Study Of Abundance And Edible Parts (Bydd) Of The Sea Snail (Gastropods) In Mangrove Ecosystem At Lampu Satu Beach And Payum Beach, Merauke District

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Abstract Gastropoda is one of the families of the molluscum phylum found in abundant amounts. Its existence in the mangrove forest ecosystem of Merauke Regency brings potential in developing alternative foodstuffs from the sea in addition to other fishery protein sources such as Fish and Shrimp. The study took place in two mangrove ecosystem locations at Lampu Satu Beach and Payum Beach using the line transect method with purposive sampling placed quadrants successfully identified as many as 8 (eight) gastropod species included in 4 (four) families namely Littorinidae, Potamididae, Neritidae and Ellobiidae. The species with the highest abundance is owned by *L. Scabra* at 44.03 ind/m^2 with a relative density of 87% at Station I, while at station II is owned by species *L. Scabra* 20.83 ind/m^2, *T. sulcata* 13.4 ind/m^2 and *C. obstusa* 11.3 ind/m^2. Furthermore, for Frequency of Attendance at Station I *L.scabra* at 100% and *C. obstusa* 67%, at Station II *L. scabra* and *C. obstusa* both at 97%. Based on the analysis of the shell length it is known that the species with the longest shell size are owned by the species *T. telescopium* 7 cm; *T. sulcata* 6.21 cm and *T. palustris* 5.29 cm. The edible portion of gastropods can be seen from the weight of the meat to the total weight, so that the species with the highest percentage is known to *Nerita sp*. 43%, *C. angulifera* and *N. lineata* 35%, and *L. scabra* 34%.

1. INTRODUCTION

Merauke Regency is located in the south of Papua province, directly adjacent to Australia in the south and PNG in the west makes Merauke district a unique Papua region because both fauna and flora have similarities with the two neighboring countries. Unfortunately the increase in community activities in line with the increase in population can threaten the diversity of natural resources, especially those in coastal areas. This increase can result in an increase in the number of requests for meeting community needs, such as fulfilling food needs. The limited land area, makes the government look for other sources to meet this need. Exploration of natural resources originating from the sea is considered to be a solution in solving these problems. According to Herdiawan [6] the potential for sustainable Indonesian marine fisheries is estimated at 6.4 million tons per year spread across Indonesian and ZEE territorial waters.

The potential of fisheries and maritime affairs in Merauke Regency is no doubt, considering there are several foreign companies that have operated. However, the tendency of coastal communities that only utilize fishery products in the form of fish and shrimp, makes it a challenge to look for other fishery commodities that can be consumed. As the opinion expressed by

Herdiawan [6] there are various fishery products such as various types of seaweed and shellfish whose potential has not been managed optimally in an effort to improve the ability to meet the food needs of the community. High fishery resources are inversely proportional to the utilization of fishery products that have not been maximized. This is due to ignorance and limited information about any fishery products that can be consumed.

One of the economically valuable fishery products is sea snail (seashell). In developing countries such as Korea and Japan, sea snail are a favorite food and high economic value. In addition to its delicious taste and high nutritional value, there are still many sea snail and are very easily found on the coast of Merauke Regency which is directly adjacent to the mangrove forest ecosystem. Research on the mangrove ecosystem on the coast of Payum has been carried out and there are 11-13 gastropod species that have been identified [11][12]. While Kangganam [7] notes that there are 5 gastropod species that are scattered in the mangrove ecosystem in the fishing port area of Merauke.

Sea snails or in fisheries terms known as gastropods originating from the word Gaster means stomach and Pous means feet [16], so that gastropods are interpreted as organisms that walk on the legs of the stomach. Has a tubular shell that is circular like a spiral. Gastropods include the richest mollusc type. In Indonesia, it is estimated that there are around 1,500 species[13][16], but only a small portion has been used. Sea snails themselves have various benefits both in terms of ecology and economics. In terms of ecology, sea snail play an important role as decomposers in chains and food webs in coastal ecosystems. Rangan [15] added that ecologically gastropods have a large role in relation to the biotic component food chain in mangrove forests, because besides being predators of detritus, gastropods also play a role in tearing or minimizing falling litter. As organisms that have slow movements and tend to settle in an ecosystem, gastropods can be used as ecological indicators to determine the condition of the ecosystem. Based on the above, national food needs are urgent to be fulfilled, so the research entitled "Abundance and Edible Parts (BYDD) Study of Sea Snails (Gastropods) in the Mangrove Ecosystem in the Lampu Satu Beach and Payum Beaches, Merauke Regency" is very important to do.

2. MATERIALS AND METHODS

This research carried out on mangrove ecosystems on the coast of Merauke Regency. The research areas include the coast of Lampu Satu (Station I) and Payum (Station II). This research was conducted from August to October. The sampling technique that will be used in this study is a combination of line transect methods and quadrant methods. Sampling carried out during the day at low tide so that it can facilitate the collection of sea snail samples. Each station be drawn on each of the 3 transect lines that are parallel to the coastline. The length of the transect line is 100 meters. In each stretched line, 10 quadrants will be placed in a purposive sampling measuring 1 x 1 m. The sample in the quadrant is then photographed and taken and placed in a plastic sample containing alcohol and labeled with paper. This is then repeated on another line transect. Identification was carried out in the field, and those that were difficult to identify were taken to the Laboratory of Aquatic Resources Management Department for further analysis and by using several identification books from Dharma [1][2][3], Oliver [14] and the WoRMs Website [17]. Data that has been obtained in the field is then analyzed using several calculations. The results of each analysis of this data will be displayed both in the form of tables, graphs and images. The analysis that will be carried out to answer the research objectives and will be discussed one by one.

a. ***Abundance***

Abundance can be used by using two methods, among others, by calculating relative density and density [9].

Density = (number of individuals) / (total area)

Relative Density = (Individual total of each species) / (Total individuals for all species) × 100%

b. Occurrence Frequency

FK = A / B × 100

Where:

FK = Frequency of occurrence according to location (n = 3) or quadrant (n = 90)

A = The number of locations or quadrants found in the type of snail

B = The total location or quadrant used in the study

c. Lenght of Sea Snail Shell

The measurement of the average length of the shell of each individual of each species and its standard deviation, namely by using a simple mathematical formula [18].

$\bar{X} = (\sum xi) / N$

Where:

$\bar{X}$ = Average shell length

∑xi = Amount of individual size in each species

N = Number of samples in each sea snail

d. Percentage of Edible Parts (BDD)

BYDD = A / B x 100

Where:

A = weight of Sea snail meat

B = Intact weight of sea snail (including shells)

3. RESULTS AND DISCUSSION

a. Identification Species of Gastropod

The research carried out for 3 (three) months has been going well on two different stations in mangrove ecosystem, there are Station I at Lampu Satu Beach and Stasiun II at the Payum Beach, where samples of the two research sites have been collected. As for this study there were 4 (four) families namely Littorinidae, Potaminidae, Neritidae and Ellobiidae, which consisted of 8 (eight) species that were identified, including: *Littoraria scabra* (Linnaeus, 1758), *Terebralia sulcata* (Born, 1778), *Terebralia palustris* (Linnaeus, 1767), *Cerithidea obtusa* (Lamarck. 1822), *Cassidula angulifera* (Petit de la Saussaye. 1841), *Nerita* sp. (Linnaeus, 1758), *Nerita lineata* (Gmelin, 1791), and *Telescopium telescopium* (Linnaeus, 1758).

b. Density and Frequency of Attendance

Based on the results of analysis of gastropod samples at station II, it is known that the number of species most found on each transect line 1, 2, and 3 is *L. scabra* as many as 625 individuals and followed by *T. palustris* as many as 402 individuals; *C. Obtusa* as many as 340 individuals; *C.angulifera* as many as 74 individuals; *T. Palustris* as many as 46 individuals; *Nerita* sp. 34 individuals; *N. Lineata* is 4 species and the least is the species *Telescopium telescopium* as many as 1 individu. More clearly can be seen in the following table.

Table 1. Total Amount of Individu's at Station I and II

STATION	SPECIES								TOTAL
	T. sulcata	*T. palustris*	*T. telescopium*	*L. scabra*	*C. obstusa*	*C. angulifera*	*N. lineata*	*Nerita sp.*	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Station I	34	63	0	1321	72	3	7	2	1502
Station II	402	46	1	625	340	74	4	34	1526
Total	436	109	1	1946	412	77	11	36	3028

Density analysis is based on the number of individuals obtained and divided by the area of the sampling area. As for each station divided into 3 transect lines with symbols 2.1, 2.2, and 2.3. Each line transect consists of 10 quadrants measuring 1 x 1 m so that it is known that at station II there are 30 consciousnesses or the equivalent area of 30 m^2. So that after analysis, the highest relative density and density were found in *L. Scabra* species of 20.83 ind/m^2 and 0.41%. This is likely due to this species having a habit of being in the trunk and most leaves of the mangrove, making it less affected by the tides. Because as it is known that tidal water inundates the substrate and interferes with ordinary plants other than mangroves [16] to live in this ecosystem, including also affecting the presence of organisms living on the substrate / floor of mangrove forest ecosystems. The ground floor of the mangrove forest ecosystem at station II is known to have sand sediments but is predominantly muddy. This resulted in an abundant *Terebralia sulcata* species from a density analysis of 12.4 ind/m^2 and a relative density of 26%. Density of gastropods also depends on the food availability on the ecosystem, and environmental parameters [5][6].

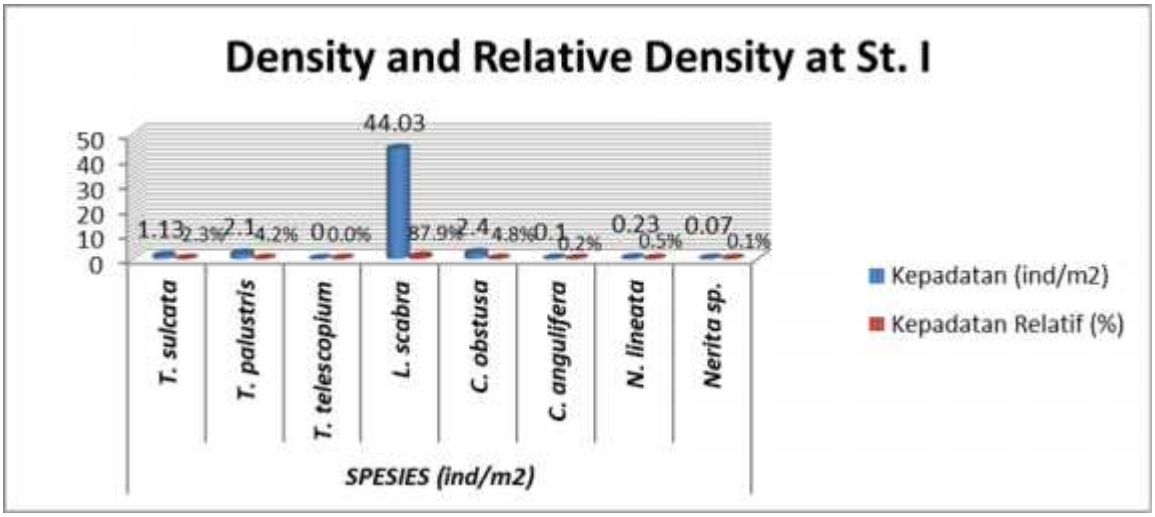

Figure 1. Density dan Relative Density at Station I

The analysis for the relative density and density at station I shows that the species *L. Scabra* is the species that has the highest value reaching 44.03 ind/m^2 with a relative density of 87.9%. The characteristics of station I are slightly different from those found in station II, where the substrate is more sandy with many mangrove tillers. The area also includes more sunlight, the tides of the sea are very influential because of its location right on the mouth of the Kumbe river, which is one of the largest rivers in Merauke Regency.

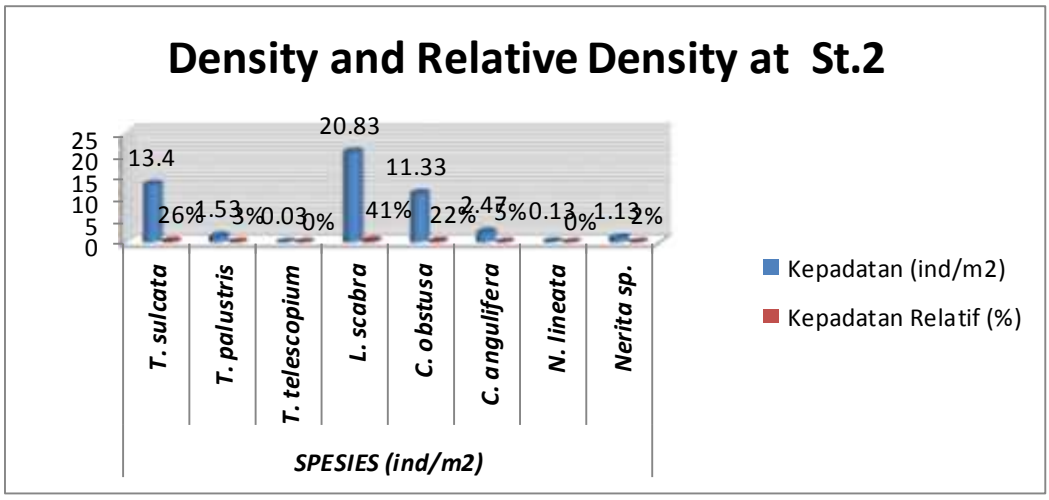

Figure 2. Density and Relative Density at Station II

The next analysis is the frequency of occurrence to see how often one species appears in the quadrant used.

Table 2. Occurence Frequency at Station I

STATION	*Occurence Frequency* (%)							
	T. sulcata	***T. palustris***	***T. telescopium***	***L. scabra***	***C. obstusa***	***C. angulifera***	***N. lineata***	***Nerita sp.***
Station I								
Total Occurence	11	10	0	30	20	8	4	1
n=30	0,37	0,33	0,00	1,00	0,67	0,27	0,13	0,03
FK01	37%	33%	0	100%	67%	27%	13%	3%
Station II								
Total Occurence	18	13	1	29	29	18	5	4
n=30	0,60	0,43	0,03	0,97	0,97	0,60	0,17	0,13
FK02	60%	43%	3%	97%	97%	60%	17%	13%

The frequency of occurrence is an analysis method to see the existence of one species in all existing quadrants / plots. The result in table 2 shows that the species that has the highest frequency of occurrence are species of *L. Scabra* and *C. obstusa*, this is caused by 30 quadrants spread on station II in the Payum mangrove forest ecosystem, both species appear in 29 quadrants. While the frequency of occurrence of *Telescopium telescopium* species is only 1 (one) time or by 0.03%. This is because local people really like this species to be used as food, so that its presence at the time of sampling is hardly found.

c. Analysis of Gastropod Shell Length

In length measurements of gastropod shells were carried out by measuring per observation station. Then the collected data are then grouped by species to analyze the average size of the shell length of each species. More can be seen in Figure 3.

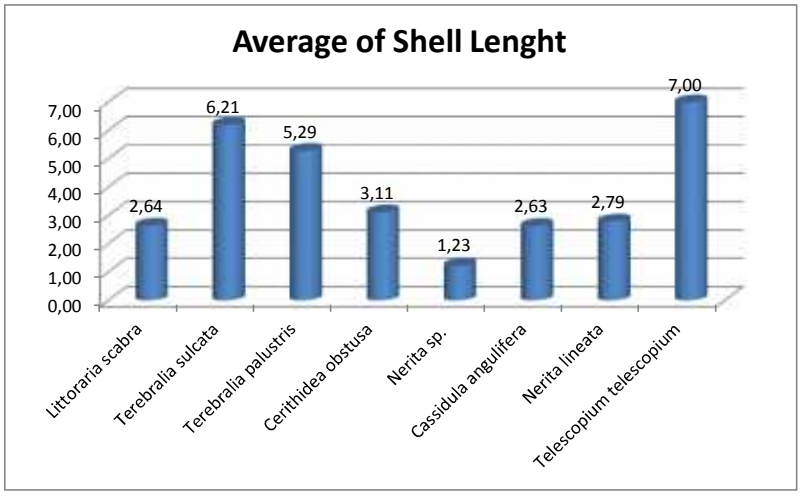

Figure 3. Diagram Average Lenght of Gastropods Shells

d. Edible Species and Parts (BYDD) From Gastropods

Based on the results of interviews with coastal communities living in Lampu Satu Beach and Payum Beach, there are several gastropod species that are often used as alternative food ingredients besides fish, shrimp, crabs and shellfish. Gastropod species consumed include *Terebralia sulcata*, *Terebralia palustris*, *Cassidula angulifera*, *Telescopium telescopium* and *Nerita lineata*. These 5 (five) species are often used as food ingredients because they are easy to find, the percentage of meat is more than other gastropod species, and the meat is good. The following will be displayed in Table 3. Parts that can be eaten from gastropod.

Table 3. Percentage of Edible Part of Gastropods

No	Spesies	BYDD (%)
1	**2**	**3**
1	*Littoraria scabra*	34%
2	*Terebralia sulcata*	19%
3	*Terebralia palustris*	18%
4	*Cerithidea obstusa*	26%
5	*Nerita sp.*	43%

6	*Cassidula angulifera*	35%
7	*Nerita lineata*	35%
8	*Telescopium telescopium*	18%

4. CONCLUSION

a. At station I the species that has the highest abundance is *Littoraria scabra* with 44.03 ind/m^2, while at Station II the highest abundance is occupied by *Littoraria scabra* with 20.83 ind/m^2, *Terebralia sulcata* 13, 4 ind/m^2 and *Cerithidea obstusa* at 11.3 ind/m^2.
b. Frequency of Occurence at Station I is owned by species *Littoraria scabra* (100%) and followed by *C. obstusa* (67%). Whereas at Station II the *Littoraria scabra* species still has a high percentage of Frequency Occurence with *L. Scabra* and *C. obstusa* as much as 97%, followed by *T. Sulcata* and *C. angulifera* by 60% and *T. Palustris* 43%.
c. The species with the longest length shell size is owned by species *T. Telescopium* of 7 cm, then species *T. Sulcata* 6.21 cm and *T. Palustris* 5.29 cm. While the highest Standard Deviation (STDEV) is owned by *N. lineata* 0.854.
d. Edible Parts (BYDD), which are found in species which are not generally the choice of coastal communities in Merauke Regency to be used as alternative food ingredients, namely: *Nerita* sp. 43%, *C. angulifera* and *N. lineata* 35%; and *Littoraria scabra* 34%.

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