

Effects of Terminalia catappa and Hopea odorata Leaves on Soil Quality and Petraeovitex wolfei Growth

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### **Abstract**

Soil Quality Study on Terminalia catappa leaf Fertilizer and Hopea odorata leaf Fertilizer Affecting the Growth of Petraeovitex wolfei ,the objectives of the study were to study the soil quality that affects the growth of petraeovitex wolfei trees in the area where Terminalia catappa leaf fertilizer and Hopea odorata leaf fertilizer were added in Wichianmatu School, 2.) to study the growth of Petraeovitex wolfei in the fertilized areas of Terminalia catappa leaf and Hopea odorata leaf in Wichianmatu School and 3.) to study the relationship between the growth of the Petraeovitex wolfei tree and the fertilizer area of Terminalia catappa leaf and the fertilizer of the leaf in Wichianmatu School. Soil quality and the growth of Petraeovitex wolfei was found that the acidity of the base in the soil moisture, soil nutrients, height of Petraeovitex wolfei Number of leaf of the Petraeovitex wolfei at Wichienmatu School that there is a difference. It was found that the soil in the pots using Terminalia catappa leaf fertilizer has an acidity base value in the soil. Soil moisture, soil nutrients, height of Petraeovitex wolfei for The number of leaf of the Petraeovitex wolfei is more than the soil in the pot that uses the leaf fertilizer.

### **Keywords**

Soil quality, Terminalia catappa leaf fertilizer, Hopea odorata leaf fertilizer

### **Origin and significance**

Petraeovitex wolfei is an ornamental flower plant that is valuable in terms of beauty and use in various auspicious events. Planting petraeovitex wolfei to have good growth, strength and consistent flowering for the most important factor is the quality of the soil, which plays the role of a source of nutrients, a source of water, and the anchorage of plant roots. It directly affects the absorption of nutrients and plant growth.

Soil is a natural resource that is important for crop production systems. Fertile soils contain organic matter, essential nutrients for plants, and soil microorganisms that help break down organic matter into nutrients in a form that can be used by plants. Therefore, it is necessary to study options to improve soil quality by using natural organic materials.

Terminalia catappa leaf and Hopea odorata leaf are common natural debris, Terminalia catappa leaf contain organic matter and some compounds when decomposing can add nutrients to the soil. While

Hopea odorata leaf are hard leaf that decompose more slowly but contribute to increasing organic matter and improving soil structure.

### **Research Questions**

1. Soil quality affecting the growth of Petraeovitex wolfei in the area where Terminalia catappa leaf fertilizer and Hopea odorata leaf fertilizer are added at Wichienmatu School. Is there a difference? How?
2. Is there a difference between the growth of the petraeovitex wolfei tree in the fertilized area of Terminalia catappa leaf and Hopea odorata leaf in WichienMatu School?
3. Is there a difference between the growth of the petraeovitex wolfei tree and the fertilizer area of Terminalia catappa leaf and the fertilizer of the leaf at Wichienmatu School?

### **Research Hypothesis**

1. Soil quality affecting the growth of petraeovitex wolfei trees in the area where Terminalia catappa fertilizer and Hopea odorata leaf fertilizer are added at Wichienmatu School. There are differences.
2. The growth of the petraeovitex wolfei tree in the fertilizer area of the tropical almond leaf and the leaf in the Wichianmatu School is different.
3. The relationship between the growth of the petraeovitex wolfei tree and the fertilizer area of tropical almond leaf and the fertilizer of the leaf at Wichienmatu School is different.

### **Related Variables**

**Hypothesis 1:** Soil quality affecting the growth of petraeovitex wolfei trees in the area where tropical almond fertilizer and Hopea odorata leaf fertilizer are added at Wichienmatu School.

**Early variable:** Soil in the area where tropical almond fertilizer and leaf fertilizer are added

**Prescription :** Soil quality of the petraeovitex wolfei

**Control Variables :** Size of the area studied, date of survey Survey Tools

**Hypothesis 2 :** The growth of the petraeovitex wolfei in the fertilized area of tropical almond leaf and Hopea odorata leaf at Wichienmatu School is different.

**Early variable:** Soil in the area where tropical almond fertilizer and leaf fertilizer are added

**Variable based on:** Growth of petraeovitex wolfei

**Control Variable:** Size of the area studied, date of survey Survey Tools

**Hypothesis 3:** The relationship between the growth of petraeovitex wolfei trees and the fertilized area of tropical almond leaf and Hopea odorata leaf fertilizers at Wichienmatu School

**Early variable:** Soil in the area where tropical almond fertilizer and takhinleaf fertilizer are added

**Variable based on :** Relationship of growth with tropical almond fertilizer and *Hopea odorata* leaf fertilizer

**Control Variable:** Size of the area studied, date of survey and survey Tools

### Study Area



Picture 1 shows the area of the *Petraeovitex wolfei*.



Picture 2 shows the area of the *Petraeovitex*

This research was conducted at Wichienmatu School, Mueang District, Trang Province, located at latitude 7.50449° N, longitude 99.62863° E.

### Materials, equipment and methods of conducting research

#### 1. Materials and equipment

- Soil moisture meter
- Soil Test Kit
- Beaker
- Container for soil
- Stick
- Filter paper
- Pink Bottle
- Distilled water
- Tape measure
- N P K Soil Meter
- Acidity Base Test Kit
- Plate
- Watering cans
- Shovel, hoe
- Fertilizer from *terminalia catalpa* leaf
- Fertilizer from the leaf of the *Hopea odorata* tree
- CU Smartlens

#### 2. How to conduct the research

**2.1 Soil quality affecting the growth of *petraeovitex wolfei* trees in the area where tropical almond fertilizer and *Hopea odorata* leaf fertilizer are added in Wichianmatu School.**

Soil quality is measured according to the GLOBE PROTOCOL methodology by studying the characteristics of the soil. Abandoned clay frame, clay color. Measure the light concentration in the soil, the acidity base value of the soil. Soil moisture and soil fertility from N P K in the soil. as follows:

2.1.1 Study the characteristics of the soil Soil Structure, Soil Color Collect soil samples from pots 1–6, then sort the soil through a sieve to obtain fine soil, put the resulting soil in a petri plate, and then check the soil structure. Soil texture and soil color use CU SmartLens and recording the observation results.

2.1.2 Measure soil moisture using a soil quality meter by inserting a probe into the soil where the *petraeovitex wolfei* tree is planted and recording the observation results.

2.1.3 Measure the acidity-base value in the soil using a soil quality meter by inserting a probe into the soil where the *petraeovitex wolfei* tree is planted and recording the observation results.

2.1.4 Measure the nutrient abundance in the soil, including nitrogen (N), phosphorus (P) and potassium (K) using the NPK Soil Meter (NPK Soil Meter) and insert the head into the soil at the same point 3 times.

## **2.2 Collecting data on the growth of *petraeovitex wolfei* trees in the area where fertilizer is added to *terminalia catalpa* and *Hopea odorata* leaf**

**Collect data on the growth of the *petraeovitex wolfei* by studying the measurement of the height of the *petraeovitex wolfei* Tree. as follows:**

1. Determine 2 sampling points: pots 1-3 use fertilizer from *terminalia catalpa* leaf, pots 4-6 use fertilizer from *Hopea odorata* leaf, which affects the growth of *Petraeovitex Wolfei* trees.

2. Measure the height of the *petraeovitex wolfei* tree from the specified branches using a tape measure to measure the distance between the base of the tree and the tip of the shoot. Read the altitude and collect data 4 times and record the observation results.

3. Count the number of leaf of the *petraeovitex wolfei* tree from the specified branches in each pot and collect the data 4 times and record the observation results.

## **2.3 Study the relationship between the growth of the *petraeovitex wolfei* tree and the area where *terminalia catalpa* fertilizer and *Hopea odorata* fertilizer are added.**

Soil Quality Analysis Soil moisture, acidity-base value in the soil. Soil nutrient concentration using mean and standard deviation.

### **findings**

According to a study on the relationship between soil quality and the growth of *etraeovitex Wolfei* filled with fertilizer from *terminalia catalpa* leaf and fertilizer from *Hopea odorata* leaf at Wichienmatu School. The results of the study are as follows:

## 1. Soil Characteristics Study Soil Structure, Soil Color

**Table 1** Comparison of soil texture characteristics Soil structure, soil color, between pots fertilized from terminalia catalpa leaf and pots fertilized from sword leaf.

Results of the study on the soil texture of the Petraeovitex wolfei tree in the area where the fertilizer was added to the terminalia catalpa leaf.			Results of the study on the soil texture of the Petraeovitex wolfei tree in the area where the fertilizer was added to the leaf of the Hopea odorata leaf.		
Ground beef	Soil structure	Clay color	Ground beef	Soil structure	Clay color
hard soils	Messy	Dark brown	hard soils	Tight soil texture.	Sugar

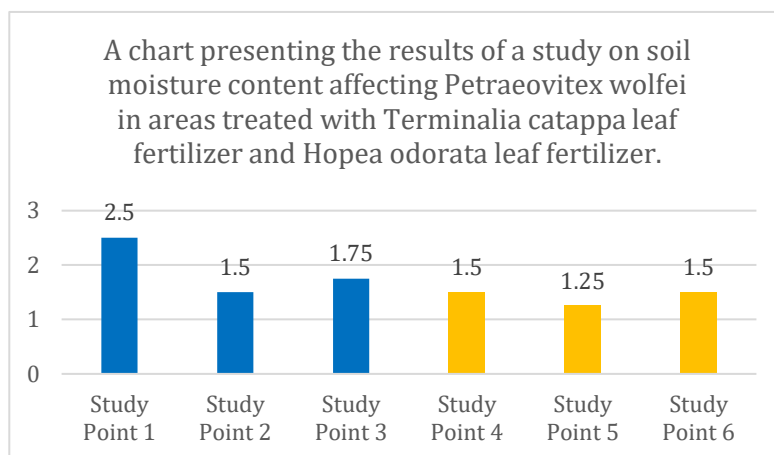
## 2. Soil moisture study

**Table 2** shows the comparison of soil moisture values between the study site of terminalia catalpa fertilizer and the study site of fertilizer from Hopea odorata leaf.

No.	Soil moisture of Petraeovitex wolfei in areas fertilized with Terminalia catalpa (%)			Soil moisture of Petraeovitex wolfei in areas fertilized with Hopea odorata (%)		
	Study Point 1	Study Point 2	Study Point 3	Study Point 4	Study Point 5	Study Point 6
1	2	1	1	1	1	1
2	5	2	3	2	2	2
3	1	1	2	1	1	2
4	2	2	1	2	1	1
Average	2.5	1.5	1.75	1.5	1.25	1.5

Results of a comparison study on the average soil moisture value of terminalia catalpa fertilizer and Hopea odorata leaf fertilizer

Blue instead results of the study on the soil moisture value that affects the *Petraeovitex wolfei* tree in the area where the terminalia catalpa leaf fertilizer is added.



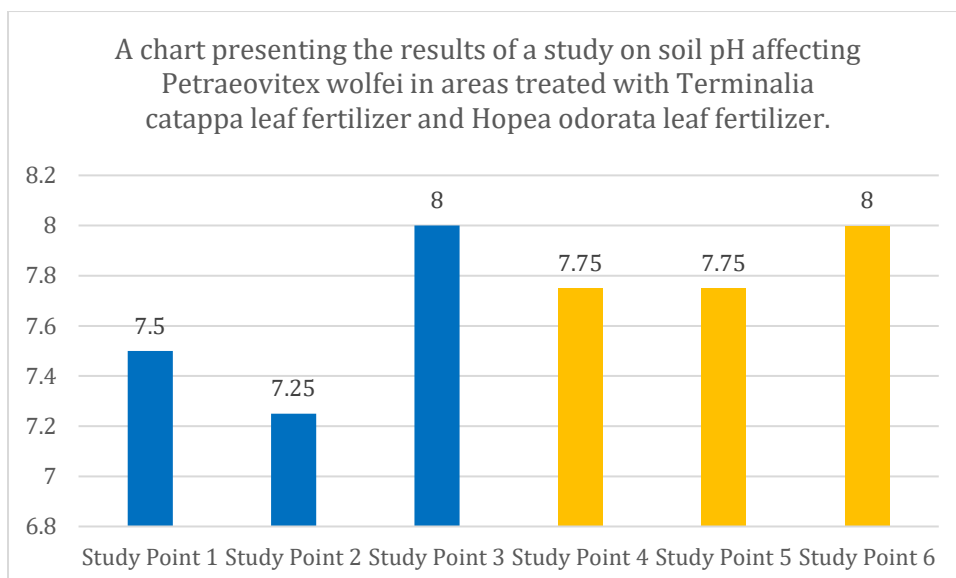
Yellow instead Results of the study on soil moisture values that affect the *Petraeovitex wolfei* tree in the area where the fertilizer was added to the leaf of *Hopea odorata*.

### 3. Acidity-base measurement study in soil.

**Table 3** shows the comparison of the acidity-base value in the soil between the study site where the terminalia catalpa leaf fertilizer was applied and the study site where the leaf fertilizer was applied.

Results of a study by comparing the average acidity-base value in the soil of terminalia catalpa fertilizer and *Hopea odorata* leaf fertilizer.

No.	Results of the study on the acidity-base value in the soil that affects the <i>petraeovitex wolfei</i> tree in the area where the fertilizer is added to the terminalia catalpa leaf			Results of the study on the acidity-base value in the soil that affects the <i>petraeovitex wolfei</i> tree in the area where the fertilizer was added to the <i>Hopea odorata</i> .		
	Study Point 1	Study Point 2	Study Point 3	Study Point 4	Study Point 5	Study Point 6
1	7	7	8	8	8	8
2	7	7	8	7	7	8
3	8	8	8	8	8	8
4	8	7	8	8	8	8
Average	7.5	7.25	8	7.75	7.75	8



-Blue instead Results of the study on the acidity-base value in the soil that affects the *petraeovortex wolfei* tree in the area where the fertilizer is added to the *terminalia catalpa* leaf

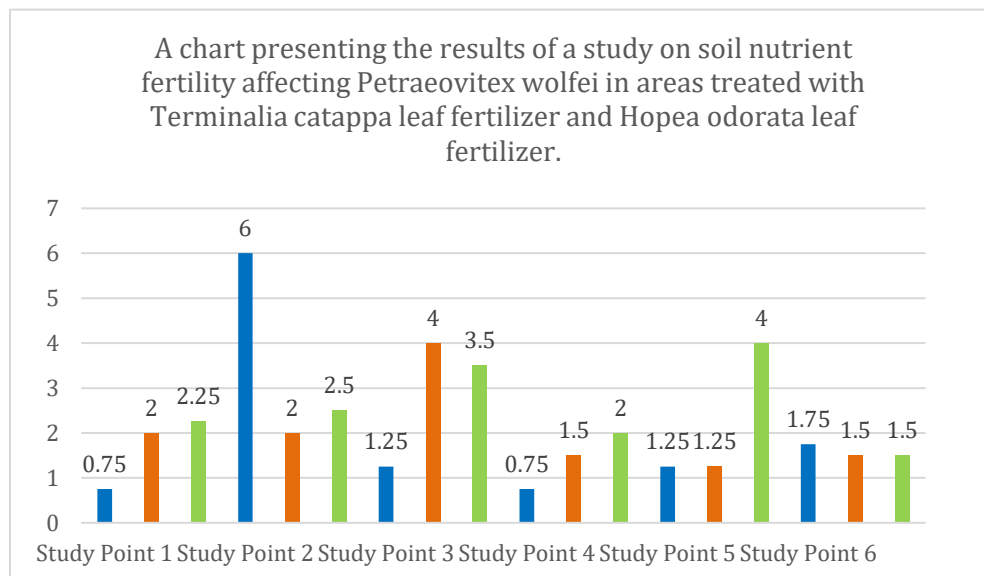
-Yellow instead Results of the study on the acidity-base value in the soil that affects the *petraeovortex wolfei* tree in the area where the fertilizer was added to the leaf.

#### 4. Study of nutrient abundance in soil

**Table 4** shows the comparison of the fertility values (n, p, k) in the soil between the study sites in the **Fertilize terminalia catalpa leaf and study points in the area where the leaf fertilizer is applied**

No.	Results of the study on the nutrient fertility value in the soil that affects the <i>petraeovortex wolfei</i> tree in the area where the fertilizer is added to the <i>terminalia catalpa</i> leaf									Results of the study on the nutrient fertility value in the soil that affects the <i>petraeovortex wolfei</i> tree in the area where the fertilizer is added to the <i>Hopea odorata</i> fertilizer.								
	Study Point 1			Study Point 2			Study Point 3			Study Point 4			Study Point 5			Study Point 6		
	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K
1	1	4	1	14	6	0	2	7	9	2	2	4	3	3	14	5	3	1
2	1	1	3	0	0	5	0	2	1	1	1	2	0	1	0	1	1	3
3	0	1	3	2	2	4	3	0	0	0	0	1	2	0	1	0	0	1
4	1	2	2	8	0	1	0	7	4	0	3	1	0	1	1	1	2	1
<b>Average</b>	0.75	2	2.25	6	2	2.5	1.25	4	3.5	0.75	1.5	2	1.25	1.25	4	1.75	1.5	1.5

Results of a study comparing the average nutrient abundance value (N, P K) in the soil of terminalia catalpa fertilizer and Hopea odorata leaf fertilizer.



Blue for Nitrogen (N) , Orange for Phosphorus (P) , Green for Potassium (K)

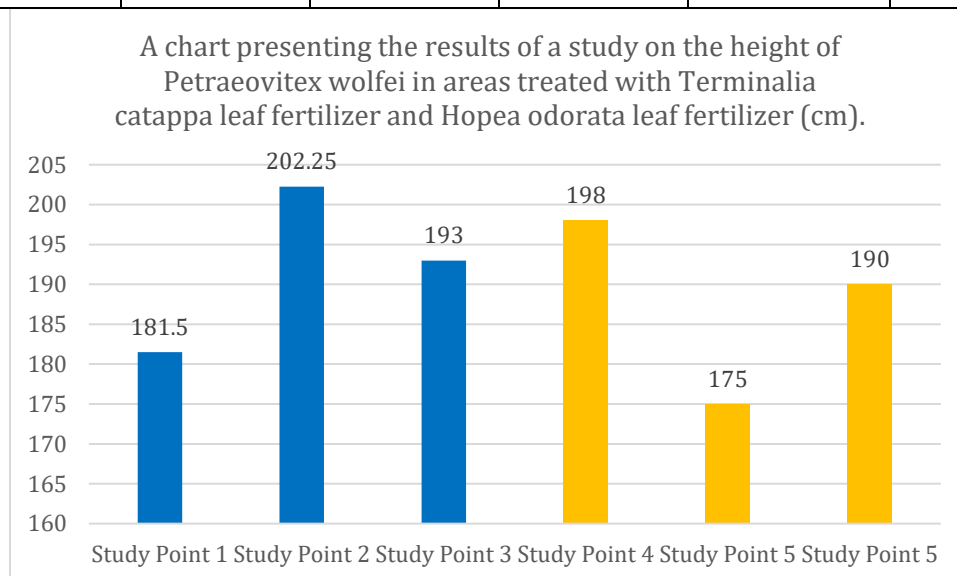
### 5. Growth Study of *petraeovitex wolfei*

**Table 5 Comparison of Growth Values (Height) In the soil between the study site where the terminalia catalpa leaf fertilizer was applied for the study site and the leaf fertilizer was applied.**

No.	Results of the study on the height of the <i>petraeovitex wolfei</i> tree in the area where the fertilizer was added to the terminalia catalpa leaf. (centimeters)			Results of the study on the height of the <i>petraeovitex wolfei</i> tree in the area where the fertilizer was added to the Hopea odorata leaf. (centimeters)		
	Study Point 1	Study Point 2	Study Point 3	Study Point 4	Study Point 5	Study Point 5
1	174	197	186	11	170	182
2	181	201	192	198	172	185
3	185	203	194	200	176	188
4	186	208	200	203	182	205
Average	181.5	202.25	193	198	175	190

The results of the study compared the growth value (height) of fertilizer from terminalia catalpa leaf and fertilizers from Hopea odorata leaf.

No.	Results of the study on the number of leaf of the <i>petraeovitex wolfei</i> tree in the area where <i>terminalia catalpa</i> leaf fertilizer was added.(leaf)			Results of the study on the number of leaf of the <i>petraeovitex wolfei</i> tree in the area where <i>Hopea odorata</i> leaf fertilizer was added. (leaf)		
	Study Point 1	Study Point 2	Study Point 3	Study Point 4	Study Point 5	Study Point 6
1	41	129	151	26	40	51
2	45	110	152	31	42	53
3	48	115	154	38	37	58
4	45	118	150	39	43	56
Average	44.75	118	151.75	33.5	40.5	54.5

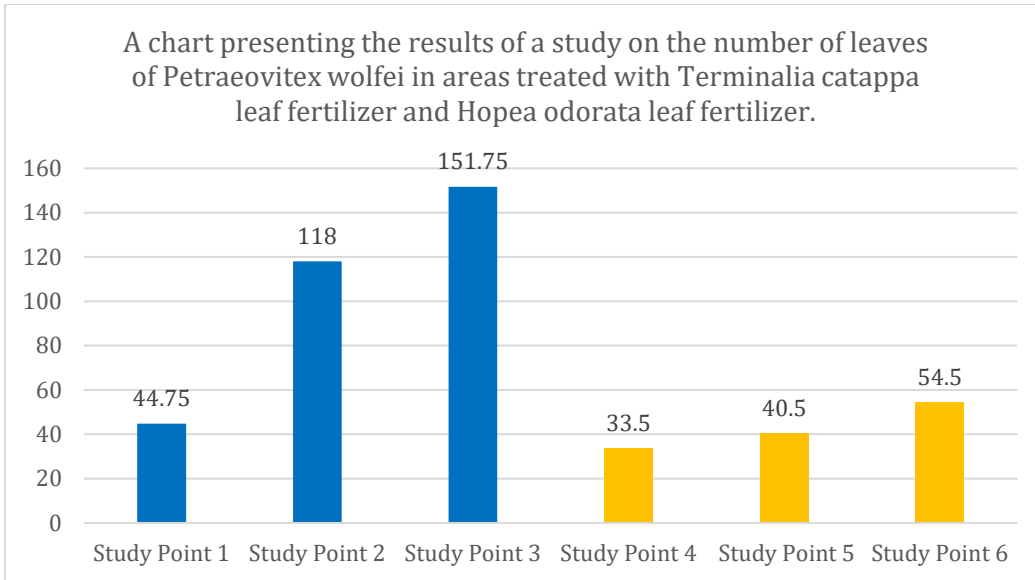


-Blue instead results of the study on the height of the *petraeovitex wolfei* tree in the area where the fertilizer was added to the *terminalia catalpa* leaf. (centimeters)

-Yellow instead results of the study on the height of the *petraeovitex wolfei* tree in the area where the fertilizer was added to the *Hopea odorata* leaf. (centimeters)

**Table 6 Comparison of Growth Values (Number of leaf) In the soil between the study site where the *terminalia catalpa* leaf fertilizer was applied and the study site where the leaf fertilizer was applied.**

The results of the study compared the growth value (number of leaf) of fertilizer from *terminalia catalpa* leaf and fertilizers from *Hopea odorata* leaf.

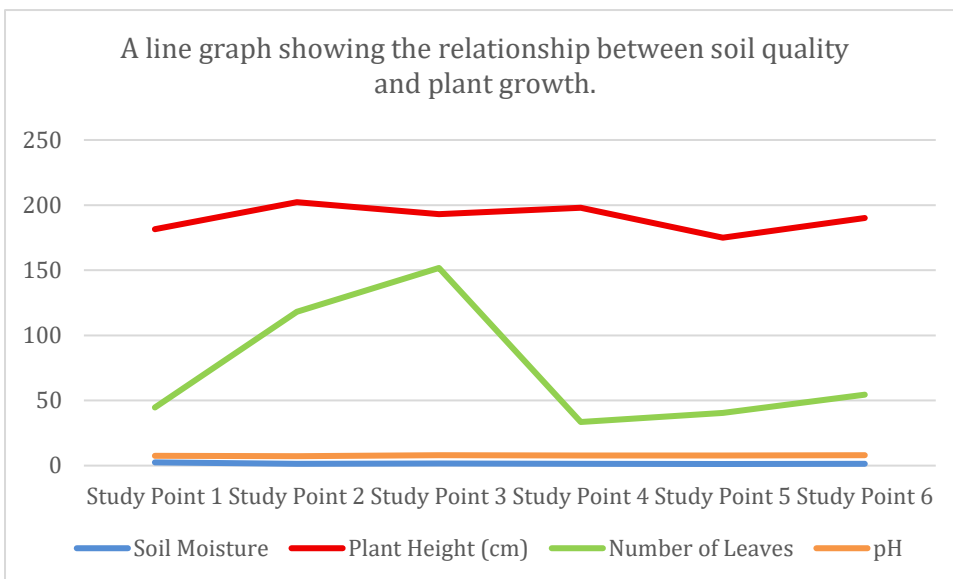


-Blue instead results of the study on the number of leaf of the *petraeovitex wolfei* tree in the area where the *terminalia catalpa* leaf fertilizer was added.

-Yellow instead results of the study on the number of leaf of the *petraeovitex wolfei* tree in the area where the *Hopea odorata* leaf fertilizer was added.

**7. Study on the relationship between soil quality and the growth of *petraeovitex wolfei* trees during the study site. Fertilize *terminalia catalpa* leaf and Fertilize *Hopea odorata*.**

Results of the study on the relationship between soil quality and the growth of *petraeovitex wolfei* trees during the study site fertilize *terminalia catalpa* leaf and fertilize *Hopea odorata* study points in the area where the leaf fertilizer is applied.



## Summary and discussion of the results

According to a study on the relationship between soil quality and the growth of *Petraeovitex Wolfei* trees in pots fertilized from terminalia catalpa leaf and fertilizers from *Hopea odorata* leaf in Wichian Romtu School. It was found that the soil moisture value, acidity-base value in the soil. Bright concentration, soil nutrients and growth of *petraeovitex wolfei*. There is a difference between the *petraeovitex wolfei* in the pot fertilized from the terminalia catalpa leaf and the fertilizer from the terminalia catalpa leaf, and it was found that the *petraeovitex wolfei* in the pot fertilized from the terminalia catalpa leaf grows better than the *petraeovitex wolfei* in the pot fertilized from the terminalia catalpa leaf. In addition, the soil quality in the pots fertilized from terminalia catalpa leaf is on average better than the soil quality in the pots fertilized from the leaf. The environmental research entitled "Study on the Relationship of Soil Quality and Growth of *petraeovitex wolfei* Trees Using Fertilizer from terminalia catalpa and *Hopea odorata* leaf at Wichienmatu School" was completed. Mrs. Khwanjai Kanchansrimek Ms.Naeriya Tonkrongchan Ms.Chularat Singkaew and Dr. Apirak Songrak for kindly providing knowledge and advice on soil quality measurement. The team has always collected data on the growth of *Petraeovitex Wolfei*, including the use of equipment for experiments and consultation in the implementation of the project. I would like to thank all my members of the group for their cooperation, assistance, and joint research to make this scientific project successful as intended. The organizer would like to thank all of you for coming to this opportunity.

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The National Environmental Quality Promotion and Preservation Act B.E. 2535 (1992) is the main law of Thailand that is prepared to formulate policies, measures, and mechanisms to prevent, solve and control environmental problems, including the conservation of natural resources for sustainability, covering important resources such as soil, water, air, forests, and ecosystems.