Transpublika International Research in Exact Sciences
https://ojs.transpublika.com/index.php/TIRES
Online ISSN 2828-5921

https://doi.org/10.55047/tires.v4i2.1786

Original Article

Gastropod Diversity in a Freshwater Spring Bathing Area in a Rural Region of Banten

Hermawan

Biology Education Program, Tangerang Raya University, Indonesia
Email: hermawanbrow24@gmail.com

Received : 15 May - 2025
Accepted : 20 June - 2025
Published online : 30 June - 2025

Abstract

The research was conducted in the Cirahab Water Spring area, the research was carried out with the aim of determining the level of diversity of gastropod species in the Cirahab Water Spring area, Padarincang Village, Padarincang District, Serang-Banten Regency. The research carried out used an explorative method on the diversity of gastropods in Cirahab. The results of this research were 127 types of gastropods, including *Thiara Scabra*, *Hemiplecta humphreysiana*, *Lissachatina fulica*, *Amphidromus palaceus*, *Pomacea speciosa*, *Cyclophorus perdix perdix*. The largest number of black snails with the Latin name Thiara Scabra is 30. From the results of calculating the diversity index, the result is 2.162391948, this number shows the level, namely at the "Medium" level according to the Shannon Wiener formula. Apart from that, water measurements were also carried out to obtain results including water temperature of 24°C, water depth of 1 meter, clarity of 30, water pH of 7 (normal) and water flow of 0.30.

Keywords: Biodiversity, Cirahab Water Spring, Gastropod Diversity, Mollusca, Shannon-Wiener Index.

1. Introduction

Indonesia has a variety of diverse types of flora and fauna. The marine diversity found in Indonesia is very large and widespread throughout Indonesia, this marine biota is also very varied and can represent all existing phyla. According to experts, mollusca have the most members after arthropods (Ira et al., 2015).

Gastropods are also a very diverse and abundant class in the *mollusca phylum*. There are around 60,000 to 80,000 known species of gastropods that live on this earth, such as those included in the types of snails, slugs, conches, abalone, perwinkles, whelks (Arby, 2011). Gastropods can also live on land, fresh water, and even in the ocean. Types of gastropods are generally found as epifauna and tree fauna that live around trees (Asplund et al., 2018; Gea et al., 2020). About ¾ of mollusk species are gastropods, most gastropods live in freshwater and seawater, but there are also many types of gastropods that can live on land, such as snails and other types of gastropods (Rusyana, 2018). Gastropods are also able to adapt and survive by attaching and have a sedentary nature (Schweizer et al., 2019; Vermeij, 2015; Yolanda, 2014). Gastropods can also be found anywhere, on land, riverbanks, in rivers, and in the ocean which are very diverse and varied (Dennis et al., 2021; Strong et al., 2008). Gastropods can also be found easily because gastropods reproduce quickly and each individual can produce a lot of eggs, for example snails in rice fields, snails and other types of gastropods.

Gastropods also live from high mountains to very wide oceans, their existence is very abundant, terrestrial gastropods can also be found in the highlands and can also be found in

the lowlands such as in the mangrove area (Campbell, 2012). Gastropods generally live attached, either to trees, bushes, rocks, litter and other places (Firdaus, 2013). One of the places where there are still many gastropods in the form of freshwater snails, slugs, snails and so on is still abundant in the Cirahab Water Spring bathing area which is located in Curuggoong Village, Padarincang District, Serang Regency-Banten which is a type of freshwater gastropod that lives on the banks of the Cirahab River, in the waters and on land.

The study took place in the Cirahab Water Spring area, with the purpose of identifying the variety of gastropod species present in that location. It was specifically conducted in Padarincang Village, Padarincang District, Serang-Banten Regency.

2. Methods

The research was conducted in the Cirahab water spring area, Curuggoong village, Padarincang sub-district, Serang-Banten district. This research also used various tools such as cellphone cameras, thermometers, pH meters, plastic containers, buckets. This research was conducted using the Exploratory method. This research was conducted in the Cirahab water spring area. The sampling methods include the following:

1) Sampling standardization: Sampling by following the path step by step in the Cirahab Water Spring area.
2) Sampling sorting: The gastropod samples obtained were then put into a bucket or plastic bag that had been prepared, then the gastropods were selected according to their gastropod group. After being grouped, the gastropods were then photographed and counted according to the type of group and then recorded for data analysis.
3) Environmental parameters: Environmental parameters were carried out using physical and biological parameters including humidity, temperature, tree types and environmental conditions around the Cirahab Water Spring area.
4) Identification and Data Analysis: The gastropods obtained were then identified using books and internet media. Furthermore, data analysis was carried out using the Diversity Index calculation or (H') for each plot:

$$\mathbf{H = -\Sigma\ (ni/N)\ log\ (ni/N)}$$

Description:
H' : Diversity Index.
ni : Number of individuals of each species.
N : Number of individuals of all species.

The interpretation of the Shannon-Wiener diversity index follows the criteria proposed by Magurran (1988):
H' < 1 : Low diversity
H' = 1–3 : Moderate diversity
H' > 3 : High diversity

The results of the calculations from the data obtained will then be analyzed using Microsoft Excel to see the types of gastropod diversity in the Cirahab Water Spring area.

3. Results and Discussion

Indonesia is one of the countries that has very abundant flora and fauna, this country consisting of islands has a lot of biological wealth and has a very diverse habitat, besides that, the number of types and individuals have different communities, characters in each place and the life of these organisms including gastropods (Heryanto, 2011, 2013).

Gastropods certainly have many types and their habitats are also diverse, both on land, riverbanks or in rivers (Susiana, 2011). Gastropods in their existence are also greatly influenced by several factors in them, including biotic and abiotic factors. What is included in biotic factors is the habitat factor and the food sources they obtain, then the abiotic factors are the temperature and salinity of their environment.

This research was also conducted in the Cirahab Water spring Area, Curuggoong Village, Padarincang District, Serang Regency, Banten Province. The gastropod research location can be seen in Figure 1 below.

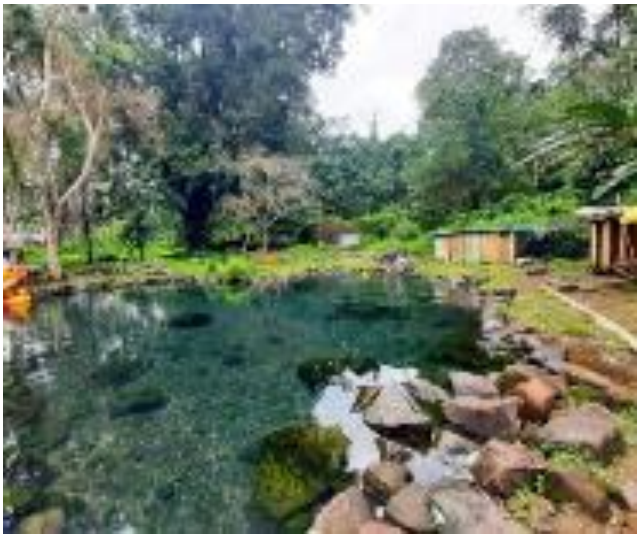

Figure 1. Cirahab Water Spring

The results obtained on the types of Gastropoda found in the Cirahab Water Spring area can be seen in table 1 below:

Table 1. Types of Gastropoda

No	Image	Latin Name	Amount	Location
1		*Thiara Scabra*	20	Found near the waters attached to wood
2		*Cyclophorus perdix perdix*	15	Found in wood litter

No	Image	Latin Name	Amount	Location
3		*Pomacea speciosa*	10	Found in Waters
4		*Amphidromus palaceus*	12	Found on land
5		*Pomacea speciosa*	10	Found on land
6		*Amphidromus palaceus*	10	Found on land
7		*Thiara scabra*	30	Found in waters
8		*Amphidromus palaceus*	5	Found on land
9		*Lissachatina fulica*	10	Found on land
10		*Hemiplecta humphreysiana*	5	Found on land

From the data above, several gastropod results were obtained, including *Thiara Scabra*, *Hemiplecta humphreysiana*, *Lissachatina fulica*, *Amphidromus palaceus*, *Pomacea speciosa*, *Cyclophorus perdix perdix*. Of the several species found above, the most results were

obtained in the river snail species, namely Thiara Scabra which is black, with 30 snail samples, this type dominates its existence in the waters of Cirahab Water Spring. The results of data analysis using Microsoft Excel include the following:

Table 2. Calculation Results (H') Diversity Index

No	Latin Name	Amount	(H') Diversity Index Value
1	*Thiara Scabra*	20	-0.291095246
2	*Cyclophorus perdix perdix*	15	-0.252299632
3	*Pomacea speciosa*	10	-0.200126141
4	*Amphidromus palaceus*	12	-0.222924136
5	*Pomacea speciosa*	10	-0.200126141
6	*Amphidromus palaceus*	10	-0.200126141
7	*Thiara scabra*	30	-0.34086371
8	*Amphidromus palaceus*	5	-0.12735233
9	*Lissachatina fulica*	10	-0.200126141
10	*Hemiplecta humphreysiana*	5	-0.12735233
Amount		127	2.162391948

From the data above, it is explained that the gastropods obtained in the Cirahap water spring area located in Curuggoong Village, Padarincang District, Serang-Banten Regency obtained a diversity index value or (H') of 2.162391948, this value indicates that the gastropods obtained in the Cirahap water spring area are in the "Medium" range.

Table 3. Measurement of Cirahab Waters

No	Water Paramerers	Measurement Value
1	Water Temperature (°C)	24
2	Depth of water flow	1
3	Clarity Level	30
4	Water pH	7
5	Water flow speed (m/s)	0.30

The data above is the result of water measurements carried out. The results of the table show the value of water temperature, namely 24°C, water depth at 1 meter, clarity at number 30, water pH 7 (normal) and water current at number 0.30. Water measurements must also be carried out to determine various factors of gastropod breeding in the Cirahab area.

4. Conclusion

Based on the research results obtained, it shows that the diversity of gastropods in the Cirahab area is the most dominant type of black snail or in Latin is Thiara scabra with a total of 30, Furthermore, the value (H') of the gastropod diversity index gets the result of 2.162391948, this value shows that in the "Moderate" range. In addition, water measurements are also calculated where the water temperature is at 24°C, water depth at 1 meter, clarity at 30, water pH 7 (normal) and water current at 0.30.

This study presents important baseline information on the diversity of gastropods in the Cirahab Water Spring ecosystem, filling in significant gaps in the documentation of freshwater mollusks in the Serang Regency area. The research involved documenting 127 gastropod specimens and calculating diversity indices (Shannon-Wiener H' = 2.16), which can be used as a reference for future monitoring of ecological changes and conservation planning. Gastropods are considered important indicators of the health of aquatic ecosystems, especially

as freshwater springs come under increasing human pressure, making this research a valuable contribution to biodiversity conservation efforts in Banten Province. The results of the study not only contribute to our academic knowledge of Indonesia's malacological fauna but also provide valuable information for making informed decisions about environmental management. Additionally, the findings can be used to create educational materials that raise awareness of local biodiversity among communities and promote sustainable stewardship of ecosystems in the area.

5. References

Arby, U. Y. (2011). Struktur komunitas Moluska di padang Lamun perairan Pulau Talise, Sulawesi Utara. Bitung. *UPT Loka Konservasi Biota Laut. Oseanologi Dan Limnologi Di Indonesia*, *37*(1), 71–89.

Asplund, J., Strandin, O. V., & Gauslaa, Y. (2018). Gastropod grazing of epiphytic lichen-dominated communities depends on tree species. *Basic and Applied Ecology*, *32*. https://doi.org/10.1016/j.baae.2018.07.007

Campbell. (2012). *Buku Ajar Biologi*. Penerbit Erlangga.

Dennis, M. M., Molnár, K., Kriska, G., & Lőw, P. (2021). Mollusca: Gastropoda. In *Invertebrate Histology* (pp. 87–132). wiley. https://doi.org/10.1002/9781119507697.ch4

Firdaus, M. F. (2013). *Keanekaragaman dan Kelimpahan Gastropoda Hutan Mangrove Pantai Tritih Kulon Kecamatan Cilacap Utara Jawa Tengah*. Repository FKIP UNPAS.

Gea, L., Khouw, A. S., & Tupan, C. I. (2020). Keanekaragaman Gastropoda Pada Habitat Lamun Di Perairan Desa Tayando Yamtel Kecamatan Tayando Tam Kota Tual. *BIOSEL (Biology Science and Education): Jurnal Penelitian Science Dan Pendidikan*, *9*(2), 163–176.

Heryanto. (2011). *Landsnails of Java, a Field Guide*. LIPI Press.

Heryanto, H. (2013). Keanekaragaman dan Kepadatan Gastropoda Terestrial di Perkebunan Bogorejo Kecamatan Gedongtataan Kabupaten Pesawaran Provinsi Lampung. *Zoo Indonesia*, *22*(1).

Ira, I., Rahmadani, R., & Irawati, N. (2015). Keanekaragaman dan Kepadatan Gastropoda di Perairan Desa Morindino Kecamatan Kambowa Kabupaten Buton Utara. *Aquasains*, *3*(2), 265–272.

Rusyana, A. (2018). *Zoologi Invertebrata (Teori dan Praktik)*. Alfabeta.

Schweizer, M., Triebskorn, R., & Köhler, H. R. (2019). Snails in the sun: Strategies of terrestrial gastropods to cope with hot and dry conditions. In *Ecology and Evolution* (Vol. 9, Issue 22). https://doi.org/10.1002/ece3.5607

Strong, E. E., Gargominy, O., Ponder, W. F., & Bouchet, P. (2008). Global diversity of gastropods (Gastropoda; Mollusca) in freshwater. In *Hydrobiologia* (Vol. 595, Issue 1). https://doi.org/10.1007/s10750-007-9012-6

Susiana, S. (2011). *Diversitas Dan Kerapatan Mangrove, Gastropoda, dan Bivalvia Di Estuari Perancak, Bali*. Repository Universitas Hasanuddin. https://doi.org/10.13140/RG.2.2.34344.78085

Vermeij, G. J. (2015). Gastropod skeletal defences : land , freshwater , and sea compared. *Vita Malacologica*, *13*(December).

Yolanda, R. (2014). Diversitas Gastropoda (Moluska) Dari Sungai Batang Kumu Pasir Pengaraian Kabupaten Rokan Hulu Riau. *Edu Research*, *3*(1), 37–42.