The study on water Quality and Phytoplankton Species

in Khlong Chang, Trang Province

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Abtract

The study on water Quality and Phytoplankton Species in Khlong Chang, Trang Province the following objectives: To assess the water quality in Khlong Chang. The results showed that the average pH was 8, the average temperature was 26°C, the water transparency was 60 cm, and the average dissolved oxygen level was 6.27 mg/L. These values indicate that the water body is in good condition, as the pH range of 7.5-8.5 is suitable for the presence of phytoplankton, aligning with the study by Theeraphorn Malikongsing (2022). To identify the phytoplankton species in Khlong Chang. The study found five species: *Cosmarium, Surirella, Aulacoseira, Oscillatoria*, and *Spirulina*. *Cosmarium* was predominantly found in clear water with high nutrient levels, *Oscillatoria* was adaptable to clear water conditions, and *Spirulina* thrived in clear water with high nutrient content and high pH levels, compared to turbid water with suspended particles.

Keywords: Natural Relationships, Phytoplankton, Water Quality, Khlong Chang

Acknowledgements

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greatly contributed to the improvement and completion of this project. The research team extends our deepest gratitude to them.

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Lastly, we hope that this research will be beneficial to relevant organizations, serve as an educational resource, and be useful for those interested in further studies.

Introduction

Water is a vital component of ecosystems worldwide, especially in various water sources such as oceans, lakes, and rivers, which provide habitats for numerous living organisms. One of the most crucial organisms in aquatic food chains is plankton, which consists of microscopic organisms floating in water. Plankton is classified into two main types: Phytoplankton: Plant plankton capable of photosynthesis and oxygen production. Zooplankton: Animal plankton that consumes smaller organisms. Phytoplankton plays a significant role as a primary producer and a key food source for zooplankton. Due to their rapid response to environmental changes, phytoplankton species can serve as indicators of water quality. The diversity of plankton also contributes to the richness of an ecosystem. Khlong Chang is a natural site with a serene atmosphere, suitable for outdoor activities. It is located near the Princess Chulabhorn Science High School in Trang and is part of the Trang River drainage system. Given its ecological importance, this study aims to examine the relationship between plankton diversity and water quality in Khlong Chang.

Research Objectives

1) To assess the water quality in Khlong Chang, Trang Province.
2) To identify the phytoplankton Species present in Khlong Chang, Trang Province.

Scope of Study

This study was conducted in Khlong Chang, Trang Province, from November 23 to December 23, 2024, covering a period of 1 month and 4 weeks**.** Sampling Locations: Three sampling sites were designated. Sample Collection: Phytoplankton samples were collected three times, at

10-day intervals, to study phytoplankton diversity. Environmental Factors Studied: Quality Parameters pH levels Water temperature transparency Dissolved oxygen concentration Measurements were taken at each sampling site.

Research Question

1) Does the water quality in Khlong Chang, Trang Province, affect the diversity of phytoplankton species?

Research Hypothesis

- Independent Variable: Water quality
- Dependent Variable: Phytoplankton species
- Controlled Variables: Sampling locations, sample volume

Materials and Equipment

1.Plankton net (10 micrometers)	2.Amber sample bottles
3.Sample collection bottles	4.pH meter
5.Dissolved oxygen test kit (DO)	6.Secchi disk
7.Thermometer	8.Hydrometer
9.Beaker	10.Measuring tape
11.Microscope	12.Microscope slides
13.Droppers	

GLOBE Measurement Protocols

Land Cover Observation Method, Water Quality Measurement Method,

Atmospheric Observation Method

Study Site Determination

The study was conducted in Khlong Chang, Trang Province, at specific latitude and longitude coordinates. Field visits were carried out to randomly collect samples from designated locations.

1. Research Preparation Phase

1. Set the research topic: Choose the topic or issue you wish to study.
2. Review and gather relevant knowledge and theories: Collect information and theories related to your research topic.
3. Define the objectives of the study: Clearly specify the objectives and goals of the research.
4. Determine the sampling locations for data collection: Decide where to collect the samples within the study area

2. Research Implementation Steps

1. Plan the research: Develop a research plan outlining the methods, timeline, and resources required.
2. Survey the study area: Conduct a survey of the area where the research will take place.
3. Collect water samples for studying plankton: Collect water samples from the Chang Canal, Na Toa Ming Subdistrict, Mueang District, Trang Province, for plankton study.
4. Survey the clouds and measure the average cloud cover: Measure the cloud cover in the area where water samples are collected and classify the clouds using a cloud classification manual.
5. Collect water samples to study water quality and plankton types: Test the water quality based on GLOBE methodology by measuring the water's pH, temperature, transparency, and dissolved oxygen levels.

5.1 Measure the water's pH: Use a pH meter to measure and record the pH value of the water. Take three readings.

5.2 Measure the water's temperature: Use a thermometer to measure the temperature at each point and record the data. Take three readings.

5.3 Measure water transparency: Use a Secchi disk to measure and record the transparency of the water. Take three readings.

5.4 Measure the dissolved oxygen levels: Use an iodometer to measure and record the dissolved oxygen in the water. Take three readings.

Water Sample Collection

Measure the water's pH, temperature, transparency, and dissolved oxygen levels.

1. Survey and collect water samples: In the Chang Canal, Trang Province from November 23 to December 23, 2024, over a period of 1 month and 4 weeks.
2. Study plankton types: In the Chang Canal, Na Toa Ming Subdistrict, Mueang District, Trang Province, to classify plankton species using a plankton identification manual.

Analysis

1. Analyze the relationship between plankton and water quality: Use the collected data to analyze the natural relationship between plankton and water quality by measuring the water’s pH, temperature, transparency, dissolved oxygen levels, cloud cover, and overall water quality.
2. Estimate the percentage of cloud cover: Estimate the cloud cover in the sky as a percentage (out of 100%).
3. Present the data for analysis: Display the data obtained during the analysis.
4. Summarize the experimental results: Conclude the findings from the experiment and highlight key observations.

Geographic coordinates

Table1 : Geographic coordinates

Study point

The geographic coordinates for the study of the diversity of plankton and water quality in the Chang Canal,Trang Province.

Study Area	Geographic Coordinates	
	Latitude (N)	Longitude (E)
Chang Canal, Na Toa Ming Subdistrict, Mueang District, Trang Province	7.55330° N	99.55591° E

According to **Table 1**, the geographic coordinates for the study on the diversity of plankton and water quality in the Chang Canal, Na Toa Ming Subdistrict, Mueang District, Trang Province were collected from three locations. Each location has the latitude (N) 7.55330° N and longitude (E) 99.55591° E.

Table 2: Water Quality

Parameter	Location 1	Location 2	Location 3	Average
Water pH	6	9	10	8
Water Temperature (℃)	24	26	28	26
Water Transparency (cm)	65	50	55	60
Dissolved Oxygen (mg/l)	6.26	6.30	6.25	6.27

From **Table 2**, the water quality study at all three sample points shows that the average water pH is 8, indicating that the water is slightly alkaline to neutral. The average water temperature is 26℃, which is within the normal temperature range for aquatic environments. The average water transparency is 60 cm, indicating a moderate level of water clarity. The dissolved oxygen level is 6.27 mg/l on average, which is at an appropriate level for supporting aquatic life.

Table 3: Cloud Cover

from **Table 3**, the cloud cover data from the surveyed area shows that the three types of

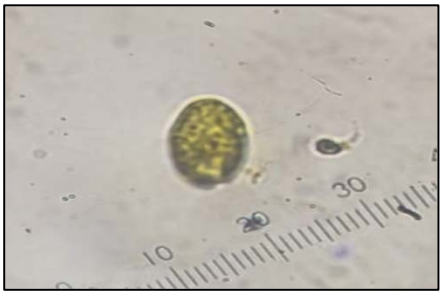
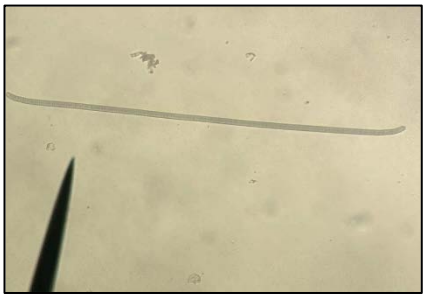
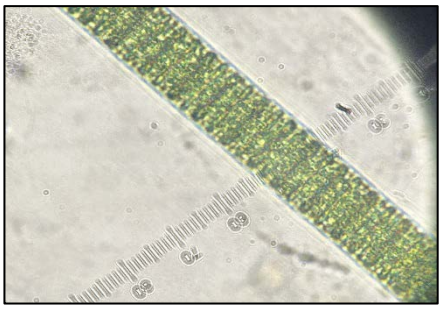
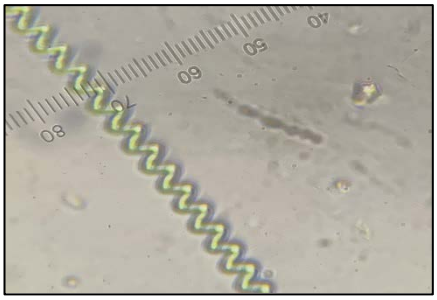
Could Type	Location 1	Location 2	Location 3	Average
Cirrostratus	35	40	25	33.33
Cumulus	45	35	30	36.66
Stratocumlus	10	15	20	15

Clouds **Cirrostratus**, **Cumulus**, and **Stratocumulus**—have different average values. The **Cumulus** clouds have the highest average percentage, while **Cirrostratus** clouds have a moderate average, and **Stratocumulus** clouds have the lowest average percentage. This difference in cloud types may indicate the weather conditions in the area. **Cumulus clouds**, which are puffy and form in warm temperatures with sufficient humidity, tend to occur more frequently and therefore have a higher average percentage. **Stratocumulus clouds**, which are flat and form in stable weather conditions, may not develop into rain clouds, leading to a lower average percentage.

Table 4: The Relationship Between Plankton and Water Quality

Chang Canal, Na Toa Ming Subdistrict, Mueang District, Trang Province

Order	Image	Type
1.		*Cosmarium sp.*

Order	Image	Type
2.		*Surirella sp.*
3.		*Aulacoseira sp.*
4.		*Oscillatoria sp.*
5.		*Spirulina sp.*

From **Table 4**, it was found that five types of plankton were identified: *Cosmarium**,*** *Surirella**,*** *Aulacoseira, Oscillatoria*, and *Spirulina**.*** *This* shows that the water quality in the study area contains a mixture of plankton species, which may affect the balance of the ecosystem in the long term. These plankton species were found in the Chang Canal, Na Toa Ming Subdistrict, Mueang District, Trang Province.

Discussion of the Research

The study of the natural relationship between phytoplankton and water quality in the Chang Canal, Na Toa Ming Subdistrict, Mueang District, Trang Province, found that certain factors affect the natural relationship between plankton and water quality. The study showed that water quality has an impact on this relationship, including parameters such as water pH, water temperature, transparency, dissolved oxygen levels, cloud cover, and overall water quality. The five identified plankton species were observed in the study area. The findings indicate the key factors that influence the relationship between plankton and water quality.

Research Conclusion

From the study of the physical characteristics of water quality and its relationship with the natural environment of phytoplankton in the Khlong Chang, Trang Province, it was found that in **Location 3**, the water pH was the highest, reaching 10, indicating that the water in this area was more alkaline than in the other locations. In **Location 1**, the water pH was the lowest at 6, meaning the water in this area was more acidic than in the other locations.

Regarding water temperature, **Location 3** had the highest temperature, likely due to more direct sunlight exposure compared to the other locations. **Location 1** had the lowest temperature, possibly because it was shaded by trees, resulting in less direct sunlight.

In terms of water transparency, **Location 1** had the highest transparency, indicating that the water had fewer foreign substances mixed in. **Location 2** had the lowest transparency, likely due to more foreign substances present in the water.

As for dissolved oxygen, **Location 2** showed a higher oxygen level, possibly due to better water circulation, allowing more oxygen to dissolve in the water. **Location 1** had a lower dissolved oxygen level, possibly due to poorer water circulation.

The cloud type **Cumulus** had the highest average percentage of 36.66%, while **Stratocumulus** had the lowest average of 15%.

From the study of the natural relationship between phytoplankton and water quality in Khlong chang, Trang Province, five species of plankton were identified: *Cosmarium**,** Surirella**,** Aulacoseira**,** Oscillatoria,* and *Spirulina**.*** These species were found in the Chang Canal area, which is fertile and suitable for the growth of aquatic life, especially phytoplankton.

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