Research Title: Study of Physical Factors Affecting Biodiversity in Nong Chum Saeng Public Park, Yantakhao District, Trang Province

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Abstract

This research aims to study the physical factors affecting biodiversity in Nong Chum Saeng Public Park, Yantakhao District, Trang Province. The study examines temperature, pH, dissolved oxygen in water, cloud types, humidity, and air temperature. The study found that physical factors influence biodiversity in Nong Chum Saeng Public Park, Yantakhao District, Trang Province. The average water temperature was 29.20 ℃, the average pH was 6.93, the average dissolved oxygen (DO) was 6.70 mg/l, the average air temperature was 29.67 ℃, and the average humidity was 54.00%. Nimbostratus and cumulonimbus clouds were observed, indicating cloud formation and variable weather. Organisms found included protozoa, algae and cyanobacteria, zooplankton, small aquatic animals, and aquatic insect larvae. The most abundant were small aquatic animals, with an average of 14.33 cells, followed by algae with an average of 4.00 cells. Protozoa were the least abundant, with an average of 1.33 cells. The water quality of Nong Chum Saeng Public Park, influenced by physical factors such as temperature, pH, and dissolved oxygen, as well as air temperature and humidity, affects biodiversity, leading to a balanced ecosystem that supports aquatic life.

Keywords: Water quality of Nong Chum Saeng Public Park, Yantakhao District, Trang Province.

introduction

Water is an essential resource for the survival of all living organisms, particularly freshwater ecosystems that serve as habitats for microorganisms, plankton, and small aquatic animals. Studying water quality in natural water sources, such as ponds, canals, or swamps, is crucial for monitoring potential impacts from human activities, such as waste disposal into water sources, which can affect the ecosystem of these water bodies. Plankton are organisms that drift in the water column with minimal resistance to currents. They are extremely small and cannot be seen with the naked eye. Plankton represent a highly diverse group of organisms in terms of species richness. Nong Chum Saeng Public Park is a well-known recreational area among people in the municipality. It is a natural pond that serves as a freshwater source, maintaining water throughout the year, even during the dry season. Many people use it as a recreational space due to its lush atmosphere and its location within the community. This has led the researchers to study the physical factors affecting biodiversity in Nong Chum Saeng Public Park, Yantakhao District, Trang Province.

Research Objectives

To study the physical factors affecting biodiversity in Nong Chum Saeng Public Park, Yantakhao District, Trang Province.

Research Questions

Do physical factors affect biodiversity?

Research hypothesis

Physical factors affecting biodiversity.

Materials, equipment and how to proceed

1. Water sampler
2. Water sample bottles (5 bottles)
3. Universal indicator paper
4. Glass rod thermometer
5 Dissolved Oxygen (DO) test kit 6. Thermometer
7. Depth measuring device
8. Cloud identification chart
9. Beaker
10. Microscope
11. Dropper
12. Microscope slides
13. Microscope coverslips
14. Digital hygrometer

Inspection methods

The GLOBE Measurement Procedures:

Hydrosphere (Water)

Atmosphere

Study site selection

Establish a straight line distance of approximately 50 meters along the pond's edge. Collect samples at 5 points along this straight line near the water source in Nong Chum Saeng Public Park, Yan Ta Khao District, Trang Province. Latitude 7.3800680, Longitude 99.6775489.

Research methodology

1. Research Preparation Stage

1) Define the research issue and select the topic of study.

2) Conduct research, gather knowledge, and compile theories related to the research.

3) Define the objectives of the study.

4) Determine sampling points within the study area.

2. Implementation Stage

1) Plan the research implementation:

2) Survey the research area:

3) Collect water samples to study plankton species using a light microscope:

4) Study the physical factors that affect plankton diversity in Nong Chum Saeng Public Park:

5) Analyze biological water quality from water quality indicators or phytoplankton in Nong Chum Saeng Public Park by finding the score of each phytoplankton species to find the diversity index:

Water Sampling

1) Determine water sampling points and survey the water source area.

2) Collect water samples along the pond's edge at 5 points, 3 times per point, using a plankton net and water sample bottles. Observe and record the amount of cloud cover.

3) Measure the pH of the water using universal indicator paper. Read and record the results.

4) Measure the water temperature using a thermometer at a depth of 10 centimeters. Wait 5 minutes, read, and record the results.

5) Measure air humidity using a digital hygrometer.

6) Measure the dissolved oxygen (DO) content by testing the collected water with a DO test kit. Read and record the results.

7) Study plankton species using a light microscope. Capture plankton images with a mobile phone.

8) Identify plankton species and record the results.

Analysis

1) Analyze and compare the relationships between the data using statistical methods, specifically the mean () and standard deviation (S.D.).

2) Estimate the percentage of cloud cover (out of 100%).

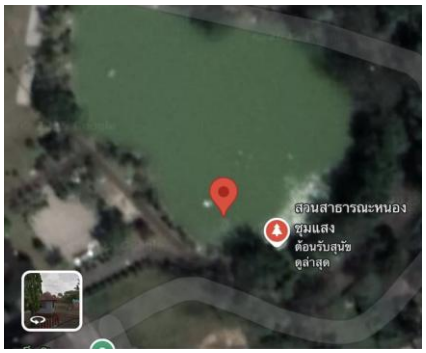
3) Calculate the biodiversity index.

Research Results

Geographic Coordinates: The study area is located in Nong Chum Saeng Public Park, Yan Ta Khao District, Trang Province, as shown in Table 1.

Table 1: Geographic Coordinates

Study Points	Geographic Coordinates	
	Latitude (N)	Longitude (E)
Nong Chum Saeng Public Park	7.3800680	99.6775489



Physical Water Quality Analysis

Table 2: Physical Factors of Water Quality in Nong Chum Saeng, Yan Ta Khao District, Trang Province.

Type	Area 1	Area 2	Area 3	Average () ± S.D.
pH Level	6.40	7.40	7.00	6.93±0.50
Temperature (°C)	27.20	31.00	29.40	29.20±1.91
Depth (cm)	35.80	33.60	35.00	34.80±1.11
Dissolved Oxygen (DO)	6.70	6.50	6.90	6.70±0.20

According to the physical water quality table, the following results were observed at Nong Chum Saeng: the average pH was 6.93 (standard deviation 0.50), indicating a slightly acidic environment. The average temperature was 29.20°C (standard deviation 1.91). The average depth was 34.80 cm (standard deviation 1.11). The average dissolved oxygen (DO) level was 6.70 (standard deviation 0.20).

Analysis of Cloud Cover

Table 3: Cloud Cover Amount

Type	Area 1	Area 2	Area 1	Average () ± S.D.
Nimbostratus	50%	55%	60%	55.00±5.00
Cumulonimbus	55%	60%	65%	60.00±5.00

From the cloud cover table, it is observed that Nimbostratus and Cumulonimbus clouds are present, indicating cloud formation and turbulent weather conditions

Analyze the temperature and humidity of the air.

Table 4: shows the temperature and humidity of the air

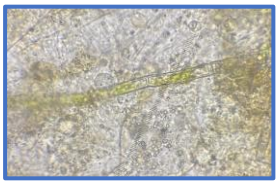
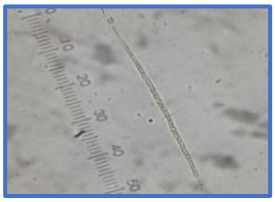
Type	Area 1	Area 2	Area 3	Average () ± S.D.
Temperature (°C)	31	28	30	29.67±1.53
Relative humidity	56	64	42	54.00±11.14

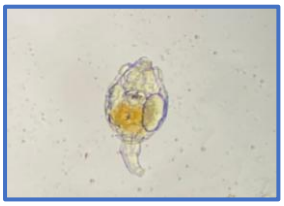
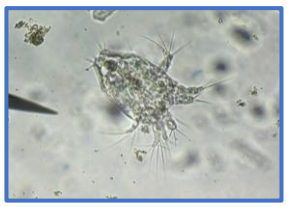
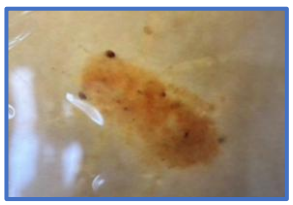
From the air temperature and humidity table, it is found that the weather is quite hot. The average temperature is 29.67°C with a standard deviation of 1.53. The average humidity is 54.00% with a standard deviation of 11.14. There is wind or an unstable environment. The weather is hot and humid.

Biological Water Quality Analysis

A study of the water sources in three areas was conducted, measuring at 10-meter intervals once a week for three weeks. The types and quantities of phytoplankton and zooplankton found are as follows.

Table 5: Organisms Found in the Water Source

Microscopic images of organisms	Protozoa
	Paramecium spp.
Microscopic images of organisms	**algae**
	Spirogyra spp.
	Oscillatoria spp.

Microscopic images of organisms	animal
	Rotifera spp.
	Copepoda spp.
	Tardigrada spp.
	Anisoptera spp.
	Cyclops spp.
	Odonata
	Culicidae spp.

Numerous small organisms inhabit the studied water source, which can be broadly categorized into the following main groups Protozoa, including Paramecium spp. Algae,

including Spirogyra spp. and Oscillatoria spp. Zooplankton, including Rotifera spp., Copepoda spp., Tardigrada spp., Anisoptera spp., Cyclops spp., Odonata, and Culicidae spp.

Table 6: Number of Protozoa Found in the Water Source

Type	Cell count			Average ($\bar{X}$)
	Area 1	Area 2	Area 3	
Paramecium spp.	3	0	1	1.33
Total	3	0	1	1.33

From the table showing the number of protozoa found in the water source, it was found that:There is only one type of protozoa, namely Paramecium spp.The highest number was found in area 1, with 3 cells, followed by area 3 with 1 cell.Paramecium spp. was not found in area 2.The average cell count is 1.33 cells.

Table 7: Number of Algae Found in the Water Source

Type	Cell count			Average ($\bar{X}$)
	Area 1	Area 2	Area 3	
Spirogyra spp.	0	1	1	0.66
Oscillatoria spp.	5	3	2	3.33
Total	5	4	3	4.00

From the table showing the number of algae found in the water source, it was found that there are Spirogyra spp. and Oscillatoria spp.The highest number was found in area 1, with 5 cells, followed by area 2 with 4 cells, and the lowest number was found in area 3 with 3 cells.The average cell count is 4.00 cells.

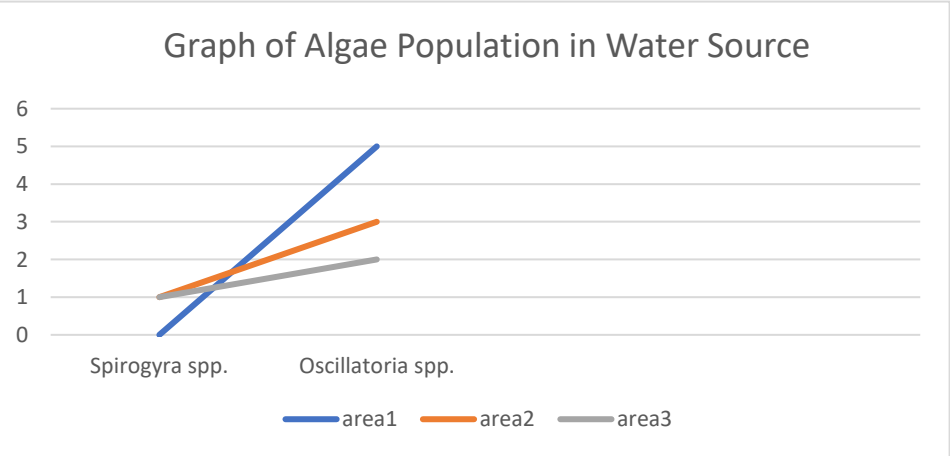
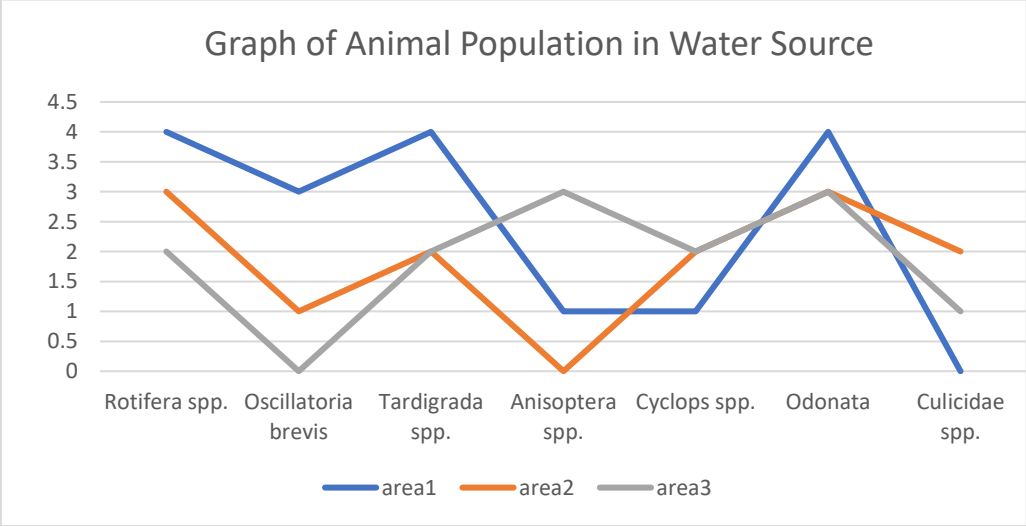


Table 8: Number of Animals Found in the Water Source

Type	Cell count			Average ($\bar{X}$)
	Area 1	Area 2	Area 3	
Rotifera spp.	4	3	2	3.00
Copepoda spp.	3	1	0	1.33
Tardigrada spp.	4	2	2	2.66
Anisoptera spp.	1	0	3	1.33
Cyclops spp.	1	2	2	1.66
Odonata	4	3	3	3.33
Culicidae spp.	0	2	1	1.00
Total	17	13	13	14.33

From the table showing the number of animals found in the water source, it was found that:The highest number was found in area 1, with 17 cells, followed by area 2 and area 3, both with 13 cells.The average cell count is 14.33 cells



Summary and Discussion of Research Findings

A study of water quality in Nong Chum Saeng Public Park, Yantakhao District, Trang Province, revealed that:The average water pH was 6.93.The average water temperature was 29.20 °C.The average dissolved oxygen (DO) was 6.70 mg/l.The sky was overcast.Cumulonimbus clouds were most prevalent, followed by Nimbostratus clouds. The average air temperature was 29.67 °C.The average air humidity was 54.00%.

A study of plankton diversity in the water source at Nong Chum Saeng Public Park, Yantakhao District, Trang Province, found: 2 species of phytoplankton, including Spirogyra

spp. and Oscillatoria spp. 8 species of zooplankton, including Rotifera spp., Copepoda spp., Tardigrada spp., Anisoptera spp., Cyclops spp., Odonata, Culicidae spp., and Paramecium spp.

Discussion of Results

From the study of water quality in Nong Chum Saeng Public Park, Yantakhao District, Trang Province, the average dissolved oxygen was found to be 6.70 mg/l, which is considered normal according to the surface water quality standard type 3. The pH value was 6.93, indicating that the water is slightly acidic. At an average depth of 0.35 meters, the average water temperature was 29.20 °C, which is considered high according to the surface water quality standard type 3. This high temperature affects the diversity of plankton in the Nong Chum Saeng Public Park area

Suggestions

Acknowledgements

This research project, titled "Study of Physical Factors Affecting Biodiversity at Nong Chum Saeng Public Park, Yantakhao District, Trang Province," was made possible by the invaluable guidance and support of many individuals.

We extend our sincere gratitude to Mr. Sakda Phaisomboon, Director of Wichianmatu School, for approving the budget for this educational research. We also deeply appreciate Ms. Sawitri Duangsook, who provided us with knowledge, advice, suggestions, and insightful feedback on the shortcomings of our research with great care.

We would also like to express our gratitude to all the staff members of Wichianmatu School not mentioned here, who contributed to the support of this project.

We hope that this project will be beneficial and serve as a guideline for future research endeavors.

Researchers

Krittin Kongkaew

Sitthikorn Hnoowun

Sakuna Khaophong

References

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Symbol Description

I am a problem solver. By collecting and analyzing water samples, I have learned that physical factors affect the biodiversity of aquatic life. The three researchers are members of the Nong Chum Saeng Public Park community in Yantakhao District, Trang Province. We can all be a part of helping to maintain the cleanliness of the water source, avoiding littering and disposing of waste into the water, and reducing the amount of waste as much as possible

I am a collaborator in the study of physical factors affecting the biodiversity at Nong Chum Saeng Public Park, Yantakhao District, Trang Province. The researchers, Mr. Kritin Kongkaew, Mr. Sitthikorn Nuwun, and Ms. Sakuna Khaopong, worked together as a team in data analysis, collaborating with fellow students from Wichianmatu School, namely Ms. Kanokwan Songsaeng, Ms. Warisa Kongthep, and Ms. Kumutmas Petchakan, who were studying the biodiversity of plankton in the water source at Sa Nae Daeng Pond, Somdet Phra Srinagarindra Park, Na Taluang Subdistrict, Mueang Trang District, Trang Province. The advantage of teamwork was that both groups exchanged knowledge on water sampling methods, identifying plankton species using a light microscope, and data analysis. This made the research feel enjoyable, and we had common topics to discuss with friends who shared the same research interests.

I create an impact. From the research question, “Do physical factors affect biodiversity?” the researchers found that the community park is an area where most people exercise or relax. The water sources have varying levels of fertility. Some water sources in the community parks have different odors, colors, turbidity, temperatures, and pH values. The researchers wondered if these physical factors affect the biodiversity of aquatic life in the community. These community water sources are connected to larger water bodies, rivers, and canals in the district or province, all of which have different physical factors. If people in the community help reduce the amount of waste or reuse materials and equipment, they can be a part of helping to care for the water sources, creating good physical factors for the community or the nation.