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GASTROPODS COMMUNITIES IN THE MANGROVE ECOSYSTEM WAISISIL BEACH SAPARUA DISTRICT MALUKU

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ABSTRACT

The gastropods community in the mangrove ecosystem on the Waisisil beach, Saparua District, Maluku consists of 14 gastropod species, namely Clypeomorus batillariaeformis, Cypraea annulus, C. moneta, Hebra corticata, Littorina scabra, Morula margariticola, Nasarius olivaceus, Natica euzona, Nerita chamaeleon, N, signata, Otoplueura auriscati, Pyrene ocellata, Strombus labiatus, Terebralia sulcata. The species with the highest number of individuals was C. batillariaeformis and the species with the lowest number of individuals was C. annulus. The gastropod community in the mangrove ecosystem on the Waisisil beach has a species diversity index (H') = 1.8, evenness index (E) = 0.7, and dominance index (D) = 0.3.

Keywords: *gastropods, mangroves, ecosystem.*

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INTRODUCTION

Mangrove ecosystems have a very important role for survival in the biosphere. The existence of mangrove ecosystems in coastal areas always plays an important role as a buffer zone and protects coastal areas from abrasion, raging storms, tsunami waves, strong winds, and sea water intrusion (Onrizal, 2003). In addition, mangrove ecosystems can reduce the impact of damage to the marine environment due to various pollution and sedimentation (Othman, 1994). One of the ecological roles of the mangrove ecosystem is as a habitat for various organisms. This causes the mangrove ecosystem to have high biodiversity. Gastropods are one of the organisms that can be found living in mangrove ecosystems. Gastropods are associated with the mangrove ecosystem as a habitat for life and shelter. In this case, the mangrove ecosystem can become a spawning ground, nursery ground, and feeding ground for various gastropod species (Nontji, 1993).

Gastropods are one of the largest classes in the phylum molluscs which have various economic and ecological values. Several types of gastropods can be consumed by humans. Gastropod shells can also be used as decorations which also have economic potential if used as raw materials for handicrafts. In fact, gastropods are often used as bioindicators in an ecosystem. The presence, abundance, and diversity of gastropod species can be an indicator of the environment, for example due to pollution or other disturbances. Waisisil Beach is one of the beaches located on the island of Saparua which is famous for its historical value as a witness to the heroic story of Kapitan Pattimura. Apart from historical value, Waisisil beach has various

biological resources. One of them is the mangrove ecosystem which is still natural because it has not been widely used by the community. This allows the mangrove ecosystem on the Waisisil coast to still have a carrying capacity for various organisms. One of the organisms found alive and occupying the mangrove ecosystem on the Waisisil coast, namely gastropods. Until now, studies on gastropods in the mangrove ecosystem on the Waisisil coast have not been carried out much. Scientific information about gastropods in the mangrove ecosystem on Waisisil beach is still rare to find. Therefore, the authors are interested in researching the gastropod community in the mangrove ecosystem on Waisisil beach, Saparua District, Central Maluku.

METHOD

This research was conducted in August 2018 in the mangrove ecosystem, Waisisil beach, Saparua District, Central Maluku Regency. The tools and materials used in this study included meters, refractometers, thermometers, DO meters, pH meters, digital cameras, gastropod identification books, 70% alcohol, and distilled water. Determination of observation stations using purposive sampling technique. Sampling was carried out using the line transect method (Facrul, 2007). Sampling was carried out at the lowest tide. In the mangrove ecosystem, 5 transects were made with a length of 55 m each and a distance of 50 m between transects. On each transect, a 1 x 1 m quadrant is placed with a distance of 5 m between quadrants.

Prior to sampling gastropods, environmental parameters were measured which included: measuring temperature using a thermometer, measuring salinity using a refractometer, measuring DO using a DO meter, and measuring pH using a pH meter. The data analyzed included species density, species abundance, diversity index, dominance index, and evenness index (Krebs, 2009; Odum, 1996). The gastropod samples found were identified based on Dharma (1988), Dharma (1992), Wilson and Gillet (1971).

DISCUSSION RESULT

Based on the results of sampling and identification, it was found that the gastropod community in the mangrove ecosystem on the Waisisil beach consisted of 14 gastropod species belonging to 11 families and 12 genera (Table 1). Of the 14 species found in the mangrove ecosystem on the Waisisil beach, several were found. species that can also be found in mangrove ecosystems in other areas, such as Littorina scabra, Morula margariticola, and Terebralia sulcate (Luturmas, 2009; Rangan, 2010). Littoraria scabra and Terebralia sulcata are known to be native species that inhabit mangrove ecosystems and have a high tolerance for changes in environmental conditions (Rangan, 2010). The 14 gastropod species found in the mangrove ecosystem on the Waisisil coast differed in the presence and number of individuals on the 5 observation transects. The gastropod species in the mangrove ecosystem on Waisisil Beach which has the highest number of individuals, namely Clypeomorus batillariaeformis and the species with the least number of individuals, namely Cypraea annulus (Table 2.). Clypeomorus batillariaeformis is not only the species with the highest number of individuals, but also the species found in all observation transects. An organism species can become the dominant species or be found in large numbers in an area if the species has a wide enough range of environmental factors, is able to reproduce quickly and is caused by a wide distribution method and has a home range to find and utilize resources. Needed (Krebs, 2009). In other words, C. batillariaeformis is the dominant gastropod species or the number of individuals is greater because it is thought to be adaptable and fit to live in that environment.

In contrast, Cypraea annulus is the species with the least number of individuals. This species was only found in the 3rd and 4th transects. This is presumably because C. annulus is not a native species that inhabits the mangrove ecosystem, but is one of the visitor species that accidentally exists in the mangrove ecosystem. Generally, visitor species are present around the boundary between the mangrove ecosystem and the ecosystem in which it lives (Rangan, 2010). This is supported by the data that C. annulus is found in the quadrant which is located on the border of the mangrove ecosystem and the seagrass ecosystem. The results of the analysis of gastropod community indices in the mangrove ecosystem on the Waisisil beach show values as in Table 3. Diversity, evenness, and dominance indices are indices that are often used to evaluate an environmental condition based on its biological condition. This is based on an imbalance in environmental conditions that will also affect an organism that lives in an environment (Odum, 1996). That is, the number of species found is small and there are species that have a greater number of individuals compared to other species. The high or low value of the species diversity index can be determined by several factors, including

the number of species or individuals found and the presence of several species found in abundance, as well as ecosystem conditions (Arbi, 2011).

The evenness index (E) is used to determine whether there is a dominance pattern by one or several groups of species within a community. If the E value is close to 1, then the distribution of individuals between species is relatively even. If the E value is close to 0, then there is a group of certain species that are abundant or dominant than other species (Dahuri, 1994). According to Daget (1976), if $0 < E \leq 0.5$, then the community is in a depressed condition. If $0.5 < E \leq 0.75$, then the community is in an unstable condition. If $0.75 < E \leq 1$, then the community is in a stable condition [12]. The calculation results show that the gastropod community in the mangrove ecosystem on the Waisisil beach has a value of E = 0.7. That is, it can be said that all gastropod species are spread almost evenly in the community. In each observation transect, almost the same species were found. This is what causes the distribution of gastropods in the mangrove ecosystem on the Waisisil beach to be classified as even. However, the gastropod community in the mangrove ecosystem on the Waisisil coast is in an unstable condition.

Gastropods in the mangrove ecosystem on the Waisisil coast have a dominance index value, D = 0.3 which indicates that the dominant pattern of gastropod species is relatively shown by several species that have a high number of individuals. In other words, species dominance is low because it is not concentrated on a particular species. This is supported by data showing that not only is C. batillariaeformis the only species with the highest number of individuals, but Terebralia sulcata and Nerita chamaeleon are also found with the highest number of individuals after C. batillariaeformis. A community is said to have high species diversity if the community is composed of many species with the same or nearly the same abundance of species. Conversely, a community composed of very few species and if only a few species are dominant will have a low level of species diversity (Soegianto, 1994). High diversity indicates that a community has high complexity because there is also high species interaction within the community. In other words, there will be species interactions involving energy transfer (food webs), predation, competition, and theoretically more complex niche distribution in a community that has high species diversity. Environmental conditions in the mangrove ecosystem on the Waisisil coast can be described by several environmental parameters (Table 4). The ideal temperature range for the growth of marine organisms in general is $25^0C - 32^0C$ (Odum, 1996; Hutabarat, 1985), while according to Carley (1998) the proper salinity for gastropod life is 280/00 - 300/00 (Dharma, 1992). Dissolved oxygen concentration for the life of marine organisms is in the range of 5 – 8 mg/L (Odum, 1996). Marine organisms need a water pH, between 6.5 – 8.5 for survival and reproduction [5]. Thus, the condition of the waters in the mangrove ecosystem on the Waisisil coast can still support the life of marine organisms, including gastropods.

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