

Study of Factors Affecting the Density and Size of Hammer Clam in Different Ages of Mangrove Forests

Students: Aphatsara Sutthikul, Watwaree longkhao

School: Princess Chulabhorn Science High School Trang

Teachers: Mrs. Patchara Pongmanawut, Mrs.Salamiyah Kittibunyathiwakon

Email: 05826@pcshstrg.ac.th

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Abstract

The study of factors affecting the density and size of Hammer clam in mangroves of different ages aimed to study salinity soil temperature and soil quality to compare the density and size of Hammer clam populations in two different aged mangrove forests, 30-year-old (mangrove forest site 1) and 10-year-old (mangrove forest site 2) in the two community; Ban Mod Tanoi and Koh Libong Sub-district, Kantang District, Trang Province. The data analysis of the soil quality began after the site visit to explore the Hammer clam. It was found that the density and size of Hammer clam were different between the two study sites. The 10-year-old mangrove forest (mangrove forest site 2) had a higher density of Hammer clam and a larger Hammer clam than 30-year-old mangrove forest (mangrove forest site 1). The soil quality in both areas was significantly different. The salinity, soil temperature, pH, soil nutrient content and organic matter content in the 10-year-old mangrove forest (mangrove forest site 2) were higher than the 30-year-old mangrove forest site 1 (mangrove forest site 1). Mangrove forests of different ages resulted in different sizes and heights of mangrove trees in both areas affecting the canopy cover as a result, the soil temperature in both areas was different as well. The 10-year-old mangrove forest (mangrove forest site 2) is an area where the temperature is appropriate and the sediment accumulation in the soil results in higher nutrient content. As a result, the population density of Hammer clam is higher and the mussels in that area are larger. The 10-year-old mangroves (mangrove forest site 2) are therefore more suitable for habitat and food source for the 30-year-old mangroves (mangrove forest site 1).

Keywords: Hammer clam, mangrove forest

Introduction

Ban Mod Ta Noi Community is located in Koh Libong Sub-district, Kantang District, Trang Province. It is an area along the coast of the Andaman Sea. Most of the villagers in the community are fishermen. Ban Mod Ta Noi community is a conservation community. There is a cost of mangrove forest conservation since 1988 with the hearts of people in the community who have strong desire to protect and preserve resources. The wisdom of coexisting between people and the mangrove forest and the sea is strong allowing the villagers to restore the mangrove forest to be complete again after being destroyed.

Hammer clam (*Telescopium telescopium*, Linné, 1758) or called by local people “Clam Clam”. Hammer Clam is one of the economically important clams found a lot in Ban Mod Tanoi community. The clam is very important, especially to local fishermen. Hammer clam collection Careers is a common occupation. The appearance of the Hammer clam has a rather thick shell with a high conical shape and a sharp spiral. The edge of the opening has a groove, the lid is opened as a dark brown chitin substance. in shallow water Along rivers and mangrove forests where the ground is muddy and sandy.

According to the survey of Ban Mod Tanoi community, it was found that there were 2 different areas of Hammer clam collections, young mangrove forest with high Hammer clam density and older mangrove forest with less Hammer clam density.

The purpose of this study was to study whether the salinity values of mangrove forests of different ages were investigated, are there differences in temperature and soil quality and how do they affect the population density and size of the Hammer clam in the mangroves in order to be used as a guideline for the conservation of Hammer clam species and areas in the mangrove forest in the future.

research question

Do salinity, soil temperature and soil quality in mangrove forests of different ages affect the density and size of Hammer clams?

research hypothesis

Salinity, soil temperature and soil quality in mangrove forests of different ages affected the size and density of the Hammer clams.

Materials and methods:

- | | |
|-------------------------------|--------------------------------|
| 1) Soil color book | 8) Soil classification manual |
| 2) quadrant | 9) tape measure |
| 3) Straw rope | 10) NP K test kit in soil |
| 4) Flags | 11) Globe Observer Application |
| 5) pH meter | 12) Vernier caliper |
| 6) Globe Observer Application | 13) Digital soil meter |
| 7) Thermometer | 14) Salinity Meter |

Study site and time duration:

This research was conducted at Ban Mod Tanoi Community, Koh Libong Sub-district, Kantang District, Trang Province. Two areas were studied: mangrove forest site 1, located at 7.3067 degrees north latitude and 99.42 degrees longitude. and the 10-year-old mangrove forest site (mangrove forest site 2) located at 7.3069 degrees north latitude, 99.4327 degrees east longitude. The study was conducted by randomly spreading straw ropes. Size 10 x 10 meters. The research team collected soil data and information about the Hammer clam during November 2022 to January 2023.

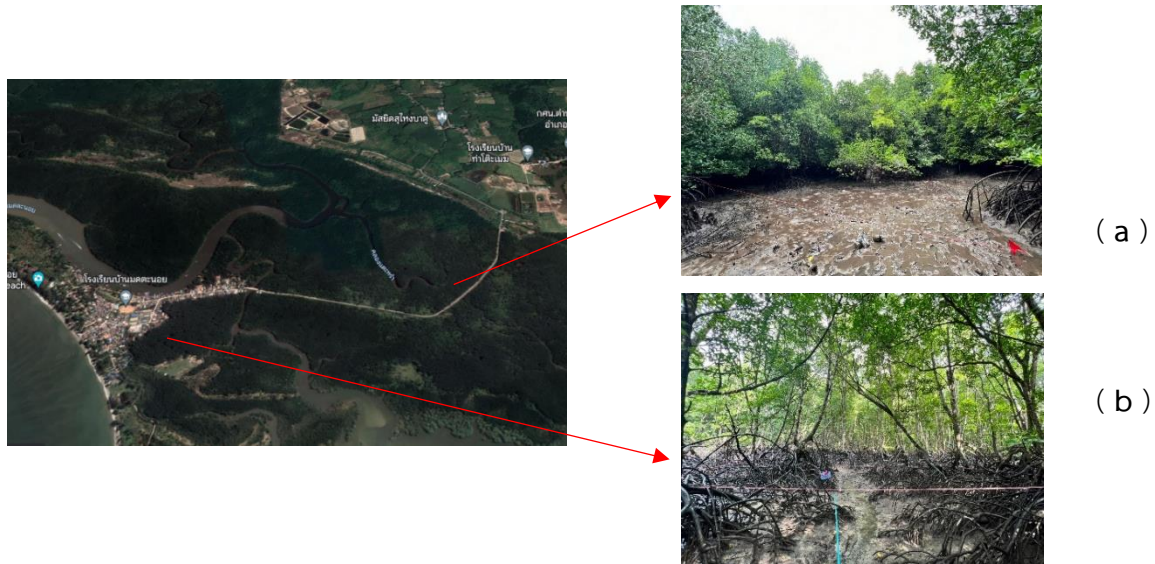


Figure 1 The study site of mangrove forest site1 (b) and mangrove forest site2 (a).

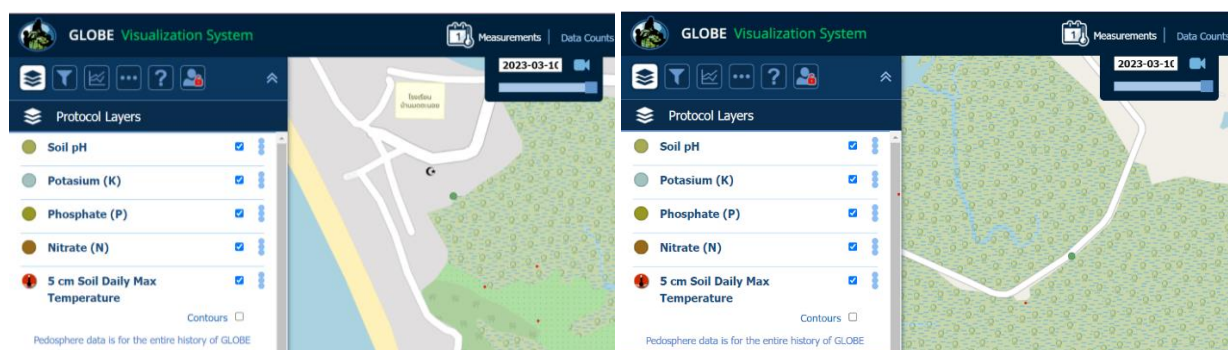


Figure 2 Land cover recording using Application GLOBE Observer.

Data collection of soil quality:

Soil data were collected according to the GLOBE method by measuring salinity, temperature, pH and nutrient and organic matter content in the soil as follows:

1. Specify an area to collect data in both areas of the mangrove forest, size of 10 x 10 meters.
2. Record the land cover in both regions using GLOBE Observer Application.
3. Set 5 sampling points per 10 x 10 meter, which are the four corners and the intersection of the diagonal lines.
4. Measure the temperature and salinity of the soil at sampling point. Data were collected 3 times per point and averaged.
5. Take a soil sample at every sampling point to study soil properties according to various indices in the laboratory, including pH, N, P and K values. Soil pH was measured using a pH meter and N, P and K values were measured using the N P K soil test kit.
6. Analyze the soil color by using the soil color reference book and classify the soil texture with the Field Soil Content Examination Manual.



Data collection of Hammer clam:

1. Specify an area to collect data in both areas of the mangrove forest, size of 10 x 10 meters.
2. Use a 50 x 50-centimeter grid, randomly placed in the sampling area 10 times , observe calmly and collect data number of clams. Record in the table to analyze the density of the Hammer clam.
3. Use a vernier caliper to measure the width and length of the Hammer clam and record the results.

Data analysis:

1. Analyze salinity, soil temperature and soil pH using mean and standard deviation.
2. Compare Nitrogen, Phosphorus and Potassium using one way ANOVA.

Results

Study of salinity Soil temperature and pH

Study of salinity, soil temperature and pH at the 30-year mangrove forest (mangrove forest site 1) and the 10-year-old mangrove forest (mangrove forest site 2), it was found that the average soil salinity at site 1 was $28 \pm 0.21\%$ and at site 2 was $30 \pm 0.48\%$. The mean salinity value was significantly different. Soil temperature study showed that site 1 had a mean soil temperature of $27.5 \pm 0.22^\circ\text{C}$, which was lower than site 2, which had a mean soil temperature of $29 \pm 0.35^\circ\text{C}$. The mean pH of site 1 was 7.3 ± 0.37 and the mean pH of site 2 was 8.0 ± 0.41 , which were not significantly different as shown in Figure 3-5.

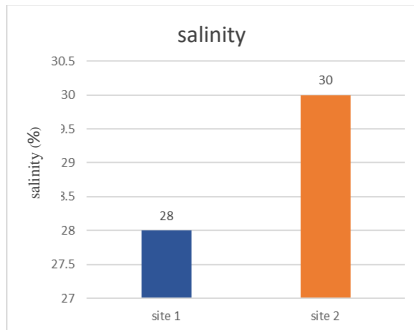


Figure 3 Soil Salinity

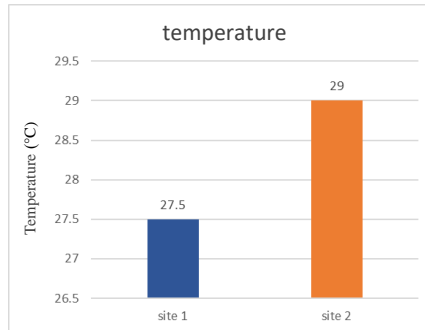


Figure 4 Soil Temperature.

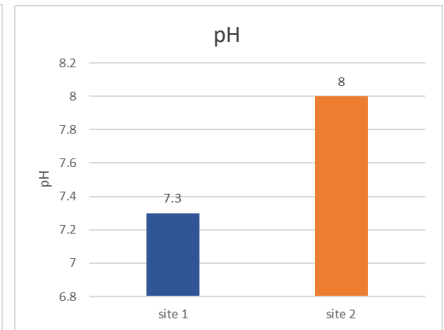


Figure 5 Soil pH.

Study of nutrients and organic matter in the soil

Study of nutrients and organic matter in the soil was found that the nitrogen and potassium values in the soil at the site 1 was averaged Low and Phosphorus was averaged Medium, which was lower than the mean Nitrogen and Potassium at site 2 which is at Medium level and average Phosphorus at High level. The study of the amount of organic matter in the soil found that Soils at site 1 and site 2 were significantly different in soil organic matter, with mean soil organic matter at site 1 at $3.5 \pm 0.13\%$, which was lower than that at site 2. Organic matter were $5.6 \pm 0.21\%$ as shown in Figure 6-7.

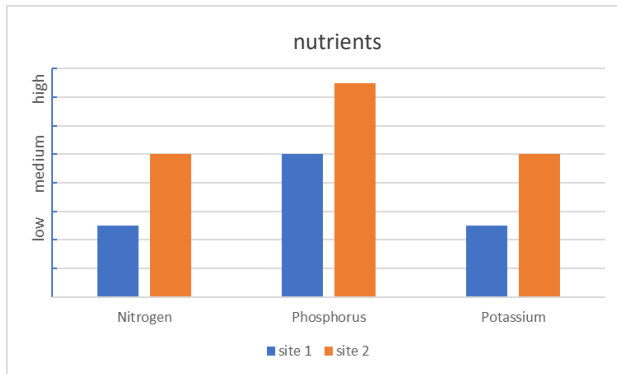


Figure 6 shows the nutrients in the soil

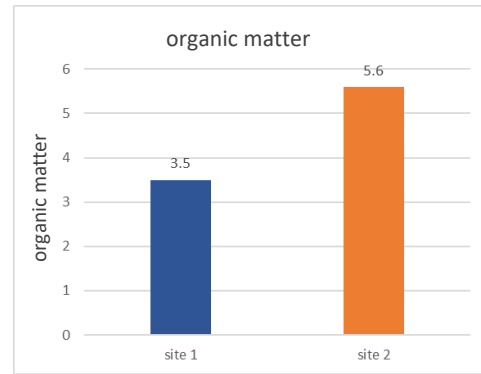


Figure 7 shows the amount of organic matter in the soil

Study of soil texture and soil color

The study found that the mangrove forest at the age of 30 years (mangrove forest site 1), the soil texture is mostly clay and sandy loam, very dark brown (7.5 YR 2.5/2) and the mangrove forest is 10 years old (mangrove forest site 2.) The soil texture is mostly clay and silty, dark greyish brown (10 YR 4/2).

Study of the size and number of Hammer clam

It was found that the number of Hammer clam in site 2 was higher than in site 1, and the size of the Hammer clam in site 2 was significantly larger than that in site 1. Statistics as shown in Figure 8.

Study area	Number of Hammer clam (units/square meter)	Hammer clam size (cm)	
		Width (cm)	Length(cm)
mangrove forest site 1	6.2 ± 0.35	4.18 ± 0.42	7.06 ± 0.34
mangrove forest site 2	14.8 ± 0.17	4.82 ± 0.19	8.22 ± 0.27

Figure 8 Sizes and numbers of Hammer clam

Discussion

The density and size of the Hammer clam between the two study sites are different. The 10-year-old mangrove forest (mangrove forest site 2) had a higher density of Hammer clam and a larger Hammer clam than 30-year-old mangrove forest (mangrove forest site 1)

The soil quality in both areas differed significantly. Mangrove forests of different ages resulted in different sizes and heights of mangrove trees in both areas affecting the canopy cover as a result, the soil temperature in both areas was different as well by a 10-year-old mangrove forest (mangrove forest site 2). It is an area where the temperature is suitable and the sediment accumulates in the soil in this area resulting in higher nutrient content. The 10-year-old mangrove forest (mangrove forest site 2) is suitable for establishing a habitat and food source for the Hammer clam. As a result, the population density of the Hammer clam is higher and the Hammer clam in that area are larger.

From this study, it is possible to know the relationship between Hammer clam and soil quality in the mangrove forest. The obtained information can be utilized for management planning in terms of conservation and management of Hammer clam resources and the environment.

Conclusion

From exploring the soil sampling area and surveying the Hammer clam. The data to study the salinity, temperature, pH values, nutrients, organic matter, soil substances, including soil and soil color characteristics were collected to analyze and compare with the density and size of the Hammer clam. It was found that soil quality in both areas is different significantly by salinity, soil temperature, pH, soil nutrient content and organic matter in mangrove forests aged 10 years (mangrove forest site 2) is greater than mangrove forests that are 30 years old (mangrove forest site 1) and found that the density and size of the Hammer clam vary between two study areas.

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Optional Badge

1. I AM COLLABORATOR

This research allows team members to learn to plan their work systematically and working as a team, 2 members of the team have divided the work to be responsible. To think together, to act together throughout the work, receiving cooperation in the area with various agencies such as Ban Mod Tanoi School provide information about the study area and provide economic data of the axillary clam. For Walailak University and the Institute for the Promotion of Teaching Science and Technology as a consultant to give advice on the research process, which work as a team and receive cooperation from various agencies, information is exchanged. Listening to feedback and making improvements can make research work more efficient.

2. I MAKE AN IMPACT

Hammer clam is one of the economically important clams found a lot in the Ban Mod Tanoi community. According to the survey of the Ban Mod Tanoy community, it was found that there were 2 different areas of Hammer clam collections: young mangrove forest with high Hammer clam density and older mangrove forest with less Hammer clam density. The purpose of this study was to investigate whether the salinity values of mangrove forests of different ages were investigated, whether there were differences in temperature and soil quality, and how they affected the population density and size of the Hammer clam in the mangroves in order to be used as a guideline for the conservation of oyster species and areas in the mangrove forest in the future.

3. I AM A DATA SCIENTIST

According to the research, we collected soil and Hammer clam data and went to the study area. Soil quality data were collected according to the Globe method by measuring salinity, temperature, pH, and nutrient and organic matter content in the soil to analyze for salinity, soil temperature, and soil pH. Using the mean and standard deviation Analyze the value of organic matter in the soil. Compare nitrogen Phosphorus and potassium in both areas were analyzed using one-way ANOVA. Soil color was analyzed using the Soil Color Reference Book, and soil texture classification was carried out by the Field Soil Inspection Manual. This research has limitations in this area. The number of times is not enough, and collecting data may not be sufficient, causing the data to be analyzed and the research to be incomplete.