Morphometrics Of Gastropods In The Waters Of The Babura River, Medan City

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Abstract.

Gastropod morphometrics in the waters of the Babura River, Medan City, is the title of research carried out to find out how Gastropod morphometrics are useful for knowing growth patterns, eating habits, and also the influence of physical and chemical parameters. So far there has been no research on morphometric measurements of gastropods in the Babura River. Data collection for this research will begin from July 2023 to October 2023. There are three research stations, namely: station 1 on Jalan Bunga Rampai IV Simalingkar B, station 2 on Jalan Karyawisata tip Namurambe, and station 3 in Taman Beringin Medan city with as many repetitions as possible. 3 repetitions, so that the data obtained is more accurate. Gastropods in the Babura river have been identified. Shell morphometric measurements include shell length (A), shell width (B), aperture length (C), number of threads (D). This type of research is ex post de facto. The morphometrics of gastropods found were six species, namely: Filopaludina javanica had an average (mm) for A 18.5, B 13.9, C 3.5; Melanoides tuberculate has a mean for A 21.53, B 8.39, C 6.43, Terebia granifera has a mean for A 18.05, B 7.75, C 4.30, Thiara scraba has a mean for A 19.50, B 15.05, C 16.90, with each number of threads (D) being 4, Lymneae rubiginosa A 6.75, B 2.75, C 3.55, and Dnya 2, Pomaceae canaliculate A 17.00, B 10.85, C 11.48, and D 3. The frequency of presence of each species is Filopaludina javanica 33.33%; Melanoides tuberculate 100%, Terebia granifera has an average of 66.66%, Thiara scraba 66.66%, Lymneae rubiginosa 33.33%, Pomaceae canaliculate 66.66% The results of measuring physical/chemical parameters are generally still below the threshold except for BOD, COD , and ammonia which should be zero. The heavy metals copper (Cu), lead (Pb) and cadmium (Cd) are still far below the threshold.

Keywords: *Morphometrics; Gastropod; waters and Babura River.*

I. INTRODUCTION

Gastropods are a type of snail of various sizes which are now widely used for various kinds of paintings, souvenirs and decorations. It turns out that several types of snails have the potential to act as intermediate hosts for the trematode worm parasite, whose adult stage parasitizes humans (Sutrisnawati, 2001). River gastropods need to have their morphometrics measured, to determine food availability, competition and pollution that influence gastropod body size.According to Suarmustika et al, (2018), *Pomacea canaliculata* was found whose shell was striped and plain. According to Arini and Aska, (2021), Littorina was found to have a shell length (SL) range of 20.47 - 66.13 mm and shell width (SW) of 12.61 - 34.01 mm. The thread length (AL) ranges from 8.50 - 12.28 mm and thread width (AW) 4.56 - 8.47 mm.

The number of spires is 5-7 for the maximum size, 6-7 for the medium size and 6 for the minimum size.Research on gastropods carried out by Sinambela and Sipayung, (2014) found gastropods of the *Amnicolidae sp*. According to Sinambela and Sipayung, (2015) the gastropods found were *Melanoides sp*. According to Berutu and Sinambela, (2016) the gastropods found were *Thiara sp*, *Brotia sp*, *Melanoides sp*. The substrate characteristics of the Babura river waters are dusty clay, dusty clay and sandy clay. According to Sinambela, (2019), *Pomacea canaliculate*, *Filopaludina javanica*, *Melanoides tuberculata*, *Tarebia granifera*, *Thiara scraba*, *Lymnaea rubiginosa*, and *Clea (Anentome) helena* were found. Based on the description above, the title of the research to be carried out is "Morphometrics of Gastropods in the Babura River Waters, North Sumatra". The upper reaches of the

Babura River are still natural in the Sibolangit forest area, its water source comes from seepages and is a tributary of the Deli River, which is one of the rivers that crosses the densely populated city of Medan. The basic substrate is known but the physical and chemical parameters need repetition.

Formulation of the problem

What is the morphometrics of Gastropods in the waters of the Babura River, Medan City?

Morphometrics are measurements of length and weight, as well as a scale of physical condition based on standard body morphology, according to the animal's life phase. According to Aralaha *et al*, (2015) the relationship between length and shell diameter at station 1 is allometric while at station 2 it is isometric. According to Bahtiar and Ishak, (2014) the highest percentage of wet weight was in February with a value of 42.86%, weight 48.34 g, and shell width 7.69-8.25 cm; The highest dry weight was in November with a value of 28.47%, weight 7.19-20.18 g, and shell width 3-3.28 cm.The diversity of gastropods can be seen from morphological variations such as: shell shape, aperture shape (shell mouth), shell surface type, and shell ornamentation (Benthem-Jutting, 1956,). From shell morphology, Wenz (1938) grouped Gastropods into Brotia, Sulcospira, Thiara, and Melanoides. The gastropods found in the Babura river are *Melanoides sp* (Sinambela and Sipayung, 2014) class Thiarideae (Sinambela and Sipayung, 2015).

According to Berutu and Sinambela, (2016) the substrate of the Babura river waters is dusty clay, dusty clay and sandy clay. Thiara scabra, 1-3 cm long, elongated and spiny shell, yellowish color with a brown line on the main whorl, pointed apex, tapered chiffon curve.*Thiara riqueti*, 1-2.5 cm long, wavy shell forming vertical lines, black with white wave lines, blunt and pointed apex. *Melanoides punctata*, 1-2 cm long, shell elongated, main whorl slightly enlarged, white with brown spots, main whorl forms a horizontal line, apex is tapered with a wide and blunt chiffon curve.The measurement method is as follows: a. Shell length (SL): maximum dimension from apex to umbilicus b. Shell width (Shell Width-SW): the widest part of the shell. c. Height q1 spire (Spire Height-SpH): the distance between the apex to the last part of the "spire whorl" d. The length of the shell opening (Internal Length of Aperture-AL) is measured from the posterior canal to the anterior canal e. Shell opening width (Internal width of Aperture-AW): the distance between the base of the columella and the inside of the outer lip f. Shell depth (Shell Depth-SD) is measured perpendicular to the aperture dimensions (Salmanu, 2021).

Gastropod Ecology

Yang *et al*. (2021) stated that differences in the average shell length of gastropods are caused by geographical differences. According to Alka *et al*. (2020) stated that the average difference in gastropod shell length could be caused by differences in human activities (anthropogenic). Gastropod shell size can be influenced by food availability, competition and pollution, which can cause pressure on gastropods and disrupt their growth.The growth rate of gastropods is largely influenced by feeding opportunities from the type and amount of food to the shell shape pattern, this is influenced by the food source. Increasing the total length of a character will affect the increasing length of other characters. Physical-Chemical Parameters measured Substrate. The bottom substrate of waters consists of various types, namely: (1) mud, (2) sand, (3) clay, (4) sandy clay, and (5) rocky (Welch, 1952). The bottom substrate of waters can be a limiting factor, both individually and cumulatively, on aquatic organisms. Gastropods are often found on rocky bottom substrates, because gastropods have the ability to firmly attach to rocky substrates with their hard shells.Current. According to Barus, (2004) currents in lotic waters are turbulent.

The current speed ranges from 3 m/sec but can reach 6 m/sec.According to Fadli and Setiawan, (2012), currents are one of the factors in the spread of gastropods. According to Ruswahyuni, (2010) areas with stronger currents have lower diversity.Solubility of oxygen/Dissolved Oxygen (DO). According to Situmorang, (2007) DO in water is an indicator of water quality, because oxygen is needed by aquatic organisms for survival.Biological Oxygen Demand (BOD).According to Situmorang, (2007) BOD is the result of measuring oxygen levels in water consumed by organisms for 5 days in the dark, at a temperature of 20°C. Within 5 days, the activity of aerobic microorganisms almost does not change, therefore it is known as BOD5, whose units are mg/lt.The high BOD value indicates that the waters

contain a lot of organic material (Barus, 2004).The organic matter content in rivers can be caused by rain or floods which wash away various wastes from human activities from the upper land,so that large water discharges cause the organic matter content to be low (Cambell, 1978).Nitrate and phosphate need to be measured again to find out more clearly the food source of gastropods.

Research result

The population used in this research is gastropods found in the Babura River and the samples are gastropods that were sampled. The shell characteristics measured include *shell length (A), shell width (B), aperture width (C), and number of threads (D).*

Fig 1. Gastropods found in the Babura river, Medan city.

Fig 2. Image caption: A = Total length, B = Shell Width, C = Aperture width, and D = Number of Threads (Spire).

Station 1 on Jalan Bunga Rampai 4 is a burial area and there is a lot of grass found, *Thiara sraba* which is found on the surface of the water bed and *Lymnaea rubiginosa* attached to the grass. Station 2 across residential areas found *Melanoides tuberculata* and *Terebia granifera* found on the surface of the water bed. Station 3 is Sudirman Beringin Park with strong water currents and deep water so that the gastropods found only on the banks of the river are *Filopaludina javanica* and *Pomaceae canaliculata*. There were 2 species of gastropods found at each sampling station. *Lymnaea rubiginosa*, which was found in July, was still a juvenile/juvenile, so based on this, *Lymnaea rubiginosa* reproduced in July.

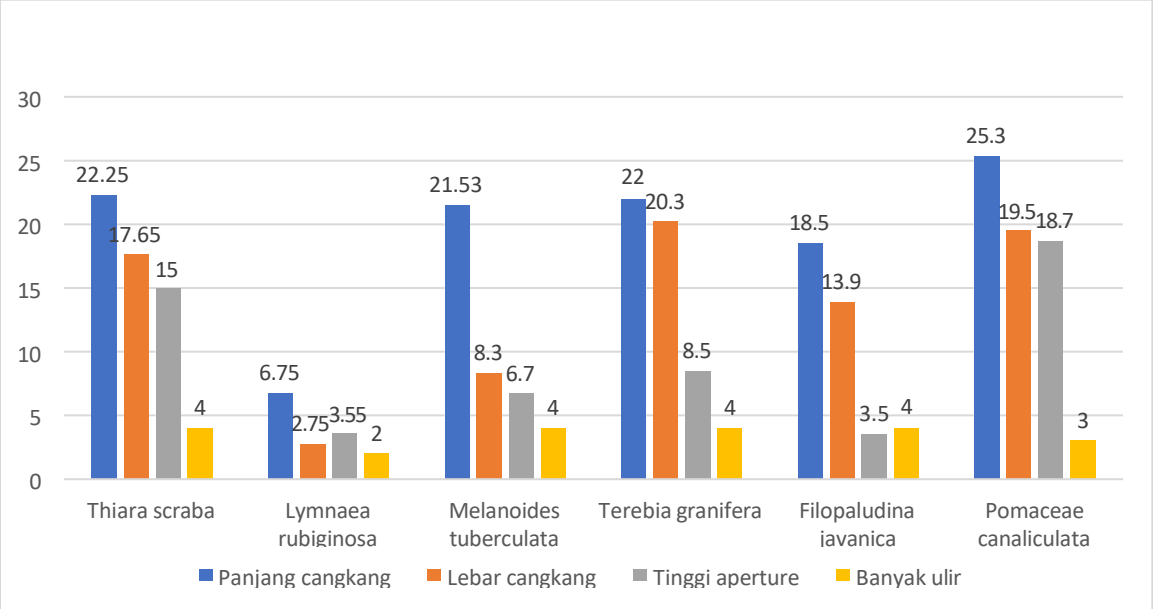
Table 1. Morphometrics of Gastropods Found in the Babura River, Medan City

Species	**Nu**	**A (mm)**			**B (mm)**			**C (mm)**			**D**
		1	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	
Thiara scraba (st 1)	**1**	19,5	9,0	2,0				29.3	22,8	32,3	**4**
	2	18,5	6,0	1,0				31,0	27,1	22,6	

	3	16,5	8,5	1,9				44,1	33,5	30,8	
	4	12,5	5,0	1,5							
	5	7.0	3,5	2,0							
	6	4.5	2,0	1,5							
Rate		9,7	7,3	1,5				34,8	27,8	28,5	
Lymnaea rubiginosa (st 1)	**7**	6,80	2,80	3,60							**2**
	8	6,70	2,70	3,60							
	9	6,70	2,70	3,50							
	10	6,80	2,80	3,50							
Rate		6,75	2,75	3,55							
Melanoides tuberculate (st 2)	**11**	26,0	11,0	5,0	18.4	7,1	8,4	30.6	11,6	12,4	**4**
	12	25,5	11,0	2,5	23,7	9,3	9,8	19,6	8,5	9,2	
	13	20,0	8,0	1,5	21,9	9,1	9,1	21,2	8,6	9,6	
	14	17,0	8.0	2,0	21,3	9,4	9,9	17,3	6,4	6,8	
	15	19,0	8,5	2,0				17,6	6,7	7,3	
	16							12,7	6,9	6,4	
	17							12,6	5,5	5,7	
	18							17,2	6,6	7,5	
Rate		21,5	8,6	2,8	21,3	8,7	9,3	21,8	7,6	8,1	
Terebia granifera (st 2)	**19**	24,5	10,0	2,0				15,8	7,0	7,2	**4**
	20	24,5	10,0	2,0							
	21	21,5	8,5	1,0							
	22	17,0	8,0	1,0							
	23	14,0	6,0	2,0							
Rate		22,0	20,3	8,5				15,8	7,0	7,2	
Filopaludina javanica (st 3)	**24**	22,0	15,5	4,5							**4**
	25	21,5	17,0	4,5							
	26	21,0	15,0	5,0							
	27	16,5	12,0	3,5							
	28	11,0	09,0	2,0							
	29	19,0	15,0	2,5							
Rate		18,5	13,9	3,5							
Pomaceae canaliculate (st 3)	**30**				32.3	24,8	23,9	32.3	24,8	23,9	**3**
	31				18,4	14,3	13,6	18,4	14,3	13,6	
Rate					25,3	19,5	18,7	25,3	19,5	18,7	

Based on table 1, it can be seen that the gastropod that has the longest shell size is *Melanoides tuberculate* and the shortest is *Thiara scraba*, the widest is *Filopaludina javanica* and the narrowest is *Thiara scraba*, the highest aperture is *Filopaludina javanica* and the shortest is *Thiara scraba*. The shell characteristics measured include Shell Length (PC), Shell Width (LC), Columella Width (LK), Aperture Width (LA), and Aperture Height (TA) (Choirunnisa dan Ambarwati, 2020).

Fig 3. Morphometric average of gastropods found during the study



The results of measuring physico-chemical parameters from water samples at the research station are presented in table 2.

Table 2. Physico-Chemical Parameters in the Babura River

Nu	Parameter	Station 1	Station 2	Station 3
Physics				
1	Temperature (ºC)	27	27,5	28
2	TDS (mg/l)	54.1	60,2	64,4
Chemical				
3	pH	6,8	6,5	6,3
4	DO (mg/l)	3,39	3,44	3,03
5	BOD (mg/l)	21,03	19,68	17,47
6	COD (mg/l)	152	137	131
7	Amonia (mg/l)	0,04	<0,013	<0,013
Heavy metal				
8	Copper (Cu)	0,000295	0,000417	0,000269
9	Lead (Pb)	0,000814	0,011516	0,000459
10	Cadmium/Cd (mg/l)	0,000106	0,000214	0,000096

Based on Table 2, the parameter that exceeds the threshold is ammonia, because good waters do not contain ammonia while the other parameters are still within the threshold or still feasible. According to Effendi (2003), most of the biota is aquatic sensitive to changes in pH and likes pH values ranging from 7-8.5. Ramses *et al*, (2018) stated that the normal pH range for mollusks is 6-8.4.The waters of the Babura river have not experienced metal pollution, where the results of measuring the metal content in water samples are very small. This means that the gastropods in the Babura River, Medan City, have not been contaminated with heavy metals because the heavy metal content in the Babura River is very small. number of threads (D).

II. CONCLUSION

The morphometrics of gastropods found were six species, namely: *Filopaludina javanica* had an average (mm) for shell length (A) 18.5, shell width (B) 13.9, aperture width (C) 3.5; *Melanoides tuberculate* has a mean for A 21.53, B 8.39, C 6.43, *Terebia granifera* has a mean for A 18.05, B 7.75, C 4.30, *Thiara scraba* has a mean for A 19.50, B 15.05, C 16.90, with each number of threads (D) being 4, *Lymneae rubiginosa* A 6.75, B 2.75, C 3.55, and Dnya 2, *Pomaceae canaliculate* A 17.00, B 10.85, C 11.48, and D 3. The frequency of presence of each species is.*Filopaludina javanica* 33.33%; *Melanoides tuberculate* 100%, *Terebia granifera* has an average of 66.66%, *Thiara scraba* 66.66%, *Lymneae rubiginosa* 33.33%, *Pomaceae canaliculate* 66.66% The results of measuring

physical/chemical parameters are generally still below the threshold except for BOD, COD , and ammonia which should be zero. The heavy metals copper (Cu), lead (Pb) and cadmium (Cd) are still far below the threshold.

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