Title of the Research: Seagrass research in Boonkhong Bay, Trang Province

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Abstract

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...

Background and Significance

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 Questions

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?

Hypothesis

1. The soil quality affecting the growth of seagrass in 2023 and 2024 differs. Independent variable: Seagrass beds in 2023 and 2024.

Independent variable Seagrass beds in 2023 and 2024

Dependent 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.

Results of the Implementation

Soil fertility

From the analysis of soil quality in the areas with seagrass and areas without seagrass, the results are as shown in the table.

Table 1: Soil fertility in areas with seagrass growth in 2023 and 2024.

Study years	Depth range (Start - End) (cm)	Soil fertility			
		Ammonium	Nitrate	Phosphorus	Potassium
2023	15	Moderate	Moderate	Moderate	Low
2024	15	Low	Low	Moderate	Moderate

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 shows the pH values of the soil in the academic year.

Study years	Depth range (Start - End) (cm)	Soil moisture (%)	The average soil pH
2023	15	38	5.93 ± 0.00
2024	15	29	5.62 ± 0.29

Table 3: Soil Temperature at Different Soil Depths

Study years	Depth level, initial-final (cm)	soil temperature (degrees Celsius)			
		1st time	2nd time	3rd time	average
2023	5	27.50	27.50	27.50	27.50 ± 0.00
	15	26.30	26.00	26.30	26.20 ± 0.33
2024	5	28.00	28.30	28.20	28.16 ± 0.16
	15	27.50	27.00	27.40	27.30 ± 0.33

Table 4s Soil structure, soil cohesion, soil color and soil texture.

Study years	Depth level, initial-final (cm)	soil structure	clay color	soil adhesion	clay
2023	15	Single pill	2.5YR 5/1 Black	crumbly	Loamy Sand
2024	15		10YR 5/3 Brown		

Table showing the types and density of seagrass in Ao Bun Khong in 2023.

sea grass names	nature	Number found percentage	illustration
sea grass	The largest size, the trunk is 1 meter or higher, the trunk is erect, growing in clumps from large, deeply embedded rhizomes, with strong, firm roots. Each plant has 2-5 leaves, which are long and flat, about 1-1.5 centimeters wide, with rounded stomata, thick, smooth edges, and no tongue.	92	
Kaffir lime leaves	kaffir lime leaves have flat, oval leaves that emerge from the rhizomes and have transverse veins.	96	
Turtle shade	The stem is erect and about 4-24 centimeters tall. The stem consists of 2-6 leaves that are curved, with rounded leaf tips and small sawtooth-like notches. The leaf edges are smooth. The lower part is a thin, transparent leaf sheath with 2-4 roots. The rhizome has scars. When the leaves rot, there will be many	88	

	layers of overlapping leaf sheaths left.		
Dwarf leaves	The trunk is about 4-8 centimeters tall. The trunk consists of 4-8 leaves in clusters. The leaves are long and slender, with smooth edges. There are 3 longitudinal veins but no transverse veins. There is 1 root at the joint.	76	

Table showing the types and density of seagrass in Ao Bun Khong in 2024.

sea grass names	nature	Number found percentage	illustration
sea grass	It has a large trunk, but the leaves are incomplete. It grows in clumps from the rhizome, not deeply planted. Each plant has 1-3 leaves, which are long and flat, about 1-1.5 centimeters wide. The stomata are rounded, the edges of the leaves are thick and smooth, and there is no tongue.	16	
Dwarf leaves	The stem is about 3-6 centimeters tall. The stem consists of 3-6 leaves in clusters. The leaves are long and slender, with smooth edges. There are 3 longitudinal veins but no transverse veins. There is 1 root at the joint.	20	

Summary of research 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.

Summary and discussion of research 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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