Research Report

Study of Lichens on Fox-tail Palm Trees in the Vicinity of Wichienmatu School

Research

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Research title: Study of Lichens on Fox-tail Palm Trees in the Vicinity of Wichianmatu School

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Abstract

The objective of this research is to study the diversity of lichen species and investigate the weather conditions, temperature, and humidity in the area in front of the workshop room at Wicheanmatu School, Mueang District, Khok Lo, Trang Province. The selected lichen species for the study are palm-like lichens, examined using a CU smart lens with a magnification of 20x.

The study revealed a variety of lichen species, categorized into two groups:

- High tolerance group: including three species - Hatta Totsukansho Kumona, Riwapra, and Siw Huachang Jiw.
- Tolerant group: including three species - Laeysin, Hai Thongroi Khemin, and Polyose.

The weather conditions were studied by examining the temperature and relative humidity of the air around the palm-like lichens.

The temperature was measured using a Maxima-Minima-Thermometer, indicating an approximate temperature of 32 degrees Celsius.

The study on air humidity utilized a hygrometer of the wet and dry bulb type.

Keywords: Air Quality, Lichen

Introduction

Lichens are a highly diverse natural resource in Thailand. Currently, there are over 1,700 documented lichen species in the country, with more than half of them yet to be identified and named due to their intricate structures, including both sexual and asexual reproductive forms. These structures are crucial for classifying species, and there are still additional lichen species that remain unexplored, such as those found on tree bark or high rocky surfaces.

Lichens are symbiotic organisms resulting from a mutually beneficial relationship between a mycobiont (fungi) and a photobiont (algae or cyanobacteria). They exhibit various growth patterns compared to fungi and independently growing algae. Lichens play essential roles in nature, serving as a food source and habitat for animals, ranging from deer that consume lichens to birds and insects using them for nest building.

Humans have historically derived numerous benefits from lichens, including their use as food, traditional medicine, dyeing agents, and even indicators of air quality. They have been employed to assess pollution levels in urban areas, notably in large cities like London, where lichen abundance increased following experiments measuring air pollution, indicating an improvement in air quality.

In recent times, lichens have gained importance in Thailand, evident in projects conducted by organizations such as the Department of Forestry, which surveys the biological diversity of lichens and connects them with the local wisdom of communities near conservation areas. Even non-profit organizations like Green World Foundation use lichens as educational tools to promote environmental awareness and their relationship with air quality in urban settings. These activities reflect an increased awareness of Thailand's biological resources.

Research questions

The types of lichens on the rattan palm tree exhibit differences, indicating the air conditions in the school.

Hypothesis of the research

Lichens on rattan palm trees as indicators of the air conditions in the school. Variables:

Tree type > Lichen type

Dependent variable > Air quality

Control variables > Location,sunlight, temperature, humidity.

The types of lichens vary.

Independent variable > Rattan palm tree,

Dependent variable > Types of lichens,

Control variables > Temperature, Humidity.

Methods and materials

1) CU smart land 20x

2) Hygrometer, wet bulb type - dry bulb type

Setting Study Points

Conducting surveys at Wichianmatu School Tat School to study the selected areas.

Research Procedure

1. Set study points for different types of lichen accurately according to the Globe protocol. Capture images of various types of lichen on trees using the CU Smart Lens 20X. Record images and information about the characteristics of lichen in the designated area of the palm tree at Wichianmatu School Tat School.

2. Study the types and categories of lichen and the selected trees.

3. Measure temperature:

3.1 Install a thermometer in the palm tree area.

3.2 Let it stand for approximately 15-30 minutes, then read the temperature.

3.3 Record the obtained data.

4. Measure humidity (Globe Thailand):

4.1 Use a wet and dry bulb hygrometer.

Determine the relative humidity by comparing the temperature difference between the dry-bulb and wet-bulb thermometers with the humidity table provided, using the measuring device.

Results and data

Geographic Coordinates

Table 1 Geographic Coordinates

Study Points

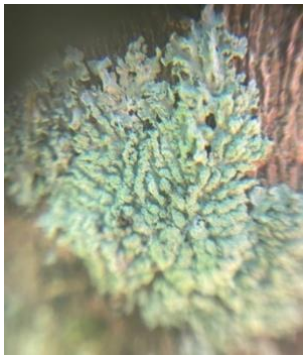
Study of lichen types and air quality in the area of the palm tree at Wichianmatu School Tat School

Study Location	Geographic Coordinates	
Type of LichenStructure of Lichen	Latitude (N)	Longitude (E)
Characteristics of Lichen Examples of Lichen	7.50374	99.62919

2.To study the types of lichens on fox-tail palm trees,

Table 2 shows the characteristics of lichens around fox-tail palm trees.

Lichen Type:	Cladonia	Teloschistes foliaceus	Usnea florida
Huttasakkan Kutnamkang	Soridia	Tallus of foliose lobes closely attached to each other, gray to greenish-gray in color, broad, measuring 0.2-0.6 millimeters wide, firmly adhering to the substrate, with a lower surface densely covered with algae and clearly divided into layers.	
Riewphae	lobe	Thallus with leaf-like lobes closely attached to each other, forming a rosette, gray to whitish-gray in color, lobes are 0.2-0.4 millimeters wide, firmly adhering to the substrate, densely attached.	
vein-like pattern	picnidia	Teloschistes" is off-white, cream, gray with yellowish tones or grayish-green. It has a smooth or somewhat rough surface. The lobes are medullary, densely intertwined, and sometimes interwoven with bark.	

Golden sprinkled with turmeric	Perithecia	Teloschistes chrysophthalmus has a smooth, somewhat shiny surface. Although mostly rough, it may be smooth in some parts. It typically has a powdery yellow to orange pigment dispersed throughout.	
Baby Elephant Pimples	asco carps	Teloschistes chrysophthalmus is white, smooth, glossy, with mostly powdery yellow to orange pigmentation scattered throughout the thallus.	
Foliose	Filicidea	The shape resembles small scale-like lobes emerging from the Teloschistes.	

From the table showing the types of lichens, it is found that there are 6 types of lichens on the oil palm trees at Wichianmatu School. They belong to the highly resistant and resistant groups, in order: Parmotrema clavulatum, Leptogium, Physcia, Usnea florida, Strigula, and Fulgensia.

Table 3: Temperature at the Oil Palm Trees Area, at Wichianmatu School School

	Temperature (°C)			Average
	First time	second time	Third time	
At the area of the oil palm trees	33°C	34°C	32°C	33°C

From the temperature measurement table at Wicheanmatu School, it can be summarized that there were 3 temperature measurements, resulting in 33, 34, and 32°C respectively. The average temperature is approximately 32°C, as shown in the table. This leads to the presence of resilient and highly resistant lichens on the oil palm trees.

Table 4: Humidity Values at Wichianmatu School

time	dry	wet	Difference	Relative humidity
1	32°C	29°C	3°C	79% (HR)
2	29°C	27°C	2°C	85% (HR)
3	30°C	28°C	2°C	85% (HR)

From the table measuring air relative humidity at Wichianmatu School, it can be summarized that in rounds 1, 2, and 3, the relative humidity values were 79%, 85%, and 85%, respectively. The average relative humidity is 92.9% (RH).

Discussion

Part 1 of the study revealed that at Wichianmatu School in Mueang District, Trang Province, there are two groups of lichens:

- Highly tolerant group: including 3 species - Huttasakkan Kutnamkang, Riewphae, and Siw Huachangjiw.
- Moderately tolerant group: including 3 species - Hia Thongroy Khamin, Laisen, and Folioth.

Part 2 of the study examined the relationship between lichen species and temperature. It was found that the lichens at Wichianmatu School belong to the highly tolerant and moderately tolerant groups, indicating the following weather conditions:

Conclusion

Temperature measurements at Wichianmatu School were conducted three times, yielding readings of 33, 34, and 32°C respectively, with an average temperature of 32°C.

Relative humidity measurements were conducted three times as well, yielding readings of 79%, 85%, and 85% respectively, with an average relative humidity of 92.9%.

The study concludes that the lichens can be categorized into two groups: highly tolerant and moderately tolerant, indicating relatively poor air quality at Wichianmatu School, as the lichens were found in an environment with poor air quality.

Declaration of Independence

Environmental research on lichen study on fox-tail palm trees around Wichianmatu School. The researchers would like to express their gratitude to Teacher Kwanjai Kanjanasrimet and Teacher Atcharee Samhui for their knowledge and providing research facilities, as well as for their guidance and advice on environmental research, which greatly contributed to the successful completion of this project. Special thanks also go to friends who assisted in environmental research.

Citation

Lichen is a composite organism consisting of a fungus and a photosynthetic partner (usually algae or cyanobacteria), living in a symbiotic relationship. [Online]. Available at: https://www.seub.or.th [10 Dec. 2023]

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