



Inventory of Echinoderms in the Intertidal Zone of Lakeba Beach, Baubau City

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ABSTRACT

This study aims to inventory the types of echinoderms that exist in the intertidal zone of the Lakeba coast of Baubau City. The tools and materials used in this study were computer boards, paper, pens, cameras, meters, machetes, raffia ropes and jars. The data collection technique is purposive sampling method. This research was conducted at three station locations. The analytical technique used is descriptive analysis to obtain information about the types of Echinoderms found and to determine the number of individuals for each species from the three observation stations. The types of echinoderms found were *Linckia laevigata* from the Asteroidea class, *Ophiocoma scolopendrina* from the Ophiuroidea class, *Paracentrotus lividus* and *Diadema paucispinum* from the Echinoidea class and *Holothuria scabra* from the Holothuroidea class

1. Introduction

The intertidal zone is a tidal area located along the coastline and the mainland. The intertidal zone has very different conditions from other parts of the sea due to daily fluctuations from extreme environmental factors [1]. The intertidal zone is inhabited by various organisms including Arthropoda, Mollusca, Cnidaria, Annelida, Porifera, Brachiopods and Echinoderma [2]. Many studies on the inventory of Echinoderms in the intertidal zone throughout Indonesia have been carried out, but there are still many unreported intertidal areas, especially on the La Keba beach. Lakeba is one of the coastal tourist destinations in Baubau City which is inhabited by various organisms and one of them is the phylum Echinoderms. Echinoderms are invertebrate animals that are characterized by the presence of spines or protrusions on the outer surface of their bodies and morphologically they have a radially symmetrical body shape. Echinoderms are divided into 5 classes, namely Asteroidea (sea stars), Echinoidea (pig spines), Ophiuroidea (snake stars), Holothuroidea (sea cucumbers), and Crinoidea (sea lilies) [3].

Echinoderms have an important role in maintaining marine ecosystems as waste and garbage cleaners as herbivores, carnivores, omnivores and detritus eaters and as food webs in seagrass ecosystems. In addition to playing a role in aquatic ecosystems, echinoderms also have high economic value and some of them can be consumed, including sea cucumbers and sea urchins [4]. In the Indo-West Pacific region, about 545 species of Echinoderms were found, including 141 species of sea cucumbers, 87 species of starfish, 142 species of snake stars, 84 species of sea urchins, and 91 species of sea lilies. Echinoderms have hard skin characteristics, shaped like fingers, body organs numbered / multiples of five, rough body that is radially symmetrical with body reinforcement made of lime. The skin has limestone plates with small spines, slow movement and has no head [5].

Research on echinoderms in the intertidal area has previously been reported. The research was conducted at Nirwana Beach Baubau, the results of the study reported that the Phylum Echinoderms found on the coast of Nirwana consisted of 4 classes, namely Holothuroidea, Class Ophiuroidea, Echinoidea and

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Asteroidea. Echinoderms on the coast of Nirvana have a low average Dominance Index [6]. This study uses the location of Lakeba Beach which is also located in the same city. Based on this description, the authors conducted research on the Inventory of Echinoderms in the Intertidal Zone of Lakeba Beach, Baubau City.

2. Material and Method

2.1. Research Time and Place

This research was conducted in August 2022 at Lakeba Beach in Sulaa Village, Betoambari District, Baubau City, Southeast Sulawesi. The tools and materials used are computer boards, paper, pens, cameras, meters, machetes, raffia ropes and jars for storing preparations.

2.2. Data collection techniques

Data in the study were obtained from 3 location points. Determination of the location of the observation station is done by applying the purposive sampling method, which is a sampling method that is carried out intentionally with the assumption that the sample taken can represent the population and conditions of the research location [6]. This research was conducted at 3 stations with a distance of 200 m and a width of 50 m between stations along the intertidal zone.

2.3 Data Analysis

The data analysis used in this study was descriptive analysis to obtain an overview of the types of Echinoderms found and to determine the number of individuals of each species found at the three observation stations.

3. Results and Discussion

Echinoderms are basically indicators of the health and status of reefs coral in the sea. The bottom of the waters is sloping with a substrate of sand, coral reefs and debris coral which is a habitat for Asteroidea and Echinoidea species [7]. Inventory carried out at three station points found five species of Echinoderms. The results of the study are listed in the following table.

Table 3.1. results of research on the phylum Echinoderms inventory

Jenis Echinodermata	Stasiun 1	Stasiun II	Stasiun III	Total
<i>Linckia laevigata</i>	0	1	0	1
<i>Ophiocoma scolopendrina</i>	3	2	5	10
<i>Paracentrotus lividus</i>	1	3	0	4
<i>Diadema paucispinum</i>	1	0	4	5
<i>Holothuria scabra</i>	0	0	1	1
Jumlah total	5	6	10	21

Source: Research data processed in 2022.

Table 3.1 shows the total number of each species of the phylum Echinoderms found. Species of blue sea star (*Linckia laevigata*) was found as many as 1 individual at station 1. This species belongs to the Echinodermata film class Asteroidea and is classified as a true starfish with the characteristics of having five cylindrical arms, fine spots, but seen attached to the the ends. The population distribution of this species covers the widest area compared to the water population in the waters. The individuals are found in all habitat types from intertidal to subtidal depths of more than 10 m, but are more likely to be widely distributed and occupy coral reef microhabitat areas [8].

3.1 *Linckia laevigata*

Blue starfish (*Linckia laevigata*) is a species of sea star whose association is harmless to Coral reefs. Different from the stars sea of thorns (*Acanthaster planci*) association with coral reefs can harm coral reefs because of animals it is the main predator of the reef coral for its main food are coral polyps [9]. *Linckia laevigata* is often found in tropical areas and functions as an anti-bacterial [7]. This study found that the *Linckia laevigata* species were at station II. *Linckia laevigata* has five cylindrical arms with a bright blue or light blue body color and yellow tube feet. In addition, some characteristics of green, pink, and yellow have been found. *Linckia laevigata* can grow to a size of 30 to 40 centimeters. Body color is obtained from a blue pigment called

linckiacyanin and some yellow carotenoids [10]. *Linckia laevigata* found on the shores of Lakeba as shown in Figure 1.

Kingdom : Animalia
 Phylum : Echinodermata
 Subphylum : Asterozoa
 Class : Asteroidea
 Infraclass : Neoasteroidea
 Superorder : Neoasteroidea
 Order : Valvatida
 Family : Ophidiasteridae
 Genus : *Linckia*
 Species : *Linckia laevigata*
 Source: (Linnaeus, 1758)

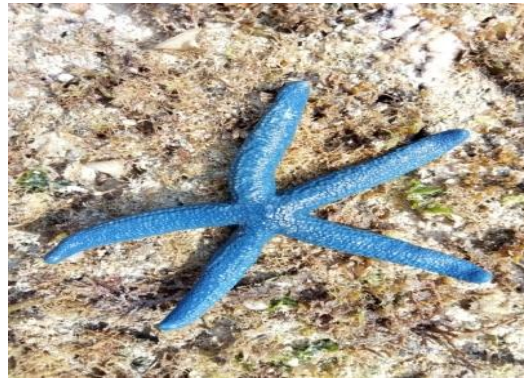


Figure 1. *Linckia laevigata*

3.2 *Ophiocoma scolopendrina*

Star snake (*Ophiocoma scolopendrina*) is a species of the phylum Echinoderms class Ophiuroide found at each station. The characteristics of this species is that it has five simple unbranched arms. At the end there is a tooth papilla [11]. This study found 10 individuals each 3 individuals at station I, 2 individuals at station II and 5 individuals at station III. *Ophiocoma scolopendrina* found on the shores of Lakeba as shown in Figure 2.

Kingdom : Animalia
 Phylum : Echinodermata
 Class : Ophiuroidea
 Order : Ophiacanthida
 Family : Ophiocomidae
 Genus : *Ophiocoma*
 Species : *Ophiocoma scolopendrina*



Figure 2. *Ophiocoma scolopendrina*

3.3 *Paracentrotus lividus*

Paracentrotus lividus are species of the phylum Echinoderms class Echinoidea. *Paracentrotus lividus* is a large sea urchin, the largest size can reach 7.5 cm. Color varies (black-purple, purple, red-brown, dark brown, yellow-brown, light brown or olive green). *Paracentrotus lividus* can be consumed, countries that use this animal as food such as Ireland, Galicia, Portugal, Croatia, France, Italy, Spain and Greece [12]. Species of *Paracentrotus lividus* were found at station 1 as many as 1 individual and at station 2 found as many as 3 individuals while the species *Diadema paucispinum* was found at station 1 as many as 1 individual and at station 3 there were four individuals. The characteristics of this species are marine animals that are round and covered in spines that can be moved all over the surface of their bodies [13].

Kingdom : Animalia
 Phylum : Echinodermata
 Class : Echinoidea
 Superorder : Echinacea
 Order : Camarodonta
 Family : Parechinidae
 Genus : *Paracentrotus*
 Species : *Paracentrotus lividus*
 Source (Lamarck, 1816)



Figure 3. *Paracentrotus lividus*

3.4 *Diadema paucispinum*

Sea urchins belonging to the genus *Diadema* are one of the dominant grass eaters and forces of erosion of the substratum in shallow tropical reef environments. These animals compete with other herbivores and can affect the interactions between algae and corals. The genus *Diadema* plays an important role in tropical reef ecology, and the factors influencing population dynamics. One of the species included in this genus is *Diadema paucispinum* [14]. At the research site, there were 5 individuals of *Diadema paucispinum*, one individual was found at station I and four individuals were found at station III. *Diadema paucispinum* found at the study site as shown in the picture 4.

Kingdom : Animalia
Phylum : Echinodermata
Subphylum : Echinozoa
Class : Echinoidea
Subclass : Euechinoidea
Infraclass : Aulodonta
Superorder : Diadematacea
Order : Diadematoidea
Family : Diadematidae
Genus : *Diadema*
Species : *Diadema paucispinum*

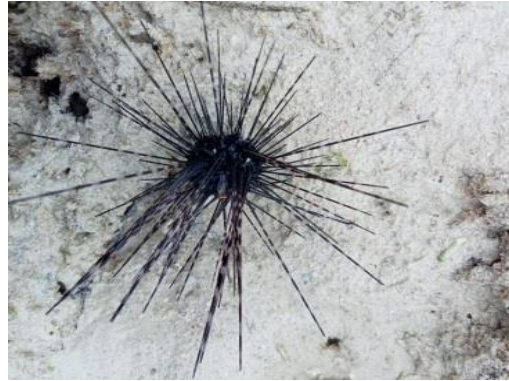


Figure 4. *Diadema paucispinum*

3.5 *Holothuria scabra*

Holothuria scabra is a species of the phylum Echinoderms class Holothurioidea. This species was found at station 3 as many as 1 individual. The characteristics of this species is to have a round body shape, the color of the back is gray to slightly blackish with transverse stripes and between the lines there is a white color. The entire surface of the abdomen is rough to the touch. Each of these sea cucumbers live separately between corals and waters whose bottom contains fine sand and is overgrown with luat/luat grass [15]. The most common species found was *Ophiocoma scolopendrina* (snake star) as many as 10 individuals. *Holothuria scabra* is the most exploited species of sea cucumber, especially on Qeshm Island due to high demand from Indian and Bangladeshi traders [16].

Kingdom : Animalia
Phylum : Echinodermata
Class : Holothuroidea
Order : Holothuriida
Family : Holothuriidae
Genus : *Holothuria*
Species : *Holothuria scabra*



Figure 5. *Holothuria scabra*

4. Conclusion

There are 5 species of echinoderms found in the intertidal zone of the Lakeba coast, namely *Linckia laevigata* from the Asteroidea class, *Ophiocoma scolopendrina* from the Ophiuroidea class, *Paracentrotus lividus* and *Diadema paucispinum* from the Echinoidea class and *Holothuria scabra* from the Holothurioidea class. The most common type is *Ophiocoma scolopendrina*.

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