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# DOMINATION SPECIES OF GASTROPODS IN THE LANAGA WATERS, MEUREUBO DISTRICT, WEST ACEH REGENCY, ACEH PROVINCE

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## ABSTRACT

Gastropods are soft-bodied animals with stomachs as legs, live in land and waters, and have dominant nature in the area they inhabit, especially in the Lanaga Waters, Meureubo District, West Aceh Regency. This study aimed to (1) analyze the dominance level of each species of the Gastropod class inhabits the Lanaga Waters, and (2) determine the species of Gastropods dominatesthe Lanaga Waters, Meureubo District, West Aceh Regency, Aceh Province. The research was carried out from January to March 2021, in the Lanaga Waters, Meureubo District, West Aceh Regency, Aceh Province.The research area was divided into 9 stations based on the conditions of the aquatic environment, and each station was assigned to five sampling plots. Data were collected using purposive sampling technique, and data analysis was analyzed using the dominance formula and further described. The results showed that (1) the dominance index of each species of the Gastropod class ranged from 0.00001to 0.710716, indicating a low to moderate level of dominance, and (2) the speciesfrom the Gastropod class dominated the Lanaga Waters, Meureubo District, Aceh Barat was *Faunus ater*, with a moderate level of dominance.

**Keywords:** Gastropods, Dominance, Lanaga Waters.

## INTRODUCTION

Gastropods are one class of the Mollusca Phylum, which have a stomach, as a part of their body, used as legs. The possessed body is soft, and generally have an external shell as body armor [1]. The owned shell, which is on the outside of the body, functioned as a protector so that their body can grow well without having damage.

Hamidah stated that Mollusca Phylum consists of Aplacophora Class, Monoplacophora Class, Polyplacophora Class, Gastropods Class, Bivalves Class, Cephallopods Class, and Scaphopoda Class. The classification of Mollusca into these classes is based on the existence of shell as body armor, and the existence of stomach which is used as for moving by these class members [2].

Gastropods Class use their stomach as legs for walking [3], Monoplacophoras Class have a shell to protect their soft body, Bivalves Class have body protected by two unidirectional shell, and Cephalopods Class have legs on the head part. Member of Gastropods Class have terrestrial, freshwater, brackish and salt water (sea) habitat. Lanaga Water, as one of the waters with various species of Gastropods Class inhibiting the area, receive fresh water from Meureubo River and receive salt water from the waters of the Indian Ocean [4].

Previous research results that have been done on the Lanaga Waters, Meureubo District, West Aceh, found 9 species of the Gastropods Class. Species of the Gastropods Class discovered in Lanaga Waters generally lived at the bottom of the Lanaga Waters as benthos, as epibenthos and zoobenthos at the bottom waters [4].

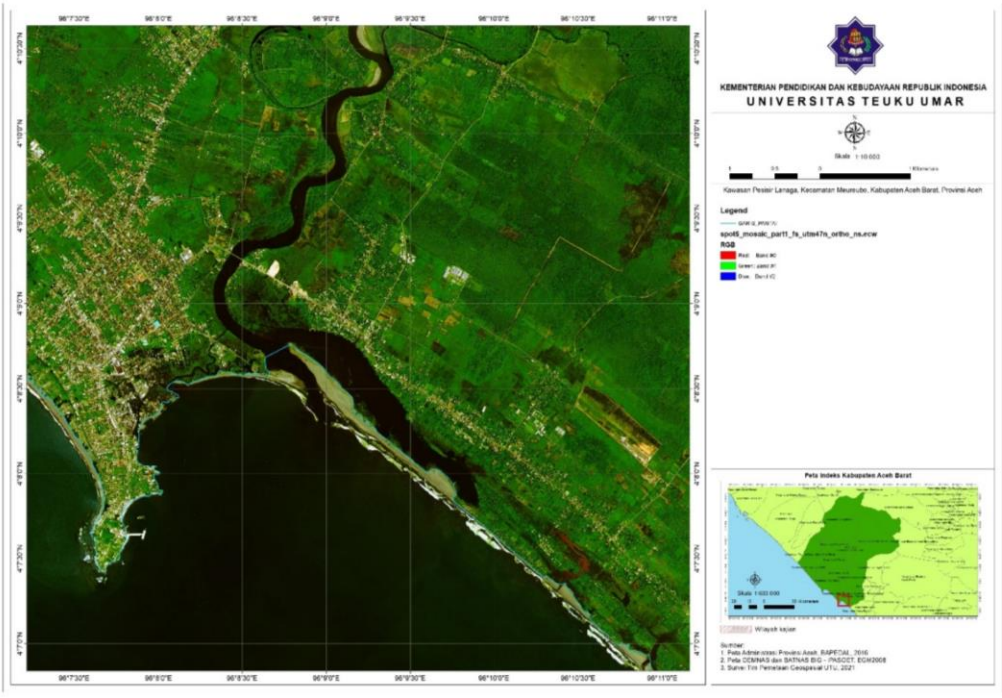
Various exploration activities about the gastropod species dominating the water area of Lanaga, Meureubo District, West Aceh Regency, have not yet found. It means, a more structured assessment and specific research are required to get information about the presence of Gastropods member located in the water area of Lanaga, Meureubo District, West Aceh Regency, Aceh Province.

The purposes of the research were (1) Analyzing the dominance level of each species of the Gastropod Class

inhabiting the Lanaga Waters, and (2) Specifying the dominant species of gastropods in Lanaga Waters, Meureubo District, West Aceh Regency, Aceh Province. From the results of this study, it was expected to get information about dominant species of Gastropods, which are found in Lanaga Waters, Meureubo District, West Aceh Regency, Aceh Province.

## RESEARCH METHODS

The research was conducted in the Coast Lanaga Waters, Meureubo District, West Aceh Regency, Aceh Province (Picture 1). The research area was divided into 9 stations based on the conditions of aquatic environment, and each station consists of 5 sampling plots. Station 1 was set on the right, station 2 was in the middle, station 3 was on the right parallel to station 1, station 4 was on the center and parallel to station 2, station 6 parallel to station 3, station 7 parallel to station 4, station 8 parallel to station 5, and station 9 parallel to station 6.




Picture 1. Lanaga Coastal Research Area, Meureubo, Meulaboh, Aceh Province, Indonesia

Each station was assigned to 5 sampling plots, carried out randomly, and each sampling plot measuring 1 meter x 1 meter. On each sampling plot that has been determined, pH, salinity, temperature, sediment, substrate, and depth were measured. The data was taken in every first week of each month in January, February, and March 2021.

Dominance level analysis and species of the Gastropod Class which dominate the Lanaga Water, using the index formula dominance is [5] as follows:

$$D = \sum_{n=1}^{s} pi^2$$

Where:

D = Dominance with range value of = 0-1,

pi = ni/N,

ni = number of species,

N = total species.

D = 0.00-0.50 means low level of dominance, and D= 0.50-0.75 means dominance level moderate, and if D = 0.75-1.00, it means a high level of dominance [5].

## RESULTS AND DISCUSSION

### 1. Gastropod Species in Lanaga Waters

The Gastropods found in Lanaga Waters, Meureubo District, West Aceh, were 9 (nine) species, as listed in Table l.

Table 1. The Density of each Mollusca Species in Lanaga Waters, Meureuboe, Meulaboh, Aceh Province

| No | Species | Class | Density at Stations | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 1 | *Faunus ater* | Gastropod | 501 | 189 | 265 | 139 | 54 | 374 | 843 | 632 | 511 | 3508 |
| 2 | *Vittina turrita* | Gastropod | 10 | 0 | 0 | 0 | 0 | 0 | 10 | 9 | 0 | 29 |
| 3 | *Terebralia sulcata* | Gastropod | 123 | 583 | 117 | 0 | 0 | 168 | 47 | 92 | 0 | 1130 |
| 4 | *Terebralia palustris* | Gastropod | 0 | 657 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 637 |
| 5 | *Pleurocera corpulenta* | Gastropod | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 7 | 0 | 11 |
| 6 | *Pirenella alata* | Gastropod | 145 | 0 | 309 | 675 | 235 | 459 | 0 | 0 | 0 | 1823 |
| 7 | *Cerithidea sinensis* | Gastropod | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 6 |
| 8 | *Pomacea canaliculata* | Gastropod | 12 | 0 | 11 | 21 | 0 | 0 | 0 | 0 | 0 | 44 |
| 9 | *Vittina natalensis* | Gastropod | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |

Gastropods Density in Lanaga Waters, Meureubo District, West Aceh Regency, ranging from 4 individuals/meter$^2$ to 843 individuals/meter$^2$. Species which had the highest density among all species were *Faunus ater,* while the lowest density among the species was owned by *Vittina natalensis*. Gastropods Class had a density ranging between 2 individuals/meter$^2$ up to 665 individuals/meter$^2$. Species with the highest density was *Sinodonta woodiana* and species with the lowest density was *Corbicula javanica.*

The existence of species with different densities due to the environmental conditions of the bottom area of the Lanaga Waters with salinity conditions and varied base waters substrate that change frequently. Mollusca is one of the phylum that has activity at the bottom of waters with species included in macrozoobenthos, especially in adult time with body size larger than 1 mm. The existence Mollusca species in a bottom water,

especially in the Lanaga Waters, was influenced by the environmental factors such as food, substrate, sediment, and salinity. [6] conveyed that the basic aquatic fauna including gastropods were very sensitive to changes in water quality, thus affecting the composition and abundance. Meanwhile [7] argued that the changes in conditions directly ecological, could affect structure and composition of macrozoobenthos species, because macrozoobenthos have a reciprocity relationship with the environment.

## 2. Dominance Level of Gastropod Species

Dominance level of Gastropod Species at the bottom of the Lanaga Waters of Meureubo District, West Aceh Regency, is shown in Table 2.

Table 2. Dominance Level of Gastropod Species in Lanaga Waters, Meureuboe, Meulaboh, Aceh Province

| No | Species | pi | $pi^2$ | Index Dominance | Level of Dominance |
|---|---|---|---|---|---|
| 1 | *Faunus ater* | 3508 | 12306064 | 0,710716 | Moderate |
| 2 | *Vittina turrita* | 29 | 841 | 0,000049 | Low |
| 3 | *Terebralia sulcata* | 1130 | 1276900 | 0,073745 | Low |
| 4 | *Terebralia palustris* | 637 | 405769 | 0,023435 | Low |
| 5 | *Pleurocera corpulenta* | 11 | 121 | 0,000007 | Low |
| 6 | *Pirenella alata* | 1823 | 3323329 | 0,191933 | Low |
| 7 | *Cerithidea sinensis* | 6 | 36 | 0,000002 | Low |
| 8 | *Pomacea canaliculata* | 44 | 1936 | 0,000112 | Low |
| 9 | *Vittina natalensis* | 4 | 16 | 0,000001 | Low |
| | **Total** | **7192** | **17315012** | **12306064** | |

Based on the results analysis of the dominance level of Gastropods species in the Aquatic region of Lanaga, there were 8 species of gastropods with a low degree of dominance, and only one species had moderate dominance. Determination of low and moderate level of dominance was based on the criteria set by [5], which showed that the dominance index less than 0.50 indicating low, and 0.50-0.75 showing moderate.

Based on habitat conditions, each species liked varied habitat existed among the species. The salinity contained in Lanaga Waters ranged from 0.5-10‰ which showed that part of Lanaga Waters included fresh and brackish waters. Brackish Waters had a salinity of 0.5-30‰, while the freshwater had the salinity of 0-0.5 ‰ [8].

Lanaga Water area had generally silt and sandy bottom substrate [9]. This became a habitat for species of Gastropods, especially *Faunus ater*, *Vittina turrita, Terebralia sulcata, Pleurocera corpulenta, and Pyrenella alata*. This condition was the basis existence for member of Gastropods species, especially species that live in a brackish area with salinity between 0.5-30‰. This condition was also in line with the opinion of [10] which mentioned that many species from Macrozoobenthos including Gastropods live in brackish waters or estuaries with varied abundance and dominance. The reason was due to environmental conditions of the bottom waters, especially varied salinity and bottom water substrate.

**3. Dominant Gastropod Species in the Lanaga Waters**

From the results analysis of the dominance level of Gastropod in Lanaga Waters, Meureubo, West Aceh Regency, it was found that *Faunus ater* was the species with moderate dominance. This matter was shown by the results calculation of dominance index, with the index dominance 0.710716.

Based on the provisions that has been established by [5] and [11], if the index dominance is (D) = 0.00-0.50, it means low level of dominance, if D = 0.50-0.75, it means moderate dominance level, and if D = 0.75-1.00,

it means a high level of dominance. The Lanaga Water area had salinity ranged from 0.5 to 10‰ which showed that these waters are part of fresh water near the mainland, while the rest have brackish waters. *Faunus ater* can live in brackish water areas, so that many of them were found in this area coupled with the existence of sandy mud substrate. This condition is a good habitat for the life of *Faunus ater*, because they live in brackish water areas.

*Faunus ater* as one of the species of the Gastropods Class, live in a habitat with brackish salinity and had a sandy silt substrate [12]. *Faunus ater* could live at the bottom of brackish waters, and spread in almost all of brackish waters bottom indicating that *Faunus ater* dominated this area. Gastropods in which they consisted of *Faunus ater* preferred muddy substrate than a sandy substrate; the reason is because the sandy substrate does not provide stable habitat for Gastropods members' lives [13]. Meanwhile, there are areas that are not provide enough organic materials because of the coarse sediment like sand, hence it has low organic materials and not comfortable for Gastropod's life [12]. Lanaga Water area has a sandy silt substrate, and indeed can provide enough organic materials for the life of *Faunus ater* so that their presence in the bottom of this waters has a big amount of individual and dominate the other species.

## CONCLUSION

Conclusions obtained through this study are (1) Dominance Level of each species from Gastropods Class that inhabit District of Lanaga Waters, Meureubo, West Aceh Regency, is low to moderate, and (2) *Faunus ater* has moderate dominance level, which is a species of gastropods dominating the District of Lanaga Waters, Meureubo, West Aceh Regency, Aceh Province.

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