

Research Title: A Study of Soil Quality Affecting the Moss Species Polytrichum commune at Wang Hin Lat Waterfall, Yan Ta Khao District, Trang Province.

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Abstract

The study of soil quality affecting the moss species Polytrichum commune at Wang Hin Lat Waterfall, Yan Ta Khao District, Trang Province, aims to investigate soil quality in natural habitats and analyze the impacts on organisms within the area. The research focuses on measuring key soil parameters, including pH levels, soil moisture, and temperature.

Introduction

Soil is a fundamental natural resource that plays a vital role in sustaining life and maintaining ecosystems. It serves as a primary habitat for numerous small organisms, such as microorganisms, earthworms, and various insects. These organisms contribute to the decomposition of organic matter, facilitating nutrient cycling and enhancing soil fertility. Furthermore, soil plays a crucial role in water storage, regulating surface water runoff, and preventing soil erosion—all of which are essential processes for maintaining overall environmental balance.

Wang Hin Lat Waterfall in Trang Province is a significant natural attraction rich in biodiversity. The area surrounding the waterfall comprises diverse environmental conditions, ranging from streambanks and densely shaded areas to locations with direct sunlight exposure. Consequently, soil properties in these different areas vary, particularly in terms of soil temperature, moisture levels, and pH values. These variations directly influence the distribution, growth, and diversity of plants and soil-dwelling organisms.

Therefore, the research team is interested in studying the soil quality at Wang Hin Lat Waterfall, Yan Ta Khao District, Trang Province. This study focuses on measuring soil temperature, moisture, and pH levels at various sampling sites to analyze the relationship between soil quality and the presence of organisms in the area. This research not only provides a deeper understanding of the characteristics and properties of soil in the study area but also serves as baseline data for soil and environmental conservation. Ultimately, it aims to raise awareness about the preservation of natural resources to ensure long-term

Research Objectives

1. To investigate the soil quality at Wang Hin Lat Waterfall, Yan Ta Khao District, Trang Province.
2. To analyze the relationship between soil quality and the distribution of moss within the study area.

Research Question

How does soil quality affect the distribution of the moss species *Polytrichum commune* at Wang Hin Lat Waterfall?

Research Hypothesis

Overall soil quality significantly influences the distribution of the moss species *Polytrichum commune* in the Wang Hin Lat Waterfall area.

Scope of Research

The study of soil quality at Wang Hin Lat Waterfall, Yan Ta Khao District, Trang Province, conducted during the month of September 2025 and December 2025.

Materials and Equipment

1. Soil pH Meter: For measuring the acidity and alkalinity of the soil.
2. Soil Moisture Meter: For determining the water content in the soil.
3. Soil Thermometer: For measuring soil temperature at the study sites.
4. Soil Sampling Bags: For collecting and storing soil samples.
5. Digital Camera: For photographic documentation of the sampling sites and moss distribution.
6. Field Notebook and Pen: For recording data and field observations.

GLOBE Protocols: Pedosphere (Soil)

The research follows the GLOBE Pedosphere Protocol to ensure standardized and accurate environmental measurements.

Study Site Selection

The study was conducted at Wang Hin Lat Waterfall, Yan Ta Khao District, Trang Province, covering three primary locations:

1. Waterfall Level 1 Area
2. Wang Hin Lat Stream Area
3. Canal Area

Research Procedures

1. Preparation Phase

1. Identify Research Topic: Select and define the core subject of study.
2. Literature Review: Gather and synthesize theoretical knowledge and previous research related to the study.
3. Establish Objectives: Define the specific goals of the research.
4. Site Mapping: Determine the sampling points within the designated study area.

2. Implementation Phase

1. Action Planning: Develop a structured research and operational plan.
2. Field Survey: Conduct a physical survey of the selected study sites.
3. Soil Quality Measurement (GLOBE Protocols): Measure soil temperature, pH, and moisture using the following steps:
 - 3.1 Sampling: Locate the pre-defined sampling points.
 - 3.2 Soil Temperature: Insert the soil thermometer into the ground. Repeat the measurement 3 times and calculate the mean (average) value.
 - 3.3 Soil pH: Measure the soil pH using a pH meter. Repeat the process 3 times and calculate the mean value.
 - 3.4 Soil Moisture: Measure the moisture content using a soil moisture meter. Repeat 3 times and calculate the mean value.
- 3.5 Data Submission: Submit the collected data to GLOBE Data Entry.

Field Sampling

The study of soil quality affecting the moss species *Polytrichum commune* at Wang Hin Lat Waterfall, Yan Ta Khao District, Trang Province, involved environmental quality observations and field sampling. The survey was conducted from September 2025 to January 2026.

Sampling sites were selected at Waterfall Level 1, the stream below the dam, and Wang Hin Lat Canal to cover the diverse environmental conditions of the water sources.

1. Soil Sampling at Waterfall Level 1: Soil samples were collected from the surface and at a depth of 10 cm. The samples were placed in clean plastic bags and labeled with the sampling point. The soil pH was then measured using a soil pH meter.

2. Soil Sampling at the Stream Below the Dam: Soil samples were collected from the surface and at a depth of 10 cm, placed in clean plastic bags, and labeled. The soil moisture content was then measured using a soil moisture meter.

3. Soil Sampling at Wang Hin Lat Canal: Soil samples were collected from the surface and at a depth of 10 cm, placed in clean plastic bags, and labeled. The soil temperature was then measured using a soil thermometer.

4. Data Recording: General physical and biological factors of the study area were recorded, such as observing the distribution of moss by tracking its expansion from narrow to wider areas to support the analysis of the results.

Data Analysis and Conclusion

1. Data Analysis: The collected data were analyzed by calculating the mean values for soil temperature, soil pH, and soil moisture.

2. Data Documentation: The results were recorded in a table format showing the average values of the data.

3. Conclusion: The findings were summarized to form the research conclusion.

Research Results

Table 1: Geographic Coordinates of Wang Hin Lat Waterf

Discovery Areas	Geographic Coordinates	
	Latitude(N)	Longitude(E)
Waterfall Level 1	7.3990202	99.7891285
Stream below the dam	7.4434942	99.79554440
Wang Hin Lad Canal	7.4406544	99.8028436

Table 1 reveals the geographical coordinates of the study sites: the first tier of the waterfall is located at Latitude 7.3990202 and Longitude 99.7891285; the stream below the dam is at Latitude 7.4434942 and Longitude 99.7955440; and the Wang Hin Lat canal is situated at Latitude 7.4406544 and Longitude 99.8028436.

Table 2: Soil Moisture Measurements (%)

Discovery Areas	Soil Moisture			
	First	Second	Third	Average
Waterfall Level1	1	2	1.9	1.63
Stream below the dam	4	1.9	1	2.3
Wang Hin Lad Canal	0	2	1.8	1.27

Table 2, the average soil moisture content at the first tier of the waterfall was 1.63%. The stream below the dam recorded an average soil moisture of 2.3%, while the Wang Hin Lat canal showed an average of 1.27%.

Table 3: Soil pH Levels

Discovery Areas	Soil pH Level			
	First	Second	Third	Average
Waterfall Level1	8	7	7.9	7.63
Stream below the dam	6.5	7.9	8	7.47
Wang Hin Lad Canal	8	7	7.9	7.63

Table 3 shows that the average soil pH at the first tier of the waterfall was 7.63, while the stream below the dam had an average soil pH of 7.47. Additionally, the Wang Hin Lat canal recorded an average soil pH of 7.63.

Table 4: Soil Temperature

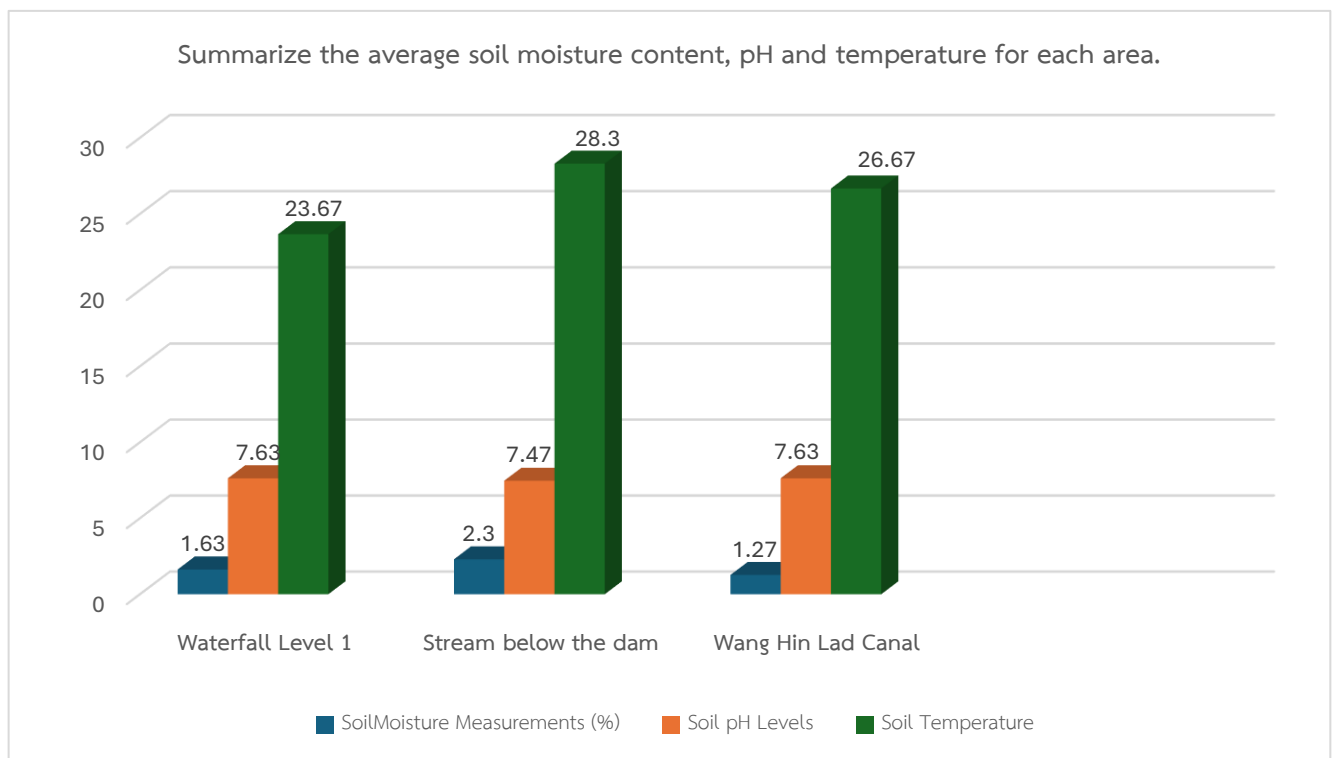
Discovery Areas	Temperature			
	First	Second	Third	Average
Waterfall Level 1	24	23	24	23.67
Stream below the dam	26	27	32	28.3
Wang Hin Lad Canal	22	34	24	26.67

Table 4 shows that the average soil temperatures were 23.67°C at the first tier of the waterfall, 28.3°C at the stream below the dam, and 26.67°C at the Wang Hin Lat canal.

Table5 : Summarize the average soil moisture content, pH and temperature for each area.

Discovery Areas	Temperature		
	Waterfall Level 1	Stream below the dam	Wang Hin Lad Canal
SoilMoisture Measurements (%)	1.63	2.3	1.27
Soil pH Levels	7.63	7.47	7.63
Soil Temperature	23.67	28.3	26.67

Table 5 It was found that the first layer of waterfall had an average soil moisture of 1.63%. The average soil pH was 7.63 and the average temperature was 23.67 degrees Celsius. It was found that the stream below the dam had an average soil moisture of 2.3%. The average soil pH was 7.47 and the average temperature was 28.3 degrees Celsius. It was found that the Wang Hin Lad Canal had an average soil moisture of 1.27%. The average soil pH was 7.63 and the average temperature was 26.67 degrees Celsius. As shown on the graph



Discussion

The study of soil quality and its effects on the moss species *Polytrichum commune* at Wang Hin Lat Waterfall, Yan Ta Khao District, Trang Province, indicates that the moisture, pH, and soil temperature across the three study sites are within optimal ranges for moss growth. Specifically, the average soil moisture was recorded at 1.63% at the first tier of the waterfall, 2.3% at the stream below the dam, and 1.27% at the Wang Hin Lat canal. These moderate to relatively high moisture levels are crucial factors supporting moss development, as mosses rely heavily on water and humidity for their biological processes.

The soil pH in the study areas ranged from neutral to slightly alkaline, which is consistent with natural environments near water sources. This condition favors *Polytrichum commune*, as the species adapts well to such environments. Meanwhile, the soil temperature remained between 24°C and 28°C, an ideal range for the growth of small plants in this region. Notably, the area near the first tier of the waterfall had an average pH of 7.63. Furthermore, the stream below the dam exhibited higher soil moisture than the Wang Hin Lat canal, resulting in a higher density and wider distribution of moss. This clearly demonstrates that overall soil quality, particularly moisture, has a direct correlation with moss growth.

In conclusion, the overall soil quality significantly influences the growth of moss at Wang Hin Lat Waterfall. Areas with optimal soil conditions facilitate better distribution and growth compared to less suitable areas. These findings align with the established research objectives and the primary research question.

Research Conclusion

The study on soil quality affecting the moss species *Polytrichum commune* reveals that the study area is located at coordinates 7.3990202°N and 99.7891285°E. Soil samples were collected from three specific locations: the first tier of the waterfall, the stream below the dam, and the Wang Hin Lat canal.

The analysis of soil properties yielded the following results:

Soil Moisture: The average moisture content across sampling periods remained consistent, with an overall mean of 1.27%.

pH Levels: The average soil pH ranged between 7.4 and 7.6.

Soil Temperature: The average temperature was recorded between 24°C and 28°C.

In conclusion, the soil conditions at Wang Hin Lat Waterfall in Yan Ta Khao District, Trang Province—specifically regarding moisture, pH, and temperature—are within the optimal range. These factors effectively support the distribution of *Polytrichum commune* and other soil organisms in the area.

References

The GLOBE Program. (2025). GLOBE Soil Protocols. Retrieved November 13, 2025, from <https://www.globe.gov>

Wang Hin Lat Waterfall. (2026). “Wang Hin Lat Waterfall”: A Tourist Attraction in Trang. Retrieved December 30, 2025, from <https://theworldbizs.com>. [Information regarding Wang Hin Lat Waterfall, located in Ban Yung Ngam, Phrong Chorakhae Sub-district, Yan Ta Khao District, Trang Province; a natural attraction serving as both a research site and a recreational area.

1. As an Impactor

"I am an Impactor: Through my environmental studies, I have helped revitalize Wang Hin Lat Waterfall in Yan Ta Khao, Trang. By researching and developing the local ecosystem—specifically focusing on soil and moss—I have transformed the area into a lush, fertile destination. This restoration has successfully attracted more tourists, directly boosting the income and livelihoods of local vendors."

2. As a Problem Solver

"I am a Problem Solver: My investigation into the soil and moss quality at Wang Hin Lat Waterfall revealed a mix of healthy and degraded areas. To address this, I utilized my research data to implement targeted soil recovery strategies. As a result, I successfully restored the balance of the ecosystem, ensuring the waterfall remains a vibrant, moist, and thriving environment for both the soil and moss populations."

3. As a Data Scientist

"I am a Data Scientist

"This research involved collecting data on soil temperature, soil pH, and soil moisture levels. The collected data were used to calculate the mean values for each grid, which were subsequently compared to analyze their correlation with physical factors