Analysis of Pelecypoda Ecology Index in Rancabuaya Beach
Garut District

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Abstract. This study aims to determine the Pelecypoda species and Pelecypoda Ecological Index values including diversity, abundance, evenness, dominance and density in Rancabuaya Beach Garut District. The method used is descriptive method with purposive sampling technique, Line transect and Quadrat transect. Sampling was carried out by dividing the study area into three observation stations totaling 90 samples. Observations were obtained, Pelecypoda species as many as 12 species including: Barbatia foliata, Antigona puerpera, Antigona materna, Anadara turonica, Cardita aviculina, Anodontia vesicula, Gaffarium pectinatum, Antigona puerpera, Antigona materna, Anadara turonica, Cardita aviculina, Anodontia vesicula, Gaffarium pectinatum, Antigona edentpera, Antigona materna, Anadara turonica, Cardita aviculina, Anodontia vesicula, Gaffarium pectinatum, Anigontia edentperula, Anigontia edentula Septifer bilocularis, Tellina scobinata, Tridacna maxima, and Anadara antiquata. The results of the analysis of diversity index 0.0069 - 0.1596 are in the low category, an abundance index of 0.3 - 35.3% are in the average category enough, evenness index 0 - 0.0753 evenness is in a depressed condition, 0 - 0.12456 which is in the low category and the density index ranges from 0.1 to 13.2 is in the low category. This indicates the threat to the survival of Pelecypoda and the low quality of waters on the coast of Rancabuaya.

1. Introduction
Molluscs, including Pelecypoda, occupy a large area of coral reefs, but there are also some who immerse themselves in sediments or substrates and not a few are attached to some marine plants such as mangroves, seagrasses and algae [1]. The existence of Pelecypoda in the waters can be used as bioindicator of environmental pollution, because it is able to control the amount of toxins or biomonitor pollutants in their bodies when the waters they occupy are contaminated, so that if in a waters the composition is little or no longer Pelecypoda, then it can be said that the ecosystem begins to experience environmental pollution [2].

As one of the ecosystems that has a high carrying capacity, it is not surprising that the Rancabuaya beach is a place of concentration of various human activities such as business opportunities, fishing, looking for food to be consumed and so on [3]. Not a few marine biota especially Pelecypoda species that exist on the coast of Rancabuaya are taken and utilized by the community for consumption. And when the holiday season arrives, tourists who come there sometimes disturb and damage the beach ecosystem, even taking the species that are on the beach excessively with the aim as a toy. These things if done repeatedly, then over time can result in marine biota, especially Pelecypoda is reduced and can cause loss of balance of the ecosystem [4].
Lack of public and tourist knowledge about the role of Pelecypoda as a bioindicator of environmental pollution and influences in the food chain causes it often does not get the attention of the government. In addition, people who are close to the beach have not been aware of the impact of littering on the coast, so they are still indifferent when there are neighbors / communities who throw trash and household waste into the coast [5].

The things above, have not received supervision and confirmation from the government, especially those around the coast of Rancabuaya. Even though by maintaining the ecosystem of sea waters, the wealth of the sea will be more abundant. In addition to these problems, Rancabuaya is one of the beaches that has Pelecypoda diversity that has not been identified as a whole, and there has been no specific research conducted on Pelecypoda which is on the Rancabuaya coast which is a special reason for this research. The purpose of this study is to determine the survival of Pelecypoda and the quality of the waters on the coast of Rancabuaya.

2. Methods

The method used in this research is descriptive method. The sampling method of this study uses a purposive sampling technique sampling method. The population studied was all Pelecypoda species that live and live in the waters of Rancabuaya beach, Purbayani Village, Caringin District, Garut Regency. Samples taken in this study were all Pelecypoda species sampled in each sampling area in Rancabuaya coastal waters with a beach length of ± 1.5 km. Consisting of three stations, as many as three observation points were carried out with a transect line along 50 meters and a square plot of size 1 m x 1 m totaling ten samples at each point. So that the total number of kidnappings is 90 squared sampling [6].

The tools used in this study are: Rapia Rope, Camera, Scale Meter, Label Paper, Small Bucket, Adhesive Plastic, Squared Bamboo, Machete, Glove, Key Identification of Pelecypoda Mollusca class, Saltmeter, Thermometer, Slink psychrometer, Luks meters, pH meters and anemometers.

Data analysis to determine Pelecypoda species diversity index was calculated using the Shannon-Wienner formula and Evenness uses the equability index formula according to Evenness [7].

3. Results and discussion

Based on observations made, Pelecypoda species found in Rancabuaya coastal waters can be seen in the following Table 1:

| No | Species Name          | Sampling station | Total |
|----|-----------------------|------------------|-------|
| 1  | Barbatia foliata      | 39 61 32         | 132   |
| 2  | Antigona puerpera     | 8 11 11          | 30    |
| 3  | Antigona materna      | 2 9 4            | 15    |
| 4  | Anadara turonica      | 1 8 16           | 25    |
| 5  | Cardita aviculina     | 5 9 12           | 26    |
| 6  | Anodontia vesicula    | 0 11 15          | 26    |
| 7  | Gafarium pectinatum   | 11 23 16         | 50    |
| 8  | Anodontia edentula    | 7 1 5            | 13    |
| 9  | Septifer bilocularis  | 7 16 4           | 27    |
| 10 | Tellina scobinata     | 0 4 6            | 10    |
| 11 | Tridacna maxima       | 1 0 1            | 2     |
| 12 | Anadara antiquata     | 0 3 16           | 19    |
|    | **Total**             | 80 157 137       | 374   |

Based on the observation table 1 above, it can be seen that Pelecypoda species sampled from the three stations have 12 species with a total of 374 species. Station II is the place where most Pelecypoda species are 157 individuals, Station III is 137 individuals and the lowest is Station I which is 80 individuals. The name of the most sampled species is Barbatia foliata with a total of 137 individuals and the least species is Tridacna maxima with the number of one individual.
After observing each sampling station and analyzing data to find out the Pelecypoda ecological index value in Rancabuaya coastal waters, the results of the calculations and recapitulation of the Pelecypoda ecological index values in the Rancabuaya coastal waters can be seen in the Table 2.

Table 2. Recapitulation of ecological index data analysis results.

| No | Species Name         | Index Diversity | Index Abundance | Index Evenness | Index Dominance | Index Density |
|----|----------------------|-----------------|-----------------|----------------|----------------|--------------|
| 1  | Barbatia foliata     | 0.1596          | 35.3            | 0.0753         | 0.12456        | 13.2         |
| 2  | Antigona puerpera    | 0.0879          | 8               | 0.0595         | 0.00643        | 3            |
| 3  | Antigona materna     | 0.0560          | 4               | 0.0476         | 0.00160        | 1.5          |
| 4  | Anadara turonica     | 0.0785          | 6.7             | 0.0562         | 0.00446        | 2.5          |
| 5  | Cardita aviculina    | 0.0805          | 6.9             | 0.0569         | 0.00483        | 2.6          |
| 6  | Anodontia vesicula   | 0.0805          | 6.9             | 0.0569         | 0.00483        | 2.6          |
| 7  | Gafrarium pectinatum | 0.1168          | 13.4            | 0.0688         | 0.01787        | 5            |
| 8  | Anodontia edentula   | 0.0508          | 3.5             | 0.0456         | 0.00120        | 1.3          |
| 9  | Septifer bilocularis | 0.0824          | 7.2             | 0.0576         | 0.00521        | 2.7          |
| 10 | Tellina scobinata    | 0.0420          | 2.7             | 0.0420         | 0.00071        | 1            |
| 11 | Tridacna maxima      | 0.0069          | 0.3             | 0              | 0              | 0.1          |
| 12 | Anadara antiquata    | 0.0657          | 5.1             | 0.0514         | 0.00258        | 1.9          |

Table 2 shows the highest index in the diversity index, namely in the Barbatia foliata species with an index value of 0.1596 and the lowest diversity index in the diversity index, namely in the Tridacna maxima species with an index value of 0.0069.

Of all the most popular species sampling stations, namely Station II, this is due to environmental factors that support the survival of the species. Based on field observations, it can be seen that the habitat at Station II is rather sandy waters compared to Station I and Station III which are dominated by large coral reefs. That generally live Pelecypoda immerse themselves in sand or muddy sand. Then the location is a place that is still relatively clean from garbage and household waste and far from the river mouth. However, the existence of Pelecypoda on Rancabuaya beach is still relatively low.

The calculation results of Pelecypoda diversity index sampled in Rancabuaya coastal waters ranged from 0.0069 to 0.1596 with a total of 0.9076. Referring to the hypothesis put forward by Shannon-Wiener that the diversity index obtained is 0.9076 < 1 indicating that the diversity of species in a transect or in Rancabuaya coastal waters is little or low [8].

The results of the Pelecypoda species abundance index sampled in Rancabuaya coastal waters ranged from 0.3 to 35.3. Barbatia foliata species occupy the highest level of abundance at 35.3% according to the formula of abundance according to Bradley et al., when > 20 = Very much [9]. Which shows that Barbatia foliata are scattered throughout the observation station. Whereas the eleven other Pelecypoda species have a relatively sufficient average abundance [10].

The results of the calculation of the Evenness Index (Equability) of Pelecypoda species which were sampled in Rancabuaya coastal waters ranged from 0 to 0.0753, which indicates that the presence of Pelecypoda species on the coast is uneven. According to Pielou's evenness index formula, if 0.00 < E ≤ 0.50 = Evenness is in a depressed condition.

The calculation results of the dominance index of Pelecypoda species sampled in Rancabuaya coastal waters ranged from 0.00 to 0.12456, showing that there were no striking Pelecypoda species in competing to dominate or dominate other species, the environment or food sources on the coast. In accordance with the Simpson dominance index formula that is if 0.00 < C ≤ 0.50 = low dominance index [11].

The calculation result of density index is obtained by comparing the number of individual species with the number of plots or sampling used in this study. Population density of Pelecypoda which is sampled in Rancabuaya coastal waters ranges from 0.1-13.2 individuals / m2 which shows that Pelecypoda species density at the coast is low according to the density index formula according if the density value is 0 ≤ 30 = Low density [12].

Based on the above explanation, the diversity index results obtained are classified as low, the abundance index in the average condition is sufficient, the evenness index is in the depressed category, the dominance index is in the low category and the density index is in the low category. This should be
a concern for all parties who are competent in the marine ecosystem. Because the ecological index number obtained can be further decreased by the existence of irresponsible activities that can be done by the community, so that it can interfere with the preservation of the marine ecosystem of Rancabuaya. Therefore, awareness of all parties is needed to maintain, preserve and improve the quality of the marine ecosystem [13].

4. Conclusion
The results of the study concluded that Pelecypoda species were found as many as 12 species with Ecological Index values as follows: (a) Diversity index 0.0069 - 0.1596 which is in the low category, (b) abundance index of 0, 3 - 35.3 % is in the moderately average category, (c) Flatness index 0 - 0.0753 which shows flatness under stress conditions, (d) Dominance index is 0 - 0.12456 which shows in the low category and (e) density in 0.1 - 13, 2 which shows in the low category. This indicates the threat to the survival of Pelecypoda and the low quality of waters on the coast of Rancabuaya.

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