Title of the Researcd: The study of the relationship between air quality and the diversity of lichens growing on trees at the median strip of Ban Khuan Intersection, Mueang Trang District, Trang

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Abstract

This study examines the relationship between air quality and lichen diversity on trees in the median strip at Ban Khuan Intersection, Mueang Trang District, Trang Province. The objectives of this study are 1)To investigate the relationship between air quality and the number of lichen species found. 2)To analyze the diversity of lichen species growing on trees in the area.Three tree species were studied Palm, Indian Oak, and Sri Trang. From the study, different tree species had varying numbers and types of lichens. A total of six types of lichens were found, categorized into high-tolerance and tolerant groups. One species belonged to the high-tolerance group, while five species belonged to the tolerant group.Among the trees studied, the Palm tree had the highest diversity of lichens, with four species: Dirinaria picta, Dirinaria aegialita, Parmotrema praesorediosum, and Parmotrema grayanum. The Indian Oak had two species, both in the tolerant group: Dirinaria picta and Pyxine subcinerea. The Palm tree had the highest number of lichens, and the area surrounding the Palm tree was found to have the lowest air quality. Meanwhile, Sri Trang had the lowest lichen diversity, indicating the best air quality. The relative humidity was found to be highest in areas around the Palm tree.

Keywords: Lichen, Air Quality Relationship, Temperature, Relative Humidity

Introduction

Currently, vehicles, including cars and motorcycles, are essential for daily use, but they also contribute significantly to environmental pollution. One major issue is air pollution caused by harmful substances released from vehicle exhaust, which continuously affects air quality over time. Another solution to mitigate air pollution is the selection of trees that can absorb pollutants such as carbon dioxide in significant amounts.

Lichens are organisms that grow symbiotically with trees and can be used as biological indicators to assess air quality. In the median strip at Ban Khuan Intersection, Mueang Trang District, Trang Province, three types of trees are planted: Palm, Indian Oak, and Sri Trang. The diversity of lichens found growing on these trees varies by species. Since lichens can be used as air quality indicators, trees with lichens from the “good air quality” group indicate low pollution levels.

This research aims to study the relationship between air quality and lichen diversity on trees in the median strip in Mueang Trang District. The findings will serve as a reference for selecting tree species for planting in median strips to help absorb air pollutants from vehicle emissions, improve air quality in urban areas, and enhance the well-being of local residents.

Research Questions

1.How does air quality affect lichen growth?

2.Do different tree species in the median strip support different lichen diversity?

Research Hypotheses

1.Air quality affects lichen growth.

2.Different tree species in the median strip support different lichen diversity.

Materials and Research Methodss

Research Hypothesis 1: Air quality affects lichen growth.

Independent Variable: Air quality, including humidity and temperature.

Dependent Variable: Lichen diversity.

Controlled Variables: Equipment used for measurement Study location.

Sampling tools.

Data collection time.

Research Hypothesis 2 : Different tree species in the median strip support different lichendiversity.

Independent Variable: Types of trees on the median strip

Dependent Variable: Lichen diversity.

Controlled Variables: Data collection methods.

Data collection period.

Materials and Equipment

1.CU smart lens.

2.Mobile phone camera.

3.Thermometer (both digital and analog).

4.Experiment documentation tools.

5.Lichen identification guidebook.

Research Methodology

The study area is located at the intersection of Ban Khuan Road, with coordinates 7.5264528°N latitude and 99.6248925°E

Chapter 1 : A Study of Air Quality Impacting the Growth of Lichens on the Median Strip at the Ban Khuan Intersection, Mueang District, Trang

1.1 Select the study area: Define the study area as the traffic island at the 4-way intersection at Ban Kuan.

1.2 Measure relative humidity: Use a dry bulb thermometer and wet bulb thermometer to measure the relative humidity in the air around the 3 types of trees. Calculate the average and record the results.

1.3 Measure temperature: Use a thermometer to measure the temperature in the air around the 3 types of trees. Calculate the average and record the results.

1.4 Record the data: Create a table or graph to record the collected data, so you can compare the temperature and relative humidity for each type of tree.

Chapter 2 : Investigating the Diversity of Lichens Growing on Different Tree Species on the Median Strip of Ban Khuan Intersection

2.1 Define the sampling points with similar characteristics of the area for each tree species, with 3 trees per species.

2.2 For all three tree species, use the CU Smart Lens with a 20X magnification attached to a smartphone to study the characteristics of different lichen species and record the data.

2.3 Count the number of lichens of each species, take photos, and record the data.

2.4 Classify and group the lichen species found on the trees using the Wind Pattern Investigator manual and record the data.

Research Results

Table 1: Air Quality Measurement Results

Results of Air Quality Measurements									
No	Tree Species	Temperature (°C)				Relative Humidity (%)			
		1	2	3	Average	1	2	3	Average
1	Palm Tree	30	29	30	29.66	69	76	69	71.33
2	Mahogany Tree	29	30	30	29.66	75	76	76	75.66
3	Sri Trang Tree	30	31	30	30.33	83	76	76	78.33

According to Table 1, the areas around palm trees have an average temperature similar to that of mahogany trees. However, the areas around Sri Trang trees exhibit the highest temperature and relative humidity, while the lowest relative humidity is found near the palm trees.

Table 2 :shows the types of lichens found on trees at the median strip of Ban Khuan Intersection, Mueang Trang District, Trang

Tree \ Lichen		High Tolerance Group				Tolerance Group										Good Air Group	
No.	Tree name	Amandinea extunata	Trypethelium eluteriae	Pyxine cocoes	Anthracothecium sp.	Dirinaria sp.	Graphid sp.	Lecanora sp.	Rinodina sp.	Cryptothecia	Bacidia sp.	Laurera benguelensis	Graphis	Trypethelium	Physcia dimidiata	Chrysothrix sp.	Pertusaria	Lecanora
1	Palm			✓			✓	✓	✓	✓					✓			
2	Mahogany		✓			✓	✓	✓				✓						
3	Sri Trang					✓	✓											
Total number of lichen groups (types)		2				7										-		
		High Tolerance Group				Tolerance Group										Good Air Group		

From Table 2, it was found that the Parlam tree had a total of 6 lichen species, the Mahogany tree had a total of 5 lichen species, and the Sri Trang tree had a total of 2 lichen species.

Summary and Conclusion

The study found that different tree species support different types of lichens, and the diversity of lichens varies among them. The Parlam tree hosted 6 species of lichens, which were classified into one high-canopy species: *Heterodermia diademata*. The remaining 5 species were categorized as lower-canopy species: *Graphis scripta*, *Lecanora sp.*, *Pertusaria sp.*, *Pyxine cocoes*, and *Haematomma africanum*.

The Mahogany tree had 5 lichen species, classified into one high-canopy species: *Pyrenula sp.*, and four lower-canopy species: *Parmotrema sp.*, *Graphis scripta*, *Lecanora sp.*, and *Haematomma africanum*.

The Sri Trang tree had only 2 lichen species, both of which were categorized as lower-canopy species: *Parmotrema sp.* and *Graphis scripta*. The tree species that hosted the highest number of lichen species was the Parlam tree.

In terms of environmental factors, it was found that the Parlam tree had similar temperatures to the Mahogany tree, while the Sri Trang tree had the highest temperature. The highest relative humidity was recorded in the Mahogany tree, while the lowest relative humidity was found in the Parlam tree.

Suggestions

It is advisable to study additional tree species beyond the three previously examined. This approach will provide a more comprehensive understanding and yield more diverse and optimal research outcomes, paving the way for future advancements in related areas.

Acknowledgments

The study on the correlation between air quality and lichen diversity growing on trees at the median strip of Ban Khuan Intersection, Mueang Trang District, Trang Province, was successfully completed. This success was made possible through the encouragement and support of Mr. Sakda Paisomboon, Director of Vichiamatuthit School. We would also like to express our heartfelt gratitude to Ms. Khwanjai Kanjanasri and Ms. Thamonwan Bunchuay, our advisors, for their kindness, assistance, valuable guidance, and for reviewing and correcting any shortcomings in our research, ensuring the quality of this report.

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