

## Diversity of Gastropod in Mangrove Ecosystems in Tomini Gulf

Mohamad Fahmi Kasim<sup>1,2</sup>, Faizal Kasim<sup>2</sup>, Sri Nuryatin Hamzah<sup>3</sup>

<sup>1</sup>fahmykasim993@yahoo.co.id

<sup>2</sup>Department of Aquatic Resources Management, Faculty of Fisheries and Marine Sciences,  
State University of Gorontalo

### Abstract

The purpose of this research is to know the diversity of gastropod in mangrove ecosystem of East Pohuwato Village, District of Marisa, Pohuwato Regency. This research was conducted in August to November 2015. The method used is a quadrant transect method measuring 1x1 meter. Data analysis includes calculation of diversity index and equality index. The results showed that 11 gastropods were found, namely *Telescopium telescopium*, *Terrebralia palustris*, *Terrebralia ulcata* and *Cerithidea cingulata*, *Cerithium cobelti*, *Faunus ater*, *Littorina scabra*, *Noses planospira*, *Nasarius corodatus* and *Nasarius optimus*, and *Spinidrupa spinosa*. The index value of diversity in the study sites ranged from 0.73-0.75 with the category of medium diversity. Epifauna Gastropod similarity index value between Station I and Station II is 70.59% while the similarity index value for gastropod type of treefauna between Station I and Station II is 60% and both are in the same category. In general this shows the similarity of species Epifauna and Treefauna on both Stations

Keywords: gastropods; diversity; similarity; mangrove; ecosystem.

### Introduction

Mangrove forest is one of nature's unique ecosystem and has high ecological and economic value. Ecological functions of the mangrove ecosystem include: as a coastal protection from wind attacks, currents and waves from the sea, as a habitat, feeding ground, nursery ground, and spawning ground for aquatic biota. The economic function of mangrove ecosystem is household producer, producer of industrial need, and seed producer (Dahuri et al, 2001).

Gastropods in mangrove forests play an important role in the decomposition of litter and mineralization of organic matter, especially those that are herbivore and detritivore. In other words, Gastropods is located as a decomposer. The presence of gastropods is largely determined by the presence of mangrove vegetation (Suwondo, et al, 2006 in Sari, et al, 2012).

Currently, the existence of mangrove forests in East Pohuwato Village has undergone conversion function, it is feared could result in mangrove ecosystem and other organisms related to the existence of mangrove ecosystem including Gastropods. In addition information on gastropods in the form of research results in East Pohuwato Village has not been done, this is why the authors are interested in doing research on the diversity of Gastropods in the mangrove ecosystem.

### Research Methodology

This research was conducted from August 2015 until March 2016, located in Pohuwato Timur Village, Marisa Sub-district, Pohuwato District. The method used in this study is the quadrant transect method adopted from Ayunda (2011). The location of the research is in the area of mangrove ecosystem. The location of this study consists of 2 Stations, where at each Station there are 3 subStations and on each sub Station is placed 3 quadrants. The distance between the subStations is 10 meters and the distance between the quadrant is 5 meters.

The diversity index shows the relationship between the number of sepsis and the number of individuals who make up a community. This diversity index is calculated according to Simpson (Waite, 2000 in Sahami, 2003).

Criterion of diversity according to Odum (1993) in Syamsurizal (2011):

$0.75 > D' \leq 1.00$ : high diversity

$0.50 > D' \leq 0.75$ : Medium diversity

$D' \leq 0.50$ : Low diversity

To determine the level of community similarity between two research Stations, which was analyzed using Sorensen Index (1948) in Firstyananda (2011). The similarity index criteria according to Jumanto et al (2013) are:

The index value is 75-100% = very similar

Index value 50-77% = Equals  
 Index value 25-49% = Not equal  
 Index value <25% = Very unequal

All the results obtained are elaborated descriptively. Descriptive is one type of research whose purpose is to present a complete picture of social phenomena or reality, by way of describing a number of variables that are concerned with the problem and the units examined among the tested phenomena (Munarto, 2010).

### Results and Discussion

Based on the results of research, Gastropods found in the study sites amounted to 11 species, namely *Telescopium telescopium*, *Terebralia palustris*, *Terralium ulcata* and *Cerithidea cingulata* from the family Potamididae, *Cerithium cobelli* from Cerithiidae family, *Faunus ater* from family Thiaridae, *Littorina scabra* from family Littorinidae, *Nerita planospira* from family Neritidae, *Nassarius corodatus* and *Nassarius optimus* from the Nassariidae family, and *Spinidrupa spinosa* from Muricidae family.

the diversity index ( $D'$ ) of Gastropodepifauna is 0.74 and Gastropodtreefauna is 0.75 and is included in the category of diversity index. This condition may be caused by the condition of mangrove forests that are still good for growth of Gastropod. This is in accordance with the statement of Aksornkoae (1993) in Talib (2008), which states that the distribution of macrozoobenthos will depend on the zonation of the mangrove vegetation formed, spatially and vertically.

According to Saripantung, et al, (2013) the medium diversity index indicates that the distribution of moderate and moderately stable individuals. While Saptarini, et al, (2010) states that a community is said to have high species diversity if the community is composed by many species with the same or almost the same abundance of species.

The Gastropod similarity index is used to determine the degree of community similarity between research Stations (Sorensen, 1948 in Firstyananda 2011). The Gastropod similarity index at the study sites is presented in Figure 2.

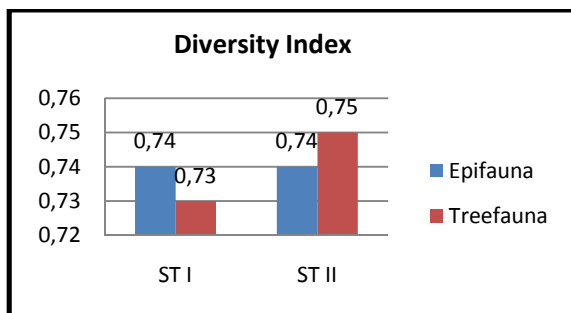


Figure 1 Diversity Index of Gastropods in site.

Based on Figure 1 it can be seen that the index of Diversity of Gastropodepifauna at Station I is 0.74 and 0.73 for Gastropodtreefauna. This value indicates that Gastropodepifauna and treefauna belong to the category of medium diversity index. While at Station II

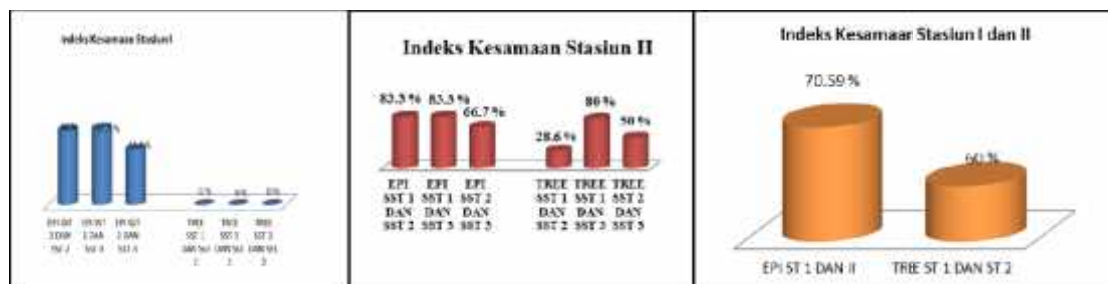


Figure 2 Similarity Index of Gastropod in the Stations of research site.

Gastropod treefauna found in Station I same with Gastropod treefauna found in Station II. The high equality index of Gastropod at Station I compared with the similarity index of Gastropod at Station II due to the spread of Gastropod at Station I is quite evenly compared with the spread of Gastropod at Station II, it is seen from the number of species and individuals Gastropod found in Station I. This corresponds to Fitriana's statement (2006) which states that a high similarity index is due to the spread of gastropods that are evenly distributed and have the same number of organism types. Odum (1996) in Haryoardiantoro

(2010) mentions that the higher the value of community equality the more species are found and vice versa.

#### Conclusion

Type of Gastropod found in the location of the study amounted to 11 species of Gastropod epifauna and 7 types of Gastropod treefauna. The diversity of gastropods in the study sites is in the categorical stage. The similarity indexes of Gastropodepifauna and Gastropodtreefauna in the study sites belong to the same category.

#### References

- Ayunda, Ranti. 2011. Struktur Komunitas Gastropod Pada Ekosistem Mangrove Di Gugus Pulau Pari, Kepulauan Seribu. Skripsi. Program S1 Biologi. Depok. Universitas Indonesia.
- Dahuri, R., J. Rais, S. P. Gintingdan M. J. Sitepu. 2001. Pengelolaan Sumberdaya Wilayah Pesisir dan Lautan Secara Terpadu. PT. Pradnya Paramita, Jakarta
- Fitriana, Y.R. 2006. Keanekaragaman Dan Kelimpahan Makrozobentos Di Hutan Mangrove Hasil Rehabilitasi Taman Hutan Raya Ngurah Rai Bali. BIODIVERSITAS 7(1) : 67-72.
- Fristyananda, P. 2011, Komposisi dan Keanekaragaman Makrozobenthos di Tiga lokasi Aliran Sungai Sumber Kuluhan Jabung, Kabupaten Magetan Departemen Biologi.
- Haryoardyantoro, S., Hartati, R., Widianingsih. 2013. Komposisi dan Kelimpahan Gastropod di Vegetasi Mangrove Kelurahan Tugurejo, Kecamatan Tugu Kota Semarang. Journal Marine of Recearsh. Vol 2. Nomor 2.
- Munarto. 2010. Studi Komunitas Gastropod di Situ Salam Kampus Universitas Indonesia. Skripsi. Program S1 Biologi. Depok. Universitas Indonesia.
- Sahami, F. 2003. Struktur Komunitas Bivalvia Diwilayah Estuari Sungai Donan dan Sungai Sapurelgel Cilacap. Tesis. (Tidak dipublikasikan) Universitas Gajah Mada. Yogyakarta.
- Sari, A. M., Lusi, A. Z., Irma, L. 2012. Gastropod yang di Temukan pada Hutan Mangrove di Kenagarian Mangguan Kota Pariaman. <http://jurnal.stkip-pgrisumbar.ac.id> diakses tanggal 19/03/2014 jam 05.58
- Saripantung.G.L. 2013. Struktur Komunitas Gastropod di Hamparan Lamun Daerah Intertidal Kelurahan Tongkeina Kota Manado.
- Saptarini, D., Trisnawati, I., Hadiputra, M. A. 2010. Struktur Komunitas Gastropod (Moluska) Hutan Mangrove Sendang Biru, Malang Selatan. Fakultas MIPA. Surabaya, Indonesia.
- Syamsurizal. 2011. Studi Beberapa Indeks Komunitas Makrozobenthos di Hutan Mangrove Kelurahan Coppo Kabupaten Barru. Skripsi. Makassar. Jurusan Perikanan. Universitas Hasanudin Makassar.