Study on the Relationship Between Air Quality and Lichen Species on Royal palm
and Macarthur plam in Wichienmatu School

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Abstract

Title of the research : Study on the Relationship Between Air Quality and Lichen Species on Royal palm and Macarthur plam in Wichienmatu School
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The study on the relationship between air quality and lichen species on Royal Palm and MacArthur Palm within Wichienmatu School, Trang Province, aims to examine the correlation between air quality and lichens on these two tree species. Air quality parameters, including humidity and temperature, were measured, and lichen species were identified using the CU Smart Lens. The study found that…

Keyword: Royal Palm,MacArthur

Introduction

Lichens are organisms that result from a symbiotic relationship between fungi and algae or cyanobacteria. They are commonly found on tree bark, rocks, and soil. Different types of lichens can serve as indicators of environmental conditions and air quality in a given area because lichens are highly sensitive to air pollution, such as sulfur dioxide (SO_2) and nitrogen oxides (NOx). Therefore, studying types of lichen and the environmental factors affecting their growth can be used as a biological tool for air quality assessment.

Observations at Wichienmatu School revealed that many trees are covered with lichens, particularly Royal Palm and MacArthur Palm, which are commonly found in the area. This led to an interest in comparing the types of lichen found on these two tree species and analyzing the relationship between air factors, such as humidity and temperature, and lichen growth.

Research Questions :
-Does air quality affect the types of lichens on Royal Palm and MacArthur Palm?
Research Hypothesis:
-Air quality affects the types of lichens on Royal Palm and MacArthur Palm differently.
Variables Independent: Air quality
Dependent Variable: Types of lichens
Controlled Variables:Duration of measurements, measurement equipment, Royal Palm and MacArthur Palm trees.

Materials and Equipment
-CU SMART LENS
-Thermometer
-Hygrometer

Research Methodology

1.1 Define study sites

The study will focus on Royal Palm and MacArthur Palm trees at specific locations. For the Royal Palm trees, the following sites will be studied:-Royal Palm Tree 1: Latitude 7.504939, Longitude 99.6299253 (North)Royal Palm Tree 2: Latitude 7.5037092, Longitude 99.6295086 (North)Royal Palm Tree 3: Latitude 7.5028111, Longitude 99.6297691 (North)For the MacArthur Palm trees, the following sites will be studied:MacArthur Palm Tree 1: Latitude 7.5027453, Longitude 99.6296336 (North)MacArthur Palm Tree 2: Latitude 7.5032864, Longitude 99.6293798 (North)MacArthur Palm Tree 3: Latitude 7.5039246, Longitude 99.6290952 (North)The study will involve three study points for both Royal Palm and MacArthur Palm trees.

Research procedures

1.Measure the air temperature at each tree using a thermometer. Read the temperature at each point and record the results.

2.Determine the relative humidity of the air using a wet-bulb and dry-bulb method. Record the relative humidity readings.

3.Collect data on the types of lichens. Use a CU SMART LENS for identification and compare the results with a lichen species guide.

Results

Table1 : Measure the temperature and humidity of each Royal Palm and MacArthur Palm tree using a thermometer for temperature and a hygrometer for humidity.

•Table showing the results of temperature and relative humidity measurements in the air of Royal plam

no.	Temperature (Celsius)	Humidity (Celsius)
1	33	25
2	33	24
3	34	24
Average	33.33	24.33

•Table showing the results of temperature and relative humidity measurements in the air of MacArthur Palm trees.

no.	Temperature (Celsius)	Humidity (Celsius)
1	32	26
2	32	26
3	32	25
Average	32	25.66

Bar chart comparing the average temperature between Royal Palm and MacArthur Palm trees.
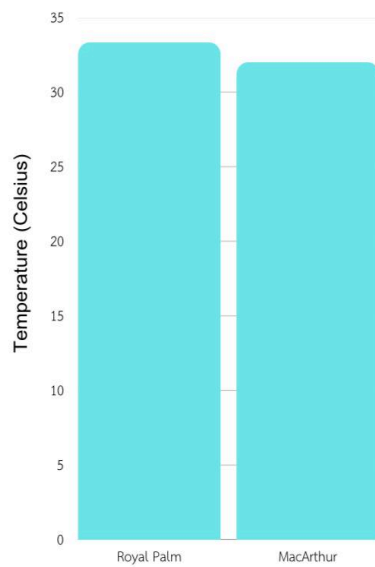
Bar chart comparing the average humidity between Royal Palm and MacArthur Palm trees.
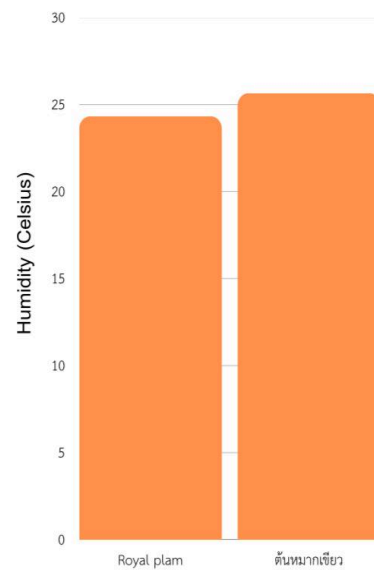
Table2 : Collect data on the types of lichens. Use a CU SMART LENS for identification and compare the results with a lichen species guide.

Table showing the lichen species found on all three Royal Palm trees.
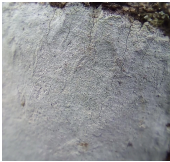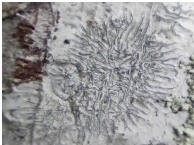
Image	Lichen species	Pollution Tolerance	Characteristics
	Foliose	Low tolerance	Pale green or light olive green, growing tightly attached to the surface. Branches are tightly clustered, raised in undulating folds, resembling wrinkled cloth. It buds in clusters of round, flour-like powder resembling a steamed cup cake or cabbage flower.
	Crustose	High tolerance	Surface is often white-gray or olive green. The fruit resembles black or white lines, and the edges are raised like a lip.
	Crustose	High tolerance	White or gray-green, in powder form.
	Crustose	High tolerance	Lichen forms a net-like pattern. It often buds, creating powdery clusters that make the surface look rough. The fruit is round and black or black-brown with a matte surface.
	Crustose	High tolerance	Surface is white. The fruit resembles black lines with raised edges like lips.
	Crustose	High tolerance	Smooth surface with black, matte fruit scattered in clusters. The fruits are often interconnected.

Table showing the lichen species found on all three MacArthur Palm trees.

Image	Lichen species	Pollution Tolerance	Characteristics
	Crustose	High tolerance	White surface, smooth texture.
	Foliose	Low tolerance	Pale green or pale gray, growing tightly attached to surfaces. The leaf edges overlap with a crystal-like appearance resembling frozen water.
	Crustose	High tolerance	Attached to wood, with an orange powder or small scales.
	Crustose	High tolerance	Surface is often white-gray or olive green. The fruit has a pattern resembling black lines.

Result

A survey of lichens on Royal palm (Roystonea regia) and MacArthur palm (Ptychosperma macarthurii) in the area of Wichienmatu School found that the temperature on the bark of Royal palm was higher than that of MacArthur palm, while the moisture on the bark of MacArthur palm was higher than that of Royal palm. These two factors influenced the distribution and types of lichens found. It was observed that Royal palm, which had higher temperatures, was more heavily covered with lichens than MacArthur palm. The increased temperature may have prevented certain lichens that require high humidity from thriving.

Additionally, it was found that the most common type of lichen on Royal palm was crustose lichen, which forms a thin, tightly adhered layer on the tree bark. This type of lichen is more resistant to polluted environments compared to other types.

Conclusion and Discussion

A survey of the types and quantity of lichens found on Royal palm (Roystonea regia) and MacArthur palm (Ptychosperma macarthurii) in the area of Wichienmatu School revealed that Royal palm had a greater amount of lichens compared to MacArthur palm. Additionally, the most commonly found lichen on Royal palm was crustose lichen, which forms a thin, tightly adhered layer on the tree bark and is more resistant to polluted environments than other types of lichens.

It was also observed that the temperature around Royal palm was higher than that of MacArthur palm, while the humidity around MacArthur palm was higher than that of Royal palm. These factors may influence the distribution of lichens on each tree. Based on this study, it can be assumed that Royal palm may provide a more suitable habitat for lichens, particularly crustose lichens, which are known for their tolerance to air pollution.

The higher presence of crustose lichens on Royal palm may indicate that the study area has a certain level of air pollution, aligning with existing knowledge that this type of lichen thrives in environments where more sensitive lichens struggle to survive. Therefore, this study not only helps to understand the factors affecting the distribution of lichens on different trees but also highlights the potential of lichens as important bioindicators for assessing environmental conditions and air quality in the study area.

Recommendation: Further air quality analysis should be conducted, such as measuring air pollution levels, to support these findings.

Acknowledgment

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