



# Gastropods Community in Babura River, Medan city

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**Submission date:** 09-Jun-2023 11:55AM (UTC+0700)

**Submission ID:** 2112262395

**File name:** Article.pdf (855.85K)

**Word count:** 1708

**Character count:** 9541

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To cite this article: Masdiana Sinambela *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **305** 012092

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## Gastropods Community in Babura River, Medan city

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**Abstract.** Gastropods community in the Babura river at Medan City were collected at Medan Johor and Medan Kota which consisted of 6 species of 96 ind., i.e. (1) *Pomacea canaliculata* [36 ind.], (2) *Filopaludina javanica* [5 ind.], (3) *Lymnaea rubiginosa* [2 ind.], (4) *Tarebia granifera* [11 ind.], (5) *Melanooides tuberculata* [35 ind.], and (6) *Thiara scraba* [7 ind.]. Total abundance was 39.0 ind./m<sup>2</sup> in Medan Johor and 43.6 ind./m<sup>2</sup> in Medan Kota. Diversity index (*H'*) was 0.897 in Medan Johor and 0.986 in Medan Kota, classified as low diversity and severe, equitability index (*E*) was 0.557 in Medan Johor, classified as moderate uniform and 0.711 in Medan Kota, classified as high uniform. Dominance index (*C*) was 0.500 in Medan Johor and 0.463 in Medan Kota, both of which are moderately dominant. Gastropods were found to be influenced by physico-chemical parameters of water. The parameters which still supported gastropods life, i.e.: temperature, turbidity, depth, pH, DO, and BOD, in contrary to strong velocity, nitrate, and phosphate. Our results then may reflect the preliminary data on gastropods assemblage in Babura river to enrich future data regarding gastropod communities in other study sites.

### 1. Introduction

Gastropoda is a snail with various sizes, soft-bodied, deposit feeder, and the amount is almost 40,000 species, has been widely used for various paintings, souvenirs, aquarium, and ornaments. Based on the morphological character of the shell, Wenz [1] classifies Gastropods into several genera, including *Brotia*, *Sulcospira*, *Thiara*, and *Melanooides*. Freshwater gastropods community from various habitat have been reported with dominant species and distinct assemblages [2]. According to Dolorosa and Dangan-Galon [3], there are 50 species of gastropods, consisting of 45 genera and 25 families of Gastropods in Batang Kumu in with four species and 181 ind./m<sup>2</sup> [4]. According to Picardal and Dolorosa [5] gastropods were found as many as 89 species in Morindino Village waters.

Dominant Gastropoda species was *Pomacea canaliculata* along with other 17 genera of 20 species at the sandy beach [6]. Gastropods prefer river and lake waters with suitable environmental factors as living habitat [7]. One of the activities that threaten the habitat in the Babura River is sand mining, which can affect the gastropods community. Gastropods living in river sediments are needed to observe due to the dynamic changes in water physico-chemical parameters. Information regarding gastropods in Babura river is still limited yet this study is conducted to present the current status of community based on different physico-chemical characteristics from study sites.

## 2. Materials and Methods

Study sites were chosen purposively and located at two locations: (1) Medan Johor in border with Namurambe district and, (2) Beringin Sudirman park in the Medan Kota. Substrates or freshwater sediments were sampled using Ekman grab. Substrates were passed into multilevel filters of 0.25 m<sup>2</sup> and 1 m<sup>2</sup>. Gastropods were inserted into sample bottles and added with 70% alcohol. Ind. were identified manually from each sites. Gastropods sample were identified in the zoology section of Indonesian Institute of Sciences or *Lembaga Ilmu Pengetahun Indonesia (LIPI)* for accurate identification. Physicochemical characteristics from both locations were measured and presented as secondary data (Table 1). Ecological parameters measured in this study were: Total abundance ( $X$ ), Shannon's diversity index ( $H'$ ), Equitability index ( $E$ ) and Dominance index ( $D$ ) [8,9].

Table 1. Physicochemical characteristics of study sites and unit of measurements

Parameters	Unit	Medan Johor	Medan Kota
Light penetration	cm	42	80.65
Velocity	m/s	5.27	3.50
Temperature	°C	27.25	26.50
pH	-	5.5	5.8
DO	mg/L	7.15	1.54
BOD	mg/L	5.28	5.5
TDS	mg/L	207.50	264.00
Nitrate	mg/L	0.85	0.45
Phosphate	mg/L	0.95	1.30

## 3. Results and Discussion

Gastropoda found from two study sites were from six species (Table 2) namely (1) *Pomacea canaliculata*, (2) *Filopaludina javanica*, (3) *Lymnaea rubiginosa*, (4) *Tarebia granifera*, (5) *Melanoides tuberculata*, and (6) *Thiara scaraba* (Figure 1).

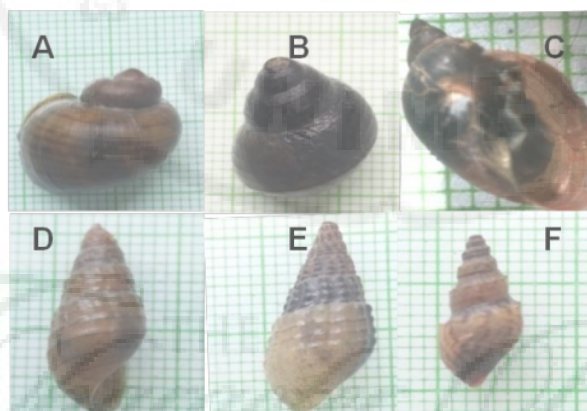


Figure 1. Gastropods community obtained from Babura river: (A) *Pomacea canaliculata*, (B) *Filopaludina javanica*, (C) *Lymnaea rubiginosa*, (D) *Tarebia granifera*, (E) *Melanoides tuberculata*, (F) *Thiara scaraba*

Table 2. Taxa classification of Gastropods community in Babura river

Class	Order	Family	Genus	Species
Gastropoda	Architanioglossa	Ampulridae	<i>Pomacea</i>	<i>Pomacea canaliculata</i>
		Viviparidae	<i>Filopaludina</i>	<i>Filopaludina javanica</i>
	Hygropila	Lymnaeidae	<i>Lymnaea</i>	<i>Lymnaea rubiginosa</i>
	Caenogastropoda	Thiaridae	<i>Melanoides</i>	<i>Melanoides tuberculata</i>
			<i>Tarebia</i>	<i>Tarebia granifera</i>
		<i>Thiara</i>	<i>Thiara scraba</i>	

Table 3. Ecological value of Gastropods community in Babura river

Species	Medan Johor	Medan Kota	Total
<i>Pomacea canaliculata</i>	4	32	36
<i>Filopaludina javanica</i>	3	2	5
<i>Lymnaea rubiginosa</i>	2	-	2
<i>Melanoides tuberculata</i>	-	11	11
<i>Tarebia granifera</i>	30	5	35
<i>Thiara scraba</i>	7	-	7
Total abundance ( <i>X</i> )	39.0 ind./m <sup>2</sup>	43.6 ind./m <sup>2</sup>	
Diversity index ( <i>H'</i> )	0.897	0.986	
Equitability index ( <i>E</i> )	0.557	0.711	
Dominance index ( <i>D</i> )	0.500	0.463	

The sampling of Gastropods species was recorded in different sites, Medan Johor and Medan Kota. Gastropods community in urban river resulted in different result in which not all species were found in both sites. *Melanoides tuberculata* was the only taxa absent in Medan Johor while *Lymnaea rubiginosa* and *Thiara scraba* were not recorded from Medan Kota. The total abundance showed that Medan Kota was inhabit by higher individu of Gastropods than Medan Johor. The result may indicate that river in Medan Kota was more suitable for the growth of Gastropods though reflected by less species than Medan Johor. Both study sites showed a low level of diversity. Based on these results, the Babura river was considered as heavily polluted from anthropogenic activities in urban area [10]. There was no a relevant dominance obtained in this study which indicated a similar productivity among species. The velocity in Medan Johor was higher than Medan Kota which can be a limiting factor to Gastropods settlement. Increased flow or velocity may resulted in an even distribution of Gastropods being benthic organisms [11]. The Equitability index (*E*) was higher in Medan Kota which indicated a gradient heterogeinty along sampling area or streams [12].

#### 4. Conclusions

Gastropods community with total of 96 ind and six species were recorded from Medan city, North Sumatra. Total abundance in Medan Johor was 39.0 ind./m<sup>2</sup> while in Medan Kota was 43.6 ind./m<sup>2</sup>. The six gastropods species were *Pomacea canaliculata*, *Filopaludina javanica*, *Lymnaea rubiginosa*, *Melanoides tuberculata*, *Tarebia granifera*, and *Thiara scraba*. This baseline study may reflect the current condition of Gastropoda community assemblage in urban area as potential bioindicator of stream health in the future.

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