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ZOOPLANKTON FOOD SOURCES OF SOFT CORALS IN MANOKWARI WATERS, WEST PAPUA PROVINCE

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ABSTRACT

Soft coral as one of the animals on coral reefs, has a food source in the form of zooplankton, especially epibenthic copepodsso that hThis is the basis of this research.Pthis researchaims toexamine the structure of the zooplankton community in terms of abundance, diversity index and dominance index of zooplankton and make an inventory of soft coral species. Zooplankton and soft coral samples were taken from Kaki Island waters, Lemon Island waters and Marampa Harbor waters, Manokwari.Zooplankton samples were observed using a 10 x 10 alternating microscope using the census (sweeping) method above*sedgwick rafter cell*.The results of the identification of zooplankton fromthree locations6 classes were found, namely Hexanauplia, Malacostraca, Ostracoda, Branchiopoda, Gastropods, and Bivalves which were divided into 24 species.ZThere are 9 species of ooplankton in the waters of Kaki Island, 21 species in Lemon Island, and 24 species in Marampa Harbor. The class with the highest number is Hexanauplia. The same zooplankton species were found from the three research sites, namely Eurytemora pacifica and Copepot sp. The highest abundance of zooplankton was found in Marampa Harbor and the smallest on Kaki Island. The waters of Kaki Island, Lemon Island and Marampa Harbor have a moderate value of zooplankton diversity. The zooplankton class that dominates the waters is Hexanauplia (copepoda). The soft corals found were Sinularia, Sarcophyton and Lemnalia where these animals consumed zooplankton from the classes Hexanauplia, Malacostraca, Ostracoda, Branchiopoda, Gastropods, and Bivalvia.

Keywords: zooplankton, soft coral, Manokwari

Introduction

The condition of percent coral cover on Mansinam Island, Manokwari is classified as medium (Dasmasela et al., 2019), although it is still classified as very good and good in Pasir Putih (Thovyan et al., 2017). Bawole et al., (2014), Mudjirahayu et al., (2017), and Runtuboi et al.,

(2018) reported on the ecological mechanisms that generate associative links between coral reefs and fish in Papua and neighboring areas (2018). Invertebrates connected with coral reefs belong to the phyla Mollusca, Echinoderms, Arthropoda, and Coelenterata (Gani et al., 2017andSala et al., 2012).

Soft coral, as one of the creatures in coral reefs, feeds on zooplankton, particularly epibenthic copepods. The results of an analysis of the intestinal contents of different soft coral species in the form of bacterioplankton and dissolved organic matter, particulate organic carbon, nitrogen, and Dissolved Organic Matter (DOM) attest to this (Bednarz et al., 2012). A pinnule net of 60-80 catches weak-swimming invertebrate larvae in tropical soft corals that lack zooxanthellae. Phytoplankton meets more than 90% of soft coral carbon demands (Fabricius et al., 1995a andFabricius et al., 1995b).

Zooplankton, being active swimming creatures, can migrate vertically to specific water strata, however their swimming power is limited in comparison to the strong current movement (Fitria and Lukman, 2013). Zooplankton are unable to resist ocean currents and hence float passively in the horizontal plane, literally following the current (Brierley, 2014).

Zooplankton is vital in the aquatic food chain because it provides food for small fish and crustaceans. The zooplankton community's importance may be seen in its variations, which affect the stability of aquatic ecosystems, particularly in the process of energy transfer and the food chain (Hasanah et al., 2014).

The condition of the waters is heavily influenced by numerous activities undertaken by the people, both on land and in the waters. The presence of zooplankton is heavily influenced by the activities of the humans who reside in the Manokwari watershed.

The goal of this study was to look at the structure of the zooplankton community in terms of abundance, diversity index, and zooplankton dominance index, as well as to create an inventory of soft coral species.

Materials and procedures

This study was conducted in Manokwari waters in October 2021. Manokwari collected zooplankton and soft coral samples from the waters of Kaki Island, Lemon Island, and Marampa Harbor (Figure 1). Kaki Island is located in northern Manokwari, immediately opposite the Pacific Ocean. Lemon Island is located in the bay area, between Mansinam Island and Manokwari City, and gets incoming currents from the Manokwari waters. Marampa Port is located in Sawaibu Bay, directly adjacent to the Pacific Ocean. Fresh water from the Sowi River also feeds the Marampa Port region.

The Aquatic Resources Laboratory, Faculty of Fisheries and Marine Sciences, University of Papua, was used to analyze zooplankton community structure and identify soft corals.

The point of observation is determined using the purposive sampling method. Zooplankton samples were collected at each site in the afternoon and evening between 12.00 and 18.30 WIT. Filtering 50 liters of saltwater through a planktonnet with a mesh size of 50 m was used to collect zooplankton samples. Zooplankton samples were examined in the lab using a 10 × 10 alternating microscope and the census method (sweeping) over the Sedgwick Rafter Cell, as described by Yamaji (1996).

Soft corals were recognized by inspecting the sclerites in each sample. Manuputty (2002) and Janes (2002) soft coral identification guides (2008). Soft corals in the form of 2-4 cm body tissue were collected from the waters of Kaki Island, Lemon Island, and Marampa Harbor and preserved in plastic samples holding 70% alcohol. Field sampling was carried out by erecting a 50-meter-long transect line with a depth of 3-13 m.

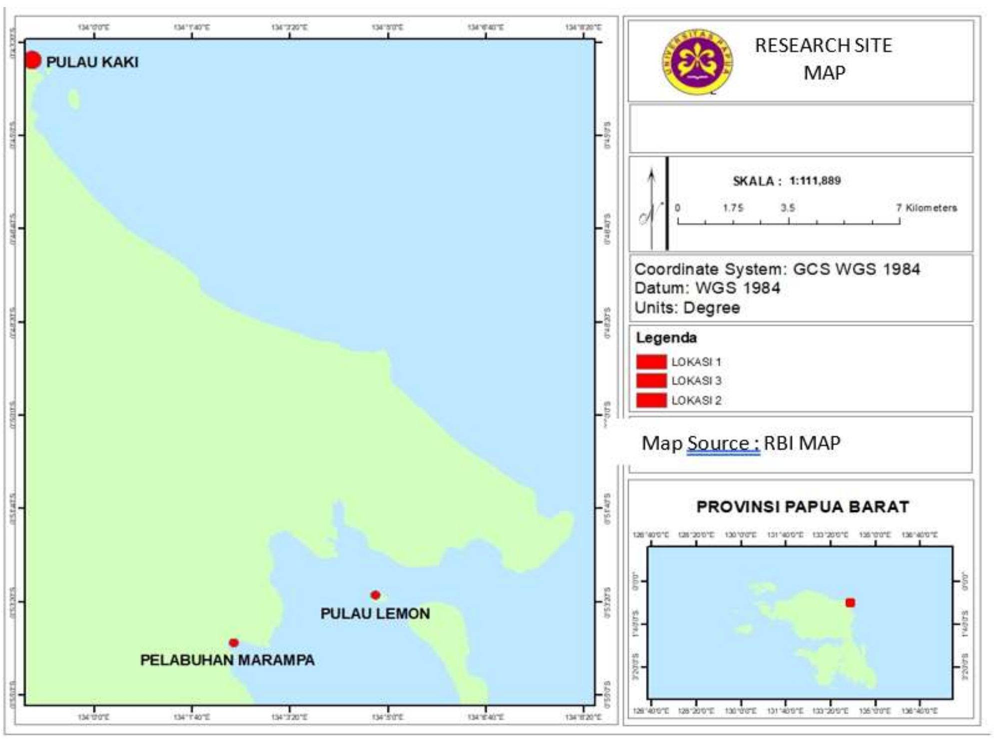

Figure 1. Research map of Kaki Island, Lemon Island and Marampa Harbor, Manokwari

Determination of zooplankton abundance was carried out based on the sweep method on the Segwick Rafter object glass, the abundance of plankton was calculated based on the formula (Fachrul, 2007):

$$N = n \times \frac{Vr}{Vo} \times \frac{1}{Vs}$$

Information :

N = Abundance (eng/L)
n = Number of observed cells (eng)
Vr = Volume of filtered water (ml)
Vo = Observed water volume (ml)
Vs = Volume of filtered water (L)

Diversity was analyzed using the Shannon – Wiener formula (Setyobudiandi and Priyono 2009) as follows:

$$H' = -\sum_{i=1}^{n}(ni/N)ln\,(ni/N)$$

Information :
H'= Diversity index
ni= Number of individuals of the i-th species
N= Number of individuals of all species
With criteria:
H' < 1= Low diversity
1<H'<3= Medium diversity
H'>3= High diversity
The dominance index is calculated using the dominance index formula of (Odum, 1993):

$$C = \sum_{i=1}^{n}(\frac{ni}{N})^2$$

Where :
C= Dominance index
ni= Number of individuals of the i-th species
N= Total number of individuals
With criteria:
0 < C 0.5= Low dominance
0.5< C < 1= High dominance

RESULTS AND DISCUSSION

The results of the identification of zooplankton from the waters of Kaki Island, Lemon Island and Marampa Harbor found 6 classes, namely Hexanauplia, Malacostraca, Ostracoda, Branchiopoda, Gastropods, and Bivalvia which were divided into 24 species. The classes and species found can be seen in Table 1.

Table 1. Type-Types of Zooplankton in the waters of Kaki Island, Lemon Island and Marampa Harbor, Manokwari

No	Class	Species	Amount		
			Foot Island	Lemon Island	Marampa Harbor
1	Hexanauplia	*Oithonina nana*	-	-	1
2	Hexanauplia	*Oithona plumifera*	-	1	-
3	Hexanauplia	*Undinula vulgaris*	-	2	3
4	Hexanauplia	*Oncaea media*	-	-	1
5	Hexanauplia	*paroithona pulla*	-	2	2
6	Hexanauplia	*Calanus sinicus*	-	6	1
7	Hexanauplia	*Corycaeus catus*	-	-	1
8	Hexanauplia	*Corycaeus*sp.	-	-	1
9	Hexanauplia	*Macrostella gracilis*	1	-	-
10	Hexanauplia	*Tigriopus japonicus*	-	-	1
11	Hexanauplia	*Eurytemora pacifica*	2	3	1
12	Hexanauplia	*Eurytemora*sp.	-	-	1
13	Hexanauplia	*Eurytemora capepodite*	1	-	-
14	Hexanauplia	*Acartia clausi*	-	1	1
15	Hexanauplia	*Acartia capepodite*	1	-	-
16	Hexanauplia	*Calanus finmarchicus*	-	1	-
17	Hexanauplia	*Undinula vulgaris*	-	2	3
18	Hexanauplia	*Pickpocket nauplius*	1	-	3
19	Hexanauplia	*Pickpocket*sp.	1	1	2
20	Malacostraca	*Sergia lucens*	1	-	1
21	Ostracoda	*Cypridina noctiluca*	-	1	1
22	Branchiopods	*Podon poiyphemoides*	1	-	-
23	gastropod	*Limacina helicina*	-	1	2
24	Bivalves	*Pinctada martensii*	-	2	1
		Total	9	21	24

The findings revealed that there were 9 species of zooplankton in the waters of Kaki Island, 21 species in the waters of Lemon Island, and 24 species in the waters of Marampa Harbor. The class with the largest number was discovered to be Hexanauplia. The same species, Eurytemora pacifica and Copepot sp., were discovered at all three investigation sites.

Table 1 illustrates that the biota that are relatively vast and dominated by crustaceans (Class Hexanauplia) are biota that operate as key secondary producers for a water (Ahmad et al., 2014). Because zooplankton consume phytoplankton, they become food for larger marine biota. Apart from eating phytoplankton, crustaceans' dominance in water is due to their omnivorous nature, or the fact that they eat everything (phytoplankton, zooplankton, and detritus) to make it simpler for them to find food.

Figure 2 depicts the amount of zooplankton detected in the three water sites based on the computation of the abundance of the kind of plankton samples taken. The waters of Marampa Harbor have the largest abundance, with a value of 12,000 ind/L. The waters of Pulau Kaki have the lowest abundance, with a value of 4,500 ind/L.

Zooplankton migrate on a daily basis, moving to the bottom of the water column during the day and to the surface at night (Nybakken, 1992). This component is one of the important characteristics that frequently limits the movement of zooplankton in the water column.

Marampa Port is regarded to have the highest abundance value because the current measured here is quite slow, precisely 0.1 m/s when compared to other locations. Large currents in water have an effect on the number of zooplankton. Waters with a high current velocity will have a low zooplankton quantity, and vice versa, waters with a low current velocity will have a high zooplankton abundance. Surface waters with low current velocity can support great abundance (Yusuf et al., 2012).

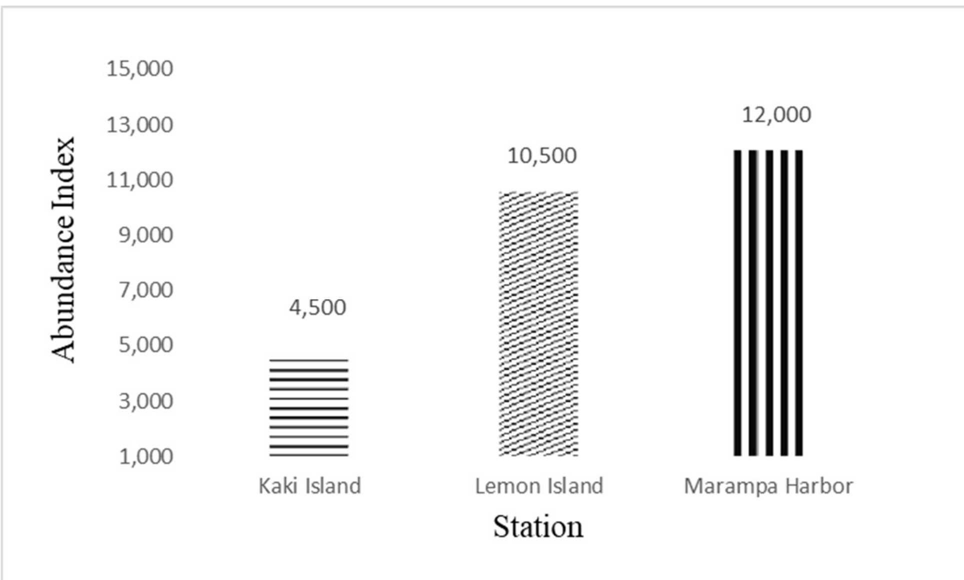

Figure 2.Zooplankton Abundance In The Three Locations

The abundance of zooplankton in Kaki Island's waters is valued at 4,500 ind/L. Figure 3 depicts the abundance of each form of zooplankton in these waters. Eurytemora pacifica had the highest abundance of zooplankton in Kaki Island waters, with a value of 1,000 ind/L, while Copepot nauplius, Copepot sp., Sergia lucens, Eurytemora capepodite, Acartia capepodite, Macrostella gracilis, and Podon poiyphemoides had the same abundance value of 0.500 ind

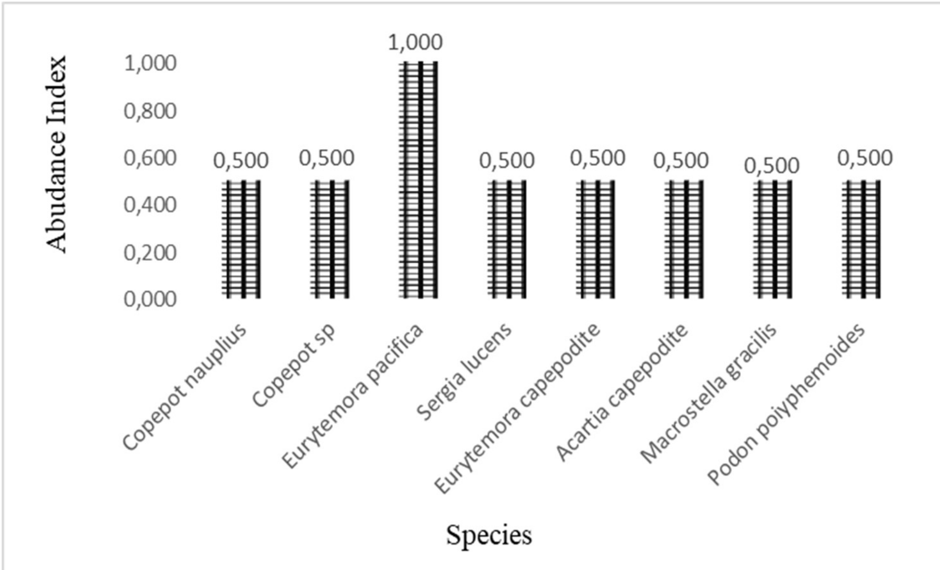

Figure 3. Zooplankton Abundance on Kaki Island

Copepod abundance is assumed to be high due to their capacity to adapt to oceanographic circumstances in coastal locations, which are more dynamic than other zooplankton groups, resulting in increased copepod abundance. This state is, of course, aided by the abundance of phytoplankton, their natural food (Mulyadi and Radjab, 2015).

The total abundance of zooplankton in Lemon Island's waters is 10,500 ind/L. Figure 4 depicts the abundance of each variety of zooplankton. Calanus sinicus has the highest abundance value of 3,000 ind/L, whereas Copepot sp., Cypridina noctiluca, Acartia clausi, Limacina helecina, Calanus finmarchicus, and Oithona plumifora have the lowest abundance value of 0.500 ind/L.

Mulyadi and Murniati conducted abundance research in Cilacap waters as well (2017). This study uses the same type of Calanus that has the highest value, Callanus sp., which is a worldwide species that is widely found in seas.

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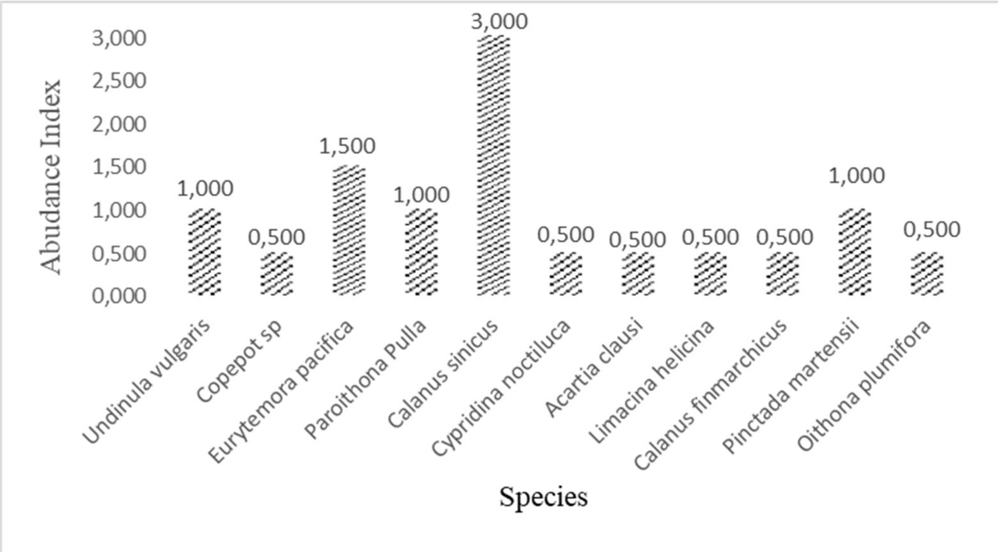

Figure 4. Abundance Lemon Island Zooplankton

Copepods, according to Nugraha and Hismayasari (2011), are species that play an essential part in the marine food chain because they are abundant, cosmopolitan, and evenly distributed, making them one of the key food chains for marine animals. The abundance of zooplankton in the waters of Marampa Harbor totals 12,000 ind/L. Figure 5 shows the abundance of each variety of zooplankton.

Figure 5 shows that Undinula vulgaris and Copepot nauplius species had the same greatest total value, 1,500 ind/L. Several species, including Oithonina nana, Oncaea media, Eurytemora pacifica, Calanus sinicus, Corycaeus sp., Sergia lucens, Corycaeus catus, Cypridina noctiluca, Tigriopus japonicus, Acartia clausi, and Pin clausi, occupy the smallest species abundance in Marampa Harbor.

Figure 5 depicts two types of zooplankton that have a high percentage value due to variations in abundance of species thought to be related to the ability of zooplankton to adapt to environmental factors and there is a tendency to have a preference for certain areas (habitat preference) so that abundance varies from one species to another. others in their life cycle (Mulyadi and Radjab, 2015).

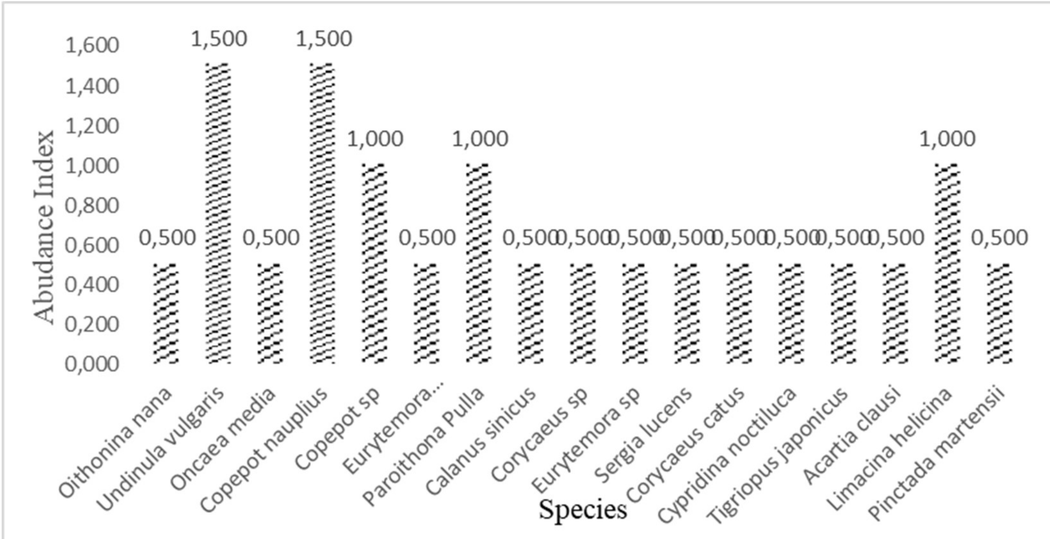

Figure 5. Abundance Marampa Harbor Zooplankton

The value of zooplankton diversity from the three research locations, namely the waters of Kaki Island, Lemon Island, and Marampa Harbor based on sample calculations can be seen in Figure 6.

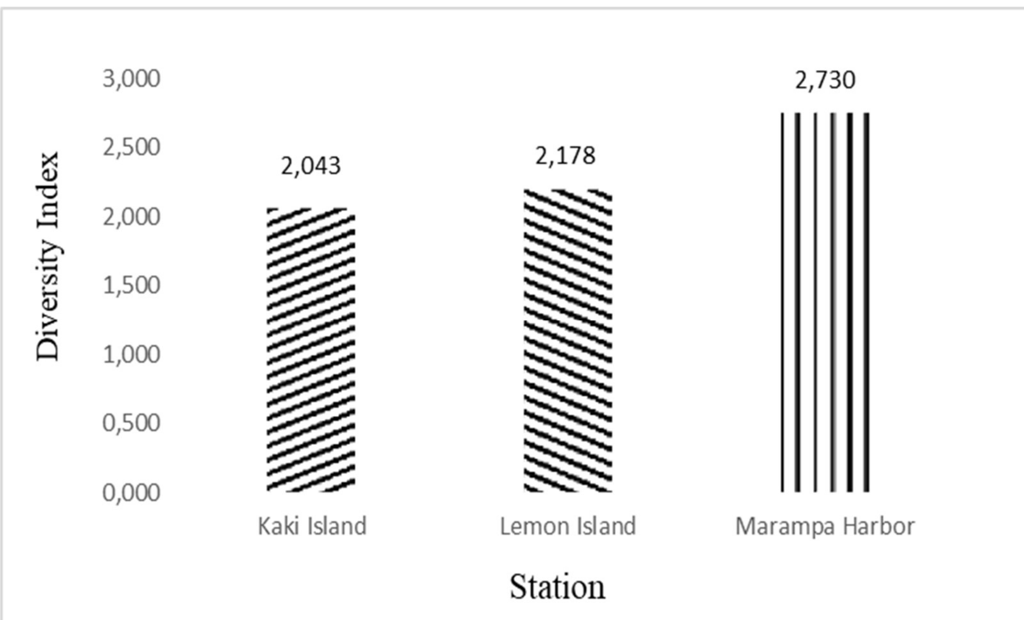

Figure 6. Zooplanton Diversity in Three Locations

The Port of Marampa has the highest overall value of diversity (2,730), while the seas of Pulau Kaki have the lowest (2,043). The diversity index is based on the Shannon - Wiener theory, which states that the three research locations have moderate diversity values.

Zooplankton diversity research was also conducted in Morosari Coastal Waters, Demak, which has a value ranging from 1.99 to 2.63. According to the Shannon - Wiener index theory, this diversity value falls into the medium group. This pretty good diversity index value is assumed to

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be associated to a number of species' ability to utilize and withstand water physical and chemical variables (Mariyati et al., 2020)

The overall diversity of zooplankton in the seas of Pulau Kaki is 2,043. Figure 7 depicts the diversity of each form of zooplankton.

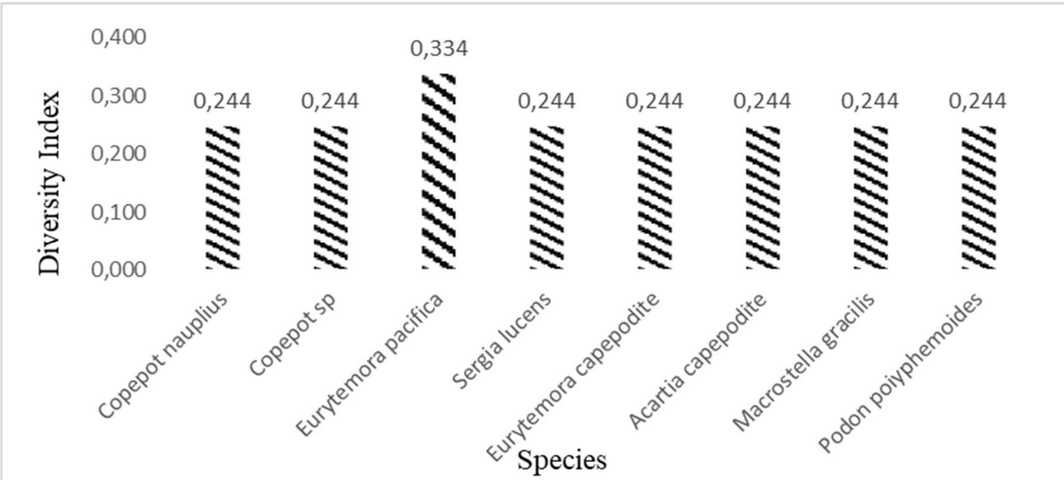

Figure 7. Zooplankton Diversity of Kaki Island

Figure 7 shows that Eurytemora pacifica has the highest total diversity value of 0.334, while Copepot nauplius, Copepot sp., Sergia lucens, Eurytemora capepodite, Acartia capepodite, Macrostella gracilis, and Podon poiyphemoides have the same lowest diversity value of 0.244.

The diversity of zooplankton in the waters of Lemon Island has a total value of 2,178. The diversity of each type of zooplankton in the waters of this station can be seen in Figure 8.

The highest diversity value was found in Calanus sinicus, namely 0.358, and the lowest diversity value was found in several species, namely Copepot sp., Cypridina noctiluca, Acartia clausi, Limacina helicina, Calanus finmarchicus, and Oithona plumifora with the same value of 0.145.

High species diversity is thought to be due to the ability of some species to utilize and tolerate aquatic environmental factors, so that productivity is quite high, while species with low diversity are thought to be due to their inability to compete for food (Patmawati et al., 2018). The diversity of zooplankton in the waters of Marampa Harbor has a total value of 2,730. The diversity of each type of zooplankton in these waters can be seen in Figure 9.

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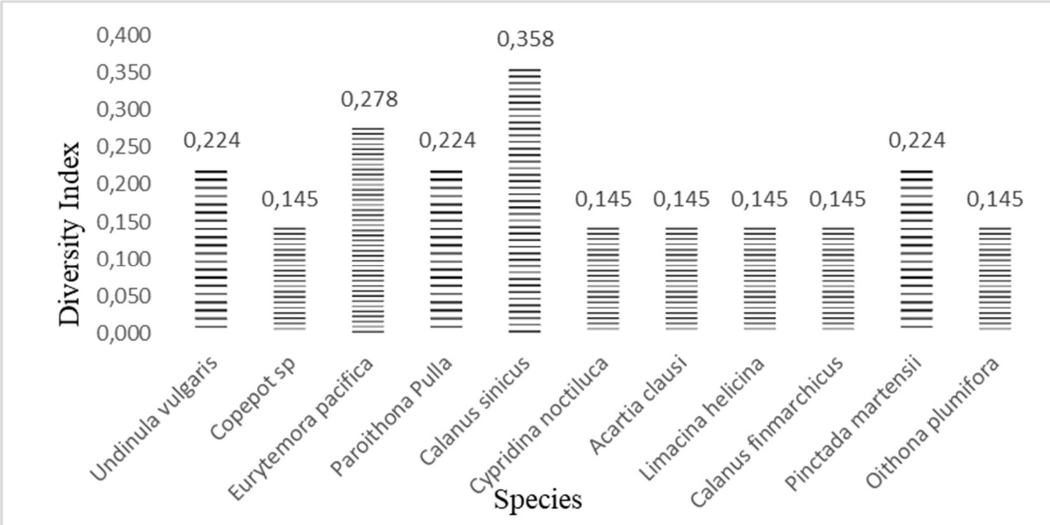

Figure 8.Lemon Island Zooplankton Diversity

Figure 9 shows that the highest species diversity is Undinula vulgaris and Copepot nauplius with a value of 0.260. The lowest diversity was Oithonina nana, Oncaea media, Eurytemora pacifica, Calanus sinicus, Corycaeus sp., Eurytemora sp., Sergia lucens, Corycaeus catus, Cypridina noctiluca, Tigriopus japonicas, Acartia clausi, and Pinctada martensii with a value of 0.132.

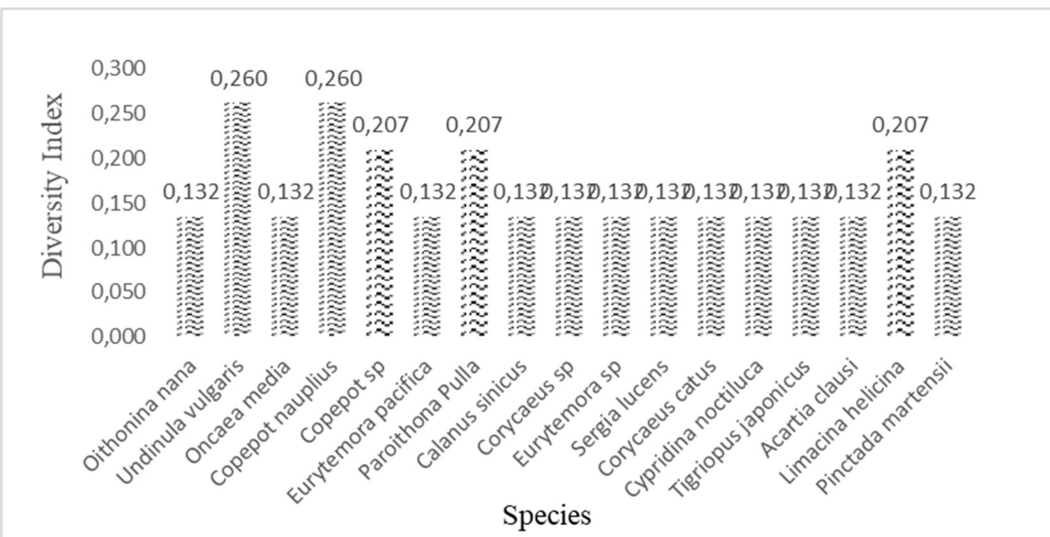

Figure 9. Diversity Marampa Harbor Zooplankton

According to Hader and Gao (2015) the smaller the value of diversity indicates the higher the pollution in the area. Based on the results of observations in the waters of the Marampa Port, there are community activities that cause pollution or disturbance in these waters.

Another factor that causes the low value of zooplankton diversity at the research site is the water quality which is not very good for the survival of zooplankton, so that only certain species can adapt to these conditions.

The value of the dominance of zooplankton found from the three water locations based on the index calculation can be seen in Figure 10. The total value of the dominance index calculation at each location has the highest value, namely the waters of Lemon Island with a value of 0.143 and the lowest is the waters of the Port of Marampa with a value of 0.073. Referring to the dominance index criteria, the three research locations are categorized as low dominance criteria.

The three locations are dominated by the Hexanauplia class (Copepoda), this is in accordance with what was reported (Nybakken, 1992) that most zooplankton organisms are members of the phylum Arthropoda (Copepoda) which is the dominant zooplankton class in the ocean.

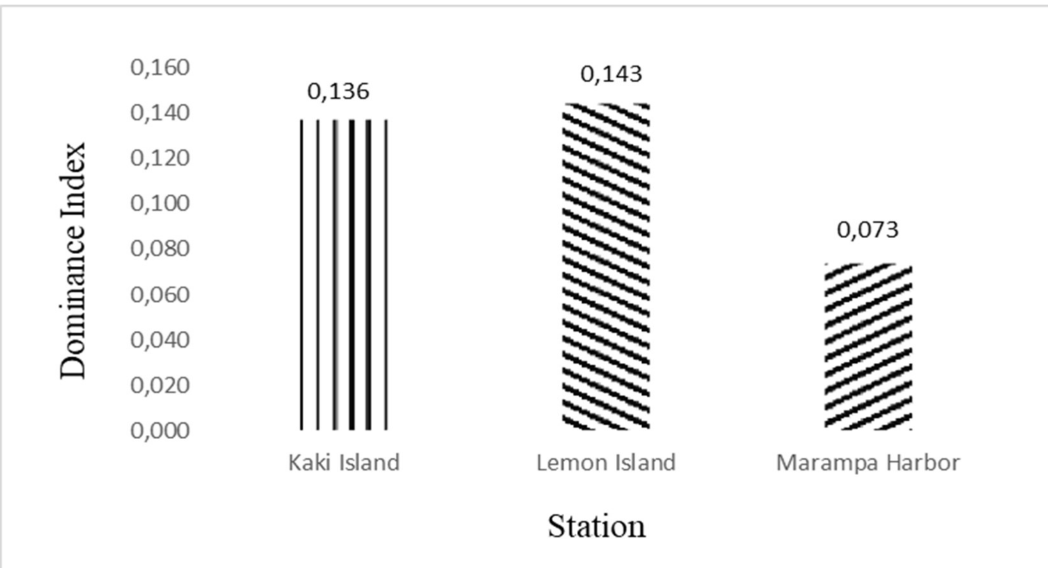

Figure 10. Dominance Zooplankton In The Three Locations

According to Mulyadi and Lakalette (2020) Copepods are the dominant zooplankton in aquatic ecosystems. Copepods act as a very important link between the primary producers of phytoplankton and carnivores.

Zooplankton in Kaki Island dominates these waters with a total value of 0.136. The dominance of each type of zooplankton in the waters of Kaki Island can be seen in Figure 11.

Based on Figure 11, it is known that the highest species dominance value in this location is Eurytemora pacifica with a value of 0.049. The zooplankton species Copepot nauplius, Copepot sp., Sergia lucens, Eurytemora capepodite, Acartia capepodite, Macrostella gracilis, and Podon poiyphemoides found at this location had the lowest value of 0.012.

Lemon Island has the highest total dominance value of the three research locations with a total value of 0.143. The dominance of each type of zooplankton in the waters of Kaki Island can be seen in Figure 12. From these results it can be seen that the highest species dominance value in this location is Calanus sinicus with a value of 0.082. Copepot sp., Cypridina noctiluca, Acartia clausi, Limacina helicina, Calanus finmarchicus, and Oithona plumifora zooplankton species have low dominance with a value of 0.002.

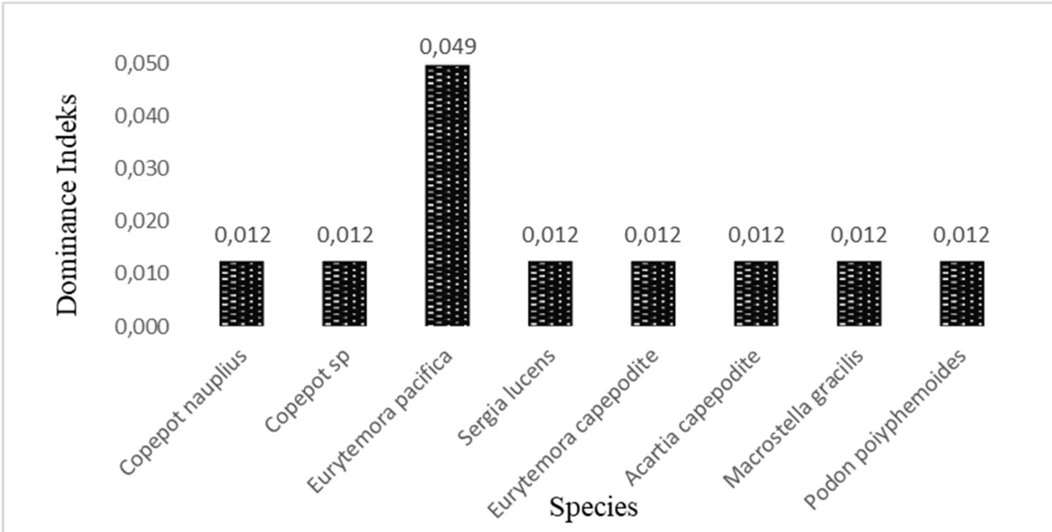

Figure 11. Dominance of Kaki Island Zooplankton

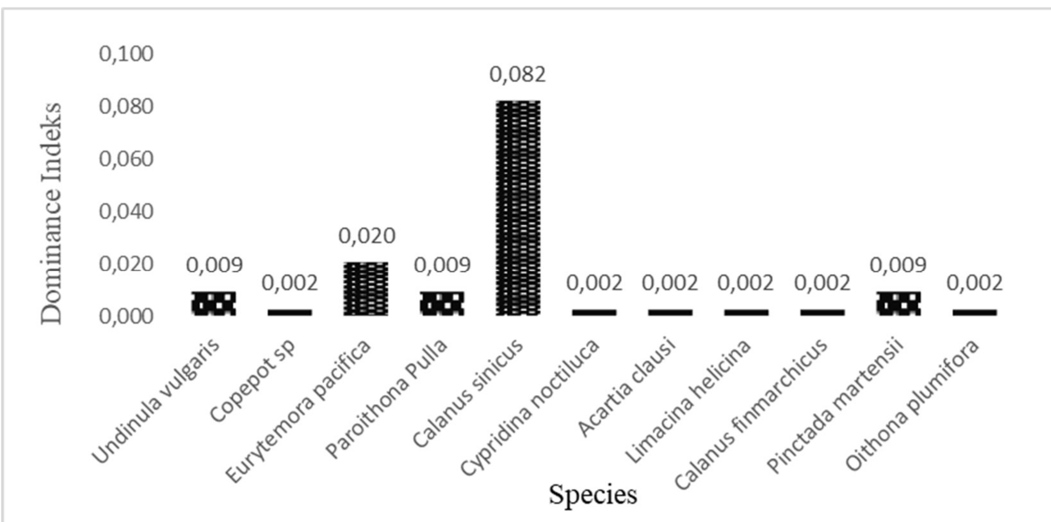

Figure 12. Dominance of Lemon Island Zooplankton

Calanus sinicus (Copepods) are essential in aquatic ecology because they constitute the primary commercial food source for many different types of fish and fish larvae (Sumiarsa, 2009). The total value of zooplankton dominance in Marampa Harbor waters is 0.073, the lowest of the three research locations (Figure 13). This location's total value of dominance is the lowest of the three research places. According to the dominance diagram above, the highest species dominance values in this location are Undinula vulgaris and Copepot nauplius with a value of 0.016, while the smallest species dominance values in this location are Oithonina nana, Oncaea media, Eurytemora

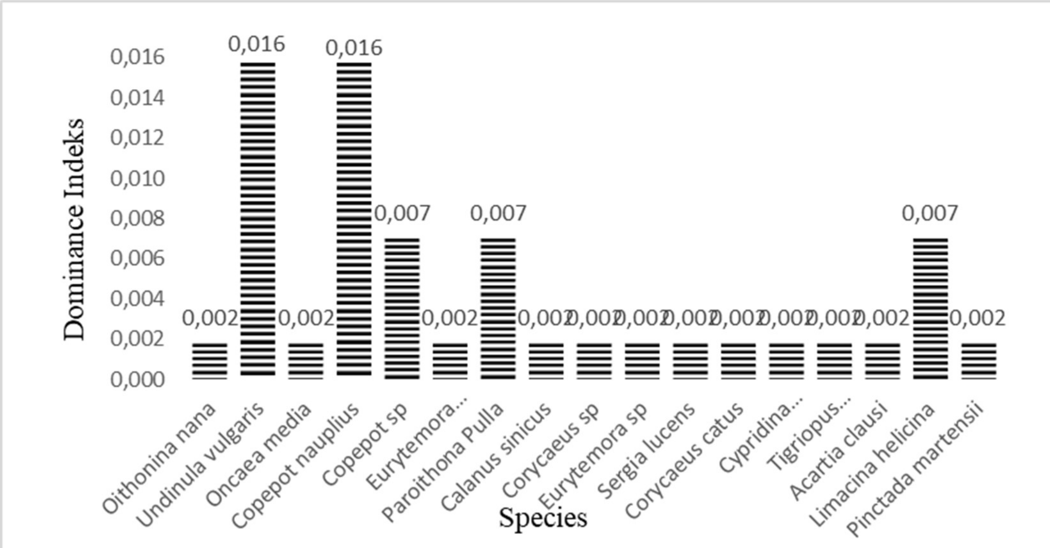

Figure 13.Dominance of Marampa Harbor Zooplankton

It is suspected that the waters of Marampa Harbor have a poor dominating value due to multiple pollutants composed of organic and inorganic elements originating from various sources, such as excrement (animal and human), organic waste, waste materials from industry, and waste materials from residences (Mulyadi and Lekalette, 2020).

The findings of zooplankton identification from three places. There were six classes discovered: Hexanauplia, Malacostraca, Ostracoda, Branchiopoda, Gastropods, and Bivalves, each with 24 species. There are 9 ooplankton species in the waters around Kaki Island, 21 on Lemon Island, and 24 in Marampa Harbor. Hexanauplia is the class with the most members. The identical zooplankton species, Eurytemora pacifica and Copepot sp., were discovered at all three research sites. The most zooplankton was detected in Marampa Harbor, with the least on Kaki Island. Zooplankton diversity is moderate in the waters of Kaki Island, Lemon Island, and Marampa Harbor. Hexanauplia is the dominant zooplankton class in the waters (copepoda).

Inventory of soft coral species

Manokwari are soft corals found in the waters of Kaki Island, Lemon Island, and Marampa Harbor. They are made up of three species and two families, with a total of 50 individuals. The soft corals found in the three research sites are those frequently found in shallow waters between 3 and 25 meters deep, particularly Sinularia, Sarcophyton, and Lemnalia. Soft corals can be found at all depths, from the intertidal to the deepest seas (abyssal), with the greatest abundance found in shallow and warm waters in the tropics, according to Manuputty (2016).

Table 2. Types of Soft Coral found in the waters of Pulau Kaki, Pulau Lemon and Marampa Harbor, Manokwari

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No	Family	Genus	Number of soft coral species			Total
			Foot Island	Lemon Island	Marampa Harbor	
1	Alcyoniidae	Sinularia	5	13	5	23
		Sarcophyton	8	12	-	20
2	Neptheidae	Lemnalia	-	7	-	7
Amount			13	32	5	50

The presence of soft coral species in the three observation sites revealed a very good and very high pattern of soft coral growth on Lemon Island. Lemon Island has reasonably good aquatic environmental parameters and is located in open waters with appropriate substrate conditions for soft coral growth (Sala et al., 2012). This is consistent with the assertion (Dasmasela et al., 2019) that the observation location is in seas right opposite an open area with waves smashing from the Pacific Waters and can be found growing in deep locations.

Soft coral species are quite rare on Pulau Kaki. This is due to environmental variables that are unsuitable for soft coral growth, particularly on the substrate. Coral is the substrate found on Kaki Island. The longevity of soft corals is also affected by the environment in which they grow, particularly the firm foundation substrate for larval attachment (Wanda and Sadarun., 2018).

Sinularia sp. colonies are stalked or encrusted, cream, light brown, or gray-white, and have a flexible capitulun. This genus can be found from the reef's average lowest low tide to a depth of 20 meters. Sinularia members are plentiful and are most usually found in shallow waters; they can also withstand drought conditions (Figure 14).

Figure 14. *Sinularia flexibilis* found in the waters of Kaki Island, Lemon Island and Marampa Harbor, Manokwari

Colonies of the Sarcophyton type are generally large, have white stalks or match the capitulum. The capitulum is broad like a mushroom or round with curved or folded edges, the surface is smooth like an anemone. Colonies are still young and just growing in the form of mushrooms. Polyps will fully contract, especially in fast-flowing sea water so that they look like velvet. Colony color is cream or beige grey, brown and gray. This type of soft coral can be found in coral reef flats up to 15 meters deep with concentrations at a depth of 3-10 meters to avoid the drought process (Figure 15).

The genus Lemnalia is in the form of trees or shrubs (arborescent), soft and the walls of the colony are in the form of canals arranged elongated, thin and easily broken, stemmed with a capitulum lobata or glomerata. Polyps are arranged in groups at the ends of the lobes, containing well-arranged spicules that function as body supports. Stems are gray to white, lobes cream, gray or brown. It can be found from the reef flat to a depth of 10 meters from drought and wave action (Figure 16).

Sarcophyton glaucum

***Sarcophyton* sp.**

Sarcophyton infundibuliforme

Figure 15. Types of Sarcophyton found in the waters

Foot Island and Lemon Island, Manokwari

The soft corals found at the research site in the waters of Kaki Island, Lemon Island and Marampa Harbor are Sinularia, Sarcophyton and Lemnalia. Soft corals in tropical environments generally consume phytoplankton as the main food source (Fabricius et al., 1995), whereas temperate species in the North prefer zooplankton (Sebens and Koehl 1984). Soft corals feed on small (150-250 m) zooplankton and various seston components (Corry et al., 2018). Phytoplankton and zooplankton are the main food sources for all Primnoidae soft coral species (Imbs et al., 2016). Soft coral Sarcophyton sp. are suspension feeders, which catch small particles such as small zooplankton, phytoplankton, ciliates, bacterioplankton as food. Particles that touch the tentacles or pinules of Sarcophyton sp. trapped, checked,

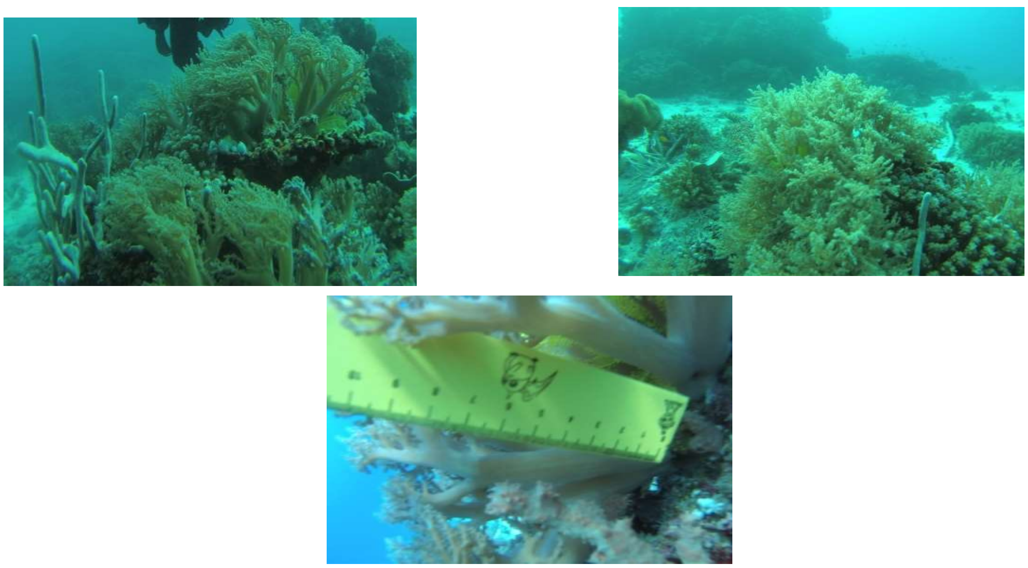

Figure 16. Types of Lemnalia found in Lemon Island Waters, Manokwari

The soft corals of Sinularia, Sarcophyton and Lemnalia found at the study site consume zooplankton from the classes Hexanauplia, Malacostraca, Ostracoda, Branchiopoda, Gastropods, and Bivalvia. The zooplankton class that dominates the waters is Hexanauplia (copepoda), with a relatively low dominance value. Hexanauplia is proven to be found in tropical waters (Baihaqi et al., 2019; Witariningsih et al., 2020). In the waters of the Lombok Strait, West Nusa Tenggara, the genus most commonly found is the class Hexanauplia subclass Copepoda as many as 7 genera (genus Paracalanus, Calanus, Cyclops, Acartia, Hemiccyclops, Labidocera, and Diaptomus) (Witariningsih et al., 2020). Marani et al., 2022 reported that there were 29 zooplankton genera found in FADs and chart fish in the waters of Doreri Bay, Manokwari.

The areas of Pulau Kaki and Pulau Lemon are dominated by Sarcophyton soft corals because they are supported by strong currents (Sala et al., 2012; Tururaja and Mogea 2010). Currents greatly affect the level of preference for soft corals to eat. Currents that are too slow cause a low chance of the Artemia zooplankton attaching to the soft coral tentacles. Sarcophyton sp. will consume artemia zooplankton with currents of about 8-15 cm/s (Fabricius and Alderslade, 2001).

CONCLUSION

The highest abundance of zooplankton was found in Marampa Harbor and the smallest on Kaki Island. The three locations, namely the waters of Kaki Island, Lemon Island and Marampa Harbor have moderate diversity values. The class that dominates the waters is Hexanauplia (copepoda). The soft corals of Sinularia, Sarcophyton and Lemnalia found at the study site consume zooplankton from the classes Hexanauplia, Malacostraca, Ostracoda, Branchiopoda, Gastropods, and Bivalvia.

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