Research Title : Study of physical factors affecting the density of sea snails. Hat Samran beach Trang, Thailand

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Abstract

The study of physical factors affecting the density of wedge clams on Samran Beach, Hat Samran District, Trang Province aimed to investigate the physical factors influencing the density of wedge clams in the area of Samran Beach, Hat Samran District, Trang Province. The study examined the density of wedge clams, water temperature, pH, dissolved oxygen, and salinity to understand the density of wedge clams in the Samran Beach area, Hat Samran District, Trang Province. The results showed that the density of wedge clams on Samran Beach, Hat Samran District, Trang Province was influenced by physical and chemical factors. The water temperature ranged from 29.4-33.3 °C, which is conducive to the survival of aquatic organisms. The pH ranged from 5.6-6.8, considered normal and suitable for aquatic life. The dissolved oxygen (DO) ranged from 4.29-7 mg/l, and the salinity ranged from 28.4-30.64 ppt. The cloud cover showed that Steatocumulus clouds were more prevalent than Cirrus clouds, indicating high humidity or changing weather conditions.

Keywords: Wedge clams, Samran Beach, Hat Samran District, Trang Province, Physical factors, Wedge clam density

Introduction

Background and Significance of the Project

The wedge clam is a bivalve mollusk belonging to the order Cardiida, family Donacidae. In Thailand's coastal areas, there are 8 confirmed species (Signorelli and Printrakoon, 2019). They have a thick, triangular shell with the upper edge of each shell longer on the front side than the back. The lower edge of the shell is circular, and the apex points towards the rear of the body. The outer shell surface has relatively smooth horizontal lines and comes in various colors such as white, cream, brown, reddish-brown, clear white, light yellow, black, or purplish-brown. These animals live in the intertidal zone on sandy beaches (Swennen et al., 2001), an area subject to constant temperature changes, allowing them to adapt well to both tropical and temperate climates. Wedge clams feed on plankton and organic matter suspended in seawater. The lower Andaman Sea coastline features long sandy beaches stretching north-south from Ranong, Phang Nga, Phuket, Trang, and Satun provinces, an area rich in marine resources and important for biodiversity, filtering food from seawater.

Samran Beach is located in the lower Andaman region, Moo 9, Phum Ban Na-Hat Samran Road, Hat Samran Subdistrict, Hat Samran District, Trang Province 92120. From Samran Beach, you can see Libong Island, Lao Liang Nuea Island, Lao Liang Tai Island, Petra Island, and Sukorn Island. It boasts black sand beaches, numerous minerals, and mud suitable for spa treatments, making it a tourist destination with abundant natural resources. It is also significant in terms of biodiversity (Department of Marine and Coastal Resources, 2022). Therefore, the researchers are interested in studying the physical factors affecting the density of wedge clams at Samran Beach, Hat Samran District, Trang Province

Research Objectives

1.To study the physical factors affecting the density of wedge clams in the Samran Beach area, Hat Samran District, Trang Province.

Scope of Study

Samran Beach, Hat Samran District, Trang Province 92120, coordinates 7.2352°N, 99.5366°E.

Research Question

1.Are the physical factors affecting the density of wedge clams in the Samran Beach area, Hat Samran District, Trang Province the same?

Research Hypothesis

1.The physical factors affecting the density of wedge clams in the Samran Beach area, Hat Samran District, Trang Province are different.

Relevant Variables

Hypothesis 1: The physical factors affecting the density of wedge clams in the Samran Beach area, Hat Samran District, Trang Province are different.

Independent Variables: Salinity of seawater, water temperature, pH, dissolved oxygen.

Dependent Variable: Density of wedge clams.

Control Variables: Sampling method, sampling time, equipment used.

Materials and Methods

1.Grating plate60x60 cm grid (Quadrat)

2.Clam collection tools

3.Sample collection bags or containers

4.Ruler or measuring tape

5.Thermometer

6.Salinity meter

7.pH meter (universal indicator)

8.Camera equipment

9.Dissolved oxygen meter

10. Notebook and writing instruments

11. Soil scoop

Measurement Principles

GLOBE measurement principles

Hydrosphere measurement principles

Atmosphere measurement principles

Research Methodology

1. Research Preparation

1) Define the research topic.

2) Conduct literature review and gather relevant knowledge and theories.

3) Define the research objectives.

4) Determine the sampling points within the study area.

2. Processing floor

1) Conduct research operations planning.

2) Conduct a survey of the area to be researched.

3) Collect soil and water samples to measure soil and water temperature using a thermometer. Read the values and record the results.

4) Measure the salinity of water with a Salinity Meter, read the words and record the results.

5) Measure the acidity-alkalinity (pH) of the soil with a universal indicator, read the value and record the results.

6) Analyze the values obtained from the survey and summarize the study results.

Study of the physical quality of water

1. Determine water sampling points.

2. Measure the water temperature with a thermometer by placing it in the prepared water. Wait for 1 minute and read the soil temperature value for the first time. Read the value and record it on the data recording sheet. Read the soil temperature value 4 more times, waiting for only 1 minute each time. If the values read all 5 times are no more than 1 degree Celsius different,

Chemical study of water quality

1. Measure the water level with a Salinity Meter. Read the value and record the data.

2. Measure the pH of the water with a universal indicator, immerse it in water and leave it for about 30 seconds, then compare the values and record the results.

3. Measure the amount of oxygen dissolved in water using a Dissolved Oxygen Test Kit.Then record the obtained values.

Soil quality study

1. Collect soil samples in coastal areas where seawater floods the area with shellfish at 5 points. Study the soil texture and color. Record the results.Study of the density of sea snails

2. Collect samples of sea clams in coastal areas that are inundated by seawater during low tide using a 60x60 cm 2 quadrat placed at 5 points. Collect all samples twice in the area with sea clams. Count the number of sea clams and record the results.

Analysis

1) The obtained data was analyzed and the relationships were compared.

2) Make a table of means and standard deviations.

3) Calculate the density of sea clams.

4) Summary of experimental results

Research results

Geographic coordinates: Study of the area around Samran Beach, Hat Samran Subdistrict

Hat Samran District, Trang Province 92120 has coordinates 7.2352 "N, 99.5366°E.

Table 1 Geographic coordinates

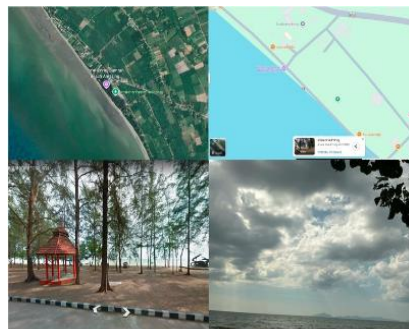| Sample Collection Site	Latitude (°N)	Longitude (°E)
Samran Beach	7.2352	99.5566

Figure 1. Map of sampling points at Samran Beach, Hat Samran Subdistrict, Hat Samran District, Trang Province.

Source: Adapted from Google Maps

Study of the physical quality of water

Table 2 Water temperature

Location	Trial 1	Trial 2	Trial 3	Average (X) ± S.D
1	28.35	29.4	30.01	29.25 ± 0.84
2	29.45	29.3	30.5	29.75 ± 0.65

From Chart 2 showing the water temperature, it was found that the average temperature of area 1 was 29.25±0.84 and the average temperature of area 2 was 29.75+0.65.

Chemical study of water quality

Table 3 Water salinity, pH, and dissolved oxygen content.

Property	Location 1	Location 2	Location 3	Location 4	Location 5	Average (X) ± S.D
1. Salinity (ppt)	28.2	28.6	28.4	28.2	28.6	28.40 ± 0.2
2. pH	7	7	7	7	6	6.80 ± 0.05
3. Dissolved Oxygen (mg/L)	7.5	7.5	7	7	6	7.00 ± 0.61

Table 3, the salinity of water, the acidity (pH), the amount of oxygen dissolved in water, the average seawater saturation value was 28.4±0.2 ppt, the average pH value was 6.8±0.45, the amount of oxygen (DO) was 7.00±0.61 mg/L

Soil quality study

Table 4 Soil texture and color

Type	Location 1	Location 2	Location 3	Location 4	Location 5
Texture	Sandy clay loam	Sandy clay loam	Clay	Sandy loam	Clay
Color	Dark brown	Dark brown	Dark brown	Dark brown	Dark brown

Table 4, soil quality found that in the area with sea shells, there are both clay and sandy soil, sandy soil, loam soil and clay soil, and all areas of soil are dark brown

Study of the density of sea snails

Table 5. Density of sea clams.

Type	Location 1	Location 2	Location 3	Location 4	Location 5	Average (X) ± S.D
Number (clams)	22	23	10	18	6	15.80 ± 7.50
Density (clams/cm²)	0.61	0.63	0.27	0.5	0.16	0.43 ± 0.20

Table 5, the density of all sea clams in Samran Beach area showed that the study area had a density of sea clams of 0.43±0.20 individuals/square meter.

Table 6 Analysis of cloud cover in areas.

Type	Trial 1	Trial 2	Average (X) ± S.D
Stratocumulus	72.50%	12.50%	42.50 ± 42.42
Cirrus	10%	35%	22.50 ± 17.67

From Table 6, showing the amount of cloud cover, it was found that Steatocumulus cloud cover was more than Cirrus cloud cover.

Conclusion and Discussion

From the study of physical factors affecting the density of sea clams in the area of Samran Beach, Hat Samran District, Trang Province, it was found that the important factors affecting the density of sea clams are the physical characteristics of the beach surface. Sea clams are mostly found in areas with clay mixed with sand and salinity values between 28.2-28.6 ppt, pH = 7 and dissolved oxygen value of 7.5 mg/1, which affects the density of sea clams. A significant change in salinity may cause the number of sea clams to decrease. Temperature and environmental factors The sea temperature that is suitable for sea clams to live is between 26-30 degrees Celsius. Changes in weather conditions, such as heavy rain or strong winds, affect the density of sea clams. The rate of sea water rise and fall (ebb and flow) Sea clams are distributed along the beach during low tide and are found to be denser in areas that receive continuous seawater.

Therefore, the factors affecting the density of sea clams, including temperature, salinity, pH and dissolved oxygen, affect the density of sea clams. This study helps to understand the ecosystem of Samran Beach and can be applied to manage sea clam resources for conservation and sustainable utilization.

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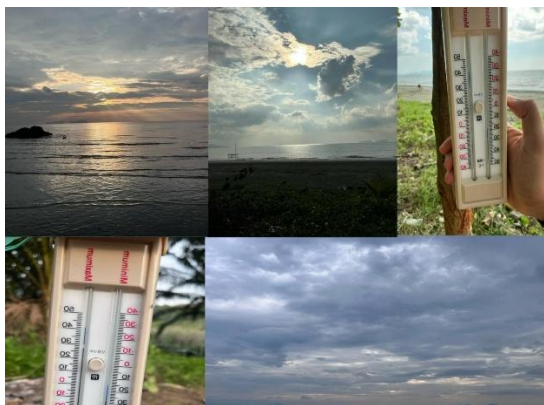
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Diversity and density of sea shells in Ao Boonkhong, Sikao District, Trang Province.

https://search.app/ByivndTill IpyaVE09

Appendix

a picture of the temperature of the air

A picture of measurement of the area of the sampling area.

Wedge clam sampling images.

Dissolved oxygen measurement images.