Factors affecting the density of Cerithidea cingulata
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THE GLOBE PROGRAM
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Abstract

This research aimed to study the factors affecting the density of pagoda snails at Samran Beach, Hat Samran District, Trang Province, during November 2024-January 2025 by setting the sampling points of clams in the mudflat area divided into 10 lines, each line 200 meters apart. The results of the study found that pagoda snails live in sandy loam and loamy sand soils that are at the same level as the sediment surface. The average number of pagoda snails is 416 individuals per square meter. In November, the highest number is 1,152 individuals/square meter. In January, the highest number is 380 individuals/square meter. Soil and water quality affecting the density of apple snails Study of water quality, measuring water temperature, salinity, pH, dissolved oxygen, and alkalinity. Study of soil quality affecting the density of apple snails. Soil temperature, salinity, pH, soil organic matter, soil color, and soil structure were measured. The data were then analyzed to analyze the relationship. The amount of apple snails is in the opposite direction to the water quality, namely temperature, acidity-alkalinity, and dissolved oxygen. Sediment quality includes organic matter, pH, and salinity, which are in the same direction as water quality.

Keywords : Density , Factor , Cerithidea cingulata

Research Question
Asking Questions

Pagoda snails are snails that villagers and fishermen collect to eat or trade to generate income for themselves and their families. Therefore, we studied the factors affecting the density of pagoda snails, and the research questions were:
1. Does water quality affect the density of pagoda snails? How?
2. Does soil quality affect the density of pagoda snails? How?

Introduction
Content Knowledge

Samran Beach is located in the south of Trang Province. To the north, it is adjacent to Kantang and Palian Districts. To the east, it is adjacent to Palian District. To the south, it is adjacent to the Strait of Malacca. To the west, it is a flat plain of mountains, lowlands, and the Andaman Sea coast. The beach is approximately 18 kilometers long and covers a total area of 224 square kilometers. It is divided into 3 sub-districts. Although it is a small district, it is a source of abundant natural resources. Hat Samran Sub-district, Hat Samran District, Trang Province, in the area of Hat Samran Beach, there are many types of shells, such as pagoda shells, shells, or other shells. Villagers along the Hat Samran Beach or nearby areas will use the low tide to collect shells to use as food and generate income for themselves and their families. The team has studied the factors affecting the density of pagoda shells. The general characteristics of pagoda shells are spiral-rolled shells. The top is high and pointed, consisting of many rings. Each ring has grooves and ridges that spirally follow the opening. The shell is brown mixed with yellow or clean white with a ridge that runs across the length of the body, which measures approximately 4-6 centimeters (Aquatic Animal Dictionary, 2018). The scientific name Cerithidea cingulata is popular among villagers by using the GLOBE measurement principles and also using data from the research on sustainable shellfish management in 5 villages of Trang Province (Assistant Professor Nipon Jaipleum) to learn and apply by considering shellfish data along with conducting research systematically in the research work to find factors affecting the density of shellfish by measuring water quality and soil quality according to the GLOBE measurement principles along with analyzing and summarizing the data clearly.

Field Photos
(requires release forms)

Research Methods
Planning Investigations
Describes the planning process

Study Point Determination
Area of Samran Beach, Hat Samran District, Hat Samran Subdistrict, Trang Province by randomly collecting soil in November and January, 2 months, which is the winter season, collecting soil 200 meters from the beach and 2 meters apart in the northeast, northwest and southeast directions until the main pagoda shells are not found.
GLOBE Testing Method
Pedosphere Soil Measurement Method
Hydtosphere Water Measurement Method
Materials and Equipment
Standard thermometer , Dissolved Oxygen (DO) Test Kit , Litmus Paper , pH meter , Quatlet , HANNA alkalinity test kit , Digital Salinity Meter
**Research Method**
1) Set the study topic, select the topic to be studied
2) Research, collect knowledge and theories related to the research
3) Determine the purpose of the study
4) Determine the sampling point in the study area

Carrying Out Investigations
Describes what happened

1) Plan a joint research project within the group.- Start collecting soil samples on November 30, 2023.- Collect once a month for 2 months.
2) Inspect the research area.- Go to survey the area with pagoda shells to collect soil and water samples for study.
3) Start collecting samples to measure the relevant factors that need to be studied.Measure geographic coordinates, soil temperature, soil salinity, soil pH, soil organic matter, soil color, soil structure, soil adhesion, water temperature, water salinity, water alkalinity, water pH, water oxygen, The study time is 14.00-17.00.- Take the collected soil and water samples to measure according to the GLOBE method.
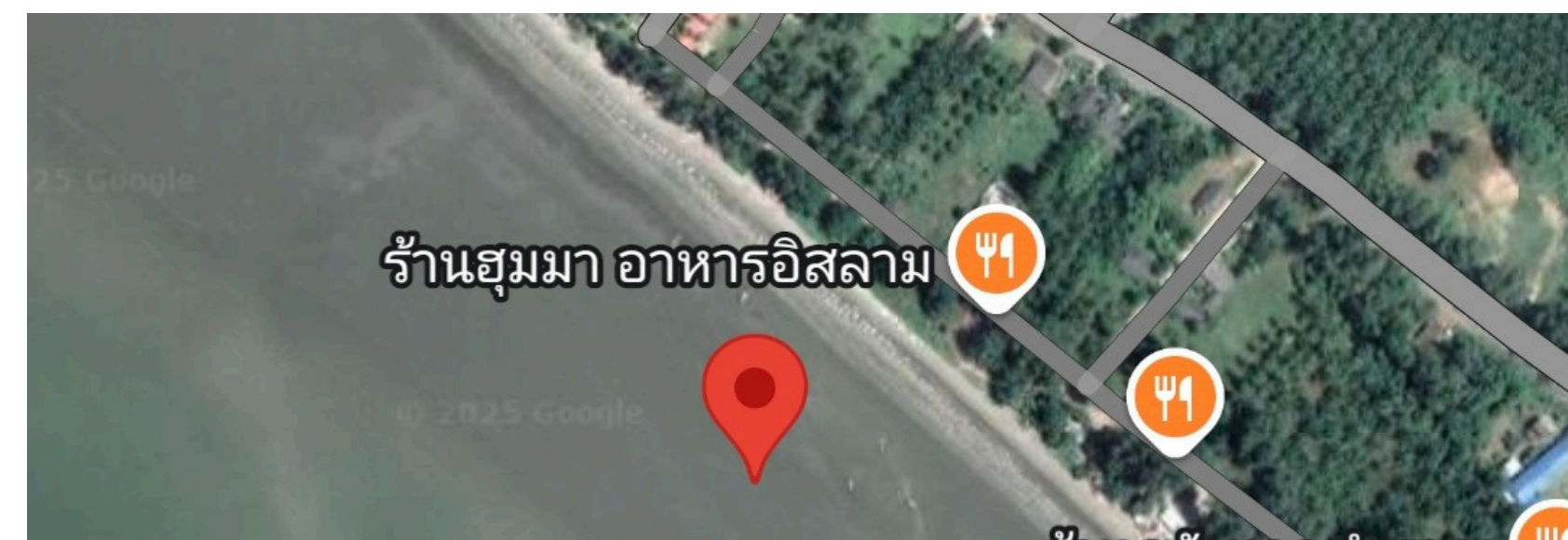
GLOBE Badges

Be a DATA SCIENTIST

This project clearly uses the data scientist approach by using the principles of data collection, analysis, andconclusion to obtain accurate data by collecting scientific data collection methods such as random sampling of soil and fivein areas with different densities to measure the quality of cool and water quality to find the factors affecting the density of pagoda snails. The analysis of the relationship of pagoda snails has a relationship in the opposite direction of water quality, consisting of temperature, acidity, oxygen dissolved in water, soil quality, and sediment, consisting of organic matter, pH, and salinity, which has a relationship in the same direction as water quality.Salinity has a relationship in the same direction as water quality and is then summarized in a clear table.

Be a PROBLEM SOLVER

In this project, the study of factors affecting the density of pagoda snails, which are snails that can generate income for local fishermen. During the survey of the project area, it was found that in the 2 surveys, the density of pagoda snails decreased. The factors that affected were:Water quality factors, with the amount of oxygen dissolved in the water decreasing and the alkalinity increasingSoil quality factors, with the pH value decreasing, salinity increasing, and organic matter decreasing in the soil. The decreasing density of pagoda snails will result in a decrease in income for fishermen who are in the jelly trade. The study found the problematic factors that affected the density of pagoda snails, leading to solutions that reduced the density of pagoda snails, such as:Increased seahorse milk quality control

Be a COLLABORATOR

The success of this project is the collaboration of many parties, both the research team and related agencies.This shows the importance of being a good collaborator. The researcher's teamwork has divided the tasks.The research team consists of 3 students who jointly planned, designed the experiment, collected data, analyzed the results, and concluded the main points. The advisor played an important role in the goat herding process.The research process, sample collection, and data analysis were supported by Wichian Mat School and the Wichian Mat School's special classroom for providing a budget, equipment, and academic support.The villagers and fishermen in the area of Samran Beach provided information about the high and low tides, showing that quality research requires cooperation from many parties, not just working alone but also exchanging knowledge, helping each other analyze and solve problems creatively, and making this project a success.

Results
Analyzing Data

1. Analyze the obtained data and read the values of factors affecting the density of shellfish. The statistics used in data analysis include soil temperature, soil salinity, soil pH, soil organic matter, soil color, soil structure, water temperature, water salinity, water alkalinity, water pH, and water oxygen.
2.Make a table showing the average values of comparative data.
3.Summarize the experimental results.

Table 1 Density of pagoda snails per square meter

Survey times	Average number of shellfish (square meter)	Average number of shellfish (square meter)
1	1152	80
2	380	52

Table 2 Water temperature, water salinity, water pH, water dissolved oxygen and water alkalinity.

Survey times	Average				
	Temperature (°C)	Salinity (ppt)	Dissolved oxygen in water (mg/l)	Alkalinity in water (mg/l)	pH
1.	28.5	26.5	8.5	130	5
2.	31	28	4.0	145	6

Table 3 Soil temperature, soil salinity, soil pH, soil organic matter and soil color.

Survey times	Average					
	Areas with high density of shellfish		Areas with a thick, dense shellfish		There is no density of shellfish.There is no density of shellfish.	
	1	2	1	2	1	2
Temperature (°C)	28.5	29.5	28	30	29	31.5
Salinity (ppt)	4179	4259	4314	4829	4196	4791
pH	7.70	7.07	7.73	7.58	7.77	7.49
Organic substances in the soil	Low	Very low	Low	Very low	Very low	Very low
clay colore	7.5 YR 4/1	7.5 YR 3/1	7.5 YR 4/1	7.5 YR 3/1	7.5 YR 4/1	7.5 YR 4/1

Table 4 Soil structure and soil retention

Survey times	Soil structure			Soil elongation		
	Areas with high density of shellfish	Areas with a thick, dense shellfish	There is no density of shellfish.There is no density of shellfish.	Areas with high density of shellfish	Areas with a thick, dense shellfish	There is no density of shellfish.There is no density of shellfish.
1	SANDY LOAM	LOAMY SAND	LOAMY SAND	Friable	Friable	Friable
2	SANDY LOAM	LOAMY SAND	LOAMY SAND	Friable	Friable	Friable

Discussion
Interpreting Data

1. Density of pagoda snails
From the study of the density of pagoda snails in each area with different densities, it was found that the density of pagoda snails in November 2014 was the highest at 1,152 individuals/sq.m., followed by 80 individuals/sq.m., and in January 2025, the highest at 380 individuals/sq.m., followed by 52 individuals/sq.m. Pagoda snails in areas with high densities in January decreased by 68% from December. The snails in areas with low densities of pagodas in January decreased by 35% from November.

2. Water temperature, water salinity, pH, dissolved oxygen, and water alkalinity
From the study of water quality in November The water source was found to have a temperature of 28.5°C, a salinity of 26.5 ppt, a pH of 5, and a dissolved oxygen of 8.5 mg/l. The alkalinity was 130 mg/l. In January, the water source was found to have a temperature of 31°C, a salinity of 28 ppt, a pH of 6.2, and a dissolved oxygen of 4.0 mg/l. The alkalinity was 145 mg/l. It was found that the increase in temperature, salinity, dissolved oxygen, and pH caused the density of the snails to decrease.

3. Soil temperature, soil salinity, soil pH, soil organic matter, soil structure, and color
From the table, it can be concluded that the first survey (November) in the area with a high density of snails found that the soil temperature was 28.5°C, soil salinity was 4259 ppt, soil pH was 7.70, and soil organic matter was low. And the soil color is 7.5 YR 4/1. The second survey of the area (January) in the area with a high density of shellfish found that the soil temperature was 29.5°C, the soil salinity was 4179 ppt, the soil pH was 7.07, the soil organic matter was very low, and the soil color was 7.5 YR 3/1. It was found that the decrease in salinity, soil organic matter, and pH caused the density of the shellfish to decrease. In the area with a high density of shellfish, the shellfish will live in the soil with the characteristics of SANDY LOAM (SL), and in the area with a low density of shellfish and the area with no density, the shellfish will live in the soil with the characteristics of LOAMY SAND (LS). As for the soil adhesion in each area, it is a Frible adhesion.

Conclusions
Drawing Conclusions & Next Steps

From the study, it can be concluded that from the study, it was found that the factors affecting the density of the pagoda snails from the survey were the water quality factor, which found that in the water quality, there were factors of the amount of oxygen dissolved in the water and alkalinity, where the amount of oxygen dissolved in the water decreased and was more alkaline than the first survey, causing the density of the snail population to decrease, and the soil quality factor, where in the soil quality, it was found that in the soil quality, there were factors of the pH value in the soil, the salinity in the soil, and the organic matter in the soil, where the pH value decreased, the salinity increased, and the organic matter in the soil decreased, causing the density of the snail population to decrease, and the soil structure that was SANDY LOAM (SL) had a higher density of pagoda snails than the soil that was LOAMY SAND (LS), and the soil adhesion did not affect the density of the pagoda snails because the soil adhesion was the same in every area.

References

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