STUDY OF WATER QUALITY AND BENTHIC ANIMAL DIVERSITY IN THE MANGROUE FOREST AT LAEM TEWAD VIEWPOINT, PALIAN DISTRICT, TRANG PROUINCE, THAILAND

Presentation by Wichienmatu school

Globe Thailand

Research Title : Study of Water Quality Affecting the Diversity and Density of Benthic Animals in theMangrove Forest Area at Laem Thuat Viewpoint, Palian District, Trang Province, Thailand

Research Team : Miss Thanakarn Lueankaew and
Miss Atikarn Saengchan
Grade Level : Grade 11 (Mathayom 5)
Advisors : Miss Kwanjai Kanjanasrimek and Miss Suthira Thajin
School :Wichianmatu School

Abstract

This research aims to study the effects of water quality on the diversity and density of benthic animals in themangrove forest. The study examines water temperature, salinity, pH level, and dissolved oxygenconcentration, as well as benthic animal populations in the mangrove forest at three designated locations.These factors serve as indicators of water quality and the overall health of the mangrove ecosystem. Thefindings reveal that the water temperature, salinity, pH level, and dissolved oxygen concentration, alongwith the diversity of benthic animals, are at good levels. This positively influences the density and diversity of benthic animals in the mangrove forest.

Keywords : Water quality, Benthic animals, Mangrove forest

Introduction

Background and Significance

Mangrove forests are an essential ecosystem in Thailand, playing a crucial role in maintaining natural balance. They serve as nurseries for aquatic animals, habitats for various species, and natural coastal erosion barriers. Benthic animals in mangrove forests are vital to the ecosystem as they contribute to nutrient cycling, improve water quality, and serve as a food source for other organisms.

Studying the relationship between water quality and the diversity and density of benthic animals in mangrove forests is crucial for conservation and restoration efforts. Human activities, such as agricultural practices involving chemical use, may impact water quality in mangrove areas, potentially reducing species diversity and population density of benthic animals.

Therefore, the researchers are interested in studying water quality, including dissolved oxygen levels, water temperature, pH levels, and salinity, along with the diversity of benthic animals in the mangrove forest at Laem Thuat Viewpoint, Lipang Subdistrict, Palian District, Trang Province. The knowledge gained from this study can be used to support mangrove ecosystem conservation, restoration, and sustainable coastal community development.

Research Question

Does water quality, including pH level, dissolved oxygen concentration, salinity, and water temperature, affect the diversity and density of benthic animals in the mangrove forest?

Research Hypothesis

Water quality, including pH level, dissolved oxygen concentration, salinity, and water temperature, affects the diversity and density of benthic animals in the mangrove

Independent Variable Water quality
Dependent Variable Diversity of benthic animals
Controlled Variables Study location, measurement methods

Materials and Research Methodology
Variables

Hypothesis

Water quality, including pH level, dissolved oxygen concentration, salinity, and water temperature, affects the diversity and density of benthic animals in the mangrove forest.

Independent Variable Water quality
Dependent Variable Diversity of benthic animals
Controlled Variables Study location, measurement methods

Materials and Equipment

1. Thermometer
2. Water dissolved oxygen test kit
3. Litmus paper
4. Water sample bottles
5. Hydrometer
6. Graduated cylinder
7. Beaker
8. Random sampling table

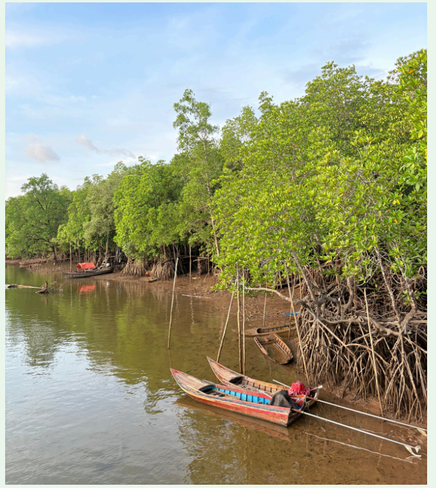
Research Procedure

Study Location

This study was conducted in the mangrove forest at Laem Thuat, Palian District, Trang Province, Thailand, located at latitude 7.1740625° N and longitude 99.7513125° E.

The research involved collecting water samples and benthic animal data at designated points in the study area. This location was selected because it is a coastal or estuarine ecosystem influenced by both seawater and freshwater inflows. Most of the mangrove forest area consists of nutrient-rich mud or clay soil, supporting a variety of plant and animal species. This makes the site an essential area for environmental conservation and economic activities. It serves as a habitat, a nursery for aquatic life, and a protected mangrove conservation

Canal water area



Mangrove forest area

Water Quality Assessment According to GLOBE Methodology

This study focuses on assessing water quality by examining various parameters, including the waters pH, dissolved oxygen content, salinity, temperature, and the abundance of benthic animals in a mangrove forest area as follows:

1. Studying the pH of water

Use Universal Indicator Paper to dip into the water sample and wait for the paper to change color.

Compare the color change with the color chart provided in the test kit to determine the pH value.

Record the pH values from three different measurements.

2. Study of Dissolved Oxygen (DO) in the Water

Collect the water sample by submerging a sample bottle completely under water, filling it to the top, and sealing the bottle underwater.Conduct the test within 2 hours after collecting the sample.Perform the test three times and compare the average dissolved oxygen level with the range specified in the test kit.

3. Study of Water Salinity

Rinse a 500-milliliter measuring cylinder with the water sample twice. Fill the measuring cylinder with 500 milliliters of the water sample and measure the temperature of the water. Slowly lower a hydrometer into the water and record the specific gravity reading.Compare the specific gravity value with the salinity chart.

Record the measurements three times.

4. Study of Water Temperature

Submerge a thermometer about 10 cm deep into the water. Read and record the water temperature from the thermometer. Take three measurements.

5. Study of Benthic Animals in the Mangrove Forest Area

Select three points within the study area to observe benthic animals. Place a random sampling grid at each of the three points. Count the number of squares in the grid that contain benthic animals at each point and record the data. Repeat the data collection three times.

Part 1 To study the effects of water quality, including pH level, dissolved oxygen concentration, salinity,and water temperature, on the diversity and density of benthic animals in the mangrove forest

Research Results

1.Study of the Acid-Base Properties of Water in the Mangrove Forest Area at Laem Thuat Viewpoint Palian District,Trang Province

Table 1: Study of the Acid-Base Properties of Water in the Mangrove Forest Area at Laem Thuat Viewpoint Palian District, Trang Province

Mangrove Forest Area at Laem Thuat Viewpoint	Acid-Base Properties of Water
First Trial	6
Second Trial	7
Third Trial	7
Average	6.67

2 .Study of Dissolved Oxygen Levels in Water in the Mangrove Forest Area at Laem Thuat Viewpoint Palian District, Trang Province

Table 2: Study of Dissolved Oxygen Levels in Water in the Mangrove Forest Area at Laem Thuat ViewpointPalian District, Trang Province

Mangrove Forest Area at Laem Thuat Viewpoint	Dissolved Oxygen Levels in Water (mg/L)
First Trial	5.8
Second Trial	6
Third Trial	6
Average	5.93

3. Study of Water Salinity in the Coastal Forest Area at the Mangrove Observation PointPalianDistrict,Trang Province

Table 3: Results of the Study on Water Salinity in the Coastal Forest Area at the Mangrove Observation Point Palian District, Trang Province

Mangrove Forest Area at Laem Thuat Viewpoint	Water Salinity (ppm)
First Trial	30
Second Trial	30
Third Trial	30
Average	30

4. Study of Water Temperature in the Mangrove Forest at Laem Thuat Viewpoint Palian District,
Trang Provinc

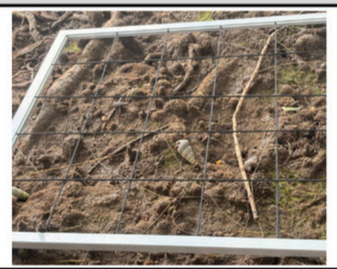
Table 4 shows the water temperature in the studied mangrove forest area at Laem ThuatViewpoint Palian District, Trang Province

Mangrove Forest Area at Laem Thuat Viewpoint	Water Temperature (°C)
First Trial	27
Second Trial	28
Third Trial	28
Average	27.67

5. Study of Benthic Animals in the Mangrove Forest Area at Laem Thuat Viewpoint Palian District,Trang Province

Table 5: Study of Benthic Animals in the Mangrove Forest Area at Laem Thuat Viewpoint Palian District, Trang Province

From the table of benthic animals in the mangrove forest area, six species of benthic animals were found.
The population density is calculated as follows:
Location 1 Fiddler crabs : 16% Arosesarma eumolpe : 4%
Cerithidea obtusa : 16%
Location 2 Fiddler crabs : 16%White Sword Clawed Crab Juveniles: 8% Nerito planospiro: 4%
Location 3 Fiddler crabs : 20%White Sword Clawed Crab Juveniles: 12% Brunneifusus ternatanus : 8%

Mangrove Forest Area at Laem Thuat Viewpoint	Benthic Animals in the Mangrove Forest Area	Benthic Animals Found at the Designated Locations
Location 1		Arosesarma eumolpe (1 individual) Fiddler crabs (4 individuals) Cerithidea obtusa (4 individuals)
Location 2		Fiddler crabs (4 individuals) White Sword Clawed Crab Juveniles (2 individuals) Nerito planospiro (1 individual)
Location 3		Fiddler crabs (5 individuals) White Sword Clawed Crab Juveniles (3 individuals) Brunneifusus ternatanus (2 individuals)

Summary and Discussion of Research Results

Research Findings Summary

The study on water quality and the diversity of benthic animals in the mangrove forest area at Laem Thuat Viewpoint, Palian District, Trang Province, Thailand, revealed that water quality has an impact on the diversity of life forms in the area. The average pH value of the water was 6.67, the dissolved oxygen concentration was 5.93 mg/L ,the Caverage salinity was 30 ppm , and the average water temperature was 27.67°C .

The study at three locations revealed a total of 6 species of benthic animals, with the following averagepopulation densities:

1. Fiddler crabs : 17.33%
2. Arosesarma eumolpe : 1.33%
3. White Sword Clawed Crab Juveniles: 6.67%
4. Cerithidea obtusa : 5.33%
5. Nerito planospiro: 1.33%
6. Brunneifusus ternatanus : 2.67%

The water quality studied was found to be at a good level, which positively impacted the population density and diversity of benthic animals in the mangrove forest area. This indicates that favorable water conditions support a higher abundance and variety of species in the ecosystem.

Recommendations

It is recommended to study other mangrove areas that have more diverse habitats and a greater variety of benthic animals.

Acknowledgements

In conducting the research project titled Study of Water Quality Affecting the Diversity and Density of Benthic Animals in the Mangrove Forest Area at Laem Thuat Viewpoint, Palian District, Trang Province, Thailand, several steps were involved, including literature review, data collection, data analysis, studying measurement methods, conducting experiments, and preparing the final report, all of which were successfully completed. Throughout this process, the research team received valuable assistance and guidance in various aspects, as well as encouragement from many individuals. The team is deeply grateful for the kindness and support ofeveryone involved. On this occasion, we would like to express our sincere thanks to all those who contributedto the success of this project, as follows

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The Research Team

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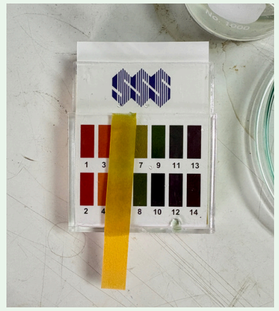
Appendix

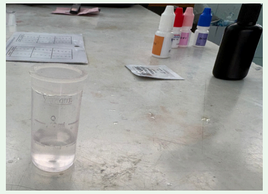
pH measurement



Measuring water temperature

Study the diversity and density of benthic animals.

Measurement of dissolved oxygen (DO) in water



Measuring the salinity of water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