Coastal and Marine Journal

journal homepage: https://nusantara-research.com/index.php/coastal-and-marine-journal

Original research article

Abundance and Distribution Patterns of Asiatic Hard Clam (*Meretrix meretrix*) in The Pukan Beach Coastal Area, Bangka Regency

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ARTICLE INFO

Article history:
Received 12 August 2023
Received in revised from 10 September 2023
Accepted 10 October 2023
Available online 04 December 2023

Keywords:
Asiatic Hard Clam
Pukan Beach
Distribution Pattern

ABSTRACT

The dynamics and diversity of bivalve resources can be influenced by various human activities at the beach. At Pukan Beach, Activities such as harvesting Asiatic Hard Clam (Meretrix meretrix), local community tin mining, shrimp pond farming, and inputs of organic materials from surrounding rivers and freshwater sources can affect the presence of Asiatic Hard Clam in its habitat. This research aims to analyze the abundance and distribution patterns Asiatic Hard Clam and the environmental factors influencing them. Data collection was conducted from February to April 2023 at Pukan Beach, Bangka Regency, using a systematic method and 2 x 2m^2 quadrats consisting of 4 stations with a total of 48 sampling plots. The observed environmental parameters included water temperature, salinity, water pH, substrate, dissolved oxygen (DO), calculation of total organic matter (BOT), and soil pH, which were then analyzed using principal component analysis (PCA).The research findings showed that the lowest abundance values were found at Station 4, while the highest were at Station 3. The average clam abundance at Pukan Beach ranged from 0.03 to 0.22 ind.m^{-2}, indicating a minimum or low abundance level, with an average value of Ip was 0.05, suggesting a clustered distribution pattern. Based on the principal component analysis (PCA), the environmental parameters that most influenced clam abundance were BOD and DO, and the most suitable habitat preference for the clams was identified at Station 4.It is recommended that clam harvesting be based on the size of the shell's length and width, specifically during the adult or mature stage when individuals are larger than 3.10 – 4.00 cm. Smaller clams should be returned to their natural habitat to allow for growth and reproduction.

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https://doi.org/10.61548/cmj.v1i2.11

Introduction

The Bangka Belitung Islands province consists of hundreds of small islands and two main islands, namely Bangka Island and Belitung Island. The total area of the Bangka Belitung Islands, including both land and sea, is approximately 81,725.06 km^2 (Alita et al., 2021), indicating that the marine area is larger than the land area. Thus, the Bangka Belitung Islands possess significant coastal potential, and one of the coastal areas with great potential for bivalve species is Pukan Beach, located on the eastern coast of Bangka Island, precisely in Mudel county, Air Anyir Village, Merawang Subdistrict. Pukan Beach is characterized by gently sloping sandy shores with a line of pine trees along the edge. It is a popular tourist destination for the local community, especially the residents of Pangkalpinang city, due to its expansive sandy beach during low tide. Moreover, Pukan Beach is a productive marine area due to various activities conducted by the local community, such as tourism, shrimp farming, shipping traffic, and gathering various types of clams, particularly clam.

One of the natural resources utilized by human is Bivalves, either utilized on a local or large-scale basis (Zarkasyi, 2016). The bivalve species frequently encountered at Pukan Beach is the *Meretrix meretrix*, commonly known in Indonesia as "kerang tahu" (tofu clam). The Lokan (*Meretrix meretrix*) is often consumed or targeted for harvesting by the local community around Pukan Beach because of its economic value, fetching approximately Rp 20,000-25,000 per kg. The Lokan (*Meretrix meretrix*) has a flattened, smooth shell with various colors and patterns on its outer surface, characterized by concentric growth lines (Indraswari et al., 2014). Besides its nutritional benefits, providing nine essential amino acids and six non-essential amino acids (Chairunnisa, 2011), the Lokan shell (Meretrix meretrix) is also utilized in handicraft industries (Indraswari et al., 2014).

In line with the utilization of the potential natural resources in the intertidal zone to meet human needs, both for exploring fisheries resources and anthropogenic activities (input of organic materials from rivers, tourism, and human activities), they have become threats to several marine creatures in the intertidal areas, especially the *Meretrix meretrix*. The presence of *Meretrix meretrix* in its habitat is suspected to be declining due to continuous exploitation without considering its size. Additionally, the input of organic materials from rivers and activities such as shrimp pond farming and community tin mining around Pukan Beach, which enter the waters (Simanjuntak et al., 2020), can directly impact the water quality and sediment substrate for the bivalve biota, specifically the *Meretrix meretrix* species, living in the vicinity. Information regarding the presence *of Meretrix meretrix* at Pukan Beach is crucial and serves as a benchmark for determining sustainable management policies in Bangka Regency. This research aims to analyze the abundance, distribution patterns, and environmental parameters that influence Lokan (*Meretrix meretrix)*.

Materials And Methods

Time and Study Location

This research was conducted from February to April 2023 at Pukan Beach, Bangka Regency, Bangka Belitung Islands Province, in the intertidal zone during the spring tide (according to Ardiyansyah & Kurnia, 2022). Physicochemical parameters were directly collected in the field (in situ), while substrate samples were analyzed in the laboratory of Fisheries and Aquatic Resources Management, Faculty of Agriculture, Fisheries, and Biology, University of Bangka Belitung. The

research location map is shown in Figure 1.

Materials and Equipments

The equipment and materials used in this study included quadrats of size 2x2 m^2, a soil tester, pH meter, roll meter, hand refractometer, thermometer, raffia rope, coolbox, core sampler, trowel/clam rake, HP camera, plastic bags sample, 70% alcohol solution, *Meretrix meretrix* (Lokan) specimens, identification book for Recent & Fossil Indonesian Shells, and the website "worms" for taxonomic references.

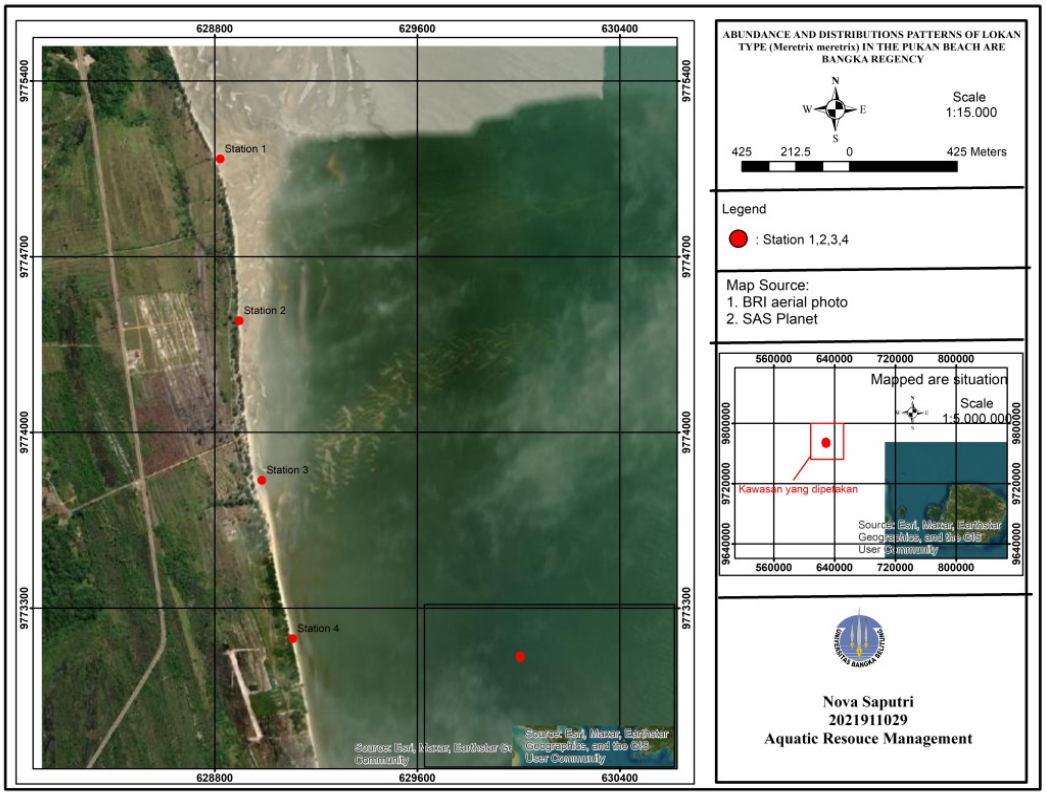

Figure 1. Research location is Pukan Beach, Bangka Regency

Data Collection Methods

The data collection method and station determination employed a systematic approach. The systematic method sequentially involves regular intervals (Sudiyar et al., 2019). The study comprised four stations with approximately 610 m between each station and a 20 m distance between sub-stations. Station 1 was located near a freshwater source, and Station 2 was close to tourism activities, with a substrate composed of sandy clay. Meanwhile, Station 3 was near a freshwater source, and Station 4 was close to shrimp pond farming activities, with a substrate of sandy clay loam. For Lokan data collection, three transect lines, each 150 m long, were established from the coastline, along with quadrats of size 2 x 2 m^2 at each station (Rudi *et al*, 2017). There were a total of four data collection stations, and each station had three sub-stations (four replications), resulting in a total of 48 sampling plots observed across all stations based on a modified method from Akhrianti et al. (2014).

Data Analysis
Abundance

Lokan (*Meretrix meretrix*) data was analyzed using the formula (Odum, 1993).

$$K = \frac{ni}{A} \quad \text{.....(1)}$$

Where:
K : Species Abundance (ind/m^2)
ni : Average number of Lokan (*Meretrix meretrix*) found at the site
A : Transect wide 2 x 2 m^2

Distribution Pattern

The analyses used for distribution pattern of Lokan (*Meretrix meretrix*) refers to (Krebs,1998):

$$Id = \frac{n\,(\sum x^2)-n}{N\,(N-1)} \quad \text{.....(2)}$$

Where:
Id : Morisita Distribution index
N : Total Individual in n plot
n : number of plot
$\sum x^2$: Summation of the number of individual squares per plot

Subsequently, the next stage is doing the *chi-square* test to determine the *Uniform index* (Mu) and *Clumpeed index* (Mc) using the formula below:

$$Mu = \frac{x^2 0{,}975 - n + \sum xi}{(\sum xi) - 1} \quad \text{..... (3)}$$

$$Mc = \frac{x^2 0{,}025 - n + \sum xi}{(\sum xi) - 1} \quad \text{.....(4)}$$

Where:
Mu : Evenness index
Mc : Grouping index
N : Total number of individuals in n plots
$x^2$0,975 : Chi-square table value (db = n-1)
$x^2$0,025 : Chi-square table value (db = n-1)

Based on the calculation result of the Morisita dispersion index (Id), the subsequent calculation was performed using the equation proposed by Krebs (1998), which is:

Id $\geq Mc \geq 1{,}0$ then Ip = 0,5+0,5 ($\frac{Id-Mc}{n-Mc}$)

Mc > Id $\geq$ 1,0 then Ip = 0,5 ($\frac{Id-1}{Mc-1}$)

1,0 > Id > Mu, then Ip = 0,5 ($\frac{Id-1}{Mu-1}$)

1 > Mu > Id , then Ip = 0,5 +0,5 ($\frac{Id-Mu}{Mu}$)

The standardized value of the Morisita dispersion index (Ip) ranges from -1.0 to 1.0 with a 95% confidence interval. The criteria for distribution patterns have three categories (Sudiyar et al., 2019), which are as follows:
if (Ip) = 0, Then the distribution pattern is random
if (Ip) > 0, Then the distribution pattern is aggregated
if (Ip) < 0, Then the distribution pattern is uniform

The Relationship Between Environmental Factors and The Presence of The Meretrix meretrix

The relationship between environmental factors and the *Meretrix meretrix* species at Pukan Beach, Bangka Regency, is analyzed using the Principal Component Analysis (PCA) method. PCA is a multivariate statistical analysis or principal component analysis aimed at describing or presenting maximum information in a matrix of data graphically and descriptively. The data used in this analysis include the abundance and distribution patterns of the *Meretrix meretrix* species and environmental parameters as statistical variables (columns of the data matrix) and research stations as statistical individuals (rows of the data matrix) (Bengen, 2000).

Substrate Analysis

Substrate analysis involves several stages according to Suarman (2018), including drying, sieving, and

measurement. Substrate analysis is used to determine the substrate texture based on its composition by first weighing the wet weight of the samples. Subsequently, the samples are dried using an oven at 105°C until the evaporation process occurs, resulting in dried samples. To separate the particle sizes of the dried samples, 100 grams of the oven-dried samples are weighed and sieved using a sieve shaker for 10 minutes. The percentage volume of sediment is then calculated using the following formula:

$$\text{Volume Percentage} = \frac{Fraction\ Volume}{Total\ Volume} \text{ x } 100\% \quad \text{..... (5)}$$

Then, substrate samples are analyzed using the Miller triangle to determine the substrate texture.

Calculation of Total Organic Matter (BOT)

The analysis used the gravimetric method to determine the total organic matter content in the water. A sediment substrate sample of 20 grams was taken and then heated at a temperature of 600°C for approximately 4 hours using a Furnace (Sudiyar et al., 2018). Subsequently, the substrate sample was cooled inside a desiccator, and its final weight was measured. The formula used to determine the Total Organic Matter (BOT) based on Simanjuntak et al. (2020) is as follows:

$$\%\ BOT = \frac{a-c}{a-b}\ x\ 100\% \quad \text{..... (6)}$$

Where:
% BOT: Percentage of Total Organic Matter in sediment
a: Weight of the sample and crucible after drying (g)
b: Initial weight of the crucible (g)
c: Weight of the sample and crucible after combustion (g)

RESULTS AND DISCUSSIONS

Results

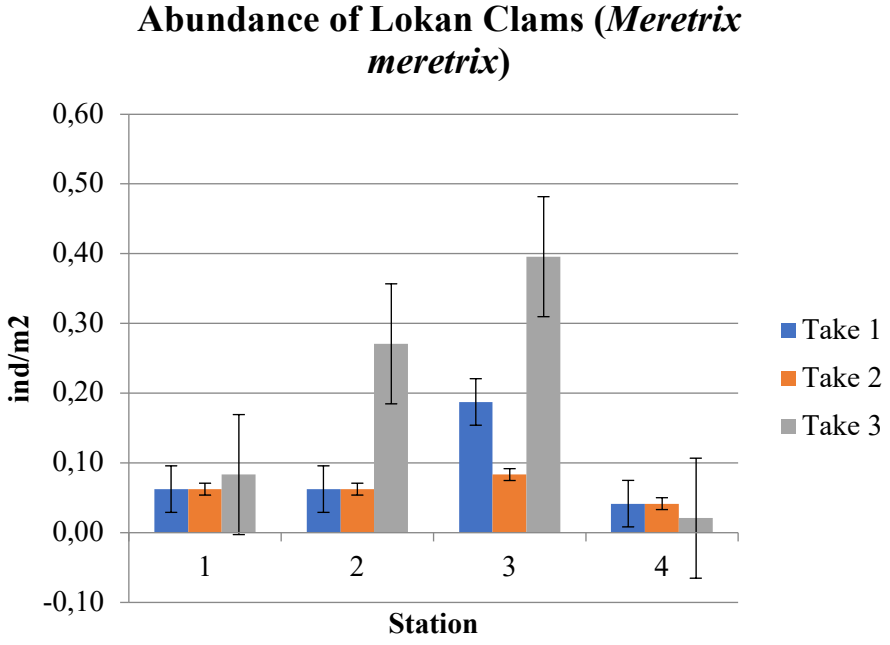

Figure 2. The results of the Lokan (Meretrix meretrix) abundance

Table 1. Results of Lokan (Meretrix meretrix) distribution pattern

Location	Repetition	Id	MC	MU	Ip	Distribution pattern	Species
Station1	P1	4	6,46	14,58	0,3	Uniform	*Meretrix*
	P2	4	6,46	14,58	0,3	Uniform	*meretrix*
Average	P3	2	6,46	10,05	0,1	Uniform	
					0,2	**Uniform**	
Station 2	P1	4	6,46	14,58	0,3	Uniform	*Meretrix*
	P2	4	6,46	14,58	0,3	Uniform	*meretrix*
Average	P3	2	6,46	3,26	0,1	Uniform	
					0,2	**Uniform**	
Station 3	P1	1	2,37	4,39	0,4	Uniform	
	P2	4	4,64	10,05	0,5	Uniform	*Meretrix*
Average	P3	1	4,64	2,51	0,3	Uniform	*meretrix*
					0,4	**Uniform**	
Station 4	P1	12	11,92	28,16	0,2	Uniform	*Meretrix-*
	P2	0	11,92	28,16	-1,0	Aggregated	*meretrix*
Average	P3	0	11,92	28,16	-1,0	Aggregated	
					-0,6	**Aggregated**	
Average of all stations					**0,05**	**Uniform**	*Meretrix meretrix*

Discussions

Abundance

To determine the abundance of *Meretrix meretrix* at Pukan Beach, data were collected three times in February (data collection 1), March (data collection 2), and April (data collection 3). The first data collection in February at station 1 yielded an abundance value of 0.06 ind/m², station 2 had 0.06 ind/m², station 3 had 0.19 ind/m², and station 4 had 0.04 ind/m². The second data collection in March at station 1 resulted in approximately 0.06 ind/m², station 2 had 0.06 ind/m², station 3 had 0.08 ind/m², and station 4 had 0.04 ind/m². The third data collection in April showed an abundance value of approximately 0.08 ind/m² at station 1, 0.27 ind/m² at station 2, 0.40 ind/m² at station 3, and 0.02 ind/m² at station 4.

The highest average abundance value was observed at station 3 with a mean value of 0.22 ind/m². This was influenced by several factors, such as the high dissolved oxygen content of approximately 6.6 mg/l compared to other stations due to the input of freshwater flow containing nutrients, which serves as natural food for the Meretrix meretrix clams (Sudiyar *et al*, 2019). The high abundance value at station 3 suggests that this station provides the most suitable habitat for the Meretrix meretrix clams at Pukan Beach. On the other hand, the lowest abundance was recorded at station 4 with an average value of 0.03 ind/m². This low abundance can be attributed to environmental factors, such as the presence of shrimp pond waste in the surrounding area, leading to decreased oxygen levels and an unsuitable habitat for the survival of the Meretrix meretrix clams. Stations 1 and 2 had slightly lower abundance values, with average values of 0.07 ind/m² and 0.13 ind/m², respectively, likely due to intensive clam harvesting activities by the local community in those locations daily. This is supported by

Ardyansyah & Kurnia (2022), stating that intense human activities in searching for bivalves can disturb or threaten the survival of these bivalves.

The *Meretrix meretrix* clams at Pukan Beach are commonly found in areas with the lowest tides rather than the highest tides, as the lowest tide conditions maintain a moist substrate. This preference is inherent to the *Meretrix meretrix* species, which thrive in substrates submerged in seawater to facilitate food filtration and support their growth processes. The average abundance of *Meretrix meretrix* clams at Pukan Beach at each station is relatively lower, ranging from 0.03 to 0.22 ind/m² when compared to the study by Tritama *et al* (2022) in the intertidal zone of Kota Pangkalpinang Beach, which reported an abundance of 1.44-1.67 ind/m². The presence of *Meretrix meretrix* clams at Pukan Beach may be influenced by various physicochemical factors of the water, such as dissolved oxygen (DO) levels, soil and water pH, temperature, salinity, substrate, and total organic matter (BOT) (Utami *et al*, 2019). The lower abundance values observed at stations 4 and 1 are attributed to unsuitable habitat conditions and changes in environmental factors affecting the clams. As a result of surrounding environmental activities (Sudiyar *et al*, 2019), the *Meretrix meretrix* clams may not be able to thrive in these habitats due to alterations in their surroundings.

Distribution Patterns

The distribution pattern of the *Meretrix meretrix* clams at Pukan Beach, based on the average values, yielded the following results: at station 1 with a value of 0.2, the distribution pattern is clumped; at station 2 with a value of 0.2, the distribution pattern is also clumped; at station 3 with a value of 0.4, the distribution pattern remains clumped; and finally, at station 4 with a value of -0.6, the distribution pattern is uniform. Therefore, it can be concluded that the distribution pattern of the *Meretrix meretrix* clams at Pukan Beach exhibits a clumped distribution pattern, with a total average value of the standardized Morisita dispersion index (Ip) being 0.05. The occurrence of a uniform distribution pattern can be attributed to intense competition among individuals and the presence of positive antagonists that promote the division of the same space (Ode, 2017). The clumped distribution pattern is one of the most common and likely patterns to occur, as individuals within a population tend to form groups of various sizes and specific numbers (Zarkasyi, 2016). One of the factors influencing the occurrence of the clumped distribution pattern at Pukan Beach is the presence of environmental factors such as physical and chemical conditions, as well as responding to changes in weather, seasons, reproduction processes, and habitat changes (Ode, 2017). This is also supported by Aritonang *et al* (2018), who suggest that the uniform distribution of physical and chemical factors in a habitat and the availability of food resources determine whether a biota will live in groups or not. In conclusion, the clumped distribution pattern observed in the *Meretrix meretrix* clams at Pukan Beach is a common occurrence and can be attributed to general characteristics of clams, as well as differences in their responses to the surrounding environment.

Relationship Between Environmental Factors and the Presence of the Meretrix meretrix Clams at Pukan Beach

The *Meretrix meretrix* clams found at Pukan Beach in Bangka Regency were analyzed in terms of environmental parameters at each station, including temperature, salinity, soil pH, water pH, dissolved oxygen (DO), bottom organic matter (BOT), and substrate composition (sand, clay, and silt). The relationship between the abundance of *Meretrix*

meretrix clams and environmental parameters was analyzed using Principal Component Analysis (PCA). The analyzed results showed a correlation relationship centered on two main axes, F1 and F2. The information provided along these axes was 56.46% and 32.21%, respectively, with a total variance of 88.68%. The relationship between the presence of *Meretrix meretrix* clams and their environmental parameters can be seen in Figure 3. The presence of sand, temperature, and water pH indicated a positive correlation forming the F1 axis, while the abundance of *Meretrix meretrix* clams and BOT formed a positive correlation along the F2 axis. On the other hand, clay, silt, and soil pH formed a negative correlation along F1, while salinity formed a negative correlation along F2. BOT and DO had a positive correlation with the abundance of *Meretrix meretrix* clams along F2 and were the parameters most influencing their abundance, with values of r (0.985) and (0.774). Based on the similarity of physical characteristics of water and substrate environmental parameters measured, certain environmental parameters clustered at specific stations, reflecting their characteristic features. The first group was characterized by the presence of sand, high water pH, and temperature, located at station 1. The second group was also characterized by the presence of temperature, water pH, and sand at station 2. The third group was characterized by the abundance of *Meretrix meretrix* clams, BOT, and DO. Lastly, the fourth group was characterized by salinity, which was present across all stations, including station 4.

The measured values of environmental parameters included temperature, salinity, water pH, soil pH, DO, BOT, and substrate composition. The *Meretrix meretrix* clams can thrive within a temperature range of 26-31℃ (Warsidah *et al*, 2020), which aligns with the temperatures at Pukan Beach, indicating a suitable environment for their survival. The average temperature at Pukan Beach is approximately (30.3℃-32.3℃). The temperature at Pukan Beach falls within the optimal range based on the quality standards of the Indonesian Government Regulation (PP RI) No. 22 of 2021, Annex VIII, which stipulates a water temperature range of 28-32℃. Bivalvia can carry out metabolic processes within a temperature range of 25-35℃ (Bening & Purnomo, 2019).

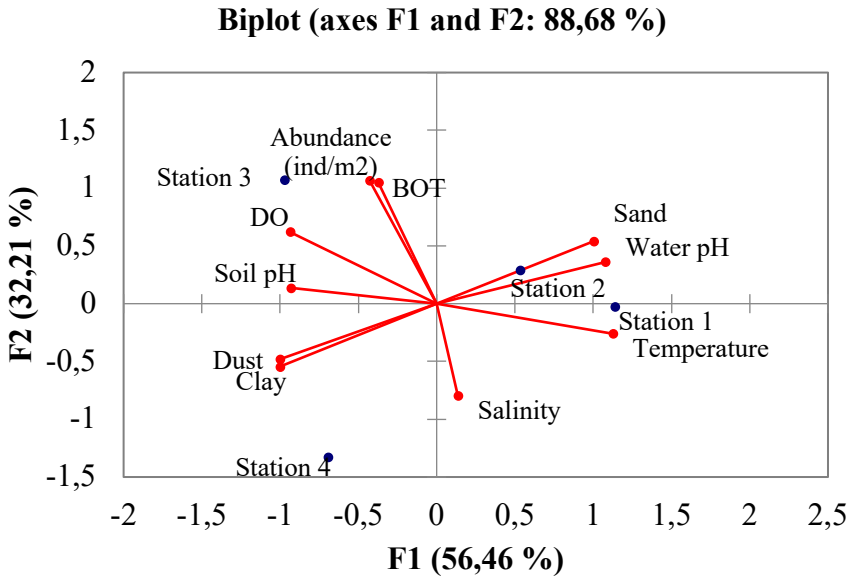

Figure 3. Stations distribution based on the characteristics of the F1 and F2 habitats

According to Warsidah *et al* (2020), the *Meretrix meretrix* clams can thrive and live with a salinity range of 13.36-37 ppt. However, these clams do not thrive well under high salinity conditions. The average salinity at each station on Pukan Beach is still suitable to support the life of *Meretrix meretrix* clams, with values ranging from 24.3 to 25.7 ppt. This is influenced by the presence of freshwater from the nearby estuary of the Selindung River in Kota Pangkalpinang, which flows into the right side of Pukan Beach. The average water pH at Pukan Beach is (6.30-6.71), which is considered safe for aquatic organisms since it falls within the range of 6.0-9.0, as indicated by Bening and Purnomo (2019). Furthermore, the observed average soil pH values were (5.33-6.33). The required pH range for Mollusca is 5.7-8.4 (Rajab et al, 2016). Both soil pH and water pH can significantly influence the life within aquatic environments. Extremely acidic or alkaline water conditions can impact and endanger the survival of aquatic organisms (Barus, 2004). The low pH values observed at stations 3 and 4 are due to their proximity to the river estuary, resulting in slightly acidic conditions. This aligns with the findings of Na'u *et al* (2022), who indicated that as seawater gets closer to the estuary, it tends to become more acidic due to the increased influx of organic materials, which can raise the carbon dioxide (CO2) content when decomposed.

The dissolved oxygen (DO) content at Pukan Beach ranged from (6.1-6.6 mg/l). The DO values at each station meet the oxygen requirements for the growth of clams. This is supported by Rohmah and Muhsoni (2020), who stated that the optimal DO content for clam growth ranges from 4.19 to 6.24 mg/l. High DO values were observed at station 3 due to the uninterrupted influx of freshwater, unaffected by human activities, leading to increased organic matter and nutrient supply in that area. Low DO values were observed at station 1 due to tin mining activities by the local community discharging waste through freshwater streams. Rangkuti *et al* (2017) highlighted that the presence of waste in aquatic environments can decrease dissolved oxygen levels.

The total organic matter content (BOT) at Pukan Beach ranged from (4.17-12.77%). According to Adelya *et al* (2022), the classification of total organic matter levels includes very high for percentages > 5%, high for percentages > 3.01-5%, and low for percentages < 1-2%. Therefore, it can be concluded that the BOT values at Pukan Beach are classified as high, exceeding > 3.01-5%. Based on the substrate results obtained at Pukan Beach, the composition includes sand (84.98-89.98%), silt (9.91-14.59%), and clay (0.0823-0.4466%), forming a substrate texture of sandy clay and sandy clay-loam. As stated by Rudi *et al* (2017), substrate is a critical component for organism life. The predominant soil texture found at station 3 was sandy clay-loam, while station 4 had a clay-loam texture. The high abundance of *Meretrix meretrix* clams is closely related to the substrate, which can be due to the compatibility of the substrate, as indicated by Adelya *et al* (2022). Therefore, the most favored substrate by *Meretrix meretrix* clams at Pukan Beach is sandy clay-loam, found predominantly at station 3.

Shell Size and Width of Meretrix meretrix Clams at Pukan Beach

Based on the results of the size groups of Meretrix meretrix clams at Pukan Beach in Bangka Regency, there are several length and width classes. According to Priani *et al* (2022), the size categories for clams are small (1.0 cm-2.0 cm), medium (2.1 cm-3.0 cm), and large (>3.1 cm). The *Meretrix meretrix* clams found at Pukan Beach exhibit medium

and large shell sizes, with no small-sized individuals found. Based on the length and width measurements of the shell of *Meretrix meretrix* clams, the dominant sizes found can provide insights into the population's condition in its habitat. The width of *Meretrix meretrix* clams was found to have 4 individuals in the small size category, 30 individuals in the medium size category, and 33 individuals in the large size category.

The condition of *Meretrix meretrix* clams at Pukan Beach is dominated by the large size category (>3.1 cm), with 51 individuals, which indicates a declining population. According to Priani *et al* (2022), the presence of larger-sized individuals (>3.1 cm) or so-called old individuals and the absence of small-sized individuals (1.0 cm-2.0 cm) suggest a declining population. The decline in the population of *Meretrix meretrix* clams at Pukan Beach can be attributed to environmental factors and inappropriate harvesting activities not aligned with suitable size limits.

Meretrix meretrix clams in the medium size category (2.1 cm-3.0 cm) at Pukan Beach were found to consist of 16 individuals out of the total population. The presence of young individuals or clams in the medium size category can be attributed to the seasonal transition from the rainy season to the dry season, as the data collection occurred from February to April. During this transitional season, according to Kariyanti & Zulkhairiyah (2019), there is an increase in phytoplankton and nutrients in the water, which is conducive for the growth of clams in the medium size range. Larger-sized *Meretrix meretrix* clams could also experience an increase due to the availability of food resources along the coast (Priani *et al*, 2022).

Alternatives of The Management

Based on the conducted research, it has been found that the low abundance of *Meretrix meretrix* clams at Pukan Beach is influenced by environmental factors such as shrimp farming activities, illegal tin mining affecting the habitat of *Meretrix meretrix*, and the exploitation of *Meretrix meretrix* by the local community without adhering to proper size limits for harvesting. To prevent a decline in the population levels of *Meretrix meretrix* clams, a management approach based on sustainable cultivation is recommended. Sustainable cultivation entails the proper and strategic utilization, as defined by Warsidah et al (2020), involving the collection of data related to population, distribution, bioecology, behavior, genetics, reproduction, as well as morphological and morphometric characteristics of *Meretrix meretrix.*

Clams of the *Meretrix meretrix* species that are found to be undersized should be returned to their natural habitat to allow them to grow, develop, and reproduce, ensuring their continued presence at Pukan Beach and preventing extinction. The recommended appropriate harvesting size based on the conducted research at Pukan Beach is clams larger than (>3.1 cm), as this size indicates that the *Meretrix meretrix* clams are mature and suitable for harvesting, having completed their growth phase and reproductive cycle. This finding contrasts with the study by Indraswari *et al* (2014), which indicated that the suitable and legal harvesting size for *Meretrix meretrix* is larger than (>4 cm). Therefore, the appropriate size for harvesting and sale of *Meretrix meretrix* clams is between (>3.1-4 cm). Given that *Meretrix meretrix* clams are highly sought after by the community, their role is vital in maintaining the balance of coastal ecosystems (Rohmah & Muhsoni, 2020). Meretrix meretrix shellfish are sought after by the public because they are very popular for consumption. Management of this type of shellfish must pay attention to sustainable use so that shellfish resources remain sustainable in nature.

CONCLUSIONS

The abundance of *Meretrix meretrix* clams at Pukan Beach is lowest at station 4, while the highest abundance is observed at station 3, ranging from 0.03 to 0.22 ind/m². The distribution pattern of *Meretrix meretrix* clams in Pukan Beach, Bangka Regency, falls under the category of clustered distribution, with an average Morisita Index (Ip) of 0.05. The Ip values for stations 1, 2, and 3 range from 0.2 to 0.4, indicating clustering, while station 4 exhibits a uniform distribution with a value of -0.6. Here, a distribution pattern of (Ip = 0 implies random distribution), (Ip > 0 indicates clustering), and (Ip < 0 signifies uniform distribution). The habitat preference of Meretrix clams at Pukan Beach, Bangka Regency, involves a substrate type characterized by sandy-clay and sandy-mud, with temperatures ranging from 30.3 to 32.3°C, water pH levels between 6.3 and 6.71, soil pH ranging from 5.33 to 6.33, dissolved oxygen (DO) levels of 6.1 to 6.6 ppm, and total organic matter (BOT) content of 4.17 to 12.77%. Among the environmental parameters, BOT and DO have the most significant influence.

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