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MORFOMETRIC ANALYSIS OF MANGROVE CRAB (*Scylla serrata*) IN TANJUNG REJO VILLAGE, PERCUT SEI TUAN DISTRICT, DELI SERDANG REGENCY, NORTH SUMATERA

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ABSTRACT

This study aims to determine the character that contributes the most to the body weight of mud crab (*Scylla serrata*) and the morphometric differences between male and female mangrove crabs *(Scylla serrata*). The research was carried out in Tanjung Rejo Village, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra from March to April 2022. This research is quantitative descriptive with explorative methods, namely direct sample collection or Hand sorting. The morphometric parameters observed were carapace width, carapace length, carapace height, optical groove widths, chela length, chela height and deep length. The analysis used is multiple linear regression with stepwise method and t test. The results of the study showed that the morphometric characters that contributed the most to body weight in male mud crabs were the length of the right chela (93%) and carapace length (94.1%), while in female mud crabs, carapace height (87%) and carapace width (91%) and there is a very significant difference between male and female mud crab morphometrics on the characters of optical groove widths, right chela length, right chela height, right chela deep length, left chela length, and chela height. on the left and deep length on the left. Meanwhile, significant characters were found in carapace width and carapace height. For carapace length characters showed no significant difference..

Introduction

Indonesia is a maritime country that has potential natural wealth, including flora and fauna and other resources. One of them is mud crab. Mangrove crabs are classified in the Portunidae family that live in almost all coastal waters covered with mangroves (Gita, 2016). There are four types of mangrove crabs in Indonesia, namely green mud crab (*Scylla Seratta*) or "giant mud crab", white mud crab (*Scylla paramamosain*), red mud crab (Scylla olivacea) or "red/orange mud crub" and purple mud crab. (*Scylla tranquebarica*) (Nurdin, 2010). The mangrove crab species that has the widest distribution of distribution compared to other species is the mud crab (*Scylla serrata*) (Hubatsch et al, 2015).

Mangrove crab management and the development of hatchery and rearing techniques in effective crab cultivation are largely determined by several factors, one of which is the uncertain taxonomic factor of Mangrove Crab (Ohoiulun, 2020). Research on mangrove crabs (*Scylla serrata*) is still minimal, especially studies on morphometric aspects as the basis for species identification. lack of information about mangrove crabs (*Scylla serrata*) biological resources can be an

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inhibiting factor in their management and utilization.

Tanjung Rejo Village is one of the villages located in Percut Sei Tuan District, Deli Serdang Regency, North Sumatra Province. This village is located on the east coast of Sumatra. Tanjung Rejo Village consists mostly of coastal and marine waters, which have great potential in the field of fisheries, mangrove forest areas, tourism and other natural resources. The area of mangrove forest in Tanjung Rejo Village is around 602,181 ha but the area of mangrove forest continues to decline because it has changed its function into a residential development area, commercial and industrial activities as well as agriculture (Samosir, 2017).

Research on mangrove crab (*Scylla serrata*) resources needs to be done, especially regarding aspects related to basic information on fisheries biology such as the morphometric characteristics of mangrove crabs found in Tanjung Rejo Village, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra which can then be used as a basis identification of species so that it can be used as a basic reference for the management of crab biological resources in order to obtain optimal utilization of mud crabs while still paying attention to their sustainability and the balance of mangrove crab populations can be well maintained.

Materials And Methods

This research was carried out in March 2022-April 2022. The sampling location was Tanjung Rejo Village, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra. Sample analysis was carried out in situ.

The population in this study were all *Scylla Seratta* found in Tanjung Rejo Village. The samples in this study were 60 mangrove crabs which were divided into 30 male Scylla Seratta and 30 female *Scylla Seratta*. The weight of *Scylla Seratta* used is mud crab which has a weight of 100 grams to 110 grams.

The tools used in this research are traps and nets used to catch *Scylla Seratta*, scales to measure the body weight of the sample and a caliper to measure the body part of the sample. The material used in this research is *Scylla Seratta*. The research procedure in this study includes the preparation stage, sampling, selection of body weight measurements, gender selection, and morphometric measurements of the sample.

The data analysis in this study was related to the morphometric characteristics of male and female crabs. This characteristic will be calculated statistically, namely the t-test to determine whether there is a significant difference in each observed morphometric character. Multiple linear regression using the Stepwise method as the next test and the data obtained was processed with the help of IBM SPSS Statistics 22 software, with the following formulation (Laili, 2017):

$Y1 = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + ... + b_nx_n$
$Y2 = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + ... + b_nx_n$
Keterangan :
Y1 : Male body weight (Kg)
Y2 : Female body weight (Kg)
b_0 : Intercept value
b1 : The value of the regression coefficient to - i
X1 : Carapace Width
Xn : Next Morphometric Character

Result And Discussion

Description of Research Results

The results of the morphometric study of the mangrove crab (*Scylla serrata*) used showed the length, width, height of the carapace, optical groove widths, length, height and deep length of the chela. In several morphometric characters, the male mud crab showed a higher average value than the female, namely the carapace width (84.29:83.54), the length of the right chela (54.44: 47.09), the height of the right chela. (21.08:18.28), the length of the right chela deep (35.50: 31.16), the length of the left chela (52.03: 47.06), the height of the left chela (19.37:17, 34) and the length of the left deep chela (33.07: 29.64) while on the characters of carapace length, carapace height and optical groove widths the average values of females were higher than males.

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Table 1. Morphometrics of Mangrove Crab (Scylla Seratta) by Gender

No	Character	Means ± SD	
		Male	Female
1.	Carapace Width (L)	84,29 ± 2,87	83,54 ± 3,79
2.	Carapace Length (P)	54,64 ± 2,92	56,12 ± 2,00
3.	Carapace Height (T)	24,89 ± 1,89	31,04 ± 1,76
4.	Optical groove widths	21,75 ± 1,88	23,42 ± 1,35
5.	Right chela length (PCR)	54,44 ± 2,54	47,09 ± 4,13
6.	Right chelal height (TCR)	21,08 ± 1,73	18,28 ± 2,18
7.	Right deep chelal length (PPR)	35,50 ± 2,23	31,16 ± 3,86
8.	Left chela length (PCL)	52,03 ± 3,27	47,06 ± 3,19
9.	Left chelal height (TCL)	19,37± 1,21	17,34 ± 1,45
10.	Left deep chelal length (PPL)	33,07 ± 2,95	29,64 ± 3,37

Correlation analysis of mangrove crab morphometric characters with body weight

The results of the morphometric research of male mangrove crabs can be seen that there are 2 morphometric characters that have the highest contribution to body weight of male mud crabs. The morphometric character with the highest contribution was the length of the right chela which contributed 93% and the length of the carapace contributed 94.1% as shown in table 2.

Tabel 2. Morphometric characters that contribute to body weight in male mud crabs

No.	Morphometric	Male (%)
1.	Right chela length (X_5)	93,0
2.	carapace length (X_2)	94,1

The results of morphometric research of female mud crabs can be seen that there are 2 morphometric characters that have the highest contribution to body weight of female mud crabs. The morphometric character with the highest contribution was carapace height contributing 87.9% and carapace width contributing 91% as shown in table 3.

Tabel 3. Morphometric characters that contribute to body weight in female mud crabs

No.	Morphometric	Female (%)
1.	Carapace height(X_3)	87,9
2.	Carapace Width (X_1)	91,0

Regression analysis of male and female mud crab morphometric characters

The results of the regression equation between male and female mud crabs were used to see the magnitude of the increase in carapace width (Y) on the characters in the variable (X). In the male mud crab, the equation states that if there is an increase of 1 unit in the X variable, it will affect the increase in the Y variable according to the coefficient value on the variable with the assumption that the other X variables in the regression model remain, it shows that if there is an increase in length the right chela or

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carapace length while the other variables are constant it will cause an increase in Y of 22.18 and for female mud crabs the equation states that if there is an increase in the carapace height and carapace width variables, it will be followed by an increase in body weight (Y) of 30, 75.

Tabel 4. Regression equation based on contribution to body weight in male and female *Scylla Seratta*

Scylla seratta	Regression equation
Scylla seratta male	$Y = 22{,}18 + 1{,}34X_5 + 0{,}20X_2$
Scylla seratta female	$Y = 30{,}75 + 1{,}31X_3 + 0{,}39X_1$

Morphometric differences between male and female mud crabs

Based on the data presented in the table above, it is explained that the difference in morphometric characteristics between male and female mud crabs through the test results showed 9 morphometric characters that were significantly different (P<0.05) at 95% confidence interval and morphometric characters were not significantly different. (P>0.05) there was 1 character out of 10 observed, namely carapace length.

Tabel 5. Difference Between Male and Female Mangrove Crab (*Scylla Serrata*)

No.	Character	Size		Sig.	Conclusion
		Male	Female		
1.	Carapace Width (L)	84,29	83,54	0,014	Significant
2.	Carapace Length (P)	54,64	56,12	0,417	Not significant
3.	Carapace Height (T)	24,89	31,04	0,039	Significant
4.	Optical groove widths	21,75	23,42	0,000	Very Significant
5.	Right chela length (PCR)	54,44	47,09	0,000	Very Significant
6.	Right chelal height (TCR)	21,08	18,28	0,000	Very Significant
7.	Right deep chelal length (PPR)	35,50	31,16	0,000	Very Significant
8.	Left chela length (PCL)	52,03	47,06	0,000	Very Significant
9.	Left chelal height (TCL)	19,37	17,34	0,000	Very Significant
10	Left deep chelal length (PPL)	33,07	29,64	0,000	Very Significant

The study was conducted in March-April, which are the months where the rainy season occurs, so it can be assumed that the mangrove crabs in that month are undergoing a gonad maturation process or will spawn (Ohoiulun, 2020) so that they have a large size of carapace weight and width and high carapace height. and on the growth of female crabs the energy consumed will tend to be used more towards the width of the carapace because the female crab will molt every time it will do copulation while in male crabs molting is less common. In the character, the length of the right chela contributes to the body weight of the male mud crab. The size of the chela in mangrove crabs has many functions during the mating period. So that the size of the chela in male crabs tends to be larger than that of females. The function of the chela is used to clamp/hold the partner during the marriage period, it also serves to reverse the partner's body when copulation takes place (Siahainenia, 2008).

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A large chela is also very much needed for male crabs to defend themselves and protect their partners when they are approaching copulation because the females will change their skin, this needs to be done because the female body will be soft and very dangerous when dealing with insects or other crabs that have cannibalistic nature and the chela functions in an effort to maintain the mating territory (Karsy, 1996).

Conclusions

The morphometric characters that contributed the most to body weight in male mud crabs were the length of the right chela (93%) and carapace length (94.1%), while in the female mud crabs were carapace height (87%) and carapace width (91%).). And there is a very significant difference between the morphometrics of male mud crabs and female mud crabs on the characters of optical groove widths, length of the right chela, height of the right chela, length of the right chela deep, the length of the left chela, the height of the left chela and the length of the profundus of the right. left. Meanwhile, significant characters were found in carapace width and carapace height. The carapace length characters were found to be not significantly different.

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