

A Comparative Study of Soil Quality Affecting the Density and Growth of Beach Morning Glory (*Ipomoea pes-caprae*) and Sea Bean (*Canavalia rosea*) Along the Mangrove Forest Edge at Laem Yong Star, Trang Province



Researchers : Miss Aphitchada Aiadkoed
Miss Natcha Thingha
Miss Sirisa Wongwun
Mathayom 5

Advisors : Mrs. Kwanjai Kanjanasrimek
Miss Sutheera Thacheen
School : Wichienmatu School

Abstract

This research aims to compare soil quality affecting the density of Beach Morning Glory (*Ipomoea pes-caprae*) and Sea Bean (*Canavalia rosea*) along the mangrove forest edge. The study examines the physical characteristics of the soil, pH level, temperature, moisture content, and the density of both plant species, which serve as indicators of soil quality in different study areas. The findings indicate that Beach Morning Glory and Sea Bean have similar average values. The average soil moisture content for Beach Morning Glory is 10, while for Sea Bean, it is also 10. The average soil temperature for Beach Morning Glory is 21.33°C, and for Sea Bean, it is 21.83°C. The average pH value for Beach Morning Glory is 6.33, whereas for Sea Bean, it is 6.39. The average plant density of Beach Morning Glory is 8.33, while for Sea Bean, it is 8.67. The soil quality in the areas where Beach Morning Glory and Sea Bean grow is similar. The moisture content is the same, the temperature differs slightly, the pH levels are nearly identical, and the plant density varies slightly. Overall, the soil quality in these areas does not show significant differences. Therefore, the pH level, temperature, and moisture content do not significantly affect the plant density and growth of Beach Morning Glory and Sea Bean.

Introduction

Beach Morning Glory (*Ipomoea pes-caprae*) and Sea Bean (*Canavalia rosea*) are common coastal plants found abundantly along the shores of Laem Yong Star. These plants have long been present in the local community and play a significant role in the ecosystem. Laem Yong Star is also a well-known tourist attraction in Trang Province, featuring beautiful scenery and fertile soil, especially in the mangrove forest area. Beach Morning Glory and Sea Bean act as ground cover plants and thrive in this environment. Since soil quality directly affects their growth, this study aims to compare soil quality factors influencing the density and distribution of Beach Morning Glory and Sea Bean in the mangrove forest area of Laem Yong Star.

Therefore, the researchers are interested in studying various soil quality parameters, including soil structure, moisture content, temperature, texture, color, pH level, and plant density of Beach Morning Glory and Sea Bean in the mangrove forest at Laem Yong Star, Palian District, Trang Province. The findings from this research will contribute to a better understanding of how soil quality impacts the growth and density of these plant species in coastal ecosystems.

Research Question

1. Do soil quality, temperature, moisture content, pH level, and plant density of Beach Morning Glory and Sea Bean vary across different areas of Laem Yong Star?

Research Hypothesis

1. Soil quality, including temperature, moisture content, pH level, and plant density of Beach Morning Glory and Sea Bean, differs in various areas of Laem Yong Star.

Variable

Independent Variable : The mangrove edge at Laem Yong Star with the growth of beach morning glory and sea bean plants.

Dependent Variables : Soil quality characteristics, soil temperature, soil moisture content, soil pH, and soil density.

Controlled Variables : Soil type, light, temperature, measurement methods, and data collection period.

Study area

This research was conducted at Laem Yong Star in two areas: a hillside with beach morning glory and sea bean plants, located at the coordinates 7.117193° N latitude and 99.668625° E longitude.



Area with Beach Morning Glory (*Ipomoea pes-caprae*)



Area with sea bean (*Canavalia rosea*)

Materials and Equipment

Random sampling table

Soil structure reference chart

Soil meter

Thermometer

pH test paper

Soil sampling equipment

Research Procedures

Soil quality data was collected following the GLOBE methodology, which includes analyzing soil texture and structure, measuring soil temperature, pH levels, and moisture content. The steps are as follows:

- 1) **Sampling Locations:** Two sampling sites were selected along the coastal area of Laem Yong Star: one with beach morning glory and another with sea bean plants. Soil samples were collected three times from each site.
- 2) **Physical Soil Characteristics Study:** The soil structure at both sites was analyzed using CU Smart Len. Soil texture was compared using a soil color chart.
- 3) **Soil Moisture Measurement:** Moisture content was measured in both sampling sites where beach morning glory and sea bean plants were distributed. A moisture meter was used at a depth of 5 cm.
- 4) **Soil pH Measurement:** The acidity and alkalinity of the soil at both sites were measured using pH test strips.
- 5) **Soil Temperature Measurement:** Soil temperature at both sites was recorded using a thermometer at a depth of 10 cm. Data was collected three times.

Research Results

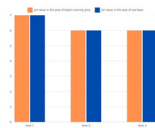


Chart 1: Shows the pH levels of the soil in areas with beach morning glory (*Ipomoea pes-caprae*) and sea bean (*Canavalia rosea*).

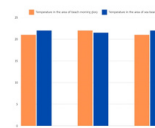


Chart 2: Displays the soil temperature in areas where beach morning glory and sea bean grow.

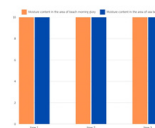


Chart 3: Represents the soil moisture levels in areas with beach morning glory and sea bean.

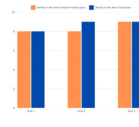


Chart 4: Illustrates the soil density in areas with beach morning glory and sea bean.

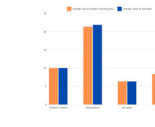


Chart 5: Shows the average values of the two areas, including moisture, temperature, pH, and soil density.

From the bar chart, it was found that the area where sea bean grows has a higher soil density than the area with beach morning glory. The moisture and pH levels in both areas are the same, but the temperature in the sea bean-growing area is higher than in the beach morning glory area.

Acknowledgments

The environmental research project titled A Comparative Study of Soil Properties Affecting the Density of Beach Morning Glory and Sea Bean in the Mangrove Area of Laem Yong Star involved multiple stages, including research, data analysis, evaluation, and finalizing the written report. Throughout the project, the research team received valuable advice, guidance, and constructive feedback, which enabled us to resolve challenges and complete this study successfully. We hope that this research will be beneficial to future studies and those interested in this topic.

We would like to sincerely thank the local residents of Laem Yong Star for their guidance and support in conducting this environmental research. We extend our gratitude to Mr. Sakda Phruosombun, Director of Wichienmatu School, for his support and assistance throughout this project. Special thanks to our project advisors, Ms. Kwanjai Krajoonsrimek and Ms. Sutheera Thachin, for their invaluable advice and information, which greatly contributed to the success of our research. We also appreciate the support of the Science and Technology Department of Wichienmatu School, whose teachers provided continuous guidance. Additionally, we are grateful to our friends for their kind assistance and encouragement throughout this project. Lastly, we deeply thank our beloved families for their unwavering love, support, and encouragement, which gave us the opportunity to pursue this research.

Conclusion, Discussion, and Research Suggestions

References

- Armat Suwanarit. (1989). Relationship Between Soil and Plants. Department of Soil Science, Faculty of Agriculture, Kasetsart University, Bangkok.
- Department of Marine and Coastal Resources. (2015). Project on the Classification of Mangrove Land Use, 2014.
- Department of Mineral Resources. (n.d.). Geological Learning Resources in Tak Province. [Online]. Available at: www.dmr.go.th/download/article/article_20110209140943.pdf (Accessed: June 24, 2011).
- Eub Khiaoruemom. (1987). Soil Survey Practical Manual. Department of Soil Science, Faculty of Agriculture, Kasetsart University.
- GLOBE THAILAND. Principles of Soil Measurement. Available at: <https://globefamily.jpst.ac.th/home/globe-channel/globe-protocols/nas029-91491>.
- Prongsayoon, U., Beckstrom, P., Jacobson, U., Lindstrom, M., & Bohlin, L. (1992). Antispasmodic Activity of B-Damascenone and E-Phytol Isolated from *Ipomoea pes-caprae*. *Planta Med.* 58, 19-21

Part 1 : The study examined the physical characteristics of the soil, including moisture, temperature, pH, and density in areas where beach morning glory (*Ipomoea pes-caprae*) and sea bean (*Canavalia rosea*) grow. The results indicate that soil quality affects the density of these plants. The study found that in areas with a high density of beach morning glory, the soil structure consists of rounded aggregates with loose cohesion, classified as sandy loam. Similarly, in areas with a high density of sea bean, the soil also has rounded aggregates, loose cohesion, and a sandy loam texture. Soil moisture levels were the same in both areas. However, the soil temperature in the sea bean area was higher than in the beach morning glory area, while the pH values were identical.

Recommendations
Future studies should investigate the impact of air quality factors on the density of beach morning glory and sea bean.