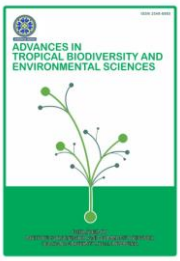

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Morphometric Feather Shells (*Anadara antiquata*) in Balauring and Dolulolong Waters, Lembata District

AstutiArni, Yudiana Jasmnindar, Welem L. Turupadang

Aquaculture Study Program, Faculty of Fisheries and Marine,
University of Nusa Cendana Kupang, Jl. Adi Sucipto, Penfui Timur, 85001, Indonesia
*Corresponding author: astutiarni@gmail.com

Abstract. Shellfish (Anadara antiquata) is a type of marine biota from the bivalve class. This species is a vital source of income for coastal communities. This study aims to compare the morphometry and population density. The method used is line transect and quadrant transect. The size of the quadrant/plot is 2x2 m², and the distance between 1 quadrant and another quadrant is 2 m. The data analysis used is multiple linear regression and the t-test. The results showed that the morphometric length of the shells in the waters of Balauring Village = 22.7 mm, in the seas of Dolulolong = 25.9 mm, the width in the waters of Balauring Village = 15.6 mm, in the waters of Dolulolong Village = 18.4 mm, the height in the seas of Balauring Village = 12.3 mm, in Dolulolong waters = 17.1 mm, while the weight of clams in Balauring Village waters = 4.3 grams and in Dolulolong Village waters = 4.8 grams, and the value of the population density of shellfish for point I = 0.55 ind/m², point II = 0.94 ind/m², and point III = 1.01 ind/m². The morphometrics in Balauring waters are greater than in Dolulolong waters. The population density in Balauring and Dolulolong waters did not experience a significant difference.

Keywords: shellfish; morphometric; population density

I. INTRODUCTION

Shellfish are a type of marine biota belonging to the Bivalvia class and typically found sedentary at the bottom of the waters (Komala et al., 2011). It is a source of high-quality animal protein and is widely consumed as a food ingredient due to its favorable chemical composition. The clam meat (A. antiquata) has a moisture content of 79.69%, ash content of 1.57%, fat content of 2.29%, protein content of 12.89%, and carbohydrate content of 3.56%; it also contains nine essential amino acids and six non-essential amino acids, with the highest content of glutamic acid 1.22% and the lowest content of histidine 0.15% (Taufik, 2011).

However, the explanation of this biota in East Nusa Tenggara Timur Province, particularly in the waters of Balauring Village and the Dolulolong waters of Lembata Regency, has raised concerns about its sustainability. If the current rate of exploitation is allowed to continue, it could lead to the depletion of the resources and hinder the recovery of natural resources. Therefore, there is a need to develop a management scheme for restoring shellfish stocks in these two regions through the use of cultivation technology.

However, to support these efforts, accurate information and data on the population density and morphometric size of shellfish (A. antiquata) are required. Hence, this study aims to conduct a comparative morphometric analysis of shellfish (A. antiquata) in the waters of Balauring and Dolulolong Villages, Omesuri District, Lembata Regency.

II. METHODS

A. Time and Location

This research was conducted over 2 months, from April 30 to June 30, 2022, in Balauring Waters and Dolulolong Village, Omesuri District, Lembata Regency (Figure 1).

B. Tools and Materials

The tools used during the study were rulers, digital scales, thermometers, pH meters, calipers, stationery,

cameras, refractometers, and rakes. The materials used during the research were shellfish (A. antiquata), basins, and raffia ropes.

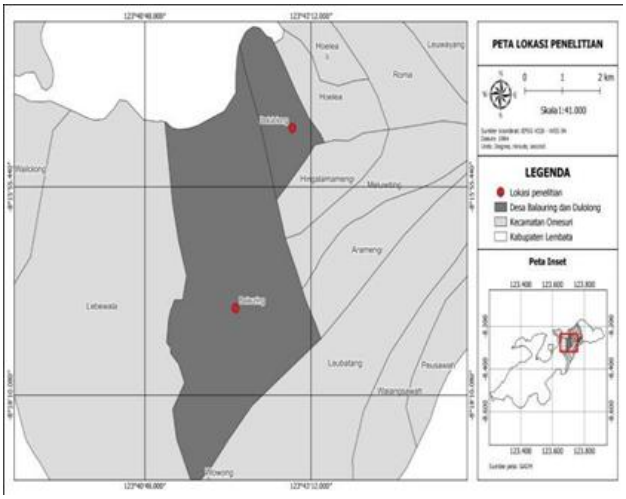

Figure 1. Research Locations

C. Research Methods

This study used line transects and quadrant transects to sample shellfish populations. The transect line size was 2 m x 2 m, and there were 15 quadrants in each location. The distance between one quadrant and another was 2 meters. Sampling was conducted manually at the lowest tide in the afternoon, with a total of 200 samples collected at each location. Multiple linear regression and t-tests were used for data analysis.

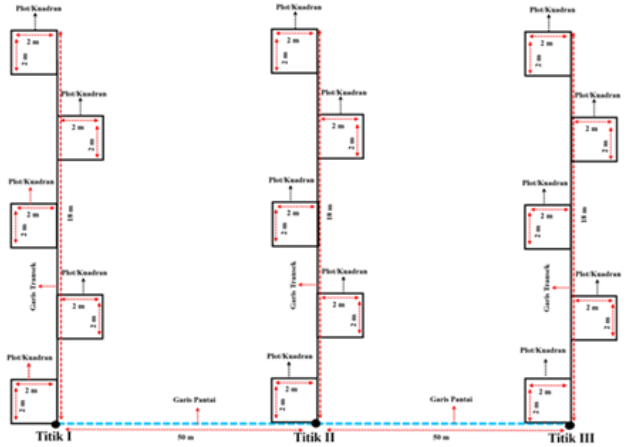

Figure 2. Placement of Quadrants/plots.

D. Sampling and Sample Measurement

Samples were taken at the lowest ebb by hand. The total sample size was 200 samples at each location. The measurement of the shell length was taken from the anterior end to the posterior end, whereas the width of the shell was measured from the maximum distance from the umbo to the ventral side. The height of the shell was measured from the maximum distance from the lateral side behind the left and right shells. The weight of the entire clam was measured (Figure 3).

a. Shell length

b. Shell Width

c. Shell height

d.Shell Weight

Figure 3. Criteria for sample measurements: a. shell length; b. shell width; c. shell height; and d. shell weight.

D. Population Density

The population density of shellfish at each location was calculated using the formula proposed by Umar (2013):

$$Di = \frac{ni}{A}$$

Information:
Di = Population Density (ind/M^2); ni = Number of individuals (ind); A = Area of taking (M^2).

D. Population Density

A comparison analysis of shell size and population density between the two locations was conducted using SPSS statistical software, with a significance level of 0.05, as per Riduwan (2009).

III. RESULT AND DISCUSSION

A. Morphometric Comparison of Seashells in Balauring and Dolulolong Waters

The average morphometric comparison between seashells from the two locations is shown in Figure 4. The morphometrics of seashells in Dolulolong waters were found to be greater than those in Balauring waters, both in terms of length, width, height, and weight. Specifically, the length of the shell in Balauring waters was 22.7 mm, while in Dolulolong waters, it was 25.9 mm. The shell width in Balauring waters was 15.6 mm, and in Dolulolong, it was 18.4 mm. The shell height in Balauring waters was 12.3 mm and 17.1 mm in Dolulong, while the shell weight in Balauring waters was 4.3 mm and 4.8 mm in Dolulolong waters.

The t-values for length, width, height, and weight, when compared with the t-table values at the 5% level, indicated a significant difference between the morphometric sizes of the seashells in the waters of Balauring Village and Dolulolong Village. It is noteworthy that other influencing factors have been suggested by Gimin (2005).

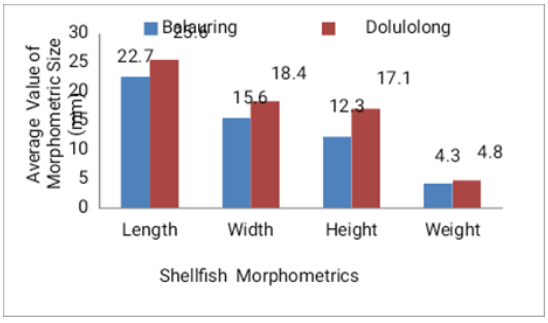

Figure 4. The average of Seashells' morphometric comparisons

B. Population Density

The population density of shellfish in Balauring and Dolulolong waters did not experience a significant difference (Figure 5). The study found that the population densities of shellfish in Balauring and Dolulolong waters did not differ significantly. The population density value of shellfish for location I was 0.55 ind/m², location II was 0.94 ind/m², and location III was 1.01 ind/m², resulting in a range value of 0.55-1.01 ind/m² with an average value of 0.83 ind/m². Similarly, in Dolulolong Village, the population density of shellfish was 0.26 ind/m² for location I, 1.24 ind/m² for location II, and 1.20 ind/m² for location III, resulting in values ranging from 0.26 to 1.20 with an average value of 0.83 ind/m². The study further revealed that although there was no significant difference in the density of shellfish in the two locations, the density and diversity index values were low.

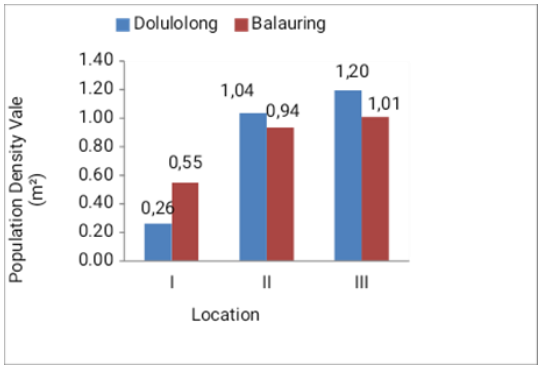

Figure 5. Population Density Graph: Balauring and Dolulolong.

The low population density of shellfish in both locations could be attributed to several specific factors, as suggested by several researchers. For example, Nurdin et al. (2006) reported that the population density of mussels in Sungai Pisang Bay, Padang City, West Sumatra, ranged from 0.3 to 1.8 individuals per square meter. Furthermore, a decrease in the number of individuals in a population, resulting in low diversity index values, is common among all living invertebrate species in both terrestrial and aquatic environments that experience continuous exploitation (Roy et al., 2003; Feinberg et al., 2008; Sato et al., 2006).

C. Water Quality

Table 1 above explains that the range of water quality measured during the study was a temperature range of 27-29 °C. Salinity ranged from 28 to 30 ppt, and the degree of acidity, as measured by pH, ranged between 7.4 and 7.6. The values of several physical and chemical parameters in the waters of Balauring Village and Dolulolong Village, when associated with water quality standards for marine

resources including shellfish, according to Effendi (2003), are for temperatures ranging from 27-30 °C, salinity ranging from 28-32 ppt, The pH ranges from 7.3-8.4. Referring to this explanation, it can be seen that the range of values for several physical and chemical parameters in the waters of Balauring Village and Dolulolong Village remains within the ideal range.

TABLE 1
WATER QUALITY PARAMETERS

Location	Parameter	Value
Balairung	Temperature (ºC)	27-29
	Salinity	20-30
	pH	7.4-7.6
Dolulong	Temperature (ºC)	27-28
	Salinity	28-29
	pH	7.4-7.6

IV. CONCLUSION

In conclusion, the morphometric measurements of clam shells were recorded at two different locations in Omesuri District, Lembata Regency. The first location, Balauring Village, exhibited a shell length of 22.7 mm, a width of 15.6 mm, a height of 12.3 mm, and a weight of 4.3 grams. The second location, Dolulolong Village, displayed a shell length of 25.9 mm, a width of 18.4 mm, a height of 17.1 mm, and a weight of 4.8 grams.

However, despite the differences in morphometric measurements, no significant difference was observed in the population density of clams between the two locations. This finding suggests that factors other than physical shell dimensions may play a role in determining clam population density in these areas. Further research is needed to identify these factors and gain a better understanding of the dynamics of clam populations in this region.

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