



# Seagrass research

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## Abstract

Seagrass, soil, and water are part of environmental research, where various experimental values are examined and analyzed for use in the study. The research observes that seagrass changes with the seasons and is influenced by several factors. The soil in different coastal areas also affects the growth rate of seagrass, which varies depending on the location. Environmental research on comparing soil quality and its effects on the types and density of seagrass in Boonkhong Bay, Trang Province, in 2023 and 2024. The objectives are: 1) to compare the soil quality that affects the growth of seagrass in 2023 and 2024, and 2) to compare the types and density of seagrass in Boonkhong Bay, Trang Province, in 2023 and 2024. The research involves checking the soil quality in terms of It was found that...

## Introduction

Seagrass plays an important role in marine and coastal ecosystems. It is classified as a higher plant or flowering plant that grows well in shallow coastal waters with calm waves. Seagrass serves as a breeding ground, habitat for juvenile marine species, refuge, and food source. It also acts as a sediment trap, reduces the strength of water currents, and helps protect the seabed from natural disasters, promoting stability. Trang Province is home to seagrass meadows, which serve as food for dugongs. Scratch marks from dugongs are often found along seagrass beds, especially in Boonkhong Bay. While seagrass has been planted continuously, its growth has not increased as expected, possibly due to the current trend of climate change. This has led to rising global temperatures, changes in sediment composition, and increased carbon dioxide levels in both the atmosphere and seawater. Seagrass is another group of marine plants with the potential to reduce or absorb carbon dioxide. Currently, seagrass is gradually declining, which has led researchers to study the comparison of soil quality and its impact on the types and density of seagrass in Boonkhong Bay, Trang Province, in 2023 and 2024

## Research Question

1. Does the soil quality affecting the growth of seagrass in 2023 and 2024 differ? If so, how?
2. Do the types and density of seagrass in Boonkhong Bay, Trang Province, in 2023 and 2024 differ? If so, how?

## Assumptions and variables

1. The soil quality affecting the growth of seagrass in 2023 and 2024 differs.  
Independent variable: Seagrass beds in 2023 and 2024.  
Dependent variable: Seagrass beds in 2023 and 2024  
Control variable: Soil quality affecting the growth of seagrass, control variable, methods of soil quality collection, and tools used.  
Control variable Methods of collecting soil quality, tools used.
2. Do the types and density of seagrass in Boonkhong Bay, Trang Province, in 2023 and 2024 differ?  
Independent variable: Seagrass beds in 2023 and 2024  
Dependent variable: Types and density of seagrass  
Control variable: Methods of collecting soil quality and tools used.

## Equipment and procedures

**Section 1: Study Area - Boonkhong Bay, Sikao District, Trang Province**  
**Section 2: To compare the soil quality affecting the growth of seagrass in 2023 and 2024.**

1. Determine the soil sampling points and collect soil samples correctly according to the principles by sampling at 2 points: Point 1 in the seagrass area and Point 2 in the area without seagrass. Then, measure the soil moisture, pH, and soil fertility once every two weeks for a period of one and a half months. Soil samples will be collected in designated areas following a 45x45 square meter grid, with 2 plots: one in the seagrass area and one in the area without seagrass. Use a shovel to dig to a depth of approximately 15 cm and place the soil into plastic bags, sealing the bag tightly.
  2. Measure the soil moisture by selecting areas within the designated 45x45 square meter grid. Use a versatile soil moisture meter to take 3 measurements and calculate the average. Record the results.
  3. Measure the soil temperature using a versatile soil thermometer 3 times, calculate the average, and record the results.
  4. Measure the soil pH using a versatile tool for measuring soil pH 3 times, calculate the average, and record the results.
  5. Measure the levels of nitrogen, phosphorus, and potassium in the soil using a nitrogen, phosphorus, and potassium testing kit. Compare the results with standard values and record the results.
- Section 3: To compare the types and density of seagrass in Boonkhong Bay, Trang Province, in 2023 and 2024.**  
Define the study area perpendicular to the beach in Boonkhong Bay over a distance of 100 meters. Set up a random grid, observe and classify the types of seagrass, count the number of each seagrass species, calculate the density, compare the seagrass data, and record the results.

## Research Methodology

Table 1

Study years	Depth range (Cent - 4 inch level)	Soil fertility			
		Ammonium	Nitrate	Phosphorus	Potassium
2023	15	Medium	Medium	Medium	Low
2024	15	Low	Low	Medium	Medium

From Table 1, the study of soil quality in areas with seagrass in the academic years 2023 and 2024 shows the following results:  
1. Ammonium  
The measurement of ammonium in the soil found that the soil in areas where wild ferns naturally grow has a moderate level of ammonium, while areas without wild ferns have a low ammonium level.  
2. Nitrate  
The measurement of nitrate in the soil in areas where wild ferns naturally grow showed a moderate level of nitrate, while the soil in areas without wild ferns had a low nitrate level.  
3. Phosphorus  
The measurement of phosphorus in the soil in areas where wild ferns naturally grow and in areas without wild ferns showed a moderate level of phosphorus.  
4. Potassium  
The measurement of potassium in the soil in areas where wild ferns naturally grow showed a low level of potassium, while the soil in areas without wild ferns had a moderate level of potassium.

Table 2

Study years	Depth range (Cent - 4 inch level)	Soil moisture (%)	The average soil pH
2023	15	38	5.05 ± 0.05
2024	15	29	5.42 ± 0.29

Table showing the types and density of seagrass in Boonkhong Bay in 2023

Seagrass species	Number	Number found percentage	Illustration
Sea grass	4	40%	
Water hyacinth	6	60%	
Turtle grass	6	60%	
Clay grass	4	40%	

Table 4

Study years	Depth range (Cent - 4 inch level)	Soil color	Soil texture	Soil adhesion	Soil
2023	15	Darkly pH	2/5 Black	Loose	Loose Sand
2024	15	Light PH	10/9 Brown		

Table 3

Seagrass species	Number	Number found percentage	Illustration
Sea grass	4	40%	
Water hyacinth	6	60%	
Turtle grass	6	60%	
Clay grass	4	40%	

## Summary of experimental results

From the study of soil structure, soil aggregation, soil color, and soil texture, it was found that the soil structure is single-grain, and the soil aggregation is loose. The soil color in 2023 was the darkest (2.5Y 2.5/1 black), while in 2024, the color changed to brown (10YR 2/2 very dark brown). The texture of the soil in both areas is Loamy Sand. The soil temperature and acidity increased in 2024, while nitrogen, phosphorus, and potassium levels in the soil decreased. The types and density of seagrass also decreased, with 4 species of seagrass and a high density in 2023, while only 2 species with lower density were found in 2024.

## Discussion of experimental results

From the study of soil structure, soil adhesion, soil color and soil texture, it was found that the soil structure remained the same in both 2023 and 2024, i.e., single grains. Soil adhesion was friable, but the soil color changed: the soil color in 2023 was the darkest (2.5Y 2.5/1 black), and in 2024, it was brown (10YR 2/2 very dark brown), which is consistent with the decrease in the amount of minerals in the soil, namely nitrogen, phosphorus and potassium. In addition, the soil became more acidic, resulting in a decrease in the type and density of seagrass. In 2023, 4 types of seagrass were found with high density, and in 2024, 2 types were found with low density.

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