



Soil Quality and Air Quality Affecting the Diversity of Insect Species at Thung Khai Botanical Garden, Trang Province

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Abstract

This research project, entitled "Soil Quality and Air Quality Affecting Insect Species Diversity at Thung Khai Botanical Garden, Trang Province," aimed to investigate the effects of soil and air quality on insect species diversity in a tropical rainforest and a modified peat swamp forest within the botanical garden.

The study examined soil properties, including structure, pH, texture, color, compaction, and temperature, as well as air temperature and relative humidity in designated sampling plots. Insect species diversity was systematically surveyed and compared between both forest types.

The results showed that both forests shared a granular soil structure. However, soil in the tropical rainforest was darker and looser than that in the modified peat swamp forest. In addition, relative humidity was higher in the tropical rainforest, while the modified peat swamp forest had higher temperatures, reflecting differences in environmental condition

Keywords : Soil and Air Quality, Insect Diversity

Research Question

1. Does soil quality affect insect diversity in the tropical rainforest and the modified peat swamp forest in Thung Khai Botanical Garden, Thung Khai Subdistrict, Yan Ta Khao District, Trang Province?
2. Does air quality affect insect diversity in the tropical rainforest and the modified peat swamp forest in Thung Khai Botanical Garden, Thung Khai Subdistrict, Yan Ta Khao District, Trang Province?

Introduction

Thung Khai Botanical Garden, Trang Province, is an area with high biodiversity in terms of both plant and animal species for containing various plant species to be important for both the economy and the environment. This area is not only a conservation site for valuable ecological plant species but also plays an important role in supporting the sustainable development of the area and the local community as well. The study of insect diversity within Thung Khai Botanical Garden is therefore important because insects are a group of animals that play a vital role in the ecosystem, including plant pollination, pest control, and nutrient cycling in nature. Surveying and studying soil insect diversity in Thung Khai Botanical Garden will help enhance the understanding of the relationship between insects and plants in the botanical garden's ecosystem to serve as an assessment of the ecological status of the area and promotes biodiversity conservation. At the same time, the obtained data can be used to develop strategies for natural resource management and sustainable biodiversity conservation. Furthermore, The study of soil [insect] diversity in the Thung Khai Botanical Garden area is important in terms of research effectively because the southern region of Thailand is a region with high natural diversity, but data regarding the types and numbers of insects in the area remains limited.

The study of insect diversity at Thung Khai Botanical Garden creates an important biological database to collect the useful environmental research which can be used for natural resource management planning, conservation, and the sustainable utilization of natural resources. Therefore, the study of soil insect diversity at Thung Khai Botanical Garden, Trang Province is important for both science and nature conservation for helping to strengthen the understanding of the role of insects and the conservation of biodiversity at local and national levels.

Research Methods

Designated Study Area

The area of Thung Khai Botanical Garden, Latitude 7.46962 North and Longitude 99.64234 East.

Part 1: To study if soil quality affects insect diversity in the tropical rainforest and modified peat swamp forest in Thung Khai Botanical Garden, Thung Khai Subdistrict, Yan Ta Khao District, Trang Province.

Part 2: To study if air quality affects insect diversity in the tropical rainforest and modified peat swamp forest in Thung Khai Botanical Garden, Thung Khai Subdistrict, Yan Ta Khao District, Trang Province

Carrying Out Investigations

Describes what happened

1. Select two study sites: tropical rainforest and modified peat swamp forest.
2. Prepare and check all soil and air measuring instruments.
3. Set sampling points at each site.
4. Collect soil data (structure, color, texture, compaction, and pH).
5. Measure air temperature and relative humidity at the same points.
6. Observe and record insect species at each site.
7. Repeat measurements three times at each site.
8. Assign team roles and record all data.

Results

Table 1: Physical characteristics of soil in Tropical Rainforest and Modified Peat

Soil Property	Tropical Rainforest Area	Modified Peat Swamp Forest Area
Soil Structure	Spherical Granular	Spherical Granular
Soil Color	Black	Black
Compaction	Loose	Compact/High Clay Content
Soil Texture	Loam	Clay

Table 2: Soil pH in Tropical Rainforest and Modified Peat Swamp Forest

Forest	pH				Average
	1st	2nd	3rd	4th	
Tropical Rainforest	7	7	7	6	6.88
Modified Peat Swamp Forest	4	4	5	5	5.44

Table 3: Air Quality in Tropical Rainforest

Point	Temperature (°C)		Relative Humidity	
	1st	3rd	85	85
1	31	31	91	91
2	31	31	83	83
3	31	31	91	91
Average	31	31	86.3	86.3

Table 4: Air Quality in Modified Peat Swamp Forest

Point	Temperature (°C)		Relative Humidity	
	1st	3rd	75	75
1	30	30	83	83
2	31	31	83	83
3	31	31	91	91
Average	30.6	30.6	83	83

Table 5: Comparison of Air Quality in Tropical Rainforest and Modified Peat Swamp Forest

Study Source	Air Quality (Overall)		
	Temperature (°C)	Relative Humidity	Soil Quality
Tropical Rainforest	31	85	Loose
Modified Peat Swamp Forest	30.6	86	High Clay Content

Table 6: Insect Diversity in Modified Peat Swamp Forest and Tropical Rainforest

No.	Tropical Rainforest Insects	Modified Peat Swamp Forest Insects
1	Ant	Ant
2	Termite	Termite
3	Beetle	Beetle
4	Spider	Spider
5	Centipede	Centipede
6	Scorpion	Scorpion
7	Snake	Snake
8	Cobra	Cobra

Conclusions and Discussion

From the study, it can be concluded that the Tropical Rainforest and the Modified Peat Swamp Forest have the same soil structure, which is spherical (granular). However, the soil in the Tropical Rainforest is darker and looser. Regarding air quality, the relative humidity in the Tropical Rainforest is higher than in the Modified Peat Swamp Forest, but the temperature in the Modified Peat Swamp Forest is higher than in the Tropical Rainforest.

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