

Factors affecting the growth of Trentepohlia algae.

In Tadwimanthip waterfall

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## PREFACE

Writing a survey research paper on this subject Have a purpose To study the factors affecting the growth of *Trentepohlia* algae in Tadwimanthip waterfall. This will benefit people who want to study or find information about the algae *Trentepohlia*.

The researchers sincerely hope that This document will be useful to anyone who wants to study. In preparing information for the readiness to present complete and accurate research results in the future

Research team

## ABSTRACT

In conducting an exploratory research on factors affecting the growth of *Trentepohlia* algae in Tadwimanthip Waterfall. With a purpose To study the factors affecting the growth of *Trentepohlia* algae in Tadwimanthip waterfall. With the following research steps 1.Explore Tadwimanthip Waterfall The survey was conducted in the seventh layer. 2. Find the latitude, longitude in the layer to be surveyed and pinned. 3. Travel to explore by collecting data. Are there *Trentepohlia* on the rock surface? If found, take temperature, humidity and light measurements. The sample population was elevation rock, *Trentepohlia* algae in Tadwimanthip waterfall. And found the exposure the air temperature. Air relative humidity Temperature on the rock's surface Rock surface moisture and exposure are affected by the growth of *Trentepohlia* algae, as this algae can thrive in hot, humid, light-exposed areas, while altitude does not affect the growth of *the Trentepohlia* algae.

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# CHAPTER 1

## INTRODUCTION

### Background and importance of the problem

Tadwimanthip Waterfall is located in Phu Langka National Park. It is a large and tall waterfall. There are seven levels, characterized by a humid tropical climate. The water flows all year round and is a major tourist attraction of Bueng Khong Long District Bueng Kan Province. Which has the most obvious physical and biological diversity is the difference between plant and animal species such as Sirindhorn crab, lobster fish, prickly pear, cypress, rhododendron, oleander flower, Penang Land seaweed.

The researcher then studied the diversity of life in Tadwimanthip waterfall. And found some interesting observations. Orange algae were found on the rocky surface in the exposed areas, and orange algae were not found in the exposed areas. Therefore, preliminary data was collected to study. And then research the data. Found that the above orange algae is *Trentepohlia* algae. In which there is an education in Thailand. Diversity and Carotenoids Producing Capability of Subaerial Green Algae Genus *Trentepohlia* from Chiang Dao Wildlife Sanctuary in the Northern of Thailand. This is the research of Mr. Santi Saraphol in 2019 and beyond this there is no further study.

The researchers then studied *Trentepohlia* algae to study factors affecting the habitat and growth of *Trentepohlia* algae in Tadwimanthip Waterfall. This knowledge will be used in the production of high-value carotenoids. In various industries such as food, medicine, cosmetics, etc. (Mr. Santi Saraphol, 2019)

### Research question

What Factors Affected The Growth of *Trentepohlia* Algae in Tadwimanthip Waterfall?

## Research objectives

To study the factors affecting the growth of *Trentepohlia* algae in Tadwimanthip waterfall.

## Research hypothesis

This research has the following hypotheses.

Light, temperature-humidity on the rock's surface and the air Affect the growth of orange algae (*Trentepohlia*) in Tadwimanthip Waterfall.

## Research scope

1. Scope of content Explore Tadwimanthip waterfall, humidity, temperature, light, altitude
2. Population and sample samples of this research are the *Trentepohlia* altitude rocks in Tadwimanthip waterfall.

## Terminology definition

Relative humidity is the ratio between the mass of the actual water vapor in the air and the mass of the current saturated water vapor. By volume And the same temperature Set the value as a percentage.

The temperature on the rock's surface is the temperature measured from the rock's surface. Measured with a thermometer - humidity (Lab Quest 2)

The moisture on the rock's surface is the humidity measured from the rock's surface. Measured with a thermometer - humidity (Lab Quest 2)

Air temperature is the cool heat level of the air. Areas with algae And no algae on the rock surface Measured with a thermometer - humidity (Lab Quest 2)



## Expected benefits

The factors affecting the growth of *Trentepohlia* algae in Tadwimanthip waterfall.

## CHAPTER 2

### RELEVANT DOCUMENTS AND RELATED RESEARCH

Document study And research related to this research The researcher has studied the following details.

#### Related documents

##### **Air humidity**

Air humidity refers to the amount of water vapor present in the air. If there is a large amount of water vapor in the air It shows that the air is very humid and if there is a low amount of water vapor in the air, the air is less humid. But if the air contains the highest amount of water vapor that it can no longer receive any more water, the air is saturated with water vapor. The water vapor in the air comes from.

1. The process of evaporation of water from various water bodies Water from various water bodies such as the sea, ocean, when receiving solar heat energy, it will evaporate into vapors rising up to the upper atmosphere. This process is called evaporation.

2. The process of plant dehydration Plants have a way to reduce heat by evaporating water from the leaves in the form of steam. This process is called dehydration.  
(transpiration)

3. Evaporation of water from different activities in human life. And industrial plants Such as in the daily cooking of cooking.

4. In the operation of industrial machinery.

Water evaporation and temperature

Evaporation of water from various water sources

And the transpiration of the plant will occur more or less depending on the air temperature. If the air has a high temperature, it will be able to absorb more water vapor than low temperature air.

Air humidity indication

The most popular air humidity indication is 2 types.

1. absolute humidity
2. Relative humidity

**Absolute humidity** is defined as the ratio between the mass of water vapor in the air (in grams) and the volume of water vapor in the air. (In cubic meters) at the same temperature

Temperature is a measure of the average kinetic energy of a particle in any matter corresponding to the heat or cold of that matter.

## temperature

The temperature of a single atomic ideal gas is related to the average atomic kinetic energy.

In the past, there were two approaches to the concept of temperature: the thermodynamic approach. And according to microstructures in statistical physics That thermodynamic concept It was developed by Lord Kelvin. In connection with macro measurements Therefore, the initial thermodynamic temperature definition Therefore specifies about the values of various variables that can be measured from observation The approach to statistical physics provides a more in-depth understanding than thermodynamics. It describes the accumulation of large numbers of particles. And interpret the parameters in thermodynamics (macro) as the statistical mean of the microscopic particle parameters. In the study of statistical physics Can interpret the definition of temperature in thermodynamics as It is a measure of the average energy of a particle in each degree of freedom in a thermodynamic system. Where that temperature can be viewed as a statistical property Hence, the system must contain a large number of particles in order to be able to determine a meaningful temperature value that is useful. In solids, this energy is found in atomic oscillations of matter at equilibrium. In the ideal gas This energy is found in the movement of particles and gas molecules.

*Trentepohlia aurea* (L. ) Martius AND *Trentepohlia abietina* (Flotow) Hansgirg



The kingdom: Plantae

Phylum: Chlorophyta - Green algae

Class: Trentepohliophyceae

sequence: Trentepohliales

The genus *Trentepohlia* is not initially viewed as a green algae.

Most independent living species are yellow to bright orange or

Reddish brown due to the orange pigment haematochrome ( $\beta$ -carotene)

Which often hides the green color of chlorophyll This genus is generally terrestrial animals on the rock. Bark walls, and especially tropical, on leaf surfaces There is no doubt that haematochrome It protects chlorophyll Of algae in these sub-habitats *Trentepohlia* is also a symbol of photosynthesis (photobiont) Prevalent in lichens

## Related research

Project name: Diversity and carotid production potential of terrestrial green algae, *Trentepohlia*, in Chiang Dao Wildlife Sanctuary in northern Thailand.

Importance: Green algae genus *Trentepohlia* The algae are classified as Ulvophyceae, Trentepohliales and Trentepohliaceae. This genus is a large group of algae found only on land or on the earth. such as Like perched on a rock Perched on a tree trunk Or various objects that man-made etc. According to the latest report, 73 species are found, mostly distributed in the tropics. And found in a slightly temperate region Which in Thailand there is not much education in this currency And in addition, the main characteristic of this family of algae is the accumulation of large amounts of carotenoids. To protect yourself from the sun and lack of water As a result, the algae has a pronounced yellow or orange color. These carotenoids are a key component of many human uses, including As a health supplement, as an ingredient in accommodation, as a cancer drug, studies and the rare early cleansing of this genus are important in order to know and understand the best production of carotenoids. To be a new production source of carotenoids For that in Thailand There have been no reports of studies on the diversity and use of the genus *Trentepohlia*, so it is interesting to study one of the genus in the natural environment. To support the study of this genus with foreign countries This is a preliminary introduction to the diversity of the *Trentepohlia* genus in Thailand, as well as the knowledge of the potential potential of the *Trentepohlia* genus that can produce large amounts of this carotene. To further utilize in the production of carotenoids which are high value substances in various industries such as Food, drugs, cosmetics, etc. Therefore, it is of interest to the small plant resources of Thailand that may have potential for development in future uses. It is the creation of new knowledge by applying the knowledge in the field of science that may be utilized from the small tropical forest plants. To contribute to the conservation, awareness and cherishing the value of the forest plant resources in Thailand.

## CHAPTER 3

### RESEARCH METHOD

Subject research Factors Affecting Growth of *Trentepohlia* Algae in Tadwimanthip Waterfall.

The researcher has carried out the research according to the following steps.

#### 1. Research plan

This research it is a survey research.

Is intended to

Study of factors affecting the growth of *Trentepohlia* algae in Tadwimanthip waterfall.

#### 2. Population / Sample

Altitude Rock *Trentepohlia* algae in Tadwimanthip waterfall.

#### 3. Research tools

The tools used in this research include.

3.1 Temperature measuring instruments Measure the moisture value.

3.2 Microscope camera Stereo camera.

3.3 Altitude app, Google earth.

#### 4. Conducting research / data collection

1. Explore TadWimanthip Waterfall by conducting a survey in the 7th floor
2. Find the latitude, longitude in the layer to be surveyed and pinned.
3. Travel to explore by collecting data. Are there Trentepohlia algae on the rock surface? If found, take temperature, humidity and light measurements.

1st time not found at position 17 ° 56 '47 "N 104 ° 06'30" E

2nd time found at position 17 ° 56 '47 "N 104 ° 06'30" E

3rd time found at position 17 ° 56 '47 "N 104 ° 06'30" E

#### Data analysis

In this research study for

To study the factors affecting the growth of *Trentepohlia* algae in Tadwimanthip waterfall.

#### Variables

Variable at the beginning of Altitude,exposure,temperature and humidity of the rock's surface and air.

Variable according to Growth of *Trentepohlia* algae

**The researcher has performed various analyzes as follows.**

Altitude, exposure, temperature and humidity of the rock's surface and air. This results in the formation of *Trentepohlia* algae on the rocky surface.



## CHAPTER 4

### RESEARCH RESULTS

From conducting research The researcher recorded the results according to Table 4.1 as follows.

Explore the algae habitats on the rocky surface (the same ones).	Air temperature (Degrees Celsius)	Air relative humidity (Percentage)	Temperature on the rock's surface (Degrees Celsius)	The moisture on the rock surface (Percentage)	Altitude (Meters above sea level)	Exposure
find	35.1 °C	11.43 %	32.4 °C	20.98 %	417	Light-exposed
Not found	28.5 °C	14.85 %	28.4 °C	18.97 %	417	Not light-exposed

Table 4.1 Factors affecting the growth of *Trentepohlia* algae.

#### 4.1 Objective research results

Factors affecting the growth of *Trentepohlia* algae in Tadwimanthip Waterfall are from Table 4.1. Data were collected as follows Air temperature. Air relative humidity Temperature on the rock's surface The humidity at the rock's surface, the altitude, the exposure was found as the air temperature 35.1 °C Air relative humidity 11.43 % Temperature on the rock's surface 32.4 °C Rock surface moisture 20.98 % and light exposed, affecting the growth of *Trentepohlia* algae., while the altitude did not affect the growth of *Trentepohlia* algae, because they are at the same altitude.

## CHAPTER 5

### CONCLUDE AND SUGGESTION

#### Conclude

This research aims to Factors affecting the growth of *Trentepohlia* algae in Tadwimanthip Waterfall were studied from Table 4.1 the exposure was found as the air temperature. Air relative humidity Temperature on the rock's surface Rock surface moisture and exposure are affected by the growth of *Trentepohlia* algae, as this algae can thrive in hot, humid, light-exposed areas, while altitude does not affect the growth of the *Trentepohlia* algae.

#### Discussion

Research results on Factors Affecting Growth of *Trentepohlia* Algae in Tadwimanthip Waterfall

Factors affecting the growth of *Trentepohlia* algae in Tadwimanthip waterfall include air temperature. Air relative humidity Temperature on the rock's surface, humidity of the rock's surface, altitude, exposure.

This algae will protect itself from the dehydration and it will produce Trentepohlia and it makes the humidity on the rock's surface more than the rock's surface that has no Trentepohlia.

The elevation had no effect on the growth of *Trentepohlia* algae because they were at the same altitude, but both rocks found and not found. Which is consistent with the research of Mr. Santi Saraphol,2019,Subject : Diversity and Carotenoids Producing Capability of Subaerial Green Algae Genus *Trentepohlia* from Chiang Dao Wildlife Sanctuary in the Northern of Thailand.

## Suggestion

### 1. Suggestions from this research

In the survey, the relevant documented information should be thoroughly studied in complete detail.

### 2. Suggestions for the next research

1. Do not survey algae in Tadwimanthip Waterfall during the rainy season.
2. Should study the type of rock and the environment in which algae is growing.
3. Should further study the erosion of rocks. And water absorption properties in air and in rocks.

## BIBLIOGRAPHY

Nicole Webster. (2012). University of Alberta. if it look like a lichen. Retrieved 7 February 2021, form [https://bmscblog.wordpress.com/2012/09/21/if-it-looks-like-a-lichen/?fbclid=IwAR2Z\\_WfgAkuBBeqJlqW-DNrPe4k\\_cEOgl5aY8T7qXdBWOM855Aejry-1l8l](https://bmscblog.wordpress.com/2012/09/21/if-it-looks-like-a-lichen/?fbclid=IwAR2Z_WfgAkuBBeqJlqW-DNrPe4k_cEOgl5aY8T7qXdBWOM855Aejry-1l8l)

Mr. Santi Saraphol. (2019). Diversity and Carotenoids Producing Capability of Subaerial Green Algae Genus *Trentepohlia* from Chiang Dao Wildlife Sanctuary in the Northern of Thailand. Retrieved 7 February 2021, form [http://www.thai-explore.net/file\\_upload/submitter/file\\_doc/698649ba7eb5d594bce3b54d357e1dfcc4e0.pdf](http://www.thai-explore.net/file_upload/submitter/file_doc/698649ba7eb5d594bce3b54d357e1dfcc4e0.pdf)

## ANNEX



