



Sea Urchin (*Echinoidea*) Distribution and Abundance in the Intertidal Zone of Bengkulu Regency

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Abstract

Sea urchins is the member of *Echinoidea*. This species can be found in tropical marine water to the poles. The study aimed to know the types, the abundance and spread of sea urchins in Bengkulu Regency. The research, used the transect method. Each station consisted of 3 transects with a length of 50 meters from the shore into the sea with the distance of 10 meters among the transects. This research obtained five species consisting of three species of the *Diadema* (genus) and two species of the *Echinotrix* (genus) i.e. *Diadema antillarum*, *D. savignyi*, *D. setosum*, *Echinotrix calamaris* and *E. deadema*. The density of sea urchins in Lemukutan Island ranges from 273 – 453 ind/Ha. The Density of sea urchins on Penata Kecil island ranges from 167 - 347 ind / Ha and on Penata Besar Island has a range from 307 - 387 ind/Ha. The highest diversity of sea urchins was found in Penata Kecil Island of (1.2355). The distribution of sea urchins in Lemukutan and Penata Besar Island was categorized into clumped and evenly distributed, while the distribution of sea urchin on Penata Kecil Island is included in the clustered and random categories. Distribution of sea urchins on the island is influenced by several factors such as sea water waves and food contained in the environment.

How to Cite

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INTRODUCTION

West Kalimantan is a province that has the highest potential population of sea urchins, it can be discovered in Lemukutan, Penata Besar and Penata Kecil Island. Based on surveys that have been conducted of the islands, organisms the most widely found is sea urchins. Sea urchins, according to Hilda *et al.* (2012), are sea animals that 95% of them have thorns in the surface of their body. Sea urchin plays an important role in a food chain in the coast, especially in coral reef ecosystems. So, this animal can be found from tropical waters to poles.

Zakaria (2007) has found 7 types of sea urchins on Cingkuak Island, Sikuai Island and Setan Island, West Sumatra, namely *Diadema setosum*, *Echinotrix deadema*, *E. calamaris*, *D. antillarum*, *D. savingii*, *E. mathaei* and *Arbacia lixula*. Another research has also been conducted by Yudasma (2013) who found 7 types of sea urchins with low diversity in Menjangan Island, Bali Province, namely *D. setosum*, *Toxopneustes pileolus*, *Tripneustes gratilla*, *Echinometra mathaei*, *Salmacis belli*, *Pseudobolatia maculata* and *Mespilia globules*.

Lang & Schrerther (1976) stated that sea urchin had been used by the community as a source of food and played a role in the health sector. According to Angka & Suhartono (2000), sea urchin can also be used to lower blood pressure and improve body metabolism. The population of sea urchins in the coastal ecosystems of Lemukutan, Penata Besar and Penata Kecil Island can be decreased by the excessive harvesting of sea urchins without conservation efforts and the damage to coral reef ecosystems due to human activities such as dock making and keramba.

The efforts to utilize sea urchins can be made with information about the distribution of sea urchins in water. Therefore, the study of the existence of sea urchin should be done especially regarding the distribution and abundance of sea urchin species in Lemukutan, Penata Besar and Penata Kecil Island of Bengkayang Districts.

This research is expected to provide information to the public and stakeholders about the existence of sea urchins in the area of intertidal waters on Lemukutan, Penata Besar and Penata Kecil Island of Bengkayang Regency.

METHODS

Time and Place

The study was conducted from May - July, 2015 in intertidal zone of Lemukutan, Penata Besar and Penata Kecil Island of Bengkayang Re-

gency. The identification process of sea urchins was established in Zoology Laboratory Faculty of Mathematics and Natural Sciences University Tanjungpura Pontianak.

Description of Research Location

Lemukutan Island has an area of 12,520 ha, Penata Besar Island has an area of 4875 ha and Penata Kecil has an area of 975 ha. Lemukutan, Penata Besar and Penata Kecil Islands are located in Sungai Raya District. The northern part is adjacent to Tujuh belas Subdistrict of Singkawang City. The eastern part is adjacent to Samalantan district, while in the southern part is adjacent to Sungai Kunyit District and west with South part is adjacent to China Sea / Natuna.

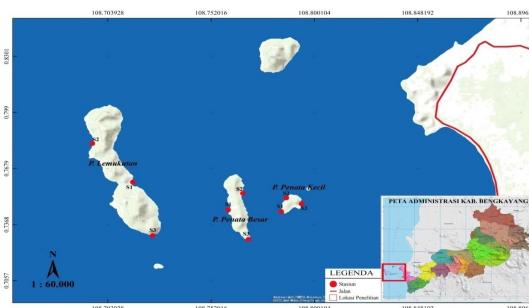


Figure 1. Map of The Location of Research Station (Map Template ArcGis, 2016)

Sample Identification

Sampling was done using the transect line. Each station consisted of three transects with a length of 50 m. Each transect had a distance of 10 meters with the other transects. Then samples were identified at the Zoological Laboratory of FMIPA UNTAN.

Environmental Parameter Measurement

Measurements of environmental parameters were carried out at each sampling station. Parameters measured include water and air temperature, brightness, depth, salinity and water pH.

Data analysis

Data analysis included Density (K), Relative Density (KR), Attendance Frequency (FK), Diversity Index (H'), Evenness Index (E), Dominance Index (C) and Morisita Index (IM).

RESULTS AND DISCUSSION

The sea urchins found in the intertidal waters of Penata Kecil, Penata Besar and Lemukutan Island were 5 species, comprising 3 species of the *Diadema* (genus) and 2 species of the *Echi-*

Table 1. The Description of Each Research Station

Location	Station	Coordinat	Environment Area
Lemukutan	I	N 0° 45'36.50" E 108° 42'56.90"	Beaches are sandy, gently sloping, muddy substrate, corals die and live
	II	N 0° 47'0.19" E 108° 41'49.66"	Shore ramps, small stone substrates, dominated by the kind of massive coral
	III	N 0° 43'46.50" E 108° 43'28.50"	Custeep, cobblestone substrates, extensive coral reefs, there are coral dead and alive
Penata Besar	I	N 0° 44'43.50" E 108° 45'40.30"	Beaches are muddy with sand substrates, ramps, there are coal dead and alive
	II	N 0° 45'17.10" E 108° 45'54.60"	Shore ramps, small stone substrates, dominated by the kind of massive coral
	III	N 0° 43'46.00" E 108° 46'9.00"	Steep, cobblestone substrates, extensive coral reefs, there are coral dead and alive
Penata Kecil	I	N 0° 44'41.90" E 108° 47'5.60"	Ramps, muddy sand substrates, there are coral dead and alive
	II	N 0° 45'1.30" E 108° 47'15.80"	ramps, small stone substrates, dominated by the kind of massive coral
	III	N 0° 44'54.80" E 108° 47'36.40"	Steep, cobblestone substrates, extensive coral reefs, there are coral dead and alive

notrix (genus). The type of sea urchin found was dominated by *Diadema setosum* (337 individuals), 80 individuals in Penata Kecil Island, 110 individuals on Penata Besar Island and 147 individuals on Lemukutan Island (Table 2).

The density of sea urchins found in Penata Kecil Island ranging from 167 - 347 ind / Ha. The highest total density was found in station 3 (around 347 ind / ha) and the lowest total density was found in station 2 (around 167 ind / ha). The highest frequencies of the sea urchin species in Penata Kecil Island were *D. savignyi*, *D. setosum*, *E. calamaris* and *D. antillarum* which have 100% of marking. More over, the lowest frequency occurred in *E. deadema* with 66.66% of marking (Table 3).

The density of sea urchins on Penata Besar Island has a range from 307 - 387 ind/Ha. The highest density was at station 2 with around 387 ind/Ha, while the lowest total density was found at station 3 with around 307 ind/Ha. Species with the highest frequencies in Penata Besar Island were *D. savignyi*, *D. setosum* and *E. calamaris* with 100% and the lowest was *D. antillarum* 33.33% (Table 4).

The density of sea urchins found in Lemukutan Island has a range from 273 - 453 ind/Ha. The highest total density at station 1 had a range around 453 ind/Ha, while the lowest total density at station 2 has a range around 273 ind/Ha. Species with the highest frequencies in Lemukutan Island were *D. savignyi*, *D. setosum* and *E. cala-*

maris with 100% of mark (Table 3) and the lowest *D. antillarum* with 66.66%. On the other hand, *E. deadema* was not found in Lemukutan Island.

Index of Diversity (H'), Evenness (E) and Dominance (C) Types of sea urchins on Lemukutan, Penata Besar and Penata Kecil Island

Index of diversity (H') of the sea urchins on Penata Kecil Island was approximately 0.9938 - 1.2355, whereas, Penata Besar Island was within 0.7726 - 0.9083 and in Lemukutan Island was around 0.2632 - 0.3993. The result of dominance index (C) of the sea urchins on Penata Kecil Island has ranging roughly 0.3795 - 0.5281, while on Penata Besar Island has ranging around 0.5448 - 0.5535 and Lemukutan Island ranged approximately 0.6704 - 0.8121. The result of evenness index (E) on Penata Kecil Island ranged just over 0.6175 - 0.8237, while Penata Besar Island ranged just under 0.6643 - 0.7033 and Lemukutan Island ranged about 0.1899 - 0.3942 (Table 6)

The result of 'Morisita' index of types of sea urchins on Lemukutan, Penata Besar and Penata Kecil Island

The spread of sea urchin in Penata Kecil Island has a tendency to split up (Table 7). The sea urchins tend to clump or to have a greater score of Morisita index than 1 ($IM > 1$) which found in species of *Diadema setosum*, *D. savignyi*, *D. antillarum*, and *Echinotrix diadema*. There was one species

Table 2. The number of individual types of sea urchins on the Penata Kecil, Penata Besar and Lemukutan island

Species	The number of individual types of sea urchins												Σ (Total)
	Penata Kecil				Penata Besar				Lemukutan				
	S1	S2	S3	Total	S1	S2	S3	Total	S1	S2	S3	Total	
<i>Deadema antillarum</i>	8	5	3	16	-	3	-	3	4	1	-	5	24
<i>D. savignyi</i>	8	4	5	17	5	9	11	25	1	6	3	10	52
<i>D. setosum</i>	29	14	37	80	36	42	32	110	61	33	53	147	337
<i>Echinotrix calamaris</i>	3	2	4	9	4	2	3	9	2	1	3	6	24
<i>E. deadema</i>	3	-	3	6	5	2	-	7	-	-	-	-	13
Total	51	25	52	128	50	58	46	154	68	41	59	168	

Table 3. Density (K), Relative Density (KR), and Attendance Frequency (FK) Sea Urchins on the Penata Kecil

Species	Station 1		Station 2		Station 3		FK(%)
	K(ind/Ha)	KR(%)	K(ind/Ha)	KR(%)	K(ind/Ha)	KR(%)	
<i>D. antillarum</i>	53.33	15.69	33.33	20	20	5.77	100
<i>D. savignyi</i>	53.33	15.69	26.67	16	33.33	9.62	100
<i>D. setosum</i>	193.33	56.86	93.33	56	246.67	71.15	100
<i>E. calamaris</i>	20.00	5.88	13.33	8	26.67	7.69	100
<i>E. deadema</i>	20.00	15.69	-	-	20.00	5.77	66,66
Total	340	100	167	100	347	100	
Σ Species	5		4		5		

Table 4. Density (K), Relative Density (KR), and Attendance Frequency (FK) Sea Urchins on the Penata Besar

Species	Station 1		Station 2		Station 3		FK(%)
	K(ind/Ha)	KR(%)	K(ind/Ha)	KR(%)	K(ind/Ha)	KR(%)	
<i>D. antillarum</i>	-	-	20,00	5,17	-	-	33,33
<i>D. savignyi</i>	33.33	10	60.00	15.56	73.33	23.91	100
<i>D. setosum</i>	240.00	72	280.00	72.41	213.33	69.56	100
<i>E. calamaris</i>	26.67	8	13.33	3.44	20.00	6.52	100
<i>E. deadema</i>	33.33	10	13.33	3.44	-	-	66.66
Total	333	100	387	100	307	100	
Σ Species	4		5		3		

Table 5. Density (K), Relative Density (KR), and Attendance Frequency (FK) Sea Urchins on the Lemukutan

Species	Station 1		Station 2		Station 3		FK(%)
	K(ind/Ha)	KR(%)	K(ind/Ha)	KR(%)	K(ind/Ha)	KR(%)	
<i>D. antillarum</i>	26.67	5.88	6.67	2.43	-	-	66.66
<i>D. savignyi</i>	6.67	1.47	40.00	14.63	20.00	5.08	100
<i>D. setosum</i>	406.67	89.70	220	80.48	353.33	89.83	100
<i>E. calamaris</i>	13.33	2.94	6.67	2.43	20	5.08	100
Total	453	100	273	100	393	100	
Σ Species	4		4		3		

Table 6. Diversity Index (H'), Evenness Index (E) and Dominance Index (C)

Island	Station	Coordinat	H'	C	E
Penata Kecil	1	N 0° 44'4190" E 108° 47'560"	1.2355**	0.3795*	0.7676
	2	N 0° 45'130" E 108° 47'1580"	1.1419	0.3856	0.8237**
	3	N 0° 44'5480" E 108° 47'3640"	0.9938	0.5281	0.6175
Penata Besar	1	N 0° 44'4350" E 108° 45'4030"	0.8991	0.5448	0.6486
	2	N 0° 45'1710" E 108° 45'5460"	0.9083	0.5535	0.5643
	3	N 0° 43'4600" E 108° 46'900"	0.7726	0.5454	0.7033
Lemukutan	1	N 0° 45'3650" E 108° 42'5690"	0.2632*	0.8093	0.1899*
	2	N 0° 47'019" E 108° 41'4966"	0.5465	0.6704	0.3942
	3	N 0° 43'4650" E 108° 43'2850"	0.3993	0.8121**	0.3643

Description: * : The Lowest Value , ** : The Highest Value

Table 7. Morisita Index's Value of types of Sea Urchins found in The Penata Kecil, Penata Besar and Lemukutan island

	Island	Morisita Index Value (IM)			
		<i>D setosum</i>	<i>E calamaris</i>	<i>D savignyi</i>	<i>E deadema</i>
Penata Kecil	1.2	1	1.2	3.6	1.8
Penata Besar	1.1	2.5	0.9	4.7	3
Lemukutan	1.1	0.6	1.8	-	0.9

Table 8. Environmental Conditions of Sea Urchins Habitat on The Penata Kecil, Penata Besar and Lemukutan Island

Environmental Factor	Penata Kecil Island	Penata Besar Island	Lemukutan Island
Water Temperatur (°C)	29.66-31	28.66-32	27.33-28
Air Temperatur (°C)	31-32	30-32	29-32
Salinity (‰)	33-34	34	34-35
Depth (cm)	48-60.66	58.33-71.66	54-88.33
pH	8	8	8
Brightness (cm)	48-60.66	58.33-71.66	54-88.33

with score IM=1 that tend to have a random namely *E Calamaris*. The spread of sea urchins on Penata Besar Island also tend to clump with score ((IM>1) (*D setosum*, *D antillarum*, *E calamaris* and *E deadema*) and only one species had a tendency to be harmonic with score (IM<1) which found in species of *D. savignyi*. The spread of sea urchins in Lemukutan Island also tend to clump (IM>1) and it can be found in *D. Setosum* and *D. Savignyi*, while the spread of harmonic (IM<1) can be found in *E. calamaris* and *D. antillarum* (Tabel 7)

The Environment of Physical Condition at Research Locations

Parameters of chemical physics measured on Penata Kecil, Penata Besar and Lemukutan Island were water temperatures (27° - 32° C), air temperatures (29° - 32° C), water salinity ranging from (33° - 35°), water depth (54 - 88.33 cm),

water pH 8 and water brightness (48 cm - 88.33 cm) (Table 8). The sea urchins found in the three islands were *D. antillarum*, *D. savignyi*, *D. setosum*, *E. calamaris* and *E. deadema* (Table 2). These results were different from those found in Zakaria (2007) in Cingkuak Island, Sikuai Island and Setan Island, in West Sumatera which found 7 species of sea urchins namely *Arbacia lixula*, *D. antillarum*, *D. savignyi*, *D. setosum*, *E. calamaris*, *E. deadema* and *E. mathaei*. Species of sea urchins such as *A. lixula* and *E. mathaei* were not found at the site of this study due to the depth of the waters in the sampling area. Water depth in Zakaria's research (2007) was more than 1 m, while the depth of waters at this location ranges from 0.4 m - 0.8 m According to Vimono (2007), species of sea urchins such as *A. lixula* and *E. mathaei* are often found in specific habitats, such as in the crevices of coral reefs with a depth ranging from 1 - 15 m.

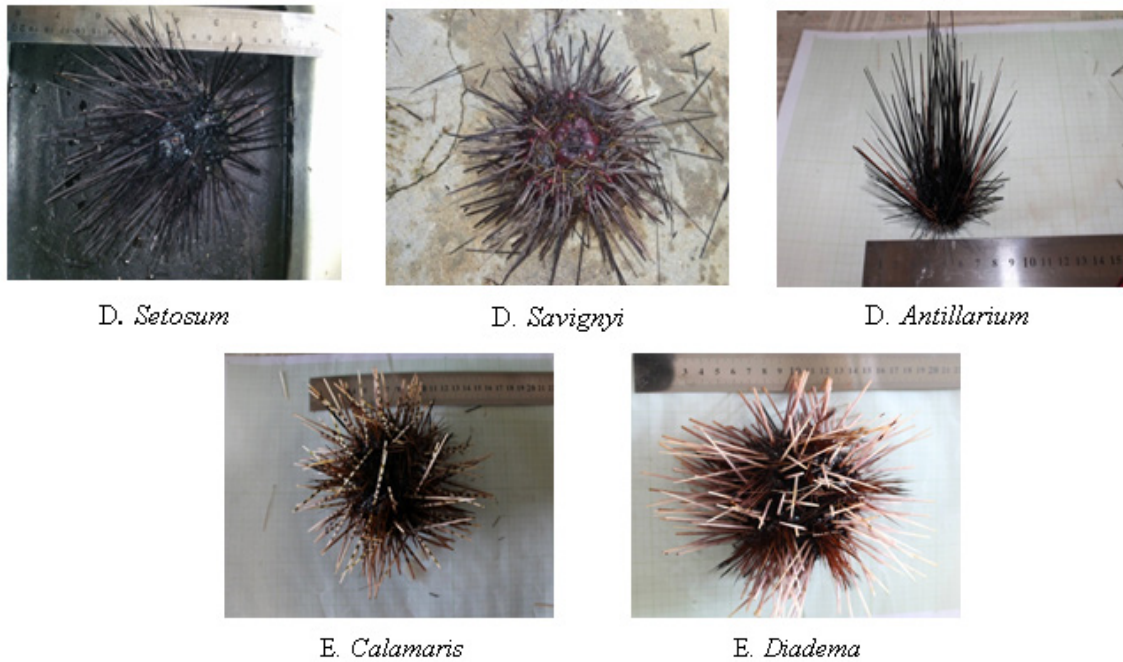


Figure 2. Types of sea urchins on the Penata Kecil, Penata Besar and Lemukutan island.

Rahmasari *et al.* (2015) showed that environmental condition like temperature, salinity, pH, water velocity, and base substrated can effect on organisms abundance. The results showed that the density of sea urchins in each island is different. This is influenced by habitat conditions such as substrate and feed availability on each island. According to Kekenusa (1993) in Radjab (2000), differences in the value of the density of sea urchins can be attributed to the lack of food availability, as well as the ability to compete in habitat, both in the form of rocky areas and rocky waters

The highest density of sea urchins was found in Lemukutan Island with a total density of 453 ind / Ha (Table 5). The lowest density of sea urchins was found in Penata Kecil Island with a total density of 167 ind / Ha (Table 3). Lemukutan Island has large coral reefs and there are many macroalgae in the island Andriyanto (2007) showed that there are 33 species of macroalga dominated by Phaeophyceae class from *Dictyotaceae* family, *Padina gymnospora*, *Sargassum* family, *Sargassum paniculatum* and *Sargassum crassifolium*, and *Rhodophyceae* class from *Corallinaceae* family, *Amphiroa rigida* According to Ratna (2002), main meals of sea urchins are *Chlorophyta* (green algae) and *Phaeophyta* (brown algae)

The highest frequency of sea urchins from the three Islands was found in *D. savignyi*, *D. setosum* and *E. calamaris* species with 100%. *D. savignyi* has long thorns so that the spines can be deeper embedded in the bottom of the waters and

protect it from sea waves. Therefore, the frequency of presence of *D. savignyi* is high *D. setosum* was found in sandy habitat types, coral reefs, to rocky areas. resulting in frequency of *D. setosum* on the Island to be relatively high Thamrin *et al.*, (2011) stated that *D setosum* was the sea urchins which mostly found in rocky coastal areas and coral reefs spread across the Indo-Pacific region. *Echinotrix calamaris* has strong and sharp spines that can harm predators These sea urchins are difficult to be devoured by predators, leading to the presence of high *Echinotrix calamaris*.

The value of the diversity of sea urchin (H') in Lemukutan Island ranged from 0.2632 – 0.5465 the diversity (H') of sea urchins on Penata Besar Island is around 0.7726 – 0.9083, whereas on Penata Kecil Island is approximately 0.9938 – 1.2355 (Table 5). Of the three locations, the index value of the diversity of sea urchins on Penata Kecil Island is higher than Lemukutan Island and Penata Besar Island. The sea urchins on Penata Kecil Island fall into the category of medium diversity (1 - 3), while Lemukutan Island and Penta Besar Island are at low density (<1) According Odum (1993), the value of diversity ranging from 0 to 1 included in the low category.

The low level of diversity in Lemukutan Island and Penata Besar Island was caused by the activity of tourist boat and fishing boat. The ship's propeller can damage the corals directly. In addition, the spillage of fossil fuel ships that contaminate marine waters also disrupts the activity and survival of sea urchins. Rumahlatu,

(2011) stated that *D. setosum* is more tolerant of heavy metal pollutants in water areas due to ship activity. The Hutaauruk study (2009) showed that *Diadema* density was found to be highest in areas which close to citizen settlements and ship belaying. The diversity of sea urchins on Penata Kecil Island has a medium category. This condition is due to the lack of community activities in taking and utilization of sea urchins around the area.

The dominance index (C) on Lemukutan Island was around 0.6704 – 0.8121, while on Penata Besar Island was within 0.5448 – 0.5535. It indicates that the dominance of sea urchins is in medium category. The dominance number of sea urchins on Penata Kecil Island has ranged around 0.3795 – 0.5281 yet it is included in the low category. This is in accordance with what was stated by Odum (1971) that if the number of dominance index closed to zero, so that there is not sea urchins which dominances in the waters. However, if the number of dominance index closed to one, there is absolutely a certain organism which dominate the area. The unity number (E) of sea urchins on Lemukutan Island has ranged around 0.8237 – 0.3942, while the unity number of sea urchins on Penata Besar Island ranged around 0.5643 – 0.7033 and in Penata Kecil Island ranged approximately 0.6175 – 0.8237. According to Odum (1993), the smaller the value of uniformity index organisms then spread each type is not the same individual, but there is a trend is dominated by a particular type, and if the value of the index is the uniformity of the higher organisms then spread of individual each type of more uniform.

Environmental conditions in the waters influence any pattern of sea urchins Based on this research, the species of *D. antillarum* and *E. calamaris* on Lemukutan Island had a pattern of distribution around 0.6 – 0.9. Equality of distribution patterns in the sea urchins caused by waters area which was overgrown with macroalgae. According to Coppard and Campbell (2005), *D. antillarum* and *E. calamaris* consuming macroalgae of *Sargassum* sp and *Caulerpa* sp that are living in coral reefs.

Species of *D. setosum* and *D. savignyi* have values of distribution patterns around 1.1 to 1.8 which means that the distribution patterns fall into clustered categories According to Nontji (2005), clustered life in the sea of sea urchins was also a special adaptation to protect themselves from predatory attacks, such as bloated fish with sharp teeth and sea crabs that can break the thorns and tear the shells of sea urchins with their claws.

Based on the results obtained in Penata Be-

sar Island, *D. savignyi* species has a distribution pattern value of 0.9, classifies the distribution of sea urchins into prevalent distributed categories. This condition is caused by source food which is quite abundant one of them sea grass plants. According to Setiabudi *et al.*, (2016), an ideal habitat for the sea grass ecosystem it is located in the tidal zone, with shallow waters, ranging from 0 to 5 meters in depth. Nurdiansyah (2010) stated that the seagrass community located in the coastal area of Penata Besar Island composed by seagrass species such as *Enhalus acoroides* Seagrass of this species is the preferred feed by the sea urchins.

Species of *D. antillarum*, *D. setosum*, *E. deadema* and *E. calamaris* have a clustered distribution pattern with a score around 1.1 to 4.7. The sea urchins from the four species were often found colonizing on sand substrate, coral and rocky boulders. This is clarified by Colin & Arneson (1995) statements that most of the sea urchins colonize around coral boulders and coral fractures so that sea urchins can hide among the coral gills.

Based on the results obtained, *D. antillarum* species, *D. savignyi*, *D. setosum* and *E. deadema* on Penata Kecil Island have a clustered distribution pattern with score around 1.2 – 3.6 (Table 47). The clustered distribution pattern in the sea urchins on Penata Kecil Island is influenced by open habitats that directly opposite the open-seas and waters such as sea water waves, so the sea urchins look for crevices to live inside. According to Sugiarto & Supardi (1995), sea urchins could generally live in clusters of dead coral holes and it can also increase the depth of the coral hole. It did it as an adaptation to face the influence of sea water waves in areas with currents. Species of *E. calamaris* has a score 1 of distribution pattern 1 which means it falls into a random category. The random distribution pattern occurred by the activity of sea urchins that often move to survive from predatory attacks (Aziz, 1987).

The brightness measured at all stations (on Lemukutan Island, Penata Besar and the Penata Kecil) was 100%. This indicates that the base of the waters can still be seen clearly from the surface. According to Hutabarat & Stewart (2000), the brightness of the clear waters would help the process of photosynthesis of seagrass and algae, so that the activity of sea urchins found frequently in the sunny waters of the overgrown plants. The results of measurements of the depth on the Lemukutan Island was around 88.33-54 cm, on Penata besar Island was 58.33-71.66 cm, and on Penata Kecil Island was around 48-60.66 cm. According to Radjab (2004), the waters to a depth of

0.5-20 metres was suitable for sea urchins. They were also found at a depth of coral reef habitats overgrown by seagrass and algae, which were a macrohabitat favoured by sea urchins.

Water temperature on the Lemukutan, Penata Kecil and Penata Besar Island was around 27.33-32°C and air temperatures was around 29-32°C. Temperature on the Island still supports the life of sea urchins. Natural temperatures in coral cover and seagrass were ranged around 28 - 32 ° C (MenLH, 2004).

The results of salinity measurements conducted on Lemukutan Island, Penata Besar and Penata Kecil Island showed the value of around 33 - 35 %. The range of salinity found in every island still supports the life of sea urchins. According to Edward and Marasabessy (2003), salinity that supports the life of sea urchins is ranged from 31 – 34.5 %.

Acidity level (pH) of the waters in each research location on Lemukutan Island, Penata Besar and Penata Kecil Island is 8. The pH's range in this study is in accordance with pH quality standard of the sea waters around 7 – 8.5 which still supports the life of sea urchins (MenLH, 2004).

This research was conducted to support the efforts of the conservation of sea urchins in the area of intertidal waters and sea urchins is one of the indicators of sea water pollution in marine waters.

CONCLUSION

Sea urchins found in the research site were *D. savignyi*, *D. antillarum*, *D. setosum*, *E. deadema*, and *E. calamaris*. Highest abundance of sea urchins was found in Lemukutan Island with 453 Ind/Ha of *D. setosum*. Lowest abundance was found in the Penata Kecil Island with 167 Ind/Ha of *E. calamaris*. The distribution of sea urchins in the Lemukutan and Penata Besar Island is in the category of clumped and evenly distributed. The diversity of sea urchins in the Penata Kecil Island is in medium category which range from 0.9938 to 1.2355, while in the Lemukutan and Penata Besar Island is in the low category with the value of 0.2632-0.5465 and 0.7726-0.9083 respectively.

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