Identification of Diversity of Coral Fish Species in the Rumpon Area in Banyak Island District, Aceh Singkil Regency

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Article Info	Abstract
	This study aims to determine the diversity and abundance of reef fish around FADs in Balai Island Waters. This research was conducted in October - December 2022 in the waters of Balai Island, Aceh Singkil Regency. The method used is a Stationary Visual Census then identified using the reef fish identification guidebook. Based on the results of the study, 9 species of reef fish were identified, consisting of 6 species. The abundance of reef fish is 1.3 is included in the medium category, the diversity index is 1.676 medium category, uniformity is 0.935 abundance category, and dominance is 0.209 low category

1. Introduction

Indonesia is the largest archipelago in the world with more than 17.000 islands and two-thirds of its land area is covered by ocean. In addition, Indonesia's marine wealth has the largest marine biodiversity in the world where there are 8.500 species of fish, 555 species of seaweed, and 950 species of coral reefs. Therefore, Indonesia has enormous marine and fisheries potential.

Aceh Singkil District is one of the districts in Aceh Province. Geographically located at the southern tip of Aceh Province, Sumatera Island has many islands, one of which is Banyak Island. These waters have very diverse aquatic ecosystems, one of which is the coral reef ecosystem. Reefs Coral is one of the marine ecosystems that must be preserved to maintain the habitat of fish life in the sea. Reef fish are fish species that live in coral areas and are interrelated with coral reef ecosystems. These fish use coral reefs as a place to find food, shelter from predators, spawning and enlargement sites, and provide a safe enough space for the survival of reef fish (Syakur, 2000).

Damage to coral reefs will affect the diversity and abundance of reef fish. Currently, small-scale fisheries activities on Banyak Island generally catch fish with limited traditional fishing gear so they cannot expand the range of fishing areas economically Banyak Island fishermen have low income. An alternative that can be done is to utilize FADs. FADs are a tool for collecting fish. These tools such as areca leaves, coconut leaves, and fibers equipped with weights or anchors Utomo & Ain (2013).

On the other hand, FADs function to streamline fishermen in fishing both from fuel and distance for fishermen. The number of human activities in the form of reef fish overfishing and anchor ship activities in coral reef areas can reduce the abundance and diversity of reef fish (Armanto et al. 2022).

The reef fish community can be used as an indicator of the influence of human activities on the environment. Therefore, research is needed to identify the diversity and abundance of reef fish in the FAD area in the waters of Pulau Banyak, Aceh Singkil Regency, so that it is expected to be the initial information for further activities on the management of fisheries and marine resources in Pulau Banyak, Aceh Singkil Regency.

2. Methodology
2.1. Time, Place, and Materials
This research was conducted in October - December 2022 in the waters of Balai Island, Aceh Singkil Regency which is presented in Figure 1. The tools used in this research are underwater cameras, ADS tools, and fish identification.
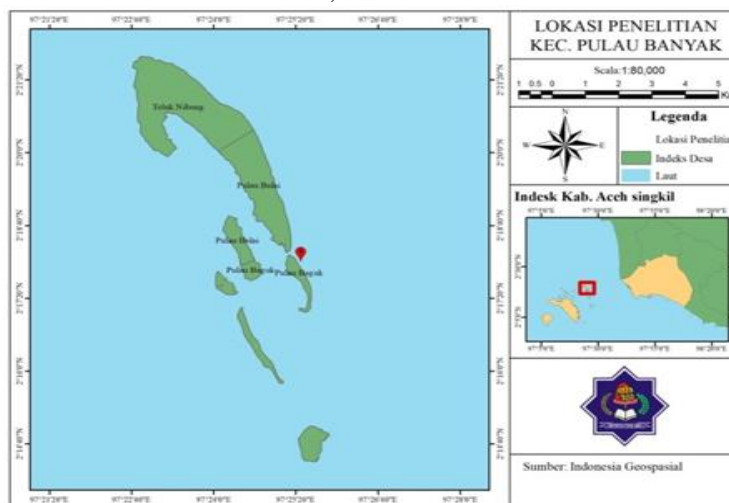

Figure 1. Research Location

2.2. Method
The method used in this research is Stationary Visual Census. This method is carried out at one point location (Hill & Wilkinson, 2004; Labrosse, 2002). For the process of data collection, researchers must be at the bottom of the waters and dwell on the side of the FADs used then record all types of reef fish around the FADs with a vertical observation area of 7 meters deep with an area of 1 m^2. This was done twice around the FADs in the waters of Balai Island, Pulau Banyak District, Aceh Singkil Regency.

Data collection was carried out directly by visual observation and observation through photos and videos using an underwater camera. Reef fish data that have been obtained are then identified by morphological observations that refer to the book Reef Fish Identification - Tropical Pacific (Yanuar & Aunurohim, 2015).

2.3. Data Analysis
Each reef fish found in the FAD area was counted as the number of individuals of each species. To see the diversity and abundance of reef fish, it is calculated using the following formula.

$$H` = - \sum_{i=l}^{S} pi \ln pi$$

Description:
H` = Shannon - Wiener diversity index
S = number of fish species

Pi = the ratio of the number of reef fishes of the Ith species (n,) to the total number of fishes

The diversity index (H´) is a number that has units using the range 0-3. The value of diversity will be high if H´ is close to 3, indicating good water conditions. Conversely, if the value of H´ is close to 0, the diversity is low and the water conditions are not good; H´< 2,0 Low, 2.0 < H´ < 3.0 medium, H´ > 3,0 high.

$$N = \frac{ni}{A}$$

Description:
N = density of individual fish
ni = number of fish individuals of species i
A = area of observation m^2

3. Result and Discussion
3.1. General Conditions
Based on the results of the research conducted, the diversity index, uniformity, and dominance of reef fish in Balai Island Aceh Singkil Village are presented in Table 1.

Table 1. Ecological index of reef fish in Balai Island village, Aceh Singkil

Number of Species	Number of Individuals	H'	E	D (ind/m^3)
6	9	1,68	0,936	1,3

Based on Table 1, the diversity index (H') of reef fish in this study is 1.676, the uniformity index value is 0.935 and the

dominance index value is 0.209. Based on the index value of diversity and diversity is included in the low category. This illustrates that the role and distribution of reef fish species at the research station in 2 repetitions is balanced or there is no particular dominance in each fish habitat around FADs.

Based on the identification results obtained by the reef fish community in the village of Pulau Balai as many as 9 individuals consisting of 6 species, 3 species from the Nemipteridae family namely *Scolopsis affinis, S.cilliata, S.lineata*, 2 species from the Labridae family namely *Labroides dimidiatus, Thalassoma lunare*, and 1 species from the Mullidae family namely Parupeneus macronemus. The reef fish diversity index value of 1,676 is included in the medium category, which is caused by several human factors that do not preserve the underwater world. Reef fish can be found in an environment that suits their life and also a suitable food source so that fish can adapt to a place of habitat (Najamuddin *et al.*, 2012).

The factors that influence the high and low diversity value of each species include, among others, the number of species found, and the presence of species found to exceed the number of other individuals (Akbar *et al.,* 2018). Diversity is not only found by the number of species, but the nature of the species is determined by the number of species variations in the waters, habitat stability, and the evenness and abundance of each species found in a community, so if the condition of habitat is getting better or stable, there will be a lot of variation in each species and the richness of marine biota that lives in it will be higher (Haryono, 2020).

According to Barus (2004), a community is said to have high species diversity if there are many species with an even number of individuals of each species, then if a community consists of only a few species with an uneven number of individuals, the community is not said to have high diversity

During the research, the fishermen caught fish in the morning and the collectors would wait for the fishermen to return from the fishing location to carry out fish-buying and selling activities. The catch and the rest are for self-consumption by fishermen. After returning from fishing activities, most fishermen will do other work such as farming and some are raising livestock to get additional income.

3.2. Coral Fish Abundance

The abundance of reef fish is the number of fish found at a research site, based on observations of reef fish abundance in Pulau Balai Village as much as 1.3 ind/m^3 were included in the abundant category, while the species found were 9 individuals, namely *Scolopsis lineate* as many as 3 species or 18%, *S.ciliata* as many as 2 species or 12%, *S.affinis* as many as 1 species or 6%.
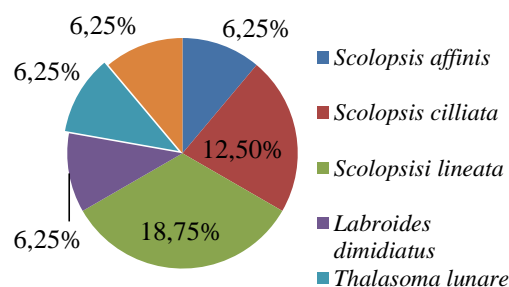

Figure 2. Reef fish abundance

Referring to the results of the analysis of the level of diversity of reef fish species in one location with two repetitions show that the health of the waters is not good and some damaged coral reefs affect the presence and abundance of reef fish species, but the diversity index obtained from this study is in the "low" category because the existence of reef fish cannot be separated from the location of coral reefs. Subekti *et al*. (2013). Stating that some research results show that the presence of reef fish is influenced by the condition of coral reefs. Najamuddin *et al.* (2012), stated that reef fish habitat with a high level of diversity is a place of life, feeding ground, nursery ground, and spawning ground for various reef fish.

4. Conclusion

Based on the results of research conducted in Balai Island Waters as many as 9 individuals consisting of 6 species, 3 species are from the Nemipteridae family namely *S.affinis, S.cilliata, S.lineata* 2 species from the Labridae family namely *L.dimidiatus, T.lunera,* and 1 species from the Mullidae family namely *Parupeneus macronemous*. it can be concluded that the abundance index with a value of 1.3 in the evenly distributed category, and the diversity index is 1.67 included in the moderate category.

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