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Species Composition and Economic Value Status of Sea Cucumbers in the Waters of Pulau Banyak, Aceh Singkil

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ABSTRACT

The sea cucumber is one of the organisms from the Echinodermata phylum, Holothuridae class. Sea cucumbers (*Holothuria*) can be found throughout the coastal waters, ranging from shallow tidal areas to deeper waters. This study aims to determine the species composition and economic value of sea cucumbers in Banyak Island waters. This research was conducted from August to September 2023, coinciding in the waters of Banyak Island Aceh Singkil. The research method was carried out by identifying sea cucumber documentation collected directly from local fishermen and conducting direct interviews with collectors who operate to obtain information about the selling price of sea cucumbers. Based on observations, sea cucumbers obtained in the waters of Banyak Island consist of several species in 2 families. The composition of sea cucumber species obtained includes *Holothuria atra*, *H. fuscocinerea*, *H.edulis*, *H. fuscopunctata*, and *Stichopus pseudohorrens*. Sea cucumbers found by fishermen have varying economic values, from cheap to expensive prices. The price is influenced by various factors, including the type of sea cucumber and its weight. Each type of sea cucumber has a different selling value, and its weight size is one of the main determining factors in the selling price.

Keywords: Sea cucumbers, Species composition, Pulau Banyak, Aceh Singkil

1. INTRODUCTION

Banyak Island is a group of small islands in the Singkil area of Aceh Province. It has a total area of 27,196 hectares. Banyak Island is directly bordered by the Indian Ocean, just west of the island of Sumatra. Banyak Island has quite a wide sea and long and beautiful beaches. The Banyak Island subdistrict consists of three villages: Balai Island, Baguk Island, and Teluk Nibung. The capital of the subregion is Balai Island Village. Banyak's Island ecosystem consists of seagrass, mangroves, and coral reefs, with rich fishing potential for both fish and non-fish (sea cucumbers).

Sea cucumbers or sea cucumbers are one of the organisms from the Echinodermata class Holothuridae. Sea cucumbers (*Holothuria*) can be found throughout coastal waters, ranging from shallow tidal areas to deeper waters. For their lives, sea cucumbers usually prefer waters free from pollution, and the water is relatively calm. In general, each type has a specific habitat; for example, white sea cucumbers (*Holothuria scabra*) are found in waters overgrown with seagrass, while coral sea cucumbers (*Muelleria lecanora*) and sand sea cucumbers are found in deeper waters. The primary habitat of sea cucumbers is seagrass and coral. The distribution of sea cucumbers in Indonesia is extensive, among others: coastal waters of Madura, East Java, Bali, Sumba, Lombok, Aceh, Bengkulu, Bangka, Riau, and Belitung, Kalimantan (western, eastern, and southern parts), Sulawesi, Maluku, Papua and Kepulauan Seribu (Martoyo et al., 2007).

Sea cucumbers have a very important role both economically and ecologically. Sea cucumbers are usually used as a food source and as ingredients in manufacturing cosmetics and drugs for various diseases. Sea cucumber, also known as sea cucumber, has long been known for its efficacy as a medicinal raw material. This is due to the abundant content of bioactive compounds in it. These compounds are believed to have various health benefits, from boosting the immune system to overcoming various diseases. Some of the compounds that have been successfully extracted are saponins, triterpene

glycosides, chondroitin sulfate, neuritogenic gangliosides, 12-methyltetradecanoic acid (12-MTA), and lectins (Matranga, 2005; Mayer & Gustafson, 2008).

Sea cucumbers are fishery commodities with high economic value, generally traded in dried form. Sea cucumbers are generally consumed in processed form, such as dried gonads (konoko), dried intestines (konowata), or crackers. Sea cucumbers contain active substances that are beneficial in the pharmaceutical and health fields. Several researchers have reported research on natural ingredients produced by sea cucumbers. Kaswandi et al. (2000); Lian et al. (2000); Kustiariyah (2006) reported that the active ingredients produced by *Holothuria* sp are antibacterial and anti-seizure.

The local community uses sea cucumbers as food, but most sea cucumber catches are sold to collectors. The higher demand for sea cucumbers in the market encourages people to catch them continuously, so it is feared that it can threaten their existence in nature. The main threat to the existence of sea cucumbers in the waters is the occurrence of over-exploitation due to increased market demand and the use of sea cucumbers as food ingredients and biomedical research. Sea cucumbers can be used as a traditional food ingredient that people in tropical countries consume. Most countries that consume them are China, Hong Kong, South Korea, Singapore, and Japan. In some countries, extracts from certain types of sea cucumber are used as traditional medicinal ingredients (Ozer et al., 2004).

This study aims to provide a deeper understanding of the composition of sea cucumber species that can be found in the waters around Banyak Island. Understanding the species composition of sea cucumbers is expected to contribute to the conservation and management of marine resources in the area. In addition, this study also aims to evaluate the status of the economic value of sea cucumbers so that it can help in the development of sustainable economic strategies for local communities and pay attention to the sustainability of marine ecosystems in Banyak Island. Through a comprehensive research approach, it is hoped that accurate and reliable data on sea cucumber species composition and economic value can be generated. The information obtained from this research is expected to provide a solid basis for decision-making related to marine resource management in Banyak Island. Thus, efforts to protect sea cucumber populations and ensure economic sustainability for local communities can be carried out more effectively and sustainably.

2. RESEARCH METHOD

Time and Place

This research was conducted from August to September 2023 in the waters of Banyak Island, Aceh Singkil District, Aceh Province (Figure 1).

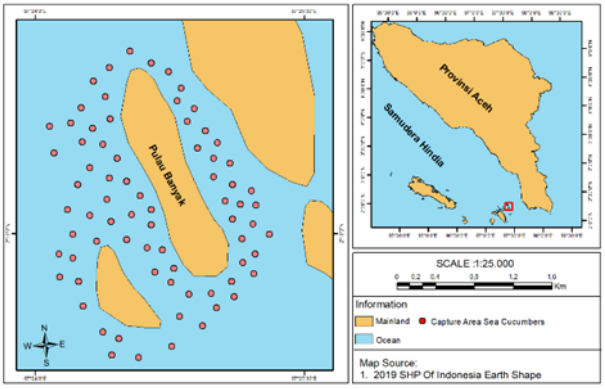


Figure 1. Research Location

Method

The method used in this research is a survey method for collecting sea cucumber data in the field and conducting direct interviews with collectors to get the value of the economic status of sea cucumbers obtained by fishermen.

Procedures

The sea cucumber samples used in this study were collected directly from local fishermen operating in the waters of Banyak Island. All sea cucumber samples that have been obtained are documented and identified using an identification book with the title "Sea Cucumber from Shallow Waters of Indonesia". The characteristics observed to identify morphologically are by paying attention to the overall body shape, the location of the mouth and anus, the shape and number of tentacles, the distribution of papillae on the dorsal body wall, the distribution of tube feet on the ventral body wall, and color patterns (Sadili et al., 2015).

Data on sea cucumber prices and market destinations were obtained through interviews with collectors operating in Banyak Island. Through intensive interaction with collectors, information on sea cucumber selling prices and main market destinations can be better collected. By utilizing this interview method, the

information obtained becomes more comprehensive and allows for more informed decision-making in the management of sea cucumber resources on Banyak Island.

3. RESULT AND DISCUSSION

Based on the results of observations of sea cucumbers obtained in the waters of Pulau Banyak, five species of sea cucumbers were obtained, which were included in 2 families (Table 1). The composition of sea cucumber species obtained are *Holothuria atra*, *H.fuscocinerea*, *H.edulis*, *H. fuscopunctata*, and *Sitchopus pseudohorrens* (Figure 2). This study revealed that the number of sea cucumbers found was not too low, indicating a significant presence in the aquatic ecosystem studied. These results highlight the importance of a deeper understanding of sea cucumber populations to maintain a balanced marine ecosystem. In addition, this study also concluded that the number of sea cucumbers found was not excessive. This indicates that there is a natural effort to maintain the sea cucumber population so that it does not exceed the limit that can disrupt the balance of the ecosystem.

Thus, these results provide a picture of stable sea cucumber population conditions in a controlled environment, which allows balanced growth and development for other species in the marine food chain. Similar to the previous research by Yenta (2022), who obtained five species of sea cucumbers, namely *H. scabra*, *H. atra*, *S. hurrens*, *S. hermani*, and *S. quadrificiatus* obtained in the waters of Mata Air Beach, Batu Ragi Village (Simeulue), showed that the composition of sea cucumber species obtained was not too low and not too excessive.

These findings provide an important foundation for marine resource conservation and management policies in the Banyak Island region. Knowing that sea cucumber numbers are not at alarming levels but also not in excess, authorities can take appropriate measures to maintain the sustainability of marine ecosystems. Rapidly declining sea cucumber populations can have consequences for the survival of many other species of biota that are part of the same complex food web (Lewerisa, 2014). In the long term, a better understanding of sea cucumber populations will help to preserve the marine environment and provide sustainable economic benefits to communities that depend on these marine resources.

Table 1. Sea Cucumber Species Composition in Banyak Island Waters, Aceh Singkil

No	Family	Genus	Species	Local Name
1	*Holothuridae*	*Holothuria*	*H. atra*	Teripang Kasik
2	*Holothuridae*	*Holothuria*	*H. fuscocinerea*	Teripang pasir
3	*Holothuridae*	*Holothuria*	*H. edulis*	Teripang coklat
4	*Holothuridae*	*Holothuria*	*H. fuscopunctata*	Teripang kunyit
5	*Stichopodidae*	*Stichopus*	*Stichopus pseudohorrens*	Teripang duri

Holothuria atra is most commonly found in the Indo-Pacific region. This sea cucumber can be found in sandy beach areas, other substrates, and coral reef ecosystems. These sea cucumbers generally have a black body color and are usually covered by sand to reflect sunlight, so *H. atra* has a relatively low body temperature compared to other sea cucumbers.

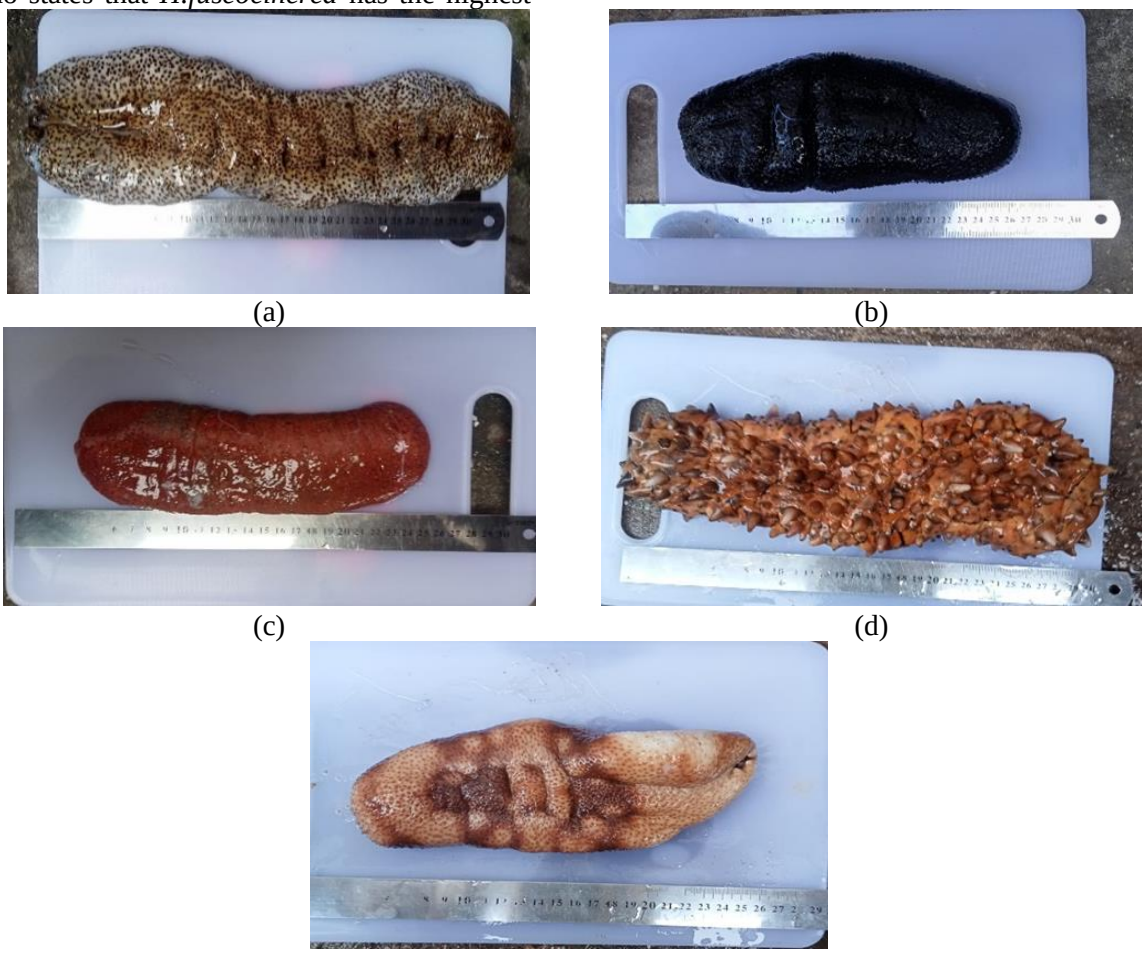
According to Elfidasari et al. (2012), this *H. fuscocinerea* sea cucumber morphologically has a round body cross-section, a flat ventral side, and a round anal hole. The dorsal body color is brown and patterned, while the ventral body is pale brown without patterns. This sea cucumber has a habitat in seagrass areas, so many are found there.

Holothuria edulis sea cucumbers morphologically have a round body cross-section, a flatter ventral part, and a round anal opening. There are differences in body color on the dorsal and ventral parts. The dorsal body is black, while the ventral part is quickly red (Elfidasari et al., 2012).

The sea cucumber *H. fuscopunctata* is dense and has thick, folded, and hard meat. The color of the sea cucumber skin is like turmeric with small brown spots and folded dark brown. Papillae are small and short, densely distributed on the dorsal part. The color on the ventral surface is white with wide tube feet. This type of sea cucumber can be found in coral reef ecosystems and exposed to sand substrates.

Holothuria fuscocinerea is a sea cucumber species often encountered by fishermen in the study area. Its abundant presence in the area is due to the environmental

characteristics rich in coral reefs. Coral reefs provide an ideal environment for Holothuria *fuscocinerea* to breed and live optimally. Thus, fishermen tend to find this type of sea cucumber more often than other species in the marine ecosystem. This is reinforced by Morton (1992), who states that *H.fuscocinerea* has the highest abundance in coral reef ecosystems due to the ability of this type of sea cucumber, which is usually found living in groups around coral reefs. Then, the ability of this sea cucumber can share habitats with sea cucumbers of other species.



(a) (b) (c) (d) (e)

Figure 2. Types of Sea Cucumbers obtained: (a) *H. fuscopunctata*, (b) *H. atra*, (c) *H. edulis*, (d) *S. pseudohorrens*, and (e) *H. fuscocinerea*.

Sea cucumbers are one of the marine biota that have significant economic potential. Its economic value is based on the high nutrient content in its body (Elfidasari et al., 2012). Sea cucumbers are rich in essential nutrients such as protein, collagen, and minerals necessary for human health. Therefore, sea cucumbers are an essential food ingredient and a raw material for various health and beauty products. Sea cucumbers provide an excellent opportunity for the fishing and pharmaceutical industries to develop innovative products that can provide significant economic benefits (Karnila, 2011).

Sea cucumbers found in many islands are types of sea cucumbers in high economic categories that are widely caught by fishermen for trade. According to Yusron (2007), sea cucumber species included in the main category are sand sea cucumber (*H. scabra*), black belly sea cucumber (*H. atra*), milk sea cucumber (*H. nobilis*), red belly sea cucumber (*H. edulis*) and pineapple sea cucumber, while those included in the medium economic value category are lotong sea cucumber, *H. atra* and *H. edulis*. *Thelenota ananas*, while those included in the medium economic value category are lotong sea cucumber and bilalo sea cucumber, which belong to the Actinopyga genus, are the other types in the low economic category.

Sea cucumbers found by fishermen have a highly variable economic value, ranging from IDR 5,000 to IDR 90,000 in the wet state. The

price is influenced by various factors, including the type of sea cucumber and its weight. Each type of sea cucumber has a different selling value, and the weight size is one of the main determining factors in the selling price. This reflects the complexity of the sea cucumber market, where fluctuating supply and demand and the diverse quality of sea cucumbers provide interesting economic dynamics for businesses in this sector.

The price of *H. atra* in this commodity ranges from USD 4-20 per kg dry in the Philippines. In comparison, the modern market in Hong Kong reaches USD 210 per kg.

After being collected by collectors on the coast, the sea cucumbers are then specially processed before being sold to markets in Medan City. This process generally involves drying so the sea cucumbers can last longer and be more easily distributed. In Medan City, dried sea cucumbers are in high demand as they have high nutritional value and are considered to have various health benefits. This process of traveling sea cucumbers from the coast to the big city is part of a significant supply chain in the marine commodity trade in the region.

Table 2. Economic Value of Sea Cucumber (Wet) in Banyak Island Waters, Aceh Singkil

No.	Local Name	Species	Wet Price (IDR)	Dry price*
1	Teripang kasik	*Holothrudidae atra*	30.000 – 90.000	Cheap
2	Teripang pasir	*Holothuria fuscocinerea*	30.000 – 90.000	Cheap
3	Teripang coklat	*Holothuria edulis*	5.000 – 30.000	Cheap
4	Teripang kunyit	*Holothurie fuscopunctata*	5.000 – 30.000	Cheap
5	Teripang duri	*Stichopus pseudohorrens*	20.000 – 40.000	Expensive

4. CONCLUSION

Sea cucumbers obtained in the waters of Banyak Island obtained several different types of sea cucumbers in 2 families. The composition of sea cucumber species obtained included *H. atra, H. fuscocinerea, H. edulis, H. fuscopunctata,* and *S. pseudohorrens*. The sea cucumbers the fishermen found have varied economic value, ranging from IDR 5,000.00 to 90,000.00 in the wet state. The price is influenced by various factors, including the type of sea cucumber and its weight.

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