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LINKAGES BETWEEN CORAL REEF CONDITIONS WITH THE DISTRIBUTION AND DIVERSITY OF MEGABENTHIC FAUNA IN THE WATERS OF BARRANGLOMPO ISLAND, MAKASSAR CITY

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ABSTRACT

Coral reefs are the most diverse and complex underwater ecosystems in terms of biodiversity, including megabenthic fauna. Megabenthos is organism with a size of more than 1 cm that lives on the bottom/substrate of waters which includes attached, crawling and burrowing biota on the seabed. The research was conducted using the Line Intercept Transect and Benthos Belt Transect methods. The results of the study of coral conditions showed the percentage of live coral cover with conditions from bad to very good. The bad category was found in the west (24.56%) and south of the island (20.55%). The moderate category was found in the northwest (45.35%) and southwest of the island (30.08%) while the very good category was found in the north (80.68%) and south of the island (75.92%). The megabenthos found at the study site were 26 species from 10 megabenthos classes with densities in each category of coral conditions ranging from 12.11 to 23.51 individual/m². The highest density was found in moderate coral conditions dominated by *Polycarpa aurata* species and the lowest in very good coral conditions with the highest number of species found in poor coral conditions with 21 species and the lowest in very good conditions with 11 species. The species diversity (H') of megabenthos at the study site is in the low category. The high number of megabenthic species was associated with high dead coral and algae cover while high megabenthic density was associated with high other and abiotic cover in the form of sand substrate.

Keywords: Coral Coverage, Megabenthos, Ecological Index, Species Diversity

INTRODUCTION

Coral reefs are important ecosystems for the sustainability of coastal area resources. Ecologically, coral reefs are a source of life for a variety of marine life. The biophysical roles of coral reefs are very diverse, including as a place to live, shelter, find food and breed for marine life. In addition, coral reefs also function as a barrier to waves and waves against coastal erosion, and produce biological resources of high economic value (Yudasmara, 2015).

One of the organisms that live on coral reefs is megabenthos. Megabenthos is an organism measuring more than 1 cm that lives on the bottom/substrate of the waters, which includes attached, creeping and burrowing biota on the seabed (Romimohtarto & Juwana, 2009).

The megabenthos group includes biota belonging to the phylum Polychaeta, Echinoderms, Crustacea and Mollusca, whose presence in coral reef areas is influenced by the character, type and zoning of the substrate (Cappenberg & Mahulette, 2019). According to Tatipata & Mashoreng (2019), high species diversity may be influenced by the condition or quality of coral reefs, which means that the better the condition of the coral reefs, the greater the chance of high diversity of megabenthos species, and vice versa.

Barranglompo Island is one of the islands located in zone two of the Spermonde Archipelago. The dense population on Barranglompo Island has an influence on the condition of the associated biota in these waters (Wahyulfatwatul et al., 2017). According to Tahir et al. (2009) the area of Barranglompo Island's coral reef is about 71.72 ha with fringing reef type. Most of the residents of Barranglompo Island work as fishermen and ornamental fish seller which have high prices. Fishing that is not environmentally friendly can certainly damage coral reefs. Other activities that can threaten coral reef ecosystems such as dropping ship anchors on coral reefs (Isnaini, 2018). The increasing needs of people who depend on existing resources on coral reefs may cause ecological damage that is very concerning.

This increasing pressure will certainly threaten the existence and sustainability of coral reefs and the biota that live in them (Yuliani et al., 2016). Damage to coral reefs will trigger the development of several species of dominant megabenthic biota according to water conditions. The movement of megabenthos which is very limited and relatively

fixed on the substrate causes the group to be more sensitive to environmental changes so that this biota has the potential as a bioindicator of coral reef damage (Satyawan & Atriningrum, 2019).

This study aims to determine the bottom cover and condition of coral reefs, as well as the distribution and ecological index of megabenthic fauna in the waters of Barranglompo Island. Based on this, a research was conducted on "The Correlation of Coral Reef Conditions with the Distribution and Diversity of Megabenthic Fauna in Barranglompo Island Waters, Makassar City"

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MATERIALS AND METHODS

The study was conducted in May–September 2021 on Barranglompo Island, Sangkarang Islands District, Makassar City (Figure 1). Measurement of total organic matter in sediments was carried out at the Coastal Geomorphology Laboratory. Measurements of turbidity, water pH, dissolved organic matter were carried out at the Chemical Oceanography Laboratory, Department of Marine Science, Faculty of Marine Sciences and Fisheries, Universitas Hasanuddin

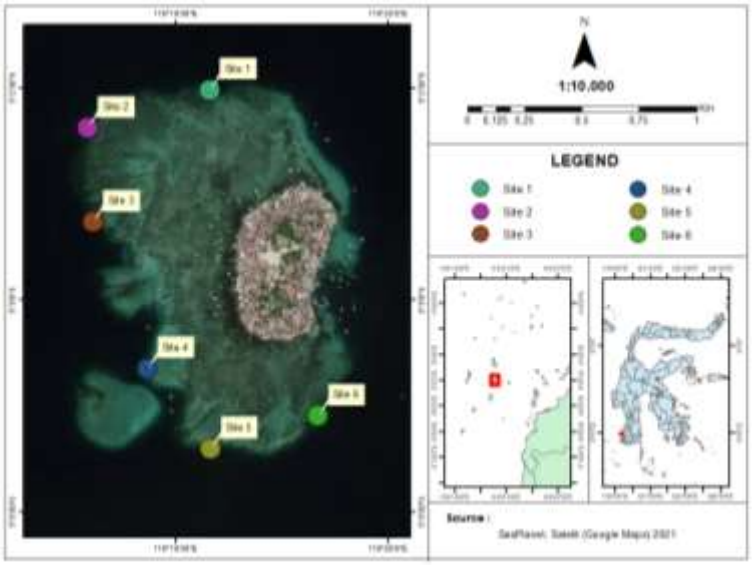

Figure 1. Map of Research location

The method used in data collection was LIT (Line Intercept Transect). This method is used to determine the condition of the benthic substrate of coral reefs based on the pattern of coral growth forms (Lifeform) (English et al., 1997). The working procedure of collecting data on coral cover was by pulling a roller meter parallel to the coastline of 100 meters and divided into 3 subtransects as replicates with a length of 30 meters each and each subtransect separated by a distance of 5 meters.

Megabenthic fauna observations were carried out using the Benthos Belt Transect (BBT) method. This method is a modification of the Belt Transect method (Arbi & Sihaloho, 2017). Megabenthos data retrieval was carried out by recording all the number of species and the number of individuals on the surface of the substrate (epifauna). Data collection for large megabenthos is divided into three sub-transects for each station with a transect length of 30 meters and an observation width of 2 meters, while data collection for small megabenthos uses the help of a 1x1 m² quadratic transect and was placed systematically on a 30 meter long transect line, starting at 0 meters and then every 5 meters (0, 5, 10, 15, 20, 25, and 30 meters).

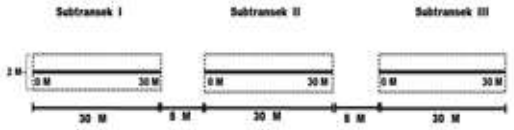

Figure 2. Megabenthic transect schematic

Measurement of environmental parameters was carried out directly and indirectly. Direct measurements include parameters of temperature, salinity, current velocity, while indirect measurements include acidity (pH), turbidity, total sediment organic matter and dissolved organic matter.

Data Analysis

Statistical analysis used in this study was One Way Anova analysis to see a comparison of the magnitude of the bottom cover value between stations and the distribution of the number of species and density of megabenthos based on coral conditions. Megabenthos community analysis used

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ecological index includes diversity index, uniformity index and dominance index. Pearson correlation analysis was used to determine the relationship between bottom cover and feeding mode of megabenthos. Principal Component Analysis (Principal Component Analysis) was used to determine the characterizing factors based on the condition of coral reefs.

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RESULTS AND DISCUSSION

Bottom Cover and Coral Reef Condition

The percentage values for the bottom cover categories of coral reefs on Barranglompo Island are presented in Figure 3. There were three categories that dominant at the research station on Barranglompo Island, i.e., live coral cover, dead coral and abiotic

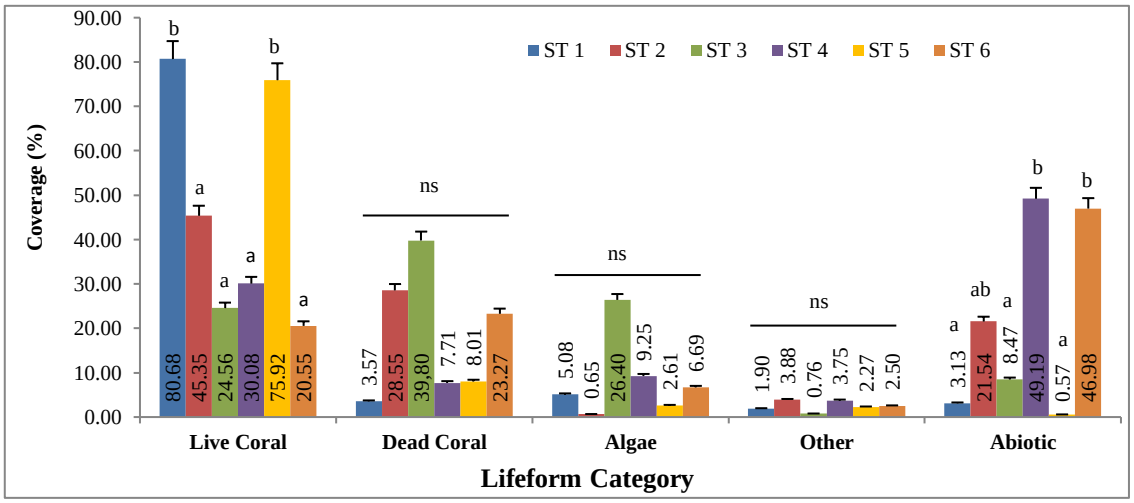

Figure 3. The condition of coral reefs on Barranglompo Island, the symbol (ns) indicates no difference between stations and different symbols indicate a significant difference based on analysis of variance at 5% alpha

The results of the analysis of variance showed a significant difference ($p<0.05$) in the value of live and abiotic coral cover, while the non-significant difference (ns, $p>0.05$) in the cover of dead coral, algae and other. Live coral cover values ranged from 20.55% - 80.68% in poor to very good condition (Ministry of Environment Decree No 4 2001) (Figure 3). Stations 1 and 5 have very good live coral cover, dominated by submassive coral growth of 35.31% at Station 1 and *Acropora* branching (ACB) of 55.78% at Station 5. Both stations are reef slope zones and facing the wind. According to Suryanti et al. (2011) corals that live facing the wind with strong waves tend to have short, strong, creeping or submassive branching growth forms. Live coral cover at Station 2 and Station 4 was in the medium category, dominated by coral submassive (CS) at 12.29% and coral massive (CM) at 12.02% at Station 2 and coral massive (CM) at 14.22% at Station 4, while the bad category was found at Station 3 and Station 6, dominated by coral mushrooms at 8.96% at Station 3 and coral massive (CM) at 11.40%. According to Panggabean & Setiadji (2011) coral growth will be better in current or wavy areas, branching corals and stony corals prefer areas with hard substrates and flowing areas due to abundant nutrient circulation.

Dead coral cover was found in the range of 3.57%-39.80% with the highest percentage at Station 3 at 39.80% and the lowest at Station 1. Dead coral cover at Station 3 was dominated by dead coral algae at 39.73%. Algae can grow rapidly on dead coral cover. The highest algae cover at Station 3 was 26.50% in line with the high dead coral cover at 39.80%. The presence of algae at each station was dominated by the algal turf component. According to Dianastuty et al. (2016) that excess water nutrients (eutrophication) can increase the rapid growth of turf algae in coral reef ecosystems. Low algal cover was obtained at Station 2. The presence of algae at each station was generally found on the substrate of crushed coral and dead coral.

The highest cover of other biota (Other) was obtained at Station 2 at 3.88%, dominated by soft coral at 3.24%, while the lowest was at Station 3. According to Panggabean & Setiadji (2011) the presence of soft coral is an indicator of the condition of hard corals. The growth of soft coral species blooms when the hard coral condition is in a critical or damaged condition. The highest abiotic cover was found at Station 4 at 49.19% dominated by sand at 38.26% and not much different from Station 6 with a cover at 46.98% dominated by sand at 41.54%. According to Muqsit et al. (2016) that one

factors that makes the abiotic components high is the use of explosives that cause coral destruction to rubble. In addition, it is influenced by environmental factors such as current velocity and turbidity level.

Distribution and Species Richness of Megabenthos

In an aquatic habitat, a good condition of the aquatic substrate will support the diversity of the megabenthos community. The richness of the megabenthos species found at the research site was 26 species from 10 megabenthos classes. Based on the number of species, the most common class of megabenthos found was the Gastropod class with a composition of 26.92% or as many as seven species of the 26 types of megabenthos found (Table 1). The class with the lowest species composition came from the Polychaeta and Anthozoa classes with a species composition of only 3.85% or as many as one species from 26 megabenthos species found

Table 1. The composition of the megabenthos class is based on the number of species and the number of individuals at the research site

No	Megabenthos Class	Species Composition		Individual number Composition	
		Number of Species	(%)	Number of Individuals	(%)
1	Polychaeta	1	3.85	37	1.72
2	Ascidiacea	3	11.54	1418	65.92
3	Anthozoa	1	3.85	36	1.67
4	Asteroidea	3	11.54	8	0.37
5	Crinoidea	3	11.54	136	6.32
6	Echinoidea	2	7.69	193	8.97
7	Holothuroidea	2	7.69	3	0.14
8	Ophiuroidea	2	7.69	141	6.56
9	Bivalvia	2	7.69	70	3.25
10	Gastropoda	7	26.92	109	5.07
Total		26	100	2151	100

The composition of the highest number of individuals was found in the Ascidiacea class as much as 65.92% or as many as 1418 individuals while the lowest was found in the Holothuroidea class as much as 0.14% or as many as 3 individuals (Table 1). According to Cappenberg & Mahulette (2019) megabenthos belongs to the group of Polychaeta, Crustacea, Echinoderms whose presence on coral reefs is influenced by the character, type and zoning of the substrate. Cappenberg & Akbar (2020) stated that the better the coral reef ecosystem, the more diverse and abundant the number of individuals associated with the biota associated with the ecosystem.

The composition of the megabenthos class based on the number of species in each coral reef condition is presented in (Table 2). Classes Gastropods and Ascidiacea are classes with a high composition in the category of poor live coral cover (21 species). In the category of moderate coral condition (20 species) a high composition was obtained in the Gastropod, Ascidiacea and Crinoidea classes, while in the very good coral condition (11 species) a high composition was obtained in the Gastropod, Ascidiacea, Echinoidea and Ophiuroidea classes.

Table 2. Distribution and composition of the number of megabenthos species in each coral reef condition

Species	Bad condition	Moderate condition	Very good condition
Polychaeta	4.76	5.00	9.09
Sabella sp	✓	✓	✓
Ascidiacea	14.29	15.00	18.18
Didemnum molle	✓	✓	
Rhopalaea sp	✓	✓	✓
Polycarpa aurata	✓	✓	✓
Anthozoa	4.76	5.00	9.09
Heteractis magnifica	✓	✓	✓
Asteroidea	9.52	10.00	
Culcita novaeguineae	✓	✓	
Linckia laevigata	✓		
Protoreaster nodosus		✓	
Crinoidea	14.29	15.00	
Comaster multifidus	✓	✓	

Comaster nobilis	✓	✓	
Comaster schlegelii	✓	✓	
Echinoidea	9.52	10.00	18.18
Diadema setosum	✓	✓	✓
Echinothrix calamaris	✓	✓	✓
Holothuroidea	4.76	5.00	
Holothuria pardalis	✓		
Synaptula lamperti		✓	
Ophiuroidea	9.52	5.00	18.18
Ophioarthrum pictum	✓		✓
Ophiomastix janualis	✓	✓	✓
Bivalvia	4.76	10,00	
Pedum spondyloideum	✓	✓	
Tridacna squamosa		✓	
Gastropoda	23.81	20.00	27.27
Coriocella nigra	✓		
Cypraea tigris		✓	✓
Lambis lambis	✓	✓	
Chromodoris coi	✓		
Jorunna funebris	✓		
Drupella cornus	✓	✓	✓
Trochus niloticus		✓	✓
Total Species	21	20	11

The high number of megabenthic species in poor coral reef conditions (Station 3 and Station 6) is thought to be due to high dead coral cover and algae cover at these stations. According to Mutaqin et al. (2020) the presence of algae that harm coral reefs can be dispelled by the presence of megabenthos, one of which is sea urchins, because these organisms have a role as grassers (algae eaters) in coral reef ecosystems. The megabenthos class with the highest number of species composition was found in the Gastropod class with a value of 23.81%. Cappenberg and Akbar (2020) stated that the presence of megabenthic fauna is influenced by the character of the substrate, the more diverse the type of substrate (heterogeneous) the greater the chance of its presence. In addition to the Gastropod class, the highest number of species was found in the Ascidiacea and Crinoidea classes of 14.29%.

The number of megabenthic species in moderate category coral reef conditions (Station 2 and Station 4) was obtained as many as 20 species. The composition of the high number of species was found in the class Gastropod and followed by the class Ascidiacea, Crinoidea. This can be influenced by the condition of the waters, where at Stations 2 and 4 stations are faced with the open sea with moderate conditions of live coral and a fairly high cover of dead coral overgrown with algae. Corals that have died sooner or later will be overgrown by algae, while the condition of coral reefs is very good (Station 1 and Station 5), as many as 11 species are obtained. The composition of the high number of species was obtained in the Gastropod class of 27.27%. The high live coral cover at Station 1 and Station 5 affected the number of megabenthos species found at these stations. According to Dody & Winanto (2018) Gastropods are widespread in various marine habitats from the coast to the deep sea, occupying many areas of coral reefs, some of them immerse themselves in the substrate and attach to marine plants. In addition to the Gastropod class, a high number of species was obtained in the Ascidiacea, Echinoidea and Ophiuroidea classes of 18.18%.

The number of megabenthos species in each category of coral reef conditions based on analysis of variance (One Way Anova) found no significant difference between each coral reef condition ($p>0.05$). This indicates that the number of megabenthos species found based on the condition of coral reefs has relatively the same value.

Megabenthos Density

The total density of megabenthos obtained in each condition of coral reefs ranged from 12.11 to 23.51 individual/m². The highest total density of megabenthos was obtained in the medium category of coral reefs of 23.51 individual/m² and the lowest was obtained in the category of very good coral reef conditions of 12.11 individual/m². The results of the statistical analysis of the One Way Anova test obtained a significance value indicating that the results of the total density of megabenthos in each category of coral reef conditions did not show significant differences or had the same value ($p>0.05$).

The density of megabenthos in each category of coral reef conditions was found to be different. The

high density value was obtained in the medium category of coral reefs with a range between 0.01–13.35 ind/m² with a total density of 23.51 ind/m². The highest density was found in the *Polycarpa aurata* species belonging to the Ascidiacea class. According to Kubelaborbir and Akerina (2014), *Polycarpa aurata* species grow on hard substrates and coral cracks and sometimes can also be found on brittle bases by expanding their rhizoid network to bind sand particles into solid parts while the lowest density is obtained in *Cypraea tigris* and *Culcita novaeguineae*. According to Fitriana (2010) *Culcita* sp is a sea star that does not have arms and has a role as a component of building coral reef ecosystems.

In very good coral reef conditions, the density of megabenthos ranged from 0.01 to 4.32 individual/m² with the highest density was *Ophiomastix janualis* and the lowest was *Sabella* sp with a total density of 12.11 individual/m². *Ophiomastix janualis* is one species of brittle star of the class Ophiuroidea. According to Setiawan et al. (2019) The brittle star is classified as a detritus-eating biota that has a role in the waters as an eater of garbage containing organic matter, this group is a food source for fish and crabs that live on coral reefs. In addition, Nugroho et al. (2014) said that brittle stars live between coral crevices and coral holes.

In poor coral conditions, density values were obtained in the range between 0.02 – 9.93 ind/m² with the highest density in *Polycarpa aurata* species with a total density of 21.05 ind/m² and the lowest in *Comaster multifidus*, *Jorunna funebris*, *Holothuria pardalis*, *Ophiarthrum pictum*, *Lambis lambis* and *Coriocella nigra* as much as 0.02 ind/m². Based on the results of the density of megabenthos in each condition of coral reefs, it is shown that *Polycarpa aurata* dominates in each category of coral reef conditions.

Ecological Index

Ecological index values include Diversity (H'), Evenness (E) and Dominance (C) obtained values for each category of coral reef conditions are presented in Figure 4. Based on the ecological index chart, the megabenthos diversity index value (H') for each category of coral reef conditions was obtained with a range of values between 1.571–1.834 with the highest diversity obtained in poor coral reef conditions with a value of 1.834 while the lowest diversity was obtained in moderate coral reef conditions with value is 1.571. For the value of the uniformity index (E) obtained a value with a range between 0.524 - 0.724 with the highest uniformity in very good coral reef conditions with a value of 0.724 while the lowest uniformity value was obtained in medium category coral reef conditions with a value of 0.524. The dominance index value ranges from 0.230 to 0.353. The highest value was obtained in the moderate category of coral reef conditions with value of 0.353 while the lowest value was obtained in very good coral reef conditions with a value of 0.230

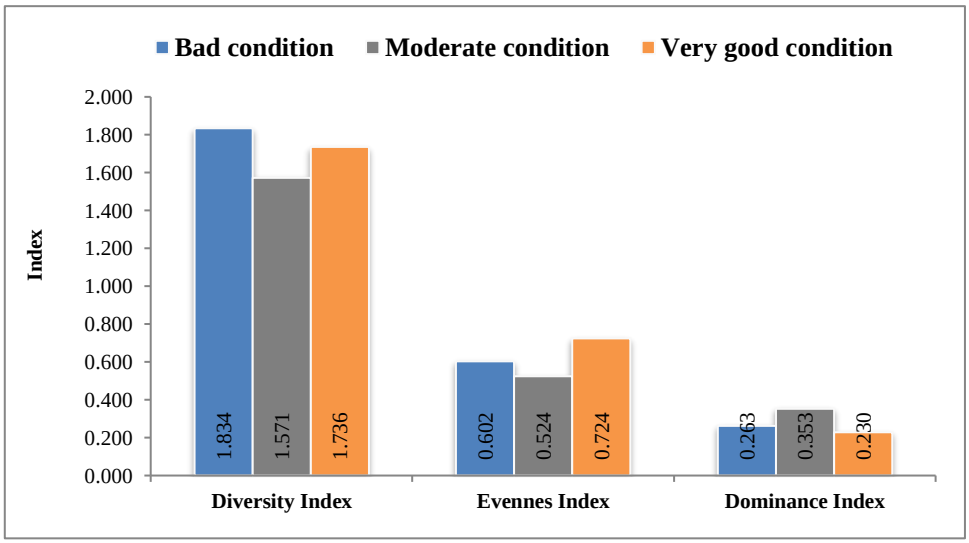

Figure 4. Megabenthos ecological index at each observation station

The ecological index in all categories of coral reef conditions is included in the low diversity category (H'<2.0) (Odum, 1993). According to Bangapadang et al. (2019) The high and low diversity index is caused by environmental factors such as the substrate or the place where megabenthos live. The uniformity index describes the number of individuals between species in a community (Odum, 1993). The uniformity index value in all categories of coral reef conditions is included in the

category of unstable communities. According to Odum (1993) the Evenness index tends to be unstable which indicates that the distribution of individuals between species is uneven. This is in line with the composition of the number of individuals of megabenthos which found a tendency for the distribution of the number of individuals to differ between species. The dominance index is used to determine the dominance of species in an area (Odum, 1993). The dominance index value in all categories of coral reef conditions is in the low category. The lower the dominance index value indicates that there is no particular species that dominates, if the dominance index value is close to or equal to 1, species dominance will occur (Dimara et al., 2020).

Coral Reef Bottom Cover Relationship to Megabenthos Fauna

The high and low density of megabenthos based on their diet is closely related to the bottom cover of coral reefs. Megabenthos density is influenced by bottom cover which includes live coral cover, dead coral cover, algae cover, other biota cover and abiotic cover. Based on the way of feeding of megabenthos found at the research site, it can be divided into four groups, namely filter feeders, detritivores, herbivores, and carnivores. Therefore, a test was carried out based on the Pearson's correlation between the way megabenthos eat and the bottom cover of coral reefs.

Based on the results of the correlation analysis, it was found that the mode of eating of megabenthos which was moderately correlated and in the same direction as the live coral was detritivores with a correlation coefficient of 0.439. Meanwhile, the way of eating megabenthos which has strong and opposite correlation with live coral is filter feeder with a correlation coefficient of -0.698. High live coral cover can be a habitat for small megabenthic organisms that live in hiding in holes and crevices of coral reefs. One of the megabenthos organisms with detritivore nature that dominates at each research station is the brittle star (*Ophiomastix janualis*). This supported by Aziz et al. (2015) that brittle stars occupy various habitats such as live coral, dead coral and coral fragments and tend to live in hiding in their distribution areas as an effort to protect themselves from predators. This is in accordance with the brittle star habitat which was found with high live coral cover, dominated by submassive corals and *Acropora* branching with branched structures so that they can hide and shelter from predators.

Furthermore, the way of eating megabenthos which is strongly correlated and in the same direction as abiotic is filter feeder with a correlation coefficient of 0.727. Meanwhile, the opposite and moderate correlations to abiotic cover were detrivores and carnivores with correlation coefficients of -0.410 and -0.425, respectively. The highest density of megabenthos was found in conditions with high abiotic cover. The density of megabenthos by feeding filter feeder dominates at each station and in each condition of coral reefs with the highest density obtained on coral reef conditions in the moderate (Station 4) and poor (Station 6) category which is dominated by the ascidian class (*Polycarpa aurata*). The high density in these conditions is thought to be due to the fact that both stations contain large numbers of massive corals and the bottom substrate of the waters is dead coral which is overgrown with algae and high sand. Ascidian density was higher on sandy bottom substrate with live coral cover in the form of massive coral. This is confirmed by Saputri et al. (2019) that the ability of ascidians to spread from one place to another and adapt to new environments can be carried out quickly, causing certain species to become invasive to dominate and threaten the existence of other organisms. This is in accordance with the conditions at Station 4 and Station 6 where there is a dominance of the Ascidian class which is a filter feeder.

The Relationship between the Distribution and Diversity of Megabenthos Fauna with Coral Reef Base Cover with Oceanographic Conditions

The oceanographic conditions of the waters at each research station obtained varying values. Parameters of temperature, salinity and pH are relatively the same at each station. The average temperature ranged from 28.66°C- 29°C, the highest temperature was found at Station 2, Station 3, Station 4, Station 5 and Station 6 which had the same value of 29°C. The highest salinity was found at Station 5 of 31.33‰ and the lowest was found at Station 3 and Station 4. The average current velocity ranged from 0.023-0.217 m/s. Strong current conditions were found at Station 6 with a speed of 0.217 m/s. The turbidity level obtained an average value of 1.86-4.11 NTU with a high value at Station 6 while the water-soluble organic matter parameter obtained an average range of 34.128-47.189 mg/L with a high value at Station 5 and total organic sediment ranged from 1.65 to 5.40% with a high value at station 5.

The relationship between bottom cover diversity and megabenthic density based on the PCA (Principal Component Analysis) is presented in (Figure 5). The relationship between the distribution of megabenthos and coral reef bottom cover and environmental parameters can be explained about 100.00% by using 2 main axes F1

and F2 forming 3 groups of distribution of coral reef conditions in analyzing the relationship between megabenthos distribution and environmental parameters and coral reef bottom cover.

Based on the results of PCA analysis, in Group 1 the category of poor coral reefs is characterized by high dead coral cover, algae cover and the number of megabenthos species. The low live coral cover at this station was caused by the high cover of dead coral overgrown with algae and algal turf. This is a result of community activities in the form of using bomb fishing gear which causes damage and affects the basic cover of coral reefs and associated biota. The damage is indicated by the number of dead coral fragments in that location. According to Pontoh (2011), fishing with bombs causes fish of all age classes as well as other biota and surrounding areas to die and coral reefs to be destroyed. The high cover of dead coral was in line with the high cover of algae. According to Febrizal et al. (2009) the increase in damage to coral reefs driven by the growth of algae on coral reefs that have died will affect the coral reef community because algae will dominate through the struggle for space. High algal cover has an effect on megabenthos related to how megabenthos eat. The presence of the highest number of megabenthos species was found in the category of poor coral condition which was dominated by the Gastropod class. According to Dody & Winanto (2018) Gastropods are basic detritus feeders with high diversity, occupying many coral reefs and partially submerging themselves in the substrate.

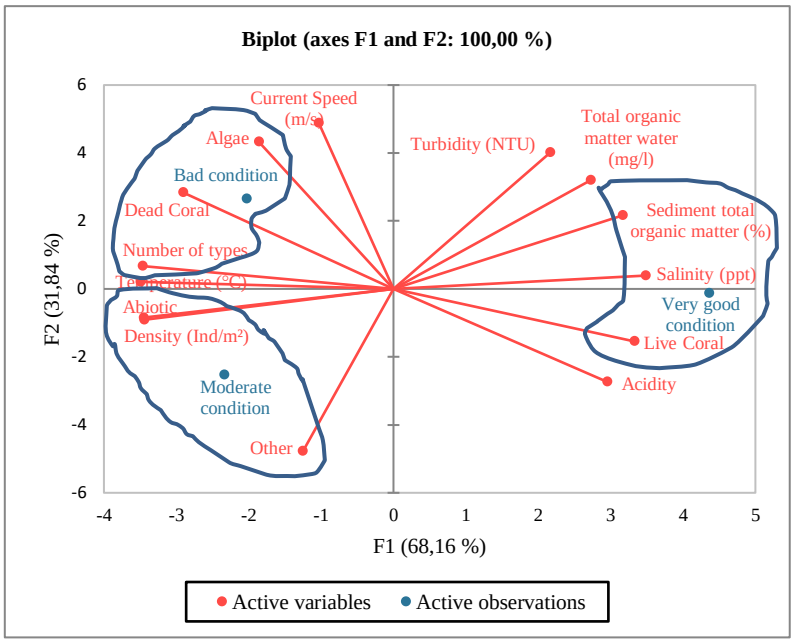

Figure 5. Relationship of lifeform coverage, total density of megabenthos and environmental parameters using PCA

Group 2 in the moderate category of coral reefs was characterized by high abiotic cover, other biota and total density of megabenthos. The relationship between live coral cover, dead coral cover and the density and diversity of megabenthos is strongly influenced by environmental conditions. The high density of megabenthos means the environment in which it lives is suitable and vice versa. This is clarified by Mutaqin et al. (2020) stated that the presence of megebenthos in a coral reef ecosystem is often an indicator that the corals in that location are still healthy, or even though the corals have been damaged. The megabenthos group that dominates in the moderate condition category is Ascidian (*Polycarpa aurata*) with the highest density value among all stations. According to Tatipata & Mashoreng (2019), ascidian biota is found in almost all types of shallow water habitats to relatively deep waters and always attaches (sessile) to the substrate at the bottom of the water. The results of research by Malintoi et al. (2020) found 5 types of substrates identified as habitat for megabenthos (ascidia), namely branching corals (CB), dead coral algae (DCA), massive corals (CM), and mollusk shells, where dead coral covered with algae became the favorite substrate. This indicates that the category of coral conditions is moderate to support the life of Ascidian megabenthos. In addition to the high density of megabenthos, it is also characterized by high abiotic cover which is dominated by sand substrate. This indicates that the density of megabenthos is increasing in locations with sand and coral base substrates. The percentage of cover of other biota (other) is dominated by soft coral. According to Wanda et al. (2018) areas where coral

reefs are damaged will be overgrown with soft corals.

Group 3 in the category of very good coral reef condition is characterized by live coral cover, high salinity parameters and total organic matter of sediments with low density and number of megabenthos species. Live coral cover at Station 1 and Station 5 was dominated by submassive and branching corals with acropora branching growth. According to Barus et al. (2018) branched growth forms are classified as fast-growing coral species in clear waters and locations where waves break. The high live coral cover supports the life of small megabenthos that live in coral crevices. The average salinity value ranges from 29‰-31.33‰ with the highest value obtained at Station 5. According to Zurba (2019) the optimum salinity for coral life ranges from 30‰-33‰, salinity affects the life of coral animals due to osmotic pressure in polyp tissue. According to Nessa et al. (2014) coral animals thrive in seawater salinity 34‰-36‰. In addition, Barus et al. (2018) stated that coral reef ecosystems are very sensitive to environmental changes, especially temperature, salinity, sedimentation, eutrophication and require natural ecosystems. This shows that the salinity value in the category of coral conditions is very good for coral growth and megabenthos life. The value of the total organic matter content of the sediment ranges from 1.65%-5.40% which is still in the low category.

CONCLUSION

The percentage of bottom cover and coral reef conditions in Barranglompo Island waters ranged from 20.55 to 80.68% with conditions from bad to very good. Poor basic cover conditions were found in the western and southern parts of the island. The moderate category was found in the northwest and southwest of the island, while the very good category was found in the north and south of the island. The megabenthos fauna found consisted of 26 species from 10 classes with high density found in the category of moderate coral reef conditions dominated by *Polycarpa aurata* and the lowest found in very good coral reef conditions while the high number of megabenthos species was found in low coral reef conditions. bad. The megabenthos diversity index (H') in all coral conditions is in the low category with the evenness index (E) including a stable community and the dominance index value being in the low category. The high number of megabenthic species was associated with high dead coral and algae cover while high megabenthic density was associated with high other and abiotic cover in the form of sand substrate.

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