A Study on the Physical and Chemical Factors Affecting the Growth of Ferns between Wichianmatu School Palm plantation and Rubber plantation, Ban Khuan Subdistrict, Trang Province

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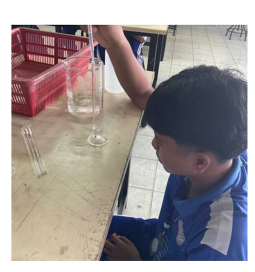
Abstract

This project aims to study the diversity and factors affecting the growth of ferns in the palm plantation area of Wichianmatu School, which is located 20 meters above sea level, and in the rubber plantation area of Ban Khuan Subdistrict, Trang Province, which is located 24 meters above sea level. Samples were collected between December 11 - 25, 2024, and both physical and chemical comparisons were made. The study examined the structure and characteristics of the soil. In the palm plantation area of Wichianmatu School, three types of ferns were found growing on the ground: Black-stemmed fern in Loamy sand, Tamarind-leaf fern in Loamy sand, Silt clay loam, Sand, and King cobra fern in Silt clay loam, Sand. On the trees, seven species of ferns were identified: Black-stemmed fern, Peacock fern, Squirrel fern, Shoelace fern, Stripe-backed fern, and Cudzu fern. In total, ten families of ferns were found both on the ground and on trees. In the rubber plantation area of Ban Khuan Subdistrict, Trang Province, two species of ferns were found on the ground, representing two families: Black-stemmed fern in Silt clay loam, Clay loam, and Skeleton Fork Fern in Silt clay loam, Silty clay.

The study results from the palm plantation at Wichianmatu School in Khok Lo Subdistrict, Mueang District, Trang Province show an average light intensity of 419.2 LUX, an average temperature of 28.42°C, average soil moisture of 23%, pH of 5.4, and average mineral content in the soil (N, P, K) of 1, 0.8, and 5.4 mg/L, respectively. In the rubber plantation area of Ban Khuan, Ban Khuan Subdistrict, Mueang District, Trang Province, the average light intensity was 351.66 LUX, average temperature was 26.05°C, average soil moisture was 18%, pH was 6, and average mineral content in the soil (N, P, K) was 0.167, 0, and 0.167 mg/L. The study found that the palm plantation area at Wichianmatu School had higher light intensity, temperature, and nutrient content (N, P, K) than the rubber plantation area at Ban Khuan, which positively affected the growth of ferns both on the ground and on trees.

Introduction




Research Question

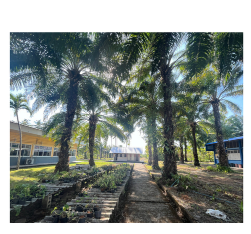
1. Physical factors such as the intensity of light, humidity, and temperature in each area affect the growth of ferns?
2. Does the difference in the chemical composition of soil between the two areas affect the growth of ferns?

Hypothetically

1. Differences in the amount of sunlight received in a palm garden and a rubber plantation and differences in temperature and humidity affect the variety and type of growth ferns.
2. The larger base acidity and mineral content of soil compared between the two areas contribute to the higher growth rate of ferns.

The study area

At Wichian Matu School, Khok Lor Subdistrict, Mueang District, Trang Province, Postal Code 92000
and At Ban Khuan, Ban Khuan Subdistrict, Mueang District, Trang Province, Postal Code 92000.


Wichianmatu School


Ban Khuan

Materials and equipment


NPK meter


Universal Indicator Paper

temperature and humidity gauge


soil thermometer


soil moisture meter


Light intensity meter

Honorary declaration

The project was completed with kindness and thanks to the support of Mr. Sakda Paisomboon, Director of Wichianmatu School.

Ms. Jiraporn Sareerat, a project consulting professor who gives advice and successfully corrects the shortcomings of this project.

I thank my parents and parents for their counseling.
be always supportive of good cheer

I would like to thank my friends for their advice, whether it be group consultation or acceptance of their friends' opinions and everything, so that this project can be completed and the organizers would like to thank you very much.

Research methodology

Step 1 : Define the study area

Step 2 : Collect sample soil

Step 3 : Soil quality testing

Step 4 : Collect soil data for study




Research results

วันที่ 25/12/67 บริเวณสวนยางพารา ตำบลบ้านควน									
จุดที่	ความเข้มแสง (LUX)	อุณหภูมิ (° C)	ความชื้น (%)	ค่าpH	N	P	K	ลักษณะดิน	เฟิร์นที่พบ
1	320	25.9	19%	6	0	0	1	CL	ก้านดำ
2	450	26	14%	6	0	0	0	SiCL	ก้านดำ
3	362	25.5	18%	6	1	0	0	SiCL	ก้านดำ
4	365	26.2	15%	6	0	0	0	SiCL	กูดตีนนกยูง
5	327	26.3	21%	6	0	0	0	SiC	กูดตีนนกยูง
6	286	26.4	18%	6	0	0	0	SiC	กูดตีนนกยูง

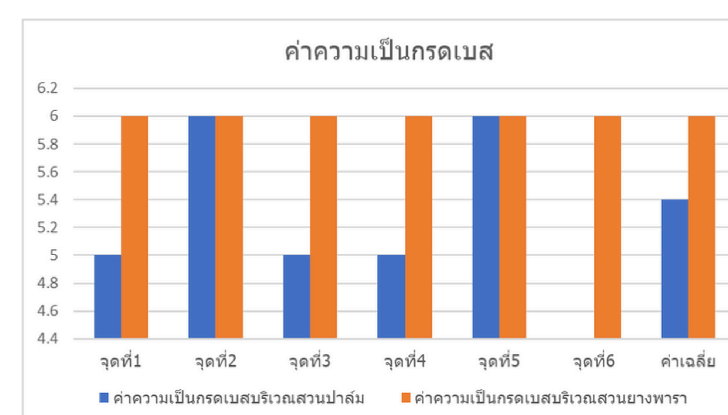
1. Summary table of the results of the sample soil measurement at Ban Khuan rubber plantation.

วันที่ 11/12/67 ที่โรงเรียน (บริเวณดิน)									
จุดที่	ความเข้มแสง (LUX)	อุณหภูมิ (° C)	ความชื้น (%)	ค่าpH	N (mg/L)	P (mg/L)	K (mg/L)	ลักษณะดิน	เฟิร์นที่พบ
1	300	27.9	18%	5	0	0	1	LS	ก้านดำ ใบมะขาม
2	585	29.1	12%	6	2	2	8	SiCL	ใบมะขาม
3	252	29	20%	5	1	1	3	S	นาคราช ใบมะขาม
4	643	29.1	17%	5	0	0	5	LS	ใบมะขาม
5	316	27	50%	6	2	1	10	SiCL	นาคราช ใบมะขาม

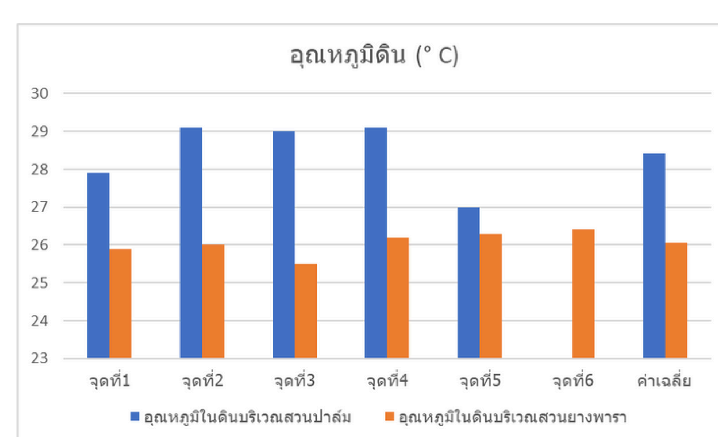
2. Summary table of the results of the sample soil measurement at Wichian Matu School Palm Plantation.

วันที่ 11/12/67 ที่โรงเรียน (บริเวณต้นไม้)		
ต้นที่	ความเข้มแสง (LUX)	เฟิร์นที่พบ
1	245	กระแตไต่ไม้,นาคราช,เชือกผูกรองเท้า,ใบมะขาม
2	258	กระแตไต่ไม้,ใบมะขาม
3	405	กระแตไต่ไม้,นาคราช,เชือกผูกรองเท้า,ใบมะขาม
4	398	พลูใบริ้ว,เชือกผูกรองเท้า,กระแตไต่ไม้,นาคราช,ใบมะขาม
5	522	นาคราช(เยอะมาก),ใบมะขาม
6	277	กระแตไต่ไม้,นาคราช,เชือกผูกรองเท้า,ใบมะขาม
7	35	นาคราช,กระแตไต่ไม้,ใบมะขาม,กูดผี,กูดโหรา,ข้าหลวงหลังลาย
8	75	นาคราช,กระแตไต่ไม้,เชือกผูกรองเท้า,ใบมะขาม,ข้าหลวงหลังลาย
9	410	นาคราช,กระแตไต่ไม้,ใบมะขาม,ข้าหลวงหลังลาย
10	675	ใบมะขาม,กระแตไต่ไม้
11	828	ใบมะขาม,กระแตไต่ไม้,นาคราช
12	343	ใบมะขาม,กระแตไต่ไม้,นาคราช,เชือกผูกรองเท้า
13	296	ใบมะขาม,กระแตไต่ไม้,นาคราช,เชือกผูกรองเท้า,พลูใบริ้ว

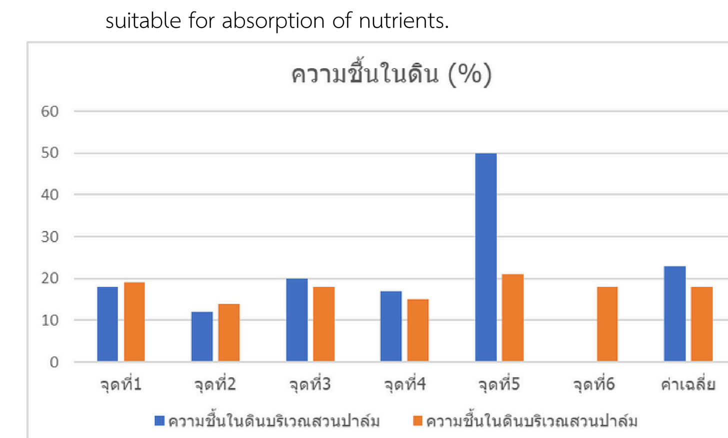
3. Summary table of studies of ferns around palm trees in Wichianmatu School



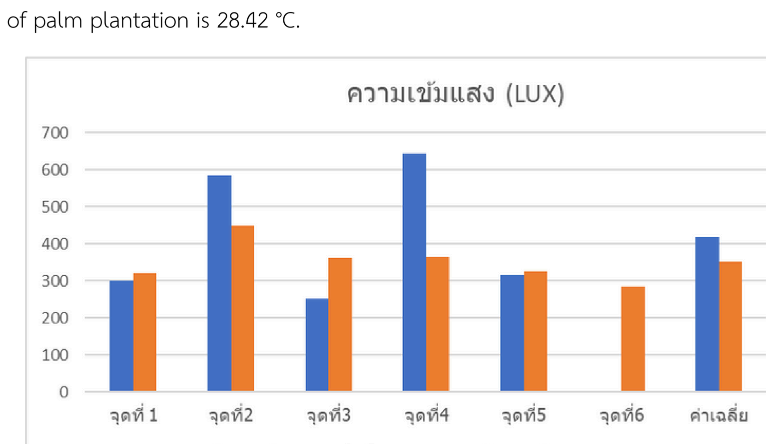
4. The comparison graph shows the pH of both areas, where rubber plantations averaged a pH of 6, and palm plantation averaged a pH of 5.4 which is in the range where pH is more suitable for absorption of nutrients.



5. The graph shows a comparison of the temperature of the two areas of soil. The average temperature of rubber plantation is 26.5 ℃ and the average temperature of palm plantation is 28.42 ℃.



6. The graph shows a comparison of soil moisture in the two areas. The average soil moisture content of rubber plantation is 18% and the average palm plantation is 23%.



7. The graph shows a comparison of the intensity of light between the two areas. The average light intensity of the rubber plantation was 351.66 LUX and the palm plantation was 419.2 LUX, which was higher than that of the rubber plantation.

8. The graph shows a comparison of the mineral content in the soil (N,P,K) of the two areas. The average NPK for rubber plantation was 0.167,0,0.167, and palm plantation were 1, 0.8, 5.4, with significantly more minerals in the soil than rubber plantation.

Summary and Discussion of Research Findings

The study concluded that ferns in Wichianmatu School grow well and become more diverse because palm orchards in Wichianmatu School are slightly higher in soil temperature and NPK is higher than rubber gardens and pH of palm orchards at Wichianmatu School has a greater effect on absorption of nutrients, making the soil more fertile than the soil. As a result, ferns found in Wichianmatu schools are more diverse and more abundant than those found in rubber plantations in Ban Khuan area.

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