

**Effects of salinity, temperature, acidity, alkalinity and DO
in the growth of crabs in Trang.**

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Title : Effects of salinity,temperature,acidity,alkalinity and DO in the growth of crabs in Trang.

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ABSTRACT

The results of the study of the effects of salinity, temperature, acidity, alkalinity and DO in the growth of crabs in Trang. It was found that the average salinity of the water in the Trang Urban forest was 6 ppt, Pak Meng beach was 32 ppt, the Kantang hot spring forest park areas was 6 ppt, the Thungmalam mangrove forest was 2 ppt, and the Nong Samet mangrove forest was 27 ppt. Pak Meng beach and Nong Samet mangrove forest are suitable for the growth of sea crabs. The study of water temperature. It was found that the average water temperature in Trang urban forest was 27.6 °C, Pak Meng beach was 28.6 °C, the Kantang hot spring forest park areas was 29.4 °C, the Thungmalam mangrove forest was 30.0 °C, and the Nong Samet mangrove forest was 30.9 °C. Thungmalam mangrove forest and Nong Samet mangrove forests have suitable water temperature for sea crab growth. The study on the acid-alkalinity. It was found that the average pH of water in Trang urban forest was 7.13, 7.82 in Pak Meng Beach, 7.78 in the Kantang hot spring forest, 8.46 in the Thungmalam mangrove forest and 8.42 in the Nong Samet mangrove forest. The Pak Meng beach, Kantang hot spring forest, Thungmalam mangrove forest ,and Nong Samet mangrove forest have suitable pH value for growth of sea crabs. The study on the dissolved oxygen. It was found that the average dissolved oxygen in Trang urban forests was 2.5 mg/L. The Pak Meng beach was 5.0 mg/L, Kantang hot spring forest was 1.0 mg/L, Thungmalam mangrove forest was 4.5 mg/L and Nong Samet mangrove forest was 2.0 mg/L. The Pak Meng beach and Thungmalam mangrove forest have suitable dissolved oxygen value for the growth of sea crabs.

Keywords : *salinity, temperature, acidity and alkalinity, dissolved oxygen , sea crabs*

Introduction & Review of Literature

The sea crabs are one of Thailand's valuable coastal aquatic animals because crabs contain many nutrients and vitamins that are beneficial to the body [4] and have a high price. Causing more fishermen catch crabs from nature for sale involved deteriorating natural habitats [1] 2018 Department of Fisheries statistical data showed that in 2016-2018, crab-type saltwater animals had been caught of 36,100 tons with a value of 5,948.8 million baht. [5] Amount of natural crab catching within three years, affected to the value of crab tends to increase Market demand is rising. [9]

Salinity is one of the significant factors in the growth of aquatic animals, salinity affects the water and ion balance regulation in the physiquess. Therefore, the salinity level in the inappropriate range will affect to living conditions. [11]

Temperature is a significant factor when eating food. Digestion and other functions in the aquatic animal body have a strong relationship with light. If the water temperature is suitable, it helps aquatic animals eat more food and grow well. Low temperatures will lower the performance of aquatic systems [3,6,12]

pH is the concentration of hydrogen ions in the water. Many factors affect the change in pH, such as the property of Kin. The alkalinity, production, and use of carbon dioxide in water depend mainly on the amount of phytoplankton [3] The pH of the water is low in the early morning. Since the carbondioxide content in the water is high from the respiration of aquatic organisms and the degradation of organic matter within the water, the pH will increase when the plankton starts photosynthesis. Since the amount of carbon dioxide in the water is used by plankton in the photosynthesis process if the pH is less than 4, it is acidic, the crabs will die, and if it is more than 11, it is alkaline, the crabs will die. [2]

The amount of dissolved oxygen in water affects food intake crab growth and health. The amount of dissolved oxygen in the water is lowest in the early morning hours due to being used for respiration aquatic organisms and the process of decomposing waste by bacteria but there will be a higher amount when plankton starts photosynthesis is highest in the afternoon. The solubility of oxygen is inversely proportional to temperature and salinity. In water with increasing salinity and temperature, the solubility of oxygen decreases [7] .Sea crabs live in water with enough oxygen will be strong and grow well.

In the opposite if sea crabs live in an environment with low oxygen, sea crabs will be weak and easily diseased. The appropriate oxygen content for crab culture must be more than 4 milligrams per liter. This makes sea crabs grow well and organic matter decomposes quickly In addition, the oxygen content affects digestion. Therefore, if the oxygen content is low, the crabs can eat less food and the amount of dissolved oxygen can be an indicator of water quality in water sources as well. [10]

Research objectives

To study the effects of salinity, temperature, acidity and alkalinity. And the amount dissolved oxygen in the water on the growth of sea crabs in different places.

Research questions

Salinity 25-32 ppt, temperature 28-32 °C, pH 7.5-8.5 and dissolved oxygen content 4.2-5.7 mg/l. affect the growth of crabs?

GLOBE protocols

Hydrosphere

Study point determination

In Trang Urban forest, Pak Meng beach, Kantang hot spring forest park, Thungmalam mangrove forest and Nong Samet mangrove forest, Trang Province, Thailand

Research Methods

Materials and Methods

Materials

1. pH Meter
2. Salinity Meter
3. Thermometer
4. DO Meter
5. Water samples from Trang Urban forest
6. Water 100 mL from Pak Meng beach
7. Water 100 mL from Kantang hot spring forest park
8. Water 100 mL from Thungmalam mangrove forest
9. Water 100 mL from Nong Samet mangrove forest

Methods

The experimental details were divided into 3 steps : water sample preparation, water measurement, comparison and analysis.

Part 1 Preparation of water samples

Water samples were collected from 5 sources in volume of 100 mL:

- 1) Trang Urban forest, Trang Province, Thailand
- 2) Pak Meng beach, Trang Province, Thailand
- 3) Kantang hot spring forest park, Trang Province, Thailand
- 4) Thungmalam mangrove forest, Trang Province, Thailand
- 5) Nong Samet mangrove forest, Trang Province, Thailand

Part 2 Water Measurement

Take 100 mL water samples from 5 sources :

- 1) Trang Urban forest, Trang Province, Thailand
- 2) Pak Meng beach, Trang Province, Thailand
- 3) Kantang hot spring forest park, Trang, Thailand
- 4) Thungmalam mangrove forest, Trang, Thailand
- 5) Nong Samet mangrove forest, Trang, Thailand

Find the value by using a pH Meter to measure the acid-base value, use a Salinity Meter to measure the salinity of the water, use a Water thermometer to measure the temperature in the water and use the DO Meter to measure the amount of oxygen in the water.

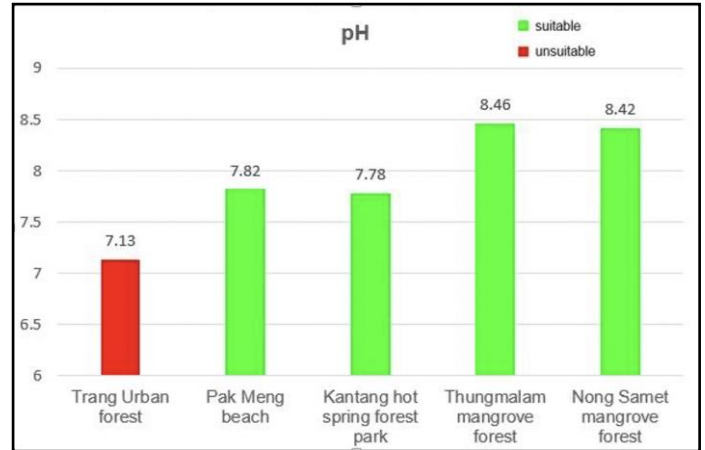
Part 3 Comparison and analysis.

Compare and analyze salinity, temperature, acidity and alkalinity. And the amount of dissolved oxygen in the water obtained from different locations.

Results

Part 1 pH in water from all 5 sources

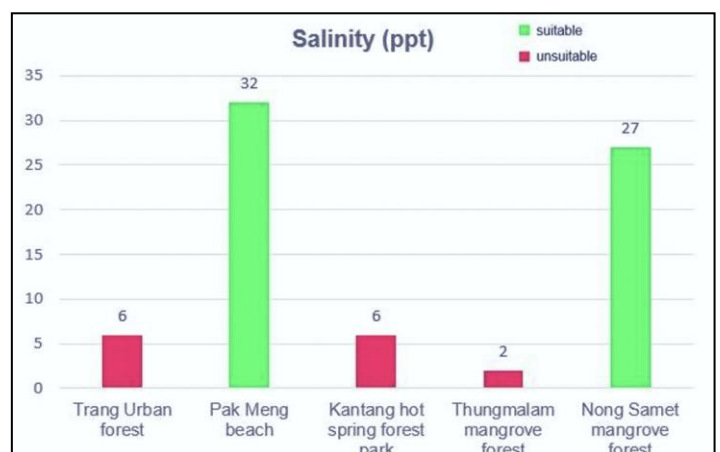
Water source	Appropriate values for the growth of sea crabs	Measured value
Trang Urban forest	7.5-8.5	7.13
Pak Meng beach	7.5-8.5	7.82
Kantang hot spring forest park	7.5-8.5	7.78
Thungmalam mangrove forest	7.5-8.5	8.46
Nong Samet mangrove forest	7.5-8.5	8.42



From part 1, the table and graph show suitable pH value for the growth of sea crabs which is 7.5-8.5. There are 4 suitable places for the growth of sea crabs: Pak Meng beach, Kantang Hot Spring forest park, Thungmalam Mangrove Forest, and Nong Samet Mangrove Forest.

Part 2 water salinity from all 5 sources

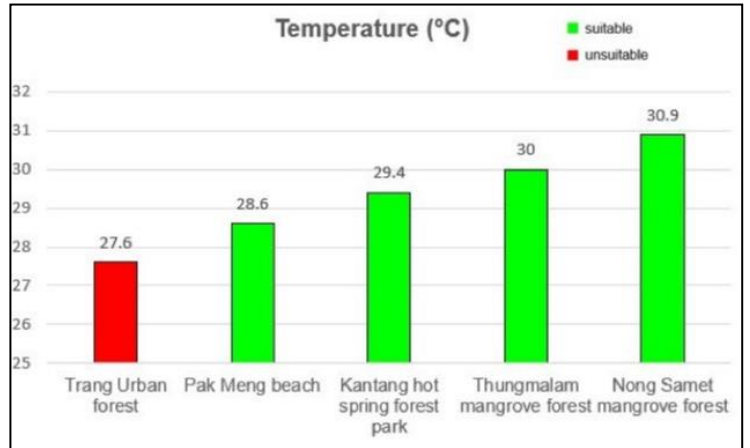
Water source	Appropriate values for the growth of sea crabs	Measured value
Trang Urban forest	25-32 ppt	6 ppt
Pak Meng beach	25-32 ppt	32 ppt
Kantang hot spring forest park	25-32 ppt	6 ppt
Thungmalam mangrove forest	25-32 ppt	2 ppt
Nong Samet mangrove forest	25-32 ppt	27 ppt



From part 2, the table and graph show suitable water salinity value for the growth of sea crabs which is 25-32 ppt. there are 2 suitable places for the growth of sea crabs, Pak Meng Beach and Nong Samet mangrove Forest.

Part 3 water temperature from all 5 sources

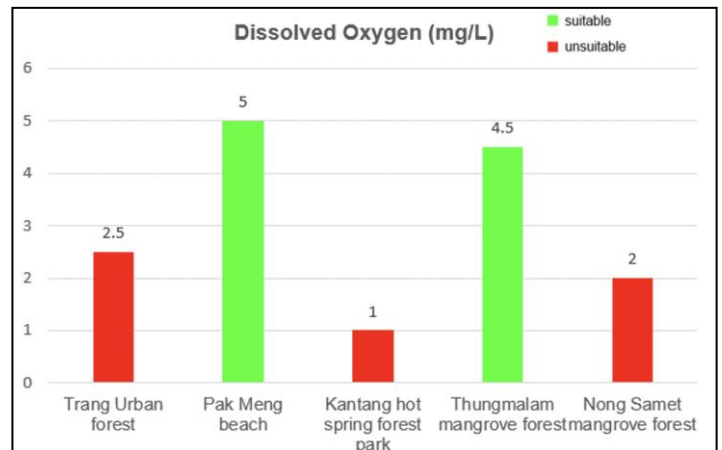
Water source	Appropriate values for the growth of sea crabs	Measured value
Trang Urban forest	28 - 32°C	27.6°C
Pak Meng beach	28 - 32°C	28.6°C
Katang hot spring forest park	28 - 32°C	29.4°C
Thungmalam mangrove forest	28 - 32°C	30.0°C
Nong Samet mangrove forest	28 - 32°C	30.9°C



From part 3, the table and graph show suitable temperature for the growth of sea crabs which is 28- 32 degrees celcius. There are 4 suitable places for the growth of sea crabs, Pak Meng Beach, Katang Hot Spring forest park, Thungmalam Mangrove Forest, and Nong Samet Mangrove Forest.

Part 4 dissolved oxygen in water from all 5 sources

Water source	Appropriate values for the growth of sea crabs	Measured value
Trang Urban forest	4.2 - 5.7 mg/L	2.5 mg/L
Pak Meng beach	4.2 - 5.7 mg/L	5.0 mg/L
Kantang hot spring forest park	4.2 - 5.7 mg/L	1.0 mg/L
Thungmalam mangrove forest	4.2 - 5.7 mg/L	4.5 mg/L
Nong Samet mangrove forest	4.2 - 5.7 mg/L	2.0 mg/L



From part 4, the table and graph show suitable dissolved oxygen value for the growth of sea crabs which is 4.2-5.7 mg/L. There are 2 suitable places for the growth of sea crabs, Pak Meng Beach and Thungmalam mangrove Forest.

Discussion

According to the salinity, temperature, acidity, and alkalinity and the amount of dissolved oxygen affect the growth of sea crabs for 5 sources. It was found that pH, salinity, and temperature in Trang urban forest areas were not suitable for sea crabs growth. The measurement results in Pak Meng areas were pH = 7.82, salinity = 32 ppt, water temperature 28.6 °C and the oxygen value in the water = 5.45 mg/L which suit well for the growth of sea crabs. In the Kantang hot spring areas, the results showed that the salinity in the water and the oxygen value in the water were not suitable for the growth of sea crabs. the measurement results in the Thungmalam mangrove showed that the pH and salinity in the water were not suitable for the growth of sea crabs. And the last areas in the Nong Samet mangrove forest. The measurements showed that the oxygen in the water was not suitable for the growth of sea crabs.

Conclusion

From the study, it was found that the Pak Meng Beach areas suited well for sea crabs growth with pH = 7.82, salinity = 32 ppt, water temperature 28.6 °C, and oxygen content in the water. = 5.0 mg/L, all 4 values are suitable for the growth of sea crabs when compared to the graphs, it showed that the sea crabs grew well In Pak Meng Beach areas.

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Thank you to all colleagues for facilitating and assisting in this research.

Finally, the researcher hopes that this research will be useful for the relevant agencies. and those interested in further study.

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OPTIONAL BADGES

I AM A STUDENT RESEARCHER

In this research, the researchers studied and discover water that is suitable for the growth of sea crabs. The research was done on the level of salinity of water, water temperature, pH value and acidity - base, and the amount of oxygen in the water that is suitable for the growth of sea crabs and bring research data for further development in the sea crab farm.

I AM A COLLABORATOR

In this research, it was conducted by 3 students; Miss Natnicha Montree, Miss Arpatsara Nuwong and Miss Supatsara Soontornnon. By conducting this research, Miss Natnicha Montree is the group leader and respond to prepare the research book. Miss Arpatsara Nuwong and Miss Supatsara Soontornnon made the presentation and edited the video clips, and all of them went to survey the area and always coordinated in their team. The advantages of working together can help us examine research data with thoroughness and be able to collect more detail because the data of three authors have to be carefully screened.

I AM A DATA SCIENTIST

From the water research, the researcher studied the level of salinity of the water, water temperature, pH value and acidity - base suitable, the amount of oxygen in the water that is suitable for the growth of sea crabs. From this study, it was found that the Pak Meng Beach area was the most suitable. The salinity level in the water is suitable for the growth of sea crabs was at 32 ppt, the suitable temperature was at 28.6. degrees Celsius, the suitable pH value was at 7.82 and the amount of oxygen in the water that suitable for the growth of sea crabs was at 5.45 mg/L. The information from this research could be applied for further development to raise sea crabs in a farm style.