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PLASMA SCIENCE LEAGUE

Quality of Bilah River Labuhanbatu Regency, Indonesia (Review: Biodiversity of Gastropods)

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Abstract

The purpose of this research is to know the quality of Bilah River which review from biodiversity of gastropods. This research conducted from March - May in 2020. This research uses Explorative Deskrptif method. Selection of research stations based on government administration or sub-district consisting of Pangkatan subdistrict, Rantau Selatan district and Bilah Barat district. Handsorting gastropod sampling. In data analysis is done calculation of diversity index (H'), evenness index (J'), the similarity Index (IS). The gastropods species were found on Bilah river 9 species: *Anantome helena, Bellamya* sp., *Cerithidea cingulata, Melonoides torulosa, Melanoides tuberculata, Nassarius coronatus, Pomacea* sp., *Sulcospira testudinaria* and *Thiara scabra*. The highest diversity index (H') on station 9 (1.46) and the lowest station 4 (1.01) by medium category. The highest evenness index value on stations 9 (0.70) and lows at Station 4 (0.56) with medium population Evenness index (J') category. The highest Similaritas (IS) index on stations 3, 4, 5 and 7 (100%)

Keyword: Gastropods, Biodiversity, Bilah River

INTRODUCTION

Gastropoda is a group of animals from the mollusc phylum that can live on a type of substrate from coarse to delicate. Gastropoda is a group of invertebrate animals that are and this animal has the main nature of utilizing its feet to walk (Suwignyo, 2005). Gastropoda can live on land, river, sea and the transitional area between land and sea (estuary) (Silaen et al., 2013).

According to Wahdaniar (2016) gastropods can generally depict the condition of the water, so its existence is often used as a bioindicator of determining the quality of water. Some of them are physical, chemical, and biological factors such as the texture of sediment, temperature, salinity, pH, organic matter content and oxygen (Dimenta & Arismen, 2017; Dimenta & Machrizal, 2017; Ruswahyuni, 2008). Most of the Gastropoda classes live in sea and freshwater, one of them on the river ecosystem (Campbell, et al., 2012). Bilah river is the largest river in the Labuhanbatu regency of North Sumatera province. This river became the habitat of various aquatic biota one of the gastropods. Harahap (2019); Dimenta et al., (2020); conveys that the quality conditions of the Bilah river in general are medium. The presence of gastropod animals is influenced by surrounding aquatic conditions.

Based on the research reference, the information related to the gastropods abundance in Labuhanbatu Regency not found. Then, this water area were habitat that gets a lot of humans anthropogenic activity. Its necessary to conduct a comprehensive data collection, could be reference for local government policy makers in maintaining the sustainability of their populations in nature and wise utilization.

RESEARCH METHODS

The study began in March - May in 2020. The research location is conducted in the Bilah River of Labuhanbatu Regency. The research station is divided into 9 research locations, the division of research stations based on anthropogenic activity consisting of Pangkatan subdistrict, Rantau Selatan district and Bilah Barat district: Station 1 (2° 6 ' 11.88 "LU, 99° 49 ' 56,88" E), station 2 (2° 6 ' 10.56 "LU, 99° 50 ' 5.96" E), Station 3 (2° 6 ' 13.21 "LU, 99° 50 ' 14,37" E), station 4 (2° 6 ' 35.86 "LU , 99° 51 ' 19,81 "BT), Station 5 (2° 7 ' 4.61" LU, 99° 51 ' 50,89 "BT), station 6 (2° 7 ' 7.51" LU, 99° 51 ' 26,75 "E), station 7 (2° 7 ' 56.94" LU, 99° 57 ' 5.11 "BT), station 8 (2° 8 ' 17.76" LU, 99 ° 57 ' 44,79 "BT), and station 9 (2° 8 ' 38.42" LU, 99° 58 ' 4.87 "BT).

Data Collection

The method used in this study was exploratory deskrptif. The Data taken include: coordinate point, water temperature, water brightness, water pH, current velocity is done by insitu (at research site) and the sample is gastropods in the Bilah river of Labuhanbatu Regency. The tools and materials used in this research are: GPS (Global Positioning System), thermometer, pH meter, Sechi disk, Pimpong ball, fishing rope, stopwatch, sampling by handsorting, meter, rope, label, plastic bag, book idenification, Camera.

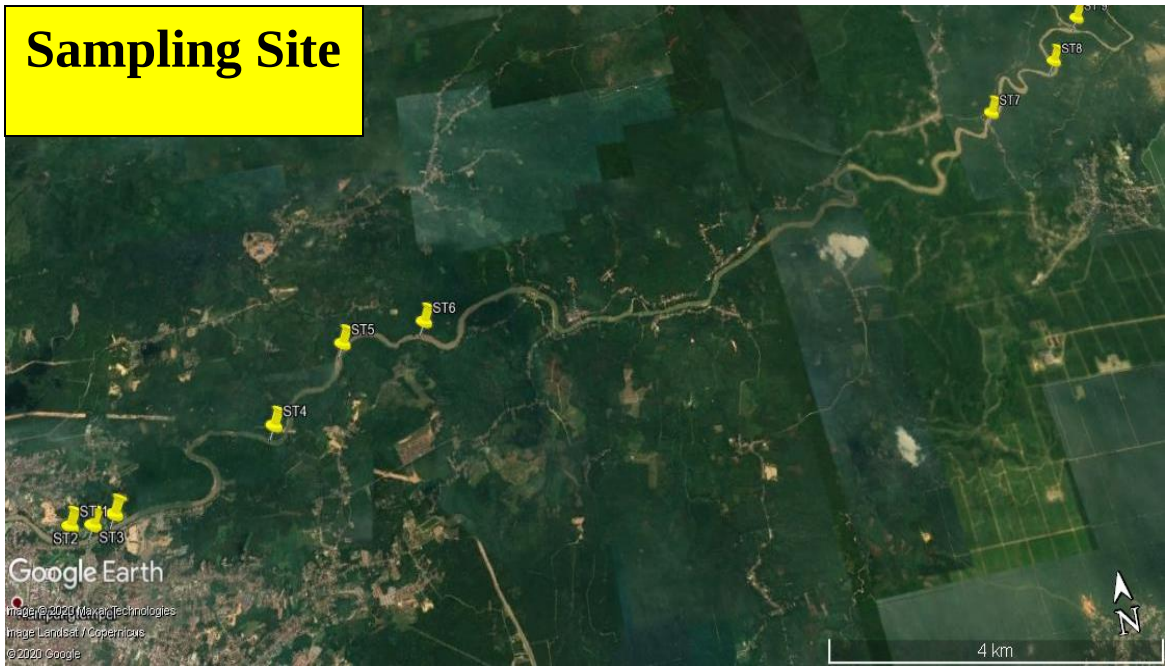

Figure 1. Research Location

Data Analysis

The results of the research analysis include: Diversity index (H') using formula (Krebs, 1978), Evenness Index (J') using formula (Krebs, 1978) and Similaritas Index (IS) using formula (Krebs, 1978).

RESULTS AND DISCUSSION

Based on the results of the gastropod catches on 9 observation stations in the Bilah river of Labuhanbatu District which can be as many as 9 types of gastropods. *Anantome helena* 7 ind/m^2, *Bellamya* sp were 9 ind/m^2, *Cerithidea cingulata* were 12 ind/m^2, *Lymnaea columella* were 14 ind/m^2, *Melanoides tuberculata* were 12 ind/m^2, *Nassarius coronatus* were 7 ind/m^2, *Pomacea* sp. were 8 ind/m^2, *Sulcospira Testudinaria* were 14 ind/m^2, with amount of total fish 159 ind/m^2 caught.

Table 1. Species Diversity of Gastropods in the Bilah River

Species	Research Station								
	1	2	3	4	5	6	7	8	9
Anantome Helena	-	√	√	-	√	-	-	√	√
Bellamya sp	√	√	√	√	√	√	√	√	√
Cerithidea cingulata	√	-	√	√	√	-	√	-	√
Lymnaea columella	√	√	√	-	√	√	-	√	√
Melanoides tuberculata	√	√	-	√	-	√	√	-	√
Nassarius coronatus	√	-	-	√	-	-	√	√	√
Pomacea spp	√	√	√	√	√	√	√	√	-
Sulcospira testudinaria	-	√	√	-	√	√	-	-	√
Thiara scabra	√	√	√	√	√	√	√	√	√

Shanon-Wienner Diversity index (H')

The diversity index (H') is used to indicate the number of species in a community and the balance in the division of individual numbers (Sari, 2017). The diversity index can be seen in table 2.

Table 2. Index of Gastropod Diversity on Bilah river

Research Location	Index Diversity (H ')	Category
Station 1	1.14	Medium
Station 2	1.18	Medium
Station 3	1.29	Medium
Station 4	1.01	Medium
Station 5	1.24	Medium
Station 6	1.03	Medium
Station 7	1.19	Medium
Station 8	1.06	Medium
Station 9	1.46	Medium

The highest diversity index value at station 9 with a value (1.46) while the lowest diversity index is at station 4 with a value of (1.01). The high diversity at Station 9 is due to the substrate being located at the station when sampling muddy so that widely found species of gastropods. While on the station 4 diversity of low gastropods is suspected because at the time of sampling the river current speed is faster than other stations. Diversity Index Categorized medium (Wilhm & Doris, 1986). Factors that can affect the low index diversity (H') of food, physical and chemical factors Dimenta et al., (2018); Fadhilah et al., 2013; Barrett, 2005).

Evenness Index (J ')

Evenness index used to describe the state of the number of varied species or genera (Wahdaniar, 2016). Results Evenness Index (J') gastropods seen in Table 3. From the calculation result evenness index of gastropods in Table 3. That the highest evenness index is at station 9 with a value (0.70) whereas the lowest evenness index at station 4 with a value (0.56), from all Research Stations evenness index (J') gastropods categorized as moderate. Dibyowati (2009) states that high low evenness index is influenced by the level of fertility of the habitat that can support the life of each species that occupies the habitat.

Table 3. Evenness Index of Gastropod on Bilah River

Research Location	Evenness Index (J ')	Category
Station 1	0.59	Medium
Station 2	0.61	Medium
Station 3	0.66	Medium
Station 4	0.56	Medium
Station 5	0.64	Medium
Station 6	0.58	Medium
Station 7	0.66	Medium
Station 8	0.59	Medium
Station 9	0.70	Medium

Table 4. index Similarity (IS) gastropods on the Bilah River

	S1	S2	S3	S4	S5	S6	S7	S8	S9
S1									
S2	71,43								
S3	71,43	85,71							
S4	92,31	61,54	61,54						
S5	71,43	85,71	100	61,54					
S6	76,2	92,31	76,93	66,67	76,92				
S7	92,31	61,54	61,54	100	61,54	66,67			
S8	76,92	76,92	76,92	66,67	76,92	66,67	66,67		
S9	80	80	80	71,43	80	71,43	71,43	71,43	

Similarity Index (IS)

According to Ernawati et al., (2019), the similarity Index (IS) is an index that can be used to compare species between research locations. These results can be crossed out in table 4. The result of the index of Similarity (IS) IS obtained the highest level of security at stations 1.4 and 7 (92.31%), Stations 2 and 6 (92.31%), Stations 3 and 5 (100%), Stations 4 and 7 (100%), stations 5, 6 and 8 (76.92%), stations 7 and 9 (71.43%), stations 8 and 9 (71.43%). Based on the criterion of Similarity Index (Sorensen index) according to (Odum, 1996) if value of IS > 50%

The community IS said to be the same. Then it can be concluded that the index similarity throughout the research station is categorized high. Santi et al., (2017); Hariyadi et al., (2019) mentions that at high the index of Similarity (IS) IS caused by the type of substrates.

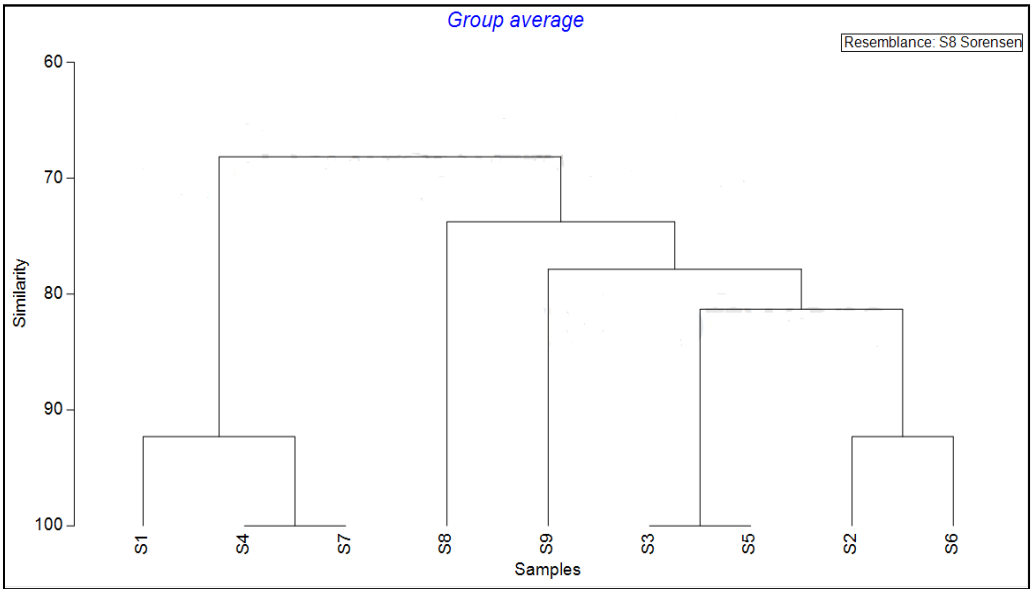

Figure 2. Index Similarity Dendogram

CONCLUSIONS

From the research results can be concluded that:

1. The diversity of gastropods in the Bilah river of Labuhanbatu District were found 9 species: *Anantome helena*, *Bellamya* sp., *Cerithidea cingulata*, *Melonoides torulosa*, *Melanoides tuberculata*, *Nassarius coronatus*, *Pomacea* sp., *Sulcospira testudinaria* and *Thiara scabra*.
2. The diversity index (H ') gastropods in the Blade River are categorized as moderate. The evenness index (J ') gastropods in the Blade River are categorized as moderate. The highest similarity index (IS) on stations 3, 4.5 and 7.

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