A study of the comparison for soil quality in areas in nature by occurring paco fern and without paco fern in Ban Klang Na, Nong Trut Sub-district, Mueang District, Trang Province

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From the study of local plant data, it found that the saplings can be used as an index to measure the health of the environment because paco fern grows only in areas with fresh air. The soil is intact and free of chemical additives. Therefore, it is considered as the ultimate plant research from this information. The research team was interested in studying the soil quality in areas with naturally occurring paco fern and those without paco fern, at Ban Klang Na, Nong Trut Sub-district, Mueang District, Trang Province, by randomly collecting soil samples at 2 depths, namely 5 centimeters and 15 centimeters found that soil fertility about the nitrogen value in the soil in the area where paco fern grow by themselves It has a moderate nitrogen value. The soil in the area without paco fern has low nitrogen content. Phosphorus values in the soils in the areas with spontaneous paco fern and the soils without the growth of paco fern had moderate phosphorus values. Potassium in soil in the area where paco fern grow by themselves low in potassium. The soil in the area without paco fern had moderate potassium value. From the study of soil moisture values, it found that the soil in the areas where the paco fern grows by itself. The moisture content was 38% and the pH value was 5.93. It has a moisture content of 29 % and a pH of 5.62.
Objectives

1. To study the quality of the soil in the area with naturally occurring paco fern and the area without paco fern, Ban Klang Na, Nong Trut, Mueang, Trang.
2. To offer information to gardeners who will grow paco fern as a Sam crop.

Research question

What's the difference of soil moisture, soil acidity-base and the fertility of the soil in areas with naturally growing paco fern and areas without paco fern?
Research Hypothesis

Soil moisture, soil acidity-base and the fertility of the soil in the area where paco fern grow naturally, it will be of better quality than soil without paco fern.

GLOBE PROTOCOLS

-Principles of soil measurement pedosphere soil.
-Principles of measurement methods in the field of biosphere cover.
Materials

- Tape measure
- Straw rope
- Settle down
- Global Positioning System (GPS)
- Rapitest Soil Fertility Meter
- Calculator
- Pen
- Hoe
- Munsell Soil Color Chart
- Pile mandrel
- Thermometer
- Soil pH Meter
- Balance
- Clay oven
- Plastic bucket
Methodology

1. Determine soil sampling points and collect soil samples correctly according to Globe principles.
2. Measure the soil moisture content, the soil was weighed before baking and after baking. Then formula for calculating humidity.
   \[
   \text{Soil moisture (g/g) = (mass of soil before baking - mass of soil after drying)/mass of soil before baking}
   \]
3. Measure the temperature of the soil hammer the Pile mandrel into a depth of about 5 cm and 15 cm. and take a thermometer for measuring the temperature at a depth of 5 cm. and 15 cm.
4. Measure the soil pH.
5. Measure nitrogen, phosphorus and potassium content in soil.
Results

Geographic coordinates: Do a soil moisture study, soil acidity-base and the fertility of the soil in the area where there are naturally growing paco fern and the soil without the paco fern, Ban Klang Na, Nong Trut Sub-district, Muang District, Trang Province by defining the points as follows.

<table>
<thead>
<tr>
<th>study point</th>
<th>geographic coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Latitude (N)</td>
</tr>
<tr>
<td>Point 1, an area where paco fern grow naturally</td>
<td>7.5969</td>
</tr>
<tr>
<td>Point 2, the area where there are no paco fern</td>
<td>7.5977</td>
</tr>
</tbody>
</table>

Table 1 Geographic Coordinates
Results

The study of soil quality in areas.

1. Nitrogen
   Determination of nitrogen in the soil in the area where paco fern grow naturally of paco fern has moderate nitrate and the soil in the area without paco fern had low nitrogen content.

2. Phosphorus
   Measurement of phosphorus in soils in areas with naturally occurring paco fern and non-paco fern soils have moderate phosphorus.

3. Potassium
   Determination of potassium in soil in areas with naturally occurring paco fern low in potassium and the soil in the area without paco fern had moderate potassium value.

<table>
<thead>
<tr>
<th>vegetation</th>
<th>Depth level start-final (cm)</th>
<th>fertility of the soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point 1, an area where paco fern grow naturally</td>
<td>15</td>
<td>Nitrogen: Medium</td>
</tr>
<tr>
<td>Point 2, the area where there are no paco fern.</td>
<td>15</td>
<td>Phosphorus: Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potassium: Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 soil fertility in each area
Results

Soil moisture and pH values

From the study of soil moisture values, it was found that the soil in the area with paco fern spontaneously grew naturally. Moisture value 38 percent and has a pH of 5.93. The soil in the area without paco fern grows. It has a moisture content of 29 percent and has a pH of 5.62.

<table>
<thead>
<tr>
<th>vegetation</th>
<th>Depth level start-final (cm)</th>
<th>Soil moisture (percent)</th>
<th>Average soil pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point 1, an area where paco fern grow naturally</td>
<td>15</td>
<td>38</td>
<td>5.93 ± 0.38</td>
</tr>
<tr>
<td>Point 2, the area where there are no paco fern.</td>
<td>15</td>
<td>29</td>
<td>5.62 ± 0.29</td>
</tr>
</tbody>
</table>

Table 3 Soil moisture and pH values

The bar chart shows the average pH comparison of two soils.
Results

temperature in each soil depth

The area with spontaneous paco fern at a depth of 5 cm had an average temperature of 27.5°C an average temperature of 15 cm, an average temperature of 26.20°C and an area paco fern at a depth of 5 cm had an average temperature of 28.16°C at a depth of 15 cm with an average temperature of 27.30°C.

<table>
<thead>
<tr>
<th>Vegetation</th>
<th>Depth level (cm)</th>
<th>Soil temperature (degree Celsius)</th>
<th>1st time</th>
<th>2nd time</th>
<th>3rd time</th>
<th>average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point 1, an area where paco fern grow naturally</td>
<td>5</td>
<td></td>
<td>27.50</td>
<td>27.50</td>
<td>27.50</td>
<td>27.50 ± 0.00</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>26.30</td>
<td>26.00</td>
<td>26.30</td>
<td>26.20 ± 0.33</td>
</tr>
<tr>
<td>Point 2, an area where there are no paco fern</td>
<td>5</td>
<td></td>
<td>28.40</td>
<td>28.30</td>
<td>28.40</td>
<td>28.40 ± 0.10</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td>27.10</td>
<td>27.00</td>
<td>27.40</td>
<td>27.30 ± 0.33</td>
</tr>
</tbody>
</table>

Table 4 temperature in each soil depth

Bar chart showing the average soil temperature comparison average of 2 soils.
Results

Soil structure, soil retention, soil color and soil texture

Soil structure was studied soil adhesion, soil color and soil texture so it was found that the soil structure in the whole area paco fern grow naturally and no paco fern grow up. It is a single tablet. Soil adhesion is crumbly. The color of the soil in the area with the naturally occurring paco fern is the darkest (2.5Y 2.5/1 black), the area without the paco fern sprout is brown (10YR 2/2 very dark brown). Characteristics of the soil texture in both areas. It is a Loamy Sand type.

<table>
<thead>
<tr>
<th>vegetation</th>
<th>Depth level start-final (cm)</th>
<th>Soil structure</th>
<th>Soil color</th>
<th>Soil retention</th>
<th>Soil texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point 1, an area where paco fern grow naturally</td>
<td>15</td>
<td>Single grain</td>
<td>2.5Y 5/1 Black</td>
<td>Friable</td>
<td>Loamy Sand</td>
</tr>
<tr>
<td>Point 2, the area where there are no paco fern.</td>
<td>15</td>
<td>Single grain</td>
<td>10YR 5/3 Brown</td>
<td>Friable</td>
<td>Loamy Sand</td>
</tr>
</tbody>
</table>

Table 5 Soil structure, soil retention, soil color and soil texture
Discussion

From the results of the soil moisture measurement soil acidity-base, it was found that soil fertility in the area with naturally occurring paco fern and soil without paco fern was found at Ban Klang Na, Nong Trut Sub-district, Mueang District, Trang Province. It has a moderate nitrogen value with paco fern that grows naturally. The soil in the area without paco fern had low nitrogen content. Phosphorus determination in soils in the area with naturally occurring paco fern and the soil with no paco fern had moderate phosphorus values. Determination of potassium in soil in areas with naturally occurring paco fern was low in potassium. The soil in the area without paco fern had moderate potassium value.

The results of the study of soil moisture showed that the soil in the area where paco fern sprout naturally grew the moisture content was 38% and the pH value was 5.93 and the average temperature was 27.5°C at a depth of 5 cm and it was 26.20°C at a depth of 15 cm. The soil in the area without the paco fern the moisture content was 29% and the pH value was 5.62 and the average temperature was 28.16 ºC at a depth of 5 cm and it was 27.30°C at a depth of 15 cm. Soil structure, soil retention, soil color and soil texture. The area where paco fern sprout naturally grew and no paco fern is a single tablet. Soil adhesion is crumbly. The color of the soil in the area with the naturally occurring paco fern is the darkest (2.5Y 2.5/1 black), the area without the paco fern sprout is brown (10YR 2/2 very dark brown). Characteristics of the soil texture in both areas. It's a Loamy Sand type.
CONCLUSION

From the results of the study, it can be seen that the area where the paco fern grows naturally. The quality of the soil is darker than in areas without paco fern. Consistent with the idea that paco fern is also an indicator of the environment to know that where the weather is bad impure soil. There are chemicals in it. Paco fern will not grow or sprout in that area.


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A book called Plants of Thailand. Forest Botanical Garden Forest Academic Bureau, Royal ForestDepartment. (Tem Smitinan).