be high if the community is composed of many types and no species dominate. Conversely, a community has a low species diversity value, if the community is organized by a few species and there is a dominant species (Indriyanto, 2006).

Uniformity values describe the individual distribution of each type of mangrove. Based on the criteria of Lund (1979), this value is classified as low. The low uniformity index at the study site is due to the number of individuals of each species that is different and uneven and there are species that dominate the community. If the greater the uniformity index value indicates that within the community there is no specific species that is dominant (Santana, 1991).

The highest dominance index value was found at station II (0.52)(Table 5). The dominance index value is considered relatively high because there is a species that is very dominating from the station. Simpson's dominance index ranges between 0 and 1 with the understanding that if it approaches 0 (zero), it means that in the community structure observed there are no speies that extreme dominate the community. This shows that the condition of the community structure in the study location is still relatively stable. If the dominance index approaches 1 (one), it means that in the community structure observed species are found that dominate other species, and this reflects the structure of the community in an unstable state, in the community there is ecological stress.

4.7. MANGROVE VEGETATION ARRANGEMENT

At the seedling level, mangrove vegetation dominated as many as 1127 individuals consisting of 2 types, namely: *A. alba* (1012 indiv.) And *A. marina* 115 (indiv.). This means that at the seedling level *A. alba* is a dominant species and is a species that is regenerating at research sites. For tillers, mangrove vegetation predominates by 91 individuals, consisting of *A. alba* (76 indiv.), *Rhizopora stylosa* (3 indiv.), and *A. officinalis* (12 indiv.). For the tree level there are 4 types of mangroves namely *A. alba, A. marina, Soneratia alba* and *Rhizopora stylosa*. At this location, it is dominated by *A. alba* species, namely as many as 53 individuals.

At the tree level, the largest IVI is owned by which is 164.48 with a density of 0.1325 ind./400 m^2. Based on the above analysis, this means that for the level of trees, seedlings, and saplings, *A. alba* is the dominant species in Ujung Batu coastal waters, Flores Sea, Jeneponto Regency. Analysis of seedlings and saplings shows that, *A.*

alba is still young and naturally this vegetation will regenerate without the need for human intervention. Likewise the presence of tree levels in *A. alba* species indicates that this species was successful in its growth. In the coastal areas of Indonesia, with muddy clay substrate is very good for the growth of various types of mangroves, especially *Avicennia*, And *Rhizopora* (Kint, 1934).

5. CONCLUSIONS

Based on research results in the waters of the Ujung Batu coast, Flores Sea, Jeneponto Regency, there were 5 species that were found at the observation site, namely: *A. alba, A. marina, A. officinalis, Rhizophora stylosa and Sonneratia alba.*

A. alba species as the dominant species were found at each observation station. The range of diversity, uniformity, and dominance index values indicates that the structure of mangrove communities in these locations is not evenly distributed, and does not have diverse vegetation communities, this is due to the discovery of dominant species. Water quality for mangrove vegetation as a buffer zone for coastal areas such as temperature, salinity, acidity and type of substrate is still in accordance with the environmental feasibility of the coastal ecosystem.

6. SUGGESTION

Further research is needed on the condition of the mangrove environment and its biological aspects. In addition, research on the socio-cultural aspects of the local community needs attention due to the sustainability of the ecosystem.

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SOURCES OF FUNDING

None.

CONFLICT OF INTEREST

None.

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REFERENCES

[1] Andy Omar, S. Bin. 2018. Buku Ajar Ekologi Perairan. Lembaga Kajian dan Pengembangan Pendidikan, Pusat Kajian dan Peningkatan Aktivitas Intruksional, Universitas Hasanuddin, Makassar.

[2] Backer, C.A, dan Van den Brink, Jr. R. C. B. 1965. Flora of Java, Vol. II, Published Under The Auspeces of The Rijkher Barium. Lieden.

[3] Bengen, G. D., 2004. Pedoman Teknis Pengenalan dan Pengelolaan Hutan Mangrove. Pusat Kajian Sumber Daya Pesisir dan Lautan –IPB, Bogor.

[4] Bengen. 2001. Pengenalan dan Pengelolaan Ekosistem Mangrove. PKSPL IPB. Bogor.

[5] Bengen, D.G., 2000. Sinopsis Ekosistem dan Sumberdaya Alam Pesisir. Pusat Kajian Sumberdaya Pesisir dan Lautan-IPB. Bogor.

[6] Buchanan, J. B. 1984. Sediment Analysis. p 41-65 In N. A. Holmes and A. D. Mc Intyre (eds.). Method for the Study of Marine Benthos. Blackwell Sci. Publ., Oxford and Edinburgh.

[7] Dinas Kehutanan Sulawesi Selatan, 2006. Rencana Penanaman Mangrove di Sulawesi Selatan. Dinas Kehutanan Sulawesi selatan. Makassar.

[8] Giesen, W., Stephan, W., Max, Z., dan Liesbeth, S., 2007. Mangrove Guidebook For Southesth Asia. FAO and Wetlands International, Bangkok.
[9] Halidah dan H. Kama. 2014. Penyebaran alami *Avicennia marina* (Forsk) Vierh dan Sonneratia Alba Smith pada Substrat pasir di Desa Tiwoho, Sulawesi Utara. Indonesian Rehabilitation Forest Journal, 1 (1) 51-58. Bogor.
[10] Indriyanto, 2006. Ekologi Hutan. Jakarta: Penerbit PT Bumi Aksara.
[11] Kint, A. 1934. De luchtfoto en de topografische terreingesteldheid in de mangrove. De Tropische Natuur, 23: 173-189.
[12] Kitamura, S., C. Anwar, A. Chaniago, and S. Baba, S. 1997. Handbook of Mangrove In Indonesia. ISME. Japan.
[13] Lund, H.F. 1979. Industrial Pollution Control Handbook. McGraw-Hill Book Company. New York.
[14] Maiti, S. K., Chowdhury, A. 2013. Effects of anthropogenic pollution on mangrove biodiversity: A review. Environmental Protection. 4(12):1428 – 1434.
[15] Noor, Y.S.M., Khazali, I.N.N., Suryadiputra. 2006. Panduan Pengenalan Mangrove di Indonesia. Indonesia Programme. Ditjen PKA dan Wetland International. Bogor.
[16] Odum, E.P., 1993. Dasar-dasar Ekologi. Edisi ke III. Terjemahan Tjahjono Saminga. Penerbit Gadjah Mada Press, Yogyakarta.
[17] Sugiarto dan Willy. 1996. Penghijauan Pantai. PT. Penebar Swadaya. Jakarta.

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