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EARLY STUDY OF AQUATIC BIODIVERSITY IN TEUPIN LAYEU IBOIH SABANG FOR MARINE ECOTOURISM¹

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Abstract

Biodiversity is the diversity of organisms that indicate the overall variation of genes, species, and ecosystems in a region. This research aims to investigate the aquatic biodiversity in Teupin Layeu Iboih beach Sabang for resources marine ecotourism. The research was carried out from March to June 2014. A descriptive approach was applied to present the research findings to show biodiversity of the Teupin Layeu Iboih. The results of the research found 71 species of coral fish, 21 species of coral, and 15 species of aquatic invertebrates. Biodiversity were found in Teupin Layeu Iboih beach was varied and could be used for attraction in the development of marine ecotourism. Therefore, tourism activity that could be sustainable without being damaged by the nature.

Keywords: *Aquatic Biodiversity, Teupin Layeu Iboih, Ecotourism*

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A. Introduction

Sabang has a variety of tourist attractions. This tourism attraction could contribute to local economic. Those tourism attractions include Teupin Layeu Iboih beach, Natural Park Sabang, Taman Tepi Laut Rubiah Island, Gapang, Panorama Paradiso, Sumur Tiga, and Ujung Kareung beach. Other areas that are destinations for tourists are Klah Island in the Gulf of Sabang, Aneuk Laot Lake, Zero Kilometer Indonesia, Sabang city, and Japanese fort.

Teupin Layeu Iboih is one of the marine tourism places in Sabang which is visited by many tourists. According to Ramadhani and Asep (2010: 44), the most favorites place in Sabang is Gapang Beach, 0 kilometer monument, and Iboih Beach. The most activities done by tourist include diving, snorkeling, sailing, and swimming around the beach. Therefore, biodiversity is one of the most important factors to improve tourism interest in choosing tourism activity, especially for marine tourism.

An interesting attraction in Teupin Layeu Iboih beach is aquatic biodiversity. Increasing tourism activity in Teupin Layeu Iboih could contribute a negative impact on the environment of the area. Most of the respondents who participated in promoting and conserving marine biodiversity, agree that the increase of visitor can increase the volume of waste and pollution generated (Mejia, *et. al.*, 2013: 157). Moreover, the climate change is a problem found in the preservation and promotion of marine biodiversity. Therefore, Teupin Layeu Iboih beach is one of locations that is originally developed for general and mass tourism, and now has been becoming ecotourism destination in this area. Ecotourism is an attempt to promote travelers to be responsible and positive contribution to the conservation of the environment, as well as to improve the welfare of the local community (Zambrano, Eben, and William, 2010: 62).

The implementation of ecotourism directly contributes to conservation of biodiversity in Teupin Layeu Iboih beach. Now, ecotourism has become a gateway for rural communities and indigenous peoples to the global economy. The local communities developed an accommodation, hiking trail, and the guide for tourists. These activities, of course, can contribute to the change of rural and indigenous people as suggested by

Stronza (2010: 57). However, data on the biodiversity of ecosystem in Teupin Layeu Iboih beach for marine ecotourism resources has not yet been conducted. Therefore, it is necessary to study this aquatic biodiversity. This study aims to investigate the aquatic biodiversity in Teupin Layeu Iboih beach Sabang for marine ecotourism resources.

B. Material, Methods and Data

The location of this research was taken place in Teupin Layeu Iboih Beach, Sabang Island, geographically located at 05°52'20"-05°52'34" N and 95°15'21"-95°15'32" E cover an area of 6.42 Ha. Teupin Layeu Iboih Beach, Sabang, is one of the tourism attraction areas that focused on the implementation of marine ecotourism.

The tools used in this study were stationery, GPS, digital cameras, underwater camera, scuba diving equipment, and snorkeling equipment. The materials used in this study were maps administration Iboih, corals and fish identification books, and observation sheets.

Primary data was collected directly at the time of the study. Secondary data was obtained by the results of previous research and survey reports of the Department of Marine and Fisheries Sabang city. Primary data was collected by visual census survey using stationery point (Muljadi dan Welly, 2012: 3-4; Setiawan, 2010: 5; Labrosse, 2002: 33-36). Stationery visual census was focused on frequency of attendance all species in the ecosystems.

C. Research Finding and Discussion

1. Aquatic Biodiversity in Teupin Layeu Iboih Beach

Teupin Layeu Iboih Sabang has marine biodiversity of invertebrates and vertebrates. Invertebrates are found include Class Anthozoa, Asteroidea, Echinoidea, Hydrozoa, Crinoidea, Holothuruidea, Demospongiae, Bivalvia, and Class Polychaeta. While vertebrates are found in Teupin Layeu Iboih beach. The Super Class Pisces consists of Chondrichtyes Class and Class Osteichthyes.

The existence of coral reefs can be found in Teupin Layeu Iboih beach at a depth of 1 to 20 meters. Total of coral species that found 21 species of 9 families (Figure 1). The composition of the coral reef located in Teupin Layeu Iboih beach quite varied, so it could be used to the basis for the development

of ecotourism. Nasir (2007) reported that coral diversity index (H) in Teupin Layeun beach Sabang is high with the value of 3.21, that consists of Family Acroporidae, Pocilloporidae Siaderastreidae, Faviidae, Poritidae, and Family Pectinidae. Baird et al (2012: 24-27) also found some coral's families that dominate the shallow water in Weh Island, among which Acroporidae, Pocilloporidae, and Poritidae. Overall coral reefs in Weh Island has good conditions with coral more than 40%.

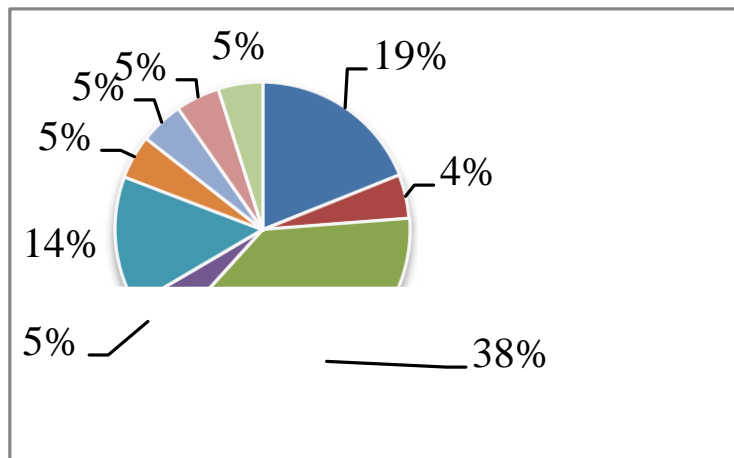


Figure 1: The composition of each Family Coral in Teupin Layeu Iboih Beach
Source: Aswita, 2014

It is also found in the location of the observation rubble and dead corals. The damaged of corals were caused by boat anchors used by sailing activities in this area for the tourists visited around Weh Island. Additionally, the damaged also happened because the tourists stepped on the coral during his/her diving and snorkling activities. To overcome these problems, in 2006 up to the end of 2008, the Green Coast Project (Wetlands International Indonesia Programme) facilitates a local NGO which was Aceh Coral Conservation (ACC) to perform an activity such as the construction of mooring buoys in the location where anchored fishing boats and tourism boats. This is a positive impact on coral reefs and other aquatic biota. Besides, in Teupin Layeu Iboih beach also appeal boards is attached on coral reef conservation, coral stepping prohibition, and the prohibition throwing garbage into the sea.

Coral reefs as a major ecosystem in the ocean have great potential in the development of marine tourism. The more diverse types of coral reefs, the more diverse the beauty of the underwater world that could be enjoyed by the tourists. Djou (2013: 15) suggests that the percentage of coral cover is a major requirement in marine tourism, because it is an essential element of the aesthetic value of the park that can be enjoyed by the tourists. The coral reefs in Weh Island have an important role for marine tourism with a series of activities that could be done to enjoy the beauty, through snorkeling, diving and other coastal recreational attractions (Rudi, 2010: 2).

The coral reefs which have a good condition as an important habitat that is necessary for some marine life that his life depended on those coral reefs. Reef fishes species found at the location observations varies consist of 71 species from 22 families. Three families were most often found is Pomacentridae, Acanthuridae, and Chaetodontidae (Figure 2). According with research Nasir (2007), coral fish families found in Teupin Layeu Beach is Family Acanthuridae, Chaetodontidae, Pomachanthidae, Pomacentridae, Labridae, Lutjanidae, Mullidae, Scaridae, Scorpaenidae, Zanclidae, Holocentridae, Serranidae, Nemipteridae, Centridae, and Family Murainidae, with coral fish diversity index (H) high with a value of 3.86. Hastuty, Yonvitner, and Luky (2014: 101-105) suggested that the condition of coral and reef fishes species composition and size better in the conservation area of Weh Island's east coast, where the reef fishes families were found among Acanthuridae, Balistidae, Caesionidae, Carangidae, Cirrhitidae, Holocentridae, Labridae, Lethrinidae, Lutjanidae, Mullidae, Nemipteridae, Pomacentridae, Priacanthidae, Scaridae, Serranidae, Sphyraenidae, and Synodontidae.

Besides the variety of coral and reef fishes, we found 15 other biota in Teupin Layeu Iboih Beach. The aquatic biota is *Linckia laevigata*, *Culcita novaeguineae*, *Echinaster luzonicus*, *Asthenosoma varium*, *Diadema setosum*, *Echinothrix calamaris*, *Sertularia* sp., *Xestospongia testudinaria*, *Oxycomanthus Benetti*, *Tridacna gigas*, *Tridacna maxima*, *Spirobranchus giganteus*, *Holothuria atra*, *Stichopus variegatus*, and *Stichopus chloronotus*.

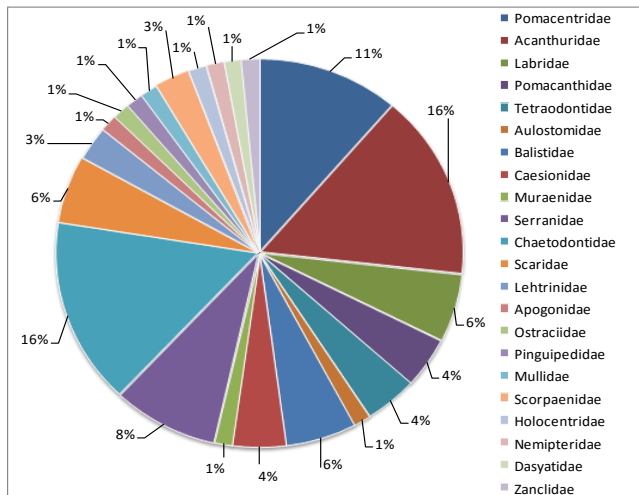


Figure 2: The composition of each Family Coral Fish in Teupin Layeu Iboih Beach
 Source: Aswita, 2014

2. Marine Ecotourism in Teupin Layeu Iboih Beach

Every year the number of tourists who visit Sabang is increasing (Figure 3). It is of course give a positive impact on the community's economy, but it is also a negative impact on environmental damage, if there is no attempt in the maintenance of the environment. Therefore, ecotourism is introduced and became the main stay of the tourism activity in Sabang. So that it can minimize the environmental damage.

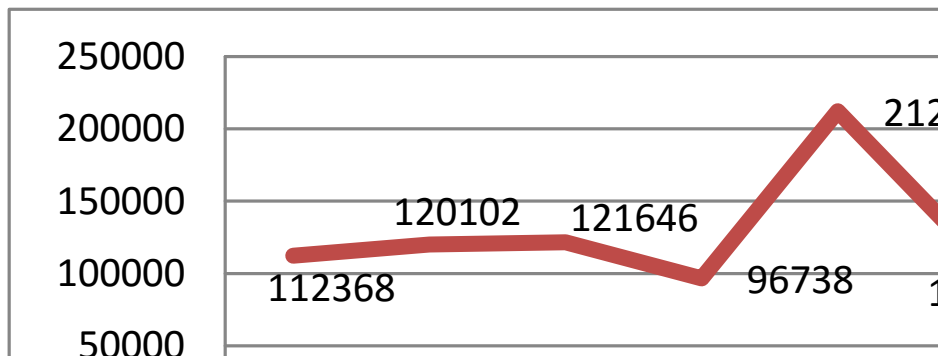


Figure 3: The number of tourists who visit the Weh island from years 2008-2013
 Source : BPS – Statistics of Sabang City

Marine ecotourism is a dominant activity done by tourists in Sabang, which is in Teupin Layeu Iboih Beach. Teupin Layeu Iboih Beach is one of the most famous tourism destinations, because it has beautiful world underwater, and it is very famous for underwater sports activities, such as swimming, diving and snorkeling. Besides, providing a variety equipment to enjoy the beauty of the underwater, the tourists who visit Teupin Layeu Iboih beach can also use a lot of facilities provided by the local community, such as for other marine tourism activities, boating, sailing, fishing and playing Jet Ski.

The land cover Teupin Layeu Iboih beach currently composed of mangrove vegetation, houses, and hotels that built by the local community. Besides, the presence of harbor charter boats and fishing boats, and open land. Type of beach Teupin Layeu Iboih is sandy, coral, presence of stones, and little steep. Therefore, some appropriate areas are suitable for recreation activities (Aswita, 2014: 35-36). One of the facilities needed by the tourists after doing marine tourism is the availability of clean water. Sources of clean water are not so hard to find. They could be found at several points along beach Teupin Layeu Iboih, ranging from <500 meters.

The implementation of marine ecotourism in Sabang is based on the coastal and marine resources. It includes aspects of education and interpretation of the environment and culture. Tuwo (2011) suggested that marine ecotourism is managed tourism with a sustainable approach, which: (1) management of nature directed at the preservation of marine and coastal resources, (2) management directed at the welfare of coastal communities, (3) conservation activities carried out to sustain the utilization of its resources in a sustainable.

Marine ecotourism is the form of tourism that exploits the potential of coastal and marine environment and the diversity of available resources as the main attraction in the tour. The nature and marine tourism activities can be generally classified into two groups: 1) tours in the waters or marine tourism which include rowing, sailing, diving and snorkeling, surfing, swimming, and fishing; and 2) in mainland tour includes fringe sports such as beach sports, cycling, rock climbing on steep walls of the beach and through the cave beach, flying kites, camping, sunbathing, walking around seeing the sights, riding or up beach buggy (Djou, 2013: 15).

Biodiversity of species of coral, coral fish species and other aquatic biota species is one of the major factors of development and implementation of marine ecotourism in Teupin Layeu Iboih Beach. Ecotourism activities undertaken to minimize environmental damage, increase revenue for the community, and provide the best services for tourists. Sihasale (2013: 24) suggested that tourism should be emphasized on three things: (1) maintaining the quality and sustainability of natural and cultural resources; (2) improving the welfare of local communities; and (3) the realization of tourist satisfaction in enjoying a series of tourism activities conducted.

Development of ecotourism integrates to the environment by developing its ecologic aspect, such as ecological, economic, social and sustainable institutional (Sayyed, Mansoori, and Jaybhaye, 2013: 297). Ecotourism should be able to create a series activity to attract tourists, offering them an opportunity for interacting with nature and allowing them to conserve flora and fauna in the ecotourism site. Additionally, ecotourism also provides access for local people to manage the productive location and sustainable ecotourism in providing services for tourists. Ecotourism resources must be used wisely, so that these resources can be continued to be enjoyed for next generation.

The experience and satisfaction of tourists to enjoy a series of ecotourism activities is fundamental in developing ecotourism that exist at the tourist sites, so that the implementation can be optimized. Newsome (2014), suggests that the ecotourism experience is a barometer of the quality assessment of the implementation and development of ecotourism, based on: (1) the use of the protected area and managed for conservation and tourism, (2) have access managed through simple management, (3) the presence of the manager so that achieve the ecological values and environmental education, (4) road access visitors have planned and designed to reduce the negative impact, (5) educative and encouraging visitor satisfaction, (6) natural based and ecologically sustainable, (7) local communities has direct benefit, and (8) a tour guide must have a license.

D. Conclusion.

Biodiversity aquatic in Teupin Layeu Iboh has many variations. It can be used for attraction purposes in the development of sustainable marine ecotourism in Sabang. Indirectly, the implementation of ecotourism in Teupin Layeu Iboh Beach Sabang can impact on local communities economic. For the implementation of these activities, it is needed the support from government of Sabang, stakeholders, local communities and environmentalists, so that the implementation of ecotourism can be implemented based on the principles and characteristics. It has a positive impact on the environment, local economy, and tourist satisfaction.

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