This study examines the soil quality's effect on the growth of spring onions in the areas of Ban Khin Nak and Ban Hai Yai

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Abstract

This research aimed to study the effect of soil quality on the growth of spring onions in two areas: Ban Khin Nak and Ban Hai Yai, Sisaket Province. The study focused on comparing soil properties such as pH, moisture, and nutrient fertility to assess the relationship between soil quality and spring onion growth.

Soil samples were collected in equal quantities from both areas. Data on spring onion growth, including height, number of leaves, and growth rate, were collected over a 20-day observation period. The data was then analyzed and compared to determine the optimal soil quality for spring onion cultivation.

The results showed that the soil in Ban Khin Nak had a pH range more suitable for spring onion growth than the soil in Ban Hai Yai. Furthermore, it had higher levels of major nutrients such as nitrogen, phosphorus, and potassium, resulting in better spring onion growth in Ban Khin Nak.

Keywords: Soil quality, Soil pH, Soil nutrients, Spring onion growth, Sisaket Province

Introduction of Literature

Spring onions are an economically important and widely consumed vegetable in Thailand due to their unique taste and aroma, as well as their richness in beneficial nutrients such as vitamins, minerals, and antioxidants. Spring onions can be used in a variety of dishes, both as a fresh vegetable and as a key ingredient in many recipes. Furthermore, spring onions are a popular crop for farmers to cultivate for income generation because of their short growing season, quick yield, and guaranteed market, thus providing a continuous income for communities. However, the growth of spring onions depends on several factors, especially suitable soil and weather conditions. If the growing area has unsuitable soil properties or unfavorable weather conditions, the spring onions may not grow properly or may yield low production (Pariwat Wannathawi. (2018). Effects of soil properties on the growth of kitchen garden vegetables. Journal of Agriculture and Environment, 14(2), 45-52).

Therefore, studying and understanding the relationship between environmental factors and spring onion growth is essential. This research aims to compare the soil and weather conditions of the Ban Hai Yai farm and the Ban Khin Nak farm and to study how these environmental conditions affect spring onion growth.

The data obtained will be analyzed to recommend appropriate methods for planting and managing onion plots in each area. This will help improve farmers' yields, increase their income, and strengthen the economic stability of communities in the long term. Furthermore, the knowledge from this research can be applied to the cultivation of other similar crops, which will be beneficial in developing a sustainable agricultural system that is compatible with local climate and natural resources.

Research Question

How do soil and weather conditions affect the growth of onions in the areas of Ban Khin Nak and Ban Hai Yai?

Research Methods

1. Origin of the study area

2 locations: the onion plantations at Ban Khin Nak and Ban Hai Yai.

Ban Khin Nak Garden

Hai Yai House Garden

2. Data Collection

2.1 Soil Sampling

2.1.1 Collecting soil samples from vegetable plots or roadside soil profiles.

2.1.2 Collecting soil samples using a shovel.

2.1.3 Collecting soil samples from the surface.

3. Soil Property Testing

3.1 Sun-drying the collected soil samples for 1-2 days until moderately dry.

3.2 Using a ready-made soil test kit to analyze soil properties, including:

- pH value
- Major nutrient content: Nitrogen (N), Phosphorus (P),
- Potassium (K)

3.3 Recording the test results in a table and taking photographs during the testing process for inclusion in the report.

Research Results

In this study, researchers collected soil samples from onion growing areas in Ban Khin Nak and Ban Hai Yai. The soil properties, including pH, moisture content, major nutrients (nitrogen, phosphorus, and potassium), and general soil characteristics, were analyzed for comparison with onion growth in each area. The research findings can be summarized as follows:

Results Recording Table

Table 1 comparing soil properties in different areas.

Study Point	pH value	Nitrogen (N)	phosphorus (P)	potassium (K)	Moisture content in the soil (%)	Characteristics of the soil
A	8	Medium	Hing	Medim	WET+	Characteristics of the soil
B	4	low	low	trace	WET+	clay

Table 2 comparing average weather conditions during the experimental period.

Study Point	Average temperature (°C)
A	33-35
B	32-34

3. Onion growth chart over 20 days.

Date	Height (cm) Ban Khin Nak	Number of leaves Ban Khin Nak	Height (cm) Baan Hai Yai	Number of leaves Baan Hai Yai
1	-	-	-	-
5	2.8	2	2.3	2
10	5.6	4	4.5	3
15	7.5	5	6.2	4
20	9.0	6	8.1	4

From the table: It was found that the scallions grown at Ban Khin Nak showed greater growth in height and number of leaves than those grown at Ban Hai Yai.

Source: (Department of Land Development. (2019). Basic Soil Analysis Manual for Agriculture. Bangkok: Department of Land Development)

Discussion

The research results clearly showed that soil quality significantly affected the growth of green onions. Soil in Ban Khin Nak, with higher levels of essential nutrients, particularly nitrogen and phosphorus, compared to soil in Ban Hai Yai, resulted in taller green onions with more leaves and a greener appearance. This demonstrates the crucial role of soil nutrients in plant growth.

Although the soil pH in both areas was not optimal for green onion cultivation—Ban Khin Nak being alkaline and Ban Hai Yai highly acidic—the experiment demonstrated that sufficient nutrients promoted green onion growth more effectively than pH alone. This aligns with the concept and research indicating that nitrogen is crucial for stem and leaf growth, while phosphorus supports root development.

Therefore, it can be concluded that soil nutrient management is more important for increasing green onion yield than controlling soil pH alone. However, improving soil pH to an optimal level combined with nutrient supplementation may further enhance green onion growth in the future.

Conclusion

1. The study found that soil quality significantly affects the growth of onions.
2. Major soil nutrients, particularly nitrogen and phosphorus, were identified as key factors influencing onion growth.
3. Soil from the Ban Khin Nak area contained higher levels of nitrogen and phosphorus compared to soil from the Ban Hai Yai area.
4. Onions grown in soil from Ban Khin Nak showed better growth performance than those grown in soil from Ban Hai Yai.
5. Although the soil pH in both study areas was not within the optimal range for onion cultivation, plant growth differed significantly between the two areas.
6. The results indicate that soil nutrient availability has a greater influence on onion growth than soil pH alone.
7. The findings of this research can be used as a guideline for improving soil quality and increasing agricultural productivity.

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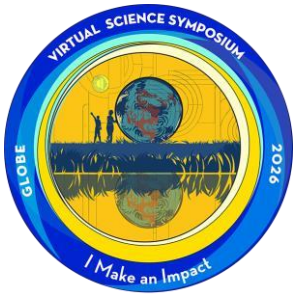
1. I AM A COLLABORATOR

Description: This research project was conducted collaboratively by all team members, with clearly defined roles ranging from soil sampling and measuring onion growth to data analysis and conclusion. Guidance from teachers and community stakeholders was also sought. This collaboration ensured the accuracy, reliability, and a more accurate reflection of the local challenges.

2. I AM A PROBLEM SOLVER

Description: Through a study on the effect of soil quality on onion growth, the research team identified problematic soil factors impacting agricultural yields. Applying earth science principles to the analysis, they proposed solutions, such as improving soil suitability for onion cultivation, aiming to address problems and promote sustainable agricultural development in the area.

3. I MAKE AN IMPACT



Description: This research stemmed from local concerns about soil quality that might affect the growth of onions in Ban Khi and Ban Hai Yai areas. The research team studied soil properties and compared soil quality in both areas to use the research findings as guidelines for improving soil management and cultivation, thereby increasing yields and creating a positive impact on farmers and the community.