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Research Article

Inventory of Echinodernata in Lendang Luar Beach, North Lombok District

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Abstract: Echinoderms are one of the main components of marine biodiversity that play an important role in ecosystem function, especially as aquatic detritus. The purpose of this study was to determine the species of Echinoderms found in Lendang Luar Beach, North Lombok District. The study was conducted in July 2022 using the purposive sampling and free sample collection. Based on the research results, found 12 species from 6 families, namely Deadematidae (*Diadema setosum, Echinothrix calamaris,* and *Echinothrix diadema*), Echinometridae *(Echinometra oblonga* and *Heliocidaris crassispina*), Holothuriidae (*Holothuria tubulosa*), Ophiocomidae (*Ophiomastix annulosa, Ophiocoma erinaceus, Ophiocoma pusilla,* and *Ophiocoma scolopendrina*), Ophiothrichidae (*Macrophiothrix longipeda*), and Toxopneustidae (*Tripneustus gratilla*). *O. Annulosa, M. longipeda*, and *T. gratilla* species were found in all stations. *M. longipeda* had the highest number of individuals. *T. gratilla* has the most extensive microhabitat because it is found in all types of existing microhabitats.

Keywords: *Inventory, Echinoderms, Microhabitats, Biodiversity, Lendang Luar Beach*

INTRODUCTION

Lendang Luar Beach is one of the beaches located in Malaka Village, North Lombok District, West Nusa Tenggara Province. The condition of the beach has a fairly good length of the intertidal zone and geographical conditions that support the potential of fishery resources and tourism potential with its white sand. With the existence of human activities on Lendang Luar Beach, of course, more or less will have an impact on the balance of the aquatic ecosystem, both environmental and abiotic.

Anthropogenic activities along the coast of Lombok Island have the potential to produce organic and inorganic waste that can enter beach waters. This condition results in a decrease in water quality and disturbs the organisms that live in it. Echinoderms are one of the aquatic organisms that are generally affected by environmental changes [11]. Echinoderms are an animal phylum consisting of six classes, five of which can be found in Indonesia, namely Holothuroidea (sea cucumbers), Echinoidea (sea urchins and sand dollars), Asteroidea (sea stars), Ophuroidea (snake stars), and Crinoidea (sea lilies) [8].

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Echinoderms are known as beach cleaning animals. So called because Echinoderms ecologically act as aquatic detritus. Echinoderms are one of the main components of marine biodiversity that play an important role in ecosystem function namely in food webs as herbivores, carnivores, omnivores, or as detritus eaters [7][11]. Echinoderms are ecologically referred to as key organisms that play a role in maintaining the balance of marine ecosystems, which Holothuroidea and Echinoidea have a role as nutrient recyclers [4][10]. Based on this, it is necessary to conduct research on the inventory of species and microhabitats of Echinoderms in the waters of Lendang Luar Beach, North Lombok District.

METHOD

Echinoderms sample collection was carried out in July 2022 at Lendang Luar Beach, North Lombok District. Identification of samples is carried out directly in the location, if there are samples that cannot be identified, then preserved specimens are made. The identification of the advanced stage is carried out at the Marine Research Laboratory, Faculty of Mathematics and Natural Science, Mataram University. The tools and materials used in this study were camera, plastic bags, 70% alcohol, milimeter block label paper, and stationery.

The method used is purposive sampling method with three research stations. Echinoderm samples were collected using the free sample collection method. The study was conducted by observing samples at each research station, namely at the ends and middle of the beach waters. Observations at each station started from the shoreline until perpendicular to the boundary of the intertidal end. Sampling is carried out at the lowest tide by collecting and recording the samples found. The samples were then labeled and photographed and then taken to the laboratory for identification. Identification is done using several sources including Tropical Pacific Invertebrates [2], Fauna Padang Lamun [9], dan some related scientific articles. Furthermore, the data were analyzed descriptively and displayed in the form of pictures and tables.

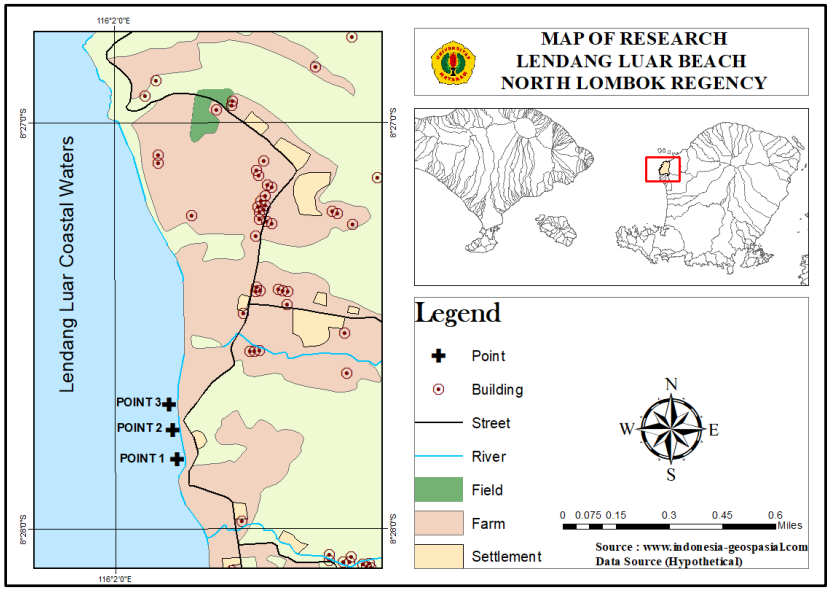

Figure 1. Research Map of Crustacean Sampling

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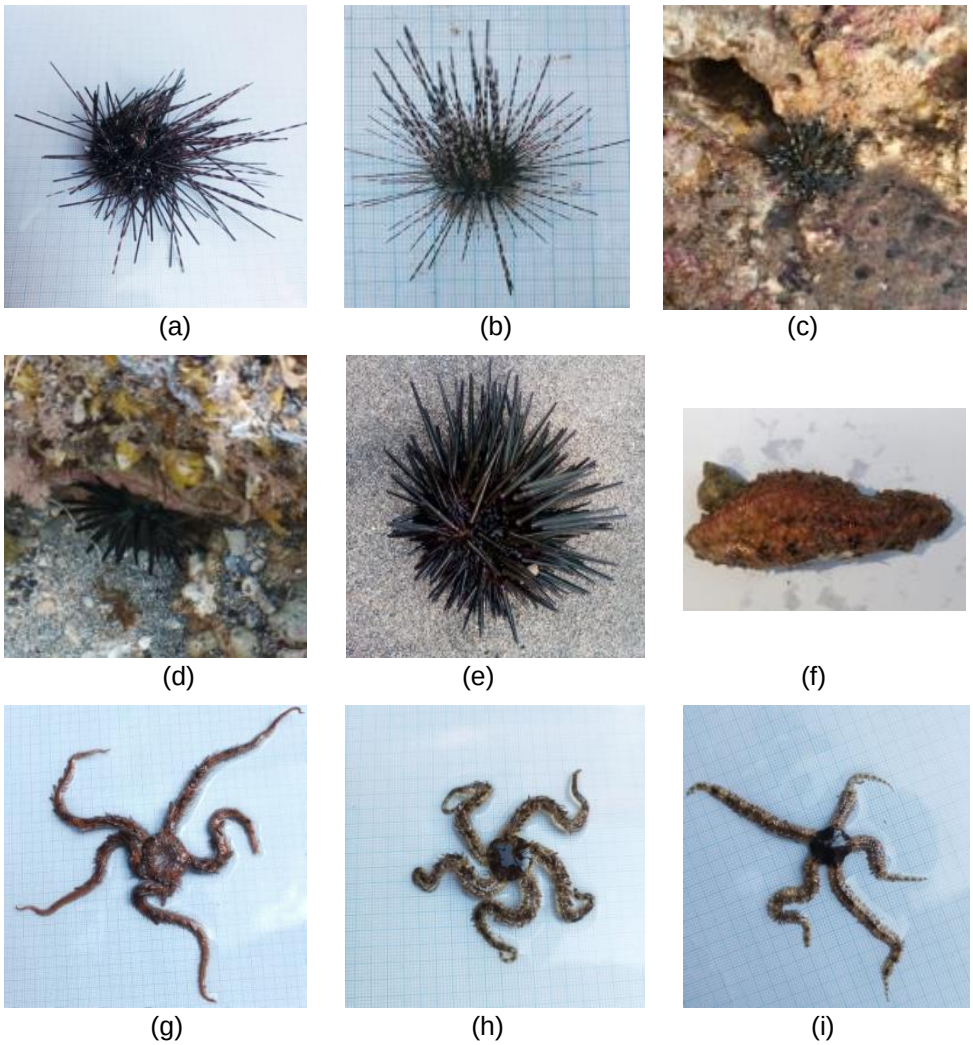
Table 1. Locations of Echinoderms Sampling Stations in Lendang Luar Beach

Location	Stations	Latitude	Longitude
Lendang Luar Beach	1	-8.463794°	116.036092°
	2	-8.462414°	116.035409°
	3	-8.461874°	116.035931°

RESULTS AND DISCUSSION

Lendang Luar Beach is located in Malaka Village, North Lombok District, West Nusa Tenggara Province. This beach intertidal zone has a length of 1.114 meter and a width of 113 meter-50 meter. Lendang Luar Beach are a zone with habitat characteristics suitable for marine life, one of which is Echinoderms. This is because in these coastal waters there are several supporting factors such as substrates consisting of sand, rocks, seagrasses, and corals which are good habitats for Echinodermata. Based on the results of the study, 12 species of Echinoderms were found in these waters which can be seen in Figure 2.



(a) (b) (c)

(d) (e) (f)

(g) (h) (i)

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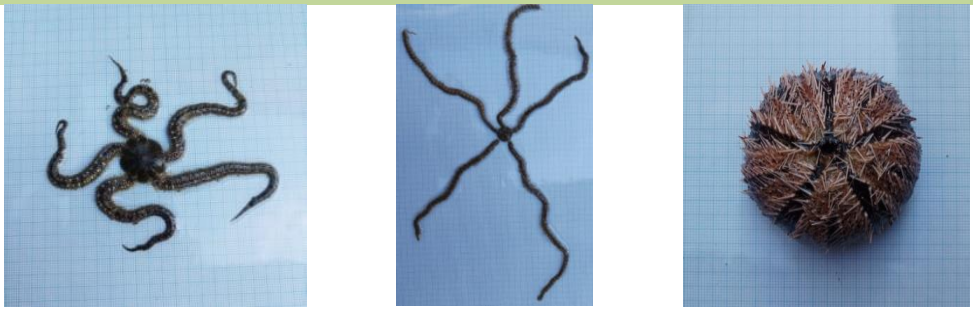

(j) (k) (l)

Figure 2. Species of Echinoderms Found in Lendang Luar Beach: a) *Diadema setosum,* b) *Echinothrix calamaris*, c) *Echinothrix diadema*, d) *Echinometra oblonga*, e) *Heliocidaris crassispina*, f) *Holothuria tubulosa*, g) *Ophiomastix annulosa*, h) *Ophiocoma erinaceus*, i) *Ophiocoma pusilla*, j) *Ophiocoma scolopendrina*, k) *Macrophiothrix longipeda*, and l) *Tripneustus gratilla*

Echinoderms are animals that live on the seabed, from the littoral area to a depth of 40 meters. Most Echinoderms are found in certain places or have zonation [8]. Echinoderms can be found in the flat zone of corals, sand, seagrass beds, coral fractures, and coral reefs [6]. These habitat characteristics affect the distribution of biota. The habitat characteristics at three stations used in this study are shown in Table 2.

Table 2. The Habitat Characteristics at Station 1, 2, and 3

Stations	Habitat	Description
1	Rocks, corals, sand	This station is located close to a cliff that has many large rocks, a little coral reef, and is sandy.
2	Corals, rocks, seagrasses	This station has more coral reefs but fewer rocks than station 1, the most dominant is coral fractures, and has little seagrasses.
3	Seagrass, sand, corals,	The habitat characteristics at this station are similar to station 2, but it has a larger seagrass area.

Based on Table 2, in this study the microhabitat was divided into four zones, namely the rocks, corals, sand, and seagrasses zones. This zonation can be influenced by the eating behavior and type of food of these species [6] or affected by the presence of predators. A total of 12 species of echinoderms were found in Lendang Luar Beach spread over three stations. Among the three stations, station 2 was the station with the most species of Echinoderms found, while station 3 was the least. The distribution of Echinoderm species at the three stations is presented in Table 3.

Table 3. Species of Echinoderms Found in Lendang Luar Beach

No.	Family	Species	1	2	3	N
1	Deadematidae	*Diadema setosum*	+	+		9
		Echinothrix calamaris		+		3
		Echinothrix diadema		+		1
2	Echinometridae	*Echinometra oblonga*	+	+		9
		Heliocidaris crassispina	+			4

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3	Holothuriidae	*Holothuria tubulosa*				1
4	Ophiocomidae	*Ophiomastix annulosa*	+	+	+	23
		Ophiocoma erinaceus		+		10
		Ophiocoma pusilla		+		9
		Ophiocoma scolopendrina	+			2
5	Ophiothrichidae	*Macrophiothrix longipeda*	+	+	+	100
6	Toxopneustidae	*Tripneustus gratilla*	+	+	+	18

Note: The number of species is recorded as N.

Station 2 has the most Echinodermata species because at that station is dominated by coral and rock substrates. These animals live hiding under these corals and rocks to protect themselves from predators as well as to adapt to the physical conditions of the extreme habitat that often changes. This also causes echinoderms to be found only slightly at station 3 with sand and seagrass microhabitats because there is no good shelter from predators [3].

As presented in the Table 3, when viewed from the number of individuals obtained, the Ophiothrichidae family has the largest number of individuals, namely 100 individuals of *Macrophiothrix longipeda*. The abundance of this species is due to its good adaptability to a variety of substrates such as sand, rocks, seagrass, and corals so it is found in all stations. This species also has negative phototactic properties and tends to live in hiding in its distribution area and has unique adaptations to survive in a changing environment in marine waters. In this study, this species is most commonly found hiding behind coral reefs. This species has no economic value, but its presence in waters has an important role as food for demersal fish.

An Echinoderm species that has economic value found in Lendang Luar Beach is *Tripneustus gratilla* from the family Toxopneustidae. *Tripneustus gratilla* can be used as food because the gonads contain lots of vitamins and protein. In addition to consumption, this species has content that can be used as medicines that can cure various diseases. In addition, the species can also be used as decoration because of the unique shell shape. Unfortunately, the economic value of this species may have led to its low abundance as it is caught by coastal communities during low tide activities. In this study, this species was found at all stations in all four microhabitat zones with the most commonly found scattered in rocky areas. The rock as a hiding place allows this species to avoid being hunted.

CONCLUSION

Based on the results of research conducted in Lendang Luar Beach, found 12 species from 6 families, namely Deadematidae (*Diadema setosum, Echinothrix calamaris,* and *Echinothrix diadema*), Echinometridae *(Echinometra oblonga* and *Heliocidaris crassispina*), Holothuriidae (*Holothuria tubulosa*), Ophiocomidae (*Ophiomastix annulosa, Ophiocoma erinaceus, Ophiocoma pusilla,* and *Ophiocoma scolopendrina*), Ophiothrichidae (*Macrophiothrix longipeda*), and Toxopneustidae (*Tripneustus gratilla*). *O. Annulosa, M. longipeda*, and *T. gratilla* species were found in all stations. *M. longipeda* had the highest number of individuals. *T. gratilla* has the most extensive microhabitat because it is found in all types of existing microhabitats.

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