

Factors Influencing Fiddler Crab Abundance at Hoi Pa Learning Center, Trang.



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Abstract

This study aimed to investigate the physical factors influencing the abundance of fiddler crabs (*Uca vocans*) at the Hoi Pa Learning and Conservation Center, Thung Ta Se Subdistrict, Yan Ta Khao District, Trang Province. Environmental parameters, including temperature, pH, salinity, and fiddler crab population counts, were measured using field survey methods. The results revealed a significant correlation between fiddler crab abundance and environmental factors, particularly salinity and pH, which directly affect the distribution and population size of fiddler crabs in the study area. The findings of this study can be utilized to develop appropriate conservation and management strategies for natural resources at the Hoi Pa Learning and Conservation Center

Research objective

To investigate the physical factors influencing the abundance of fiddler crabs (*Uca vocans*).
 Research Question: Do physical factors affect the abundance of fiddler crabs?

Research question

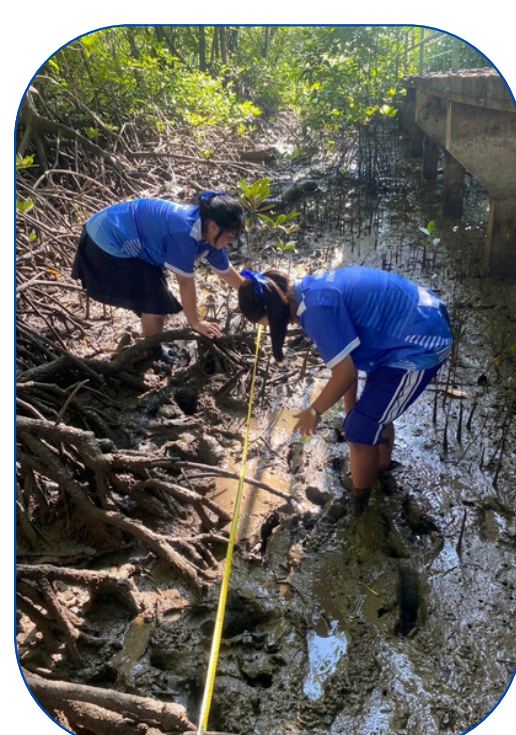
Do physical factors affect the abundance of fiddler crabs?

Research hypotheses

Environmental physical factors, such as temperature, humidity, pH, and salinity, influence the habitat and behavior of fiddler crabs in the study area

Intriduction

Mangrove forests are vital ecosystems characterized by a diverse community of plant and animal species that thrive in the unique environment of muddy, brackish, and tidally inundated areas. These ecosystems are complex, comprising both biotic and abiotic components, including environmental factors such as temperature, light, rainfall, and humidity. Fiddler crabs, also known as ghost crabs (genus *Uca*, family Ocypodidae), are small crustaceans that inhabit these mangrove ecosystems. They are easily recognizable by their trapezoidal carapace, long eyestalks, and vibrant coloration. Male fiddler crabs possess a distinctive enlarged claw, which they use for territorial displays, courtship rituals, and combat, while females have two equally sized smaller claws. Mangrove forests serve as crucial habitats, providing food resources and shelter for a wide range of flora and fauna. Recognizing the ecological significance of these environments, our research team aimed to investigate the factors influencing the abundance of fiddler crabs at the Hoi Pa Learning and Conservation Center in Thung Ta Se Subdistrict, Yan Ta Khao District, Trang Province.



Research Methods

1. Research Preparation Phase:
 1. Identification of Research Topic: Selection of the research topic and formulation of research questions.
 2. Literature Review: Extensive review and compilation of relevant knowledge and theories related to the research.
 3. Definition of Research Objectives: Clear articulation of the study's aims and objectives.
 4. Sampling Site Selection: Determination of specific sampling points within the designated study area.
2. Implementation Phase:
 1. Research Planning: Development of a detailed research implementation plan.
 2. Site Survey: Initial field survey of the research area to assess site conditions.
 3. Soil Quality Measurement (Pedosphere) using GLOBE Protocols: Measurement of relevant environmental parameters, including geographic coordinates, temperature, pH, soil moisture, and soil salinity, as follows:
 - 3.1) Soil Sampling Point Selection: Identification of 10 sampling points where fiddler crabs were observed.
 - 3.2) pH Measurement: Measurement of soil pH using a Soil pH Meter (SPM05), recording the results.
 - 3.3) Salinity Measurement: Measurement of soil salinity using a Salinity Meter (accuracy ±3%), recording the results.
 3. Atmospheric Data Collection (Atmosphere):
 - 3.1) Measurement of air temperature and relative humidity.
 - 3.2) Collect Quadrat fiddler crab population data at all 10 points 3 times, count the number of crabs in each box and observe the number of fiddler crabs in the mangrove forest, read the values and record the results.

Summary and Discussion

The research findings indicate that the average temperature was 27.94°C, which is considered a suitable temperature for the natural habitat of crabs. Crabs are capable of adapting to environments where temperatures are neither excessively high nor low. The average humidity was 79.74%, reflecting sufficient soil moisture for the construction of crab habitats and food sources. The average pH value of 7.25 falls within a suitable range for crab survival and may influence the growth of plants and animals in the area, including crabs, which must adapt to these environmental conditions. The average salinity of 9.58 ppt is within an appropriate range and does not impede the survival of crabs in mangrove forest habitats. The average crab population was 6.3 individuals, suggesting a possible correlation between pH and salinity levels and crab populations in the study area. However, the natural distribution of crabs may also depend on other factors such as water sources, temperature, pH, humidity, and optimal salinity

Research Findings

Study Area	Geographic Coordinates	
	Latitude (N)	Longitude (E)
The Hoi Pa Learning and Conservation Center, Thung Krabue Subdistrict, Yan Ta Khao District, Trang Province, Thailand	7.364722	99.586944

The study was performed at the Hoi Pa Learning and Conservation Center, a mangrove ecosystem in Thung Krabue Subdistrict, Yan Ta Khao District, Trang Province, Thailand, as indicated by the geographic coordinates (Latitude (N) 7.364722 and Longitude (E) 99.586944) presented in Table 1

Sampling Points	Temperature			Mean (x) ± S.D.
	1st Measurement	2nd Measurement	3rd Measurement	
1	28	27.5	27.2	27.57±0.29
2	27.3	27.3	27.5	27.37±0.09
3	28.2	28	27.6	27.93±0.22
4	27.1	28.2	27.1	27.47±0.49
5	28.1	27.8	28	27.97±0.11
6	28.5	28.3	27.9	28.33±0.31
7	28.8	27.8	28.1	28.23±0.38
8	28.4	28.1	28	28.17±0.16
9	28.3	28	28.3	28.20±0.13
10	28.2	27.9	28.5	28.20±0.2

Table 2 presents the air temperature measurements taken at each sampling point. Temperature was measured three times per sampling point, and the mean temperature was calculated for each point. Ten sampling points were measured, with three measurements per point. The lowest mean temperature was recorded at point 2 (27.37 ± 0.09 °C), while the highest mean temperature was recorded at point 7 (28.23 ± 0.38 °C).

Sampling Points	Humidity			Mean
	1st Measurement	2nd Measurement	3rd Measurement	
1	79	80	82	80.33
2	80	80	81	80.33
3	80	81	81	80.67
4	80	81	83	81.33
5	81	82	80	81.00
6	80	80	78	79.33
7	82	79	79	80
8	78	77	79	76.67
9	78	78	77	77.67
10	78	78	78	77.33

Table 3 presents the atmospheric humidity measurements taken at each sampling point. Humidity was measured three times per sampling point, and the mean humidity was calculated for each point. Ten sampling points were measured, with three measurements per point. The lowest mean humidity was recorded at point 8 (76.67%), while the highest mean humidity was recorded at point 3 (81.33%)

Sampling Points	pH			Mean
	1st Measurement	2nd Measurement	3rd Measurement	
1	7.5	7.3	7.5	7.43
2	7.4	7.2	7.5	7.37
3	7.4	7.2	7.4	7.37
4	7.3	7.1	7.4	7.27
5	7.2	7.2	7.3	7.23
6	7.1	7.5	7.3	7.30
7	7	7.2	7.1	7.10
8	7.2	7.1	7.2	7.17
9	7.1	7.1	7.3	7.17
10	7.1	7.2	7.2	7.17

Table 4 presents the pH values of samples collected from each point. Each point was measured three times, and the average pH value was calculated for each sampling point. The pH was measured at 10 points, with three measurements per point. The lowest average pH was recorded at point 7 (7.10), and the highest average pH was recorded at points 1 (7.43)

Sampling Points	Salinity Values (ppt)			Mean (x) ± S.D.
	1st Measurement	2nd Measurement	3rd Measurement	
1	9.9	10.2	10.1	10.07±3
2	10.2	10.1	10.1	10.13±3
3	9.8	10.3	10.2	10.1±3
4	10.1	9.1	10.3	9.83±3
5	10	10.1	10.2	10.10±3
6	10.1	10.2	10.1	10.13±3
7	8.9	9.1	9.8	9.27±3
8	7.6	9.3	8.8	8.57±3
9	9	8	9.7	8.90±3
10	8.9	7.6	9.7	8.73±3

Table 5 presents the salinity values (ppt) measured at each sampling point. Three measurements were taken at each point, and the mean salinity was calculated. Ten sampling points were measured, with three measurements per point. The lowest mean salinity was recorded at point 8 (8.57 ± 3 ppt), while the highest mean salinity was recorded at points 2 and 6 (10.13 ± 3 ppt)

Sampling Points	Number of Fiddler Crabs			Mean
	1st Measurement	2nd Measurement	3rd Measurement	
1	3	3	3	3
2	2	2	2	2
3	3	3	4	3.33
4	1	10	3	4.67
5	4	4	3	3.67
6	5	8	9	7.33
7	8	7	8	7.67
8	14	1	13	9.33
9	3	13	15	10.33
10	12	14	10	12

Table 6 presents the number of fiddler crabs found at each sampling point. Three surveys were conducted, and the mean number of crabs was calculated. The results indicate variations in crab abundance across different areas, reflecting the distribution of fiddler crabs within the study site. Ten sampling points were surveyed, with three counts per point. The lowest mean number of crabs was recorded at point 2 (2 individuals), while the highest mean number was recorded at point 10 (12 individuals)

Measurement	Temperature	Humidity	pH	Salinity Values (ppt)	Number of Fiddler Crabs
1	28.11	79.6	7.23	9.45	5.5
2	27.89	79.4	7.21	9.4	6.5
3	27.82	79.4	7.32	9.9	7
Overall Average	27.94	79.74	7.25	9.58	6.3

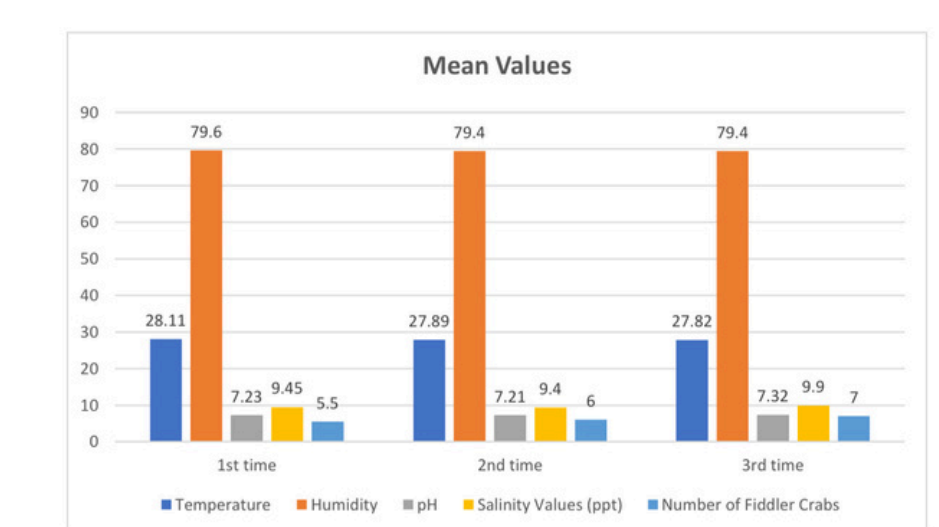


Table 7 presents the overall mean values for temperature, humidity, pH, salinity, and crab count. The average crab count was 6.3 individuals. The mean values were as follows: temperature 27.94°C, humidity 79.74%, pH 7.25, salinity 9.58 ppt, and crab count 6.3 individuals

Conclusion

The study revealed that the environmental conditions in the area, including temperature and humidity, are conducive to the natural habitat of fiddler crabs. Salinity and pH levels in the area may influence fiddler crab abundance. Areas with optimal pH and salinity may result in an increased fiddler crab population. This aligns with studies that have found a correlation between fiddler crabs and physical factors.

Acknowledgment

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