Gastropod Community Structure in Tritih Cilacap Mangrove Forest in Central Java

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Abstract : Mangrove forests are a group of plants that have the same morphological and physiological adaptations to habitats affected by tides. This study aims to find out the richness and density of gastropods in the Cilacap Mangrove Forest. The method used in this study is the Cluster Sampling method. The results showed that the gastropods found in the Tritih Cilacap Mangrove Forest consisted of 11 species from 8 families. The highest wealth at station one found 8 species, stations two, three, and four found 6 species while at station five found only 5 species. The highest density was found at station five at 33.36 ind/m^2 while the lowest density was found at station one at 6.8 ind/m^2.

Keywords: Mangroves, Gastropods, Richness, Density

Introduction

Mangrove forests are a group of plants consisting of various types of plants from different families, but have similar morphological and physiological adaptations to habitats affected by tides.

Mangrove forests are one of the ecosystems that have high ecological and economic value. One of the economic values of mangrove forests is to process mangrove fruit into chocolate mangrove (1). Ecologically mangroves as a food source of mangroves associated with biota. In addition, mangroves have various functions, including as a habitat for fish seeds, shrimp, shellfish and crabs to live and forage (2).

Mangrove ecosystem is an ecosystem that is very important for the stability of coastal areas and small island ecosystems (3). Mangrove forests as one part of the existing forests in Indonesia have a considerable role in maintaining climate stability (4). Mangrove forests also have zoning that depends on the adaptation of each type of mangrove to the environment (5).

Mangrove forest ecosystem is one of the areas with high productivity because there is litter and there is decomposition of litter so that there is detritus. Mangrove forests contribute greatly to organic detritus which is very important as an energy source for biota living in the surrounding waters. Gastropods act as decomposers in mangrove forests in the process of decomposition of litter and mineralization of organic matter, especially those that are herbivores and detrivores.

Gastropods are one type of vertebrate that is abundant in mangrove ecosystems. The distribution of gastropod species is influenced by several factors, including light, salinity level, substrate type, and tides (6). Gastropods are epifauna animals in mangrove ecosystems. Epifauna are vertebrate animals that have habitats above the sedimentary surface (7).

Gastropods are soft-bodied animals, generally living on the surface of mud substrates and some attached to the leaves and roots of mangroves (8). The presence of gastropods is largely determined by the presence of mangrove vegetation in coastal areas. The abundance and distribution of gastropods is influenced by local environmental factors, food availability, predation and competition. Pressures and changes in the environment can affect the number of species and differences in structure. Observations showed that the condition of mangrove forests in Tritih Cilacap was degraded due to activities that utilize mangrove forests. Environmental pressures and changes tend to result in changes in mangrove ecosystems. These conditions have an influence on changes in the physical, chemical and biological conditions of mangrove forests. Based on these conditions, there needs to be a study of the Structure of the Gastropod Community in the Tritih Cilacap Mangrove Forest.

Methods

The method used in this study is the Cluster Sampling method by choosing the location of mangroves from tight canopy cover to rare ones. Transects of gastropod retrieval using quadrant sizes of 1x1 m. The research site consists of five stations. Station one starts from mangroves close to settlements to station five close to the sea.

The srtucture of the gastropod community is seen from the richness of species and the density of species. Species richness is the total number of species in a community calculated using the Margalef Index based on Spellerberg's formula (9).

$$D = \frac{S - 1}{\log N}$$

Information :

D = Margalef Index
S = Total number of species
N = Total number of individuals

Density is the number of individuals per unit area or volume based on the formula of The Krebs (10).

$$Di = \sum \frac{ni}{L}$$

Information :
Di = Density of gastropod
ni = Number of individual species i
L = Plot area

Result

Gastropods Richness

Based on the results of research and identification conducted, it shows that in the Tritih Cilacap Mangrove Forest found 11 species from 8 families that spread within five stations. The structure of the gastropod community is seen from the richness of species in the Tritih Cilacap Mangrove Forest presented on (Table 1).

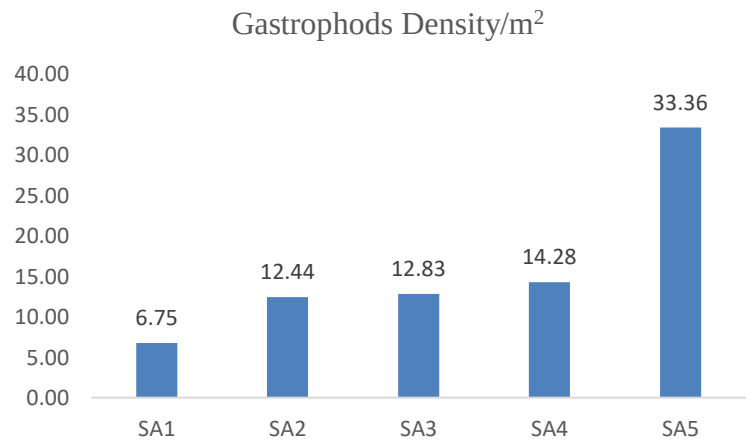
Table 1. The richness of gastropod species at each station

No	Familia	Species	Station				
			SA1	SA2	SA3	SA4	SA5
1.	Potamididae	*Ceritidhea alata*	+	+	+	+	+
		Ceritidhea quadrata	+	-	-	-	-
		Telescopium telescopium	-	-	-	+	+
2.	Neritidae	*Neritina violacea*	+	+	+	+	+
		Neritina lineate	+	-	-	-	-
		Neritina zigzag	-	-	-	-	+
5.	Ellobiidae	*Cassidulla aurisfelis*	-	+	+	+	-
		Cassidulla nucleus	+	+	+	+	-
6.	Muricidae	*Chicoreus capucinus*	+	+	+	+	-
7.	Littorinidae	*Littoraria carinifera*	+	-	-	-	-
8.	Assimineidae	*Assiminea brevicula*	+	+	+	-	+
Jumlah			8	6	6	6	5

Information; SA1 = Station 1, SA2= Station 2, SA3 =Station 3, SA4 = Station 4, SA5= Station 5
+ = present, - = absent.

Gastropods Density

Based on the results of gastropod density research in Titih Cilacap Mangrove Forest presented on (Figure 1).



Gastropod density at each station

Discussion

Gastropods Richness

The station that has the highest species richness is found at station one, which is found 8 species of 8 families while the station that has the lowest richness is found at station five, which is found 5 species of 3 families.

Ceritidhea alata and *Nerititna violacea* are the most widely found and spread species at each station. This species is almost found in every plot, because it can live optimally in mangrove forest ecosystems. *Telescopium telescopium* is a species found only on stations four and five. The station has a slight canopy cover compared to stations one two and three. This is in accordance with the statement (11) which states that *Telescopium telescopium* likes mangrove land places open because it is damaged, land that is exposed to a lot of sunlight, and in large puddles. Based on the results of research conducted (12) stated that the density of *Telescopium telescopium* in open mangrove land is greater than the density of *Telescopium telescopium* in dense mangrove land. *Telescopium telescopium* in a tight mangrove land. *Telescopium telescopium* has a high adaptability to predators because it is supported by a body shape protected by a large shell. The shell supports its ability to adjust or has extensive environmental tolerances such as withstanding dry conditions.

Neritina lineata is an abundant species found in station one. The abundance of *Neritina lineata* in station one that has a tighter canopy cover. It is suspected that there is an abundant availability of food from mangrove detritus. There is a difference in species richness at each station due to differences in topography and habitat at each station.

Gastropods Density

The lowest gastropod density was found at station one at 6.75 ind/m^2. Low density of gastropods at station one because station one borders the settlement of residents who tend to have more activity. This is in accordance with the statement (13) that the density of gastropods in mangrove ecosystems is influenced by activities contained in mangrove ecosystems. This will affect the survival of the gastropods because the living gastropods tend to settle with limited movement.

The highest density was found at station five at 33.36 ind/m^2. The high density at station five is due to the far from human activity and the low predation by predators. Pressures and environmental changes can also affect species density and differences in gastropod structure. According to the study (12), the density and distribution of gastropods are influenced by several abiotic and biotic factors such as environmental conditions, food availability, predation by predators and competition. (14) The physical, chemical and biological characteristics of the waters will determine the structure of the gastropod community as well as other organisms associated with the mangrove ecosystem.

Conclusion

Overall gastropods species are 11 species from 8 families. The highest species richness found at station one is found 8 species of 8 families while the station that has the lowest richness is found at station five, which is found 5 species from 3 families. The density of gastropods at

all five stations has a varying density. The highest density was found at station five at 33.36 ind/m^2 while the lowest gastropod density was found at station one at 6.75 ind/m^2.

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