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THE EFFECT OF DIFFERENT TYPES OF BAIT ON THE CATCHES OF MANGROVE CRABS (*Scylla serrata*) USING FOLDING TRAP FISHING GEAR IN THE WATERS OF TANJUNG PECINAN MANGARAN DISTRICT SITUBONDO REGENCY

Pengaruh Perbedaan Jenis Umpan Terhadap Hasil Tangkapan Kepiting Bakau (*Scylla serrata*) Pada Alat Tangkap Bubu Lipat Di Perairan Tanjung Pecinan Kecamatan Mangaran Kabupaten Situbondo

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ABSTRACT

This study was conducted to assess the effect of different bait types on the catch of mangrove crab (Scylla serrata) using a collapsible trap in the waters of Tanjung Pecinan, Mangaran District, Situbondo Regency. The purpose of this study was to determine the effect of bait type on mangrove crab catches. This study used a Randomized Block Design (RBD) method which included 3 treatments and 9 fishing trips. The bait types used were trash fish, field snails, and shrimp. Ten collapsible traps were used for each treatment, randomly spaced 5 meters apart. Additionally, supporting parameters included water quality, waves, current speed, temperature, and tides. Data were analyzed using SPSS with normality tests, homogeneity tests, ANOVA tests, and LSD tests. The data analysis concluded that trash fish and shrimp baits yielded better catches than golden apple snails.

Keywords: Bait Types; Collapsible Trap; Mangrove Crab (*Scylla serrata*)

ABSTRAK

Penelitian ini dilakukan untuk menilai pengaruh jenis umpan yang berbeda terhadap hasil tangkapan kepiting bakau (*Scylla serrata*) pada alat tangkap bubu lipat di Perairan Tanjung Pecinan, Kecamatan Mangaran, Kabupaten Situbondo. Maksud dari penelitian ini adalah untuk mengetahui pengaruh jenis umpan dalam menentukan hasil tangkapan kepiting bakau. Penelitian ini menggunakan metode Rancangan Acak Kelompok (RAK) yang mencakup 3 perlakuan dan 9 trip penangkapan. Jenis umpan yang digunakan yaitu umpan ikan rucah, umpan keong sawah, dan umpan udang. Pengujian menggunakan 9 bubu lipat setiap perlakuan dengan meletakkan bubu lipat secara acak dengan jarak 5 meter. Selain itu, parameter pendukung termasuk kualitas air yaitu, gelombang, kecepatan arus, suhu dan pasang surut. Data analisis menggunakan SPSS dengan uji normalitas, uji homogenitas, uji ANOVA dan uji

BNT. Dari hasil analisis data yang diperoleh, dapat disimpulkan bahwa umpan ikan rucah dan umpan udang menunjukkan hasil tangkapan yang lebih baik dibandingkan umpan keong mas.

Kata Kunci: Bubu Lipat; Jenis Umpan; Kepiting Bakau (*Scylla serrata*)

INTRODUCTION

Situbondo Regency is a regency in East Java located at the eastern tip of the northern part of Java Island, between 7˚35' - 7˚44' South Latitude and 113˚30' - 114˚42' East Longitude. Situbondo Regency covers an area of 1,638.50 km2, almost entirely located in coastal areas. The coastline in Situbondo Regency is nearly 150 km long, or 6.6% of the total coastline of East Java. The geographical location of Situbondo Regency, an area in East Java with a fairly long coastline, provides opportunities for mangrove crab production. Situbondo's proximity to the coast makes this region the largest crab producer in East Java, with a production value of 67.13 tons in 2023 (Situbondo Central Statistics Agency, 2023). Indonesia's extensive waters are largely surrounded by numerous mangrove ecosystems. Mangrove ecosystems contain a rich biodiversity, one of which is mangrove crabs. The mangrove crab (Scylla serrata) lives in muddy waters and is typically found in mangrove habitats. This species is the dominant species in Indonesian waters (Wijaya, 2011). Crabs are an important fishery commodity with high economic value and nutritional value (Asmara, 2004). Mangrove crabs are omnivorous and tend to be scavengers (Sagala et al., 2013).

Traps commonly used to catch mangrove crabs include bamboo fish traps and wire netting. Collapsible traps are also common (Susanto and Irnawati, 2012). On the island of Java, fishermen commonly use these traps to catch crabs. According to SNI (2007), a trap is a fishing tool made from various materials, aimed at trapping fish, equipped with or without bait, operated by sinking or floating passively, has a shape like a cage or basket that has one or more injeps (mouths), popular fishermen use this fishing tool because this fishing tool is very easy to operate and when taken to the fishing ground, this fishing tool can be folded, making it easier to carry and can hold many traps.

RESEARCH METHODS

Place and Time

This research was conducted on June 14, 2026 - June 22, 2026 in the waters of Tanjung Pecinan, Mangaran District, Situbondo Regency.

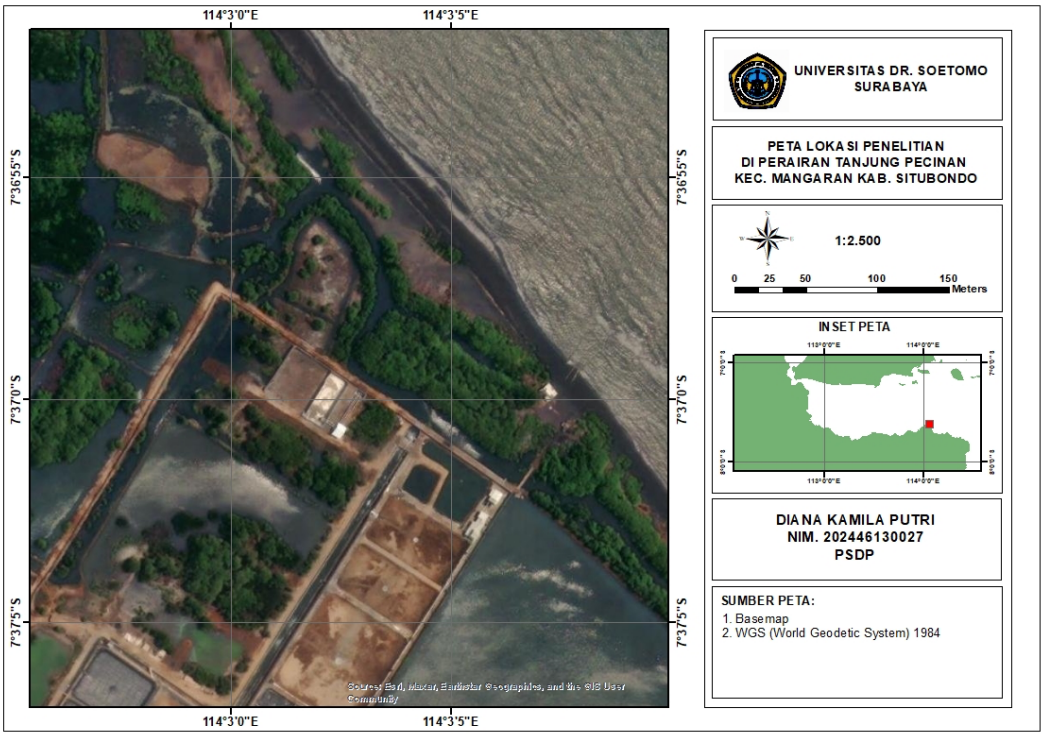

Figure 1. Map of research location (ArcGIS 10.8, 2026)

Tools and Materials

The tools used in this study included a folding fish trap, knife, stationery, camera, and laptop. The materials used in this study were trash fish bait, rice field snail bait, and shrimp bait.

Research Methods

This study used an experimental fishing method with a Randomized Block Design (RBD) that included three treatments and nine fishing trips. Each treatment used nine collapsible traps, and data was collected over nine fishing trips. Twenty-seven collapsible traps were used. Data collection lasted nine hours, from 8:00 PM to 5:00 AM WIB. This study tested three treatments:
Treatment A: trash fish bait
Treatment B: rice field snail bait
Treatment C: shrimp bait

Data Analysis

The research data obtained was processed using SPSS 21. The analysis used was the ANOVA test, but before the ANOVA test, a normality test and a homogeneity test were first conducted. If the ANOVA test met the testing criteria, it was continued with the BNT (Least Significant Difference) test.

- Data Normality Test

The normality test is used to determine whether the data is normally distributed or not with the following criteria:

1) Probability or significance a > 0.05, then the data is normally distributed.
2) Probability or significance a < 0.05, then the data is not normally distributed.

- Homogeneity of Variance Test

This homogeneity test (variance equality test) is used to determine whether the variances of the treatment groups are the same. Data that meets the requirements are if the variances are the same or the subjects come from homogeneous groups. The hypothesis used is:
H_0 : the three treatments have different variants.
H_1 : all three treatments have the same variance.

Testing criteria:
1) If the sig value > 0.05, then H1 is accepted, meaning the data has the same variance.
2) If the sig value < 0.05, then H0 is accepted, meaning the data does not have the same variance.

- BNT test

BNT (least significant difference) test to determine the most appropriate typo of bait to produce optimal catch. The Provisions for decision making are as follow:
1) If the sig value. < 0,05, then H_0 is rejected and H_1 is accepted. This means there is a real difference between the treatments.
2) If the sig value is. > 0,05, then H_0 is accepted and H_1 is rejected. This means there is no real difference between the treatments.

RESULT

The one-way ANOVA test was used to determine whether there was a significant or insignificant differences. The results of the one-way ANOVA test for the number of mangrove crab (Scylla serrata) catches.

Table 1. ANOVA Test Results on the Number of Mangrove Crab Catches (Scylla serrata)

ANOVA

Nilai Hasil

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.407	2	2.704	9.733	.001
Within Groups	6.667	24	.278		
Total	12.074	26			

The BNT or LSD (Least Significance Difference) test is conducted to determine the most appropriate bait type for optimal catches. Data that meets the criteria are those with the same variance or subjects from a homogeneous group.

Table 2. Results of BNT Test on the Number of Mangrove Crab Catches (Scylla serrata)

Multiple Comparisons

Dependent Variable: Nilai Hasil

LSD

(I) Kode Perlakuan	(J) Kode Perlakuan	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Perlakuan 1	Perlakuan 2	1.000*	.248	.000	.49	1.51
	Perlakuan 3	.111	.248	.659	-.40	.62
Perlakuan 2	Perlakuan 1	-1.000*	.248	.000	-1.51	-.49
	Perlakuan 3	-.889*	.248	.002	-1.40	-.38
Perlakuan 3	Perlakuan 1	-.111	.248	.659	-.62	.40
	Perlakuan 2	.889*	.248	.002	.38	1.40

*. The mean difference is significant at the 0.05 level.

Mangrove Crab Catches (*Scylla serrata*)

The mangrove crabs obtained in the research using folding trap fishing gear were subjected to several measurements, including calculating the number of mangrove crab catches, weighing them, and measuring the carapace width, which aimed to determine the comparison of mangrove crab catches with treatments in the form of trash fish bait, rice field snail bait, and shrimp bait in Tanjung Pecinan Waters.

Table 3. Number of Mud Crab (Scylla serrata) Catches

Replication	Treatment								
	Number (tail)			Weight (gr)			Carapace Width (mm)		
	Small Fish Bait	Rice Field Snail Bait	Shrimp Bait	Small Fish Bait	Rice Field Snail Bait	Shrimp Bait	Small Fish Bait	Rice Field Snail Bait	Shrimp Bait
1	3	1	3	687,0	199,6	670,0	341	106	327
2	2	2	2	496,2	346,8	422,3	226	193	210
3	3	2	3	716,3	346,6	551,2	338	192	312
4	3	2	2	594,9	333,4	472,5	314	195	230
5	2	1	2	474,9	202,5	459,2	228	107	239
6	2	2	3	507,3	376,4	665,0	235	206	332
7	3	1	2	723,3	178,4	258,7	340	106	174
8	3	2	3	738,9	388,8	747,1	338	210	344
9	2	1	2	505,2	214,2	422,0	232	110	211
Total	23	14	22	5.444,0	2.586,7	4.668,0	2.592	1.425	2.379
Average	2,56	1,56	2,44	604,9	287,4	518,7	288,0	158,3	264,3

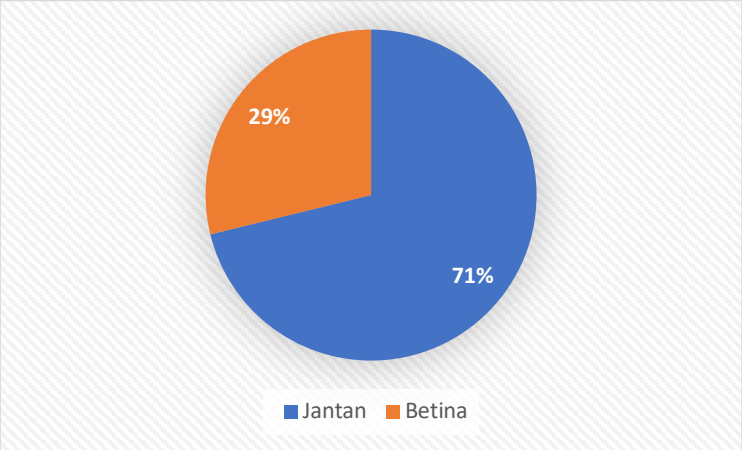

Figure 2. Number of Catches by Gender (%)

During the research process, in addition to the main catch (mangrove crabs), there was also bycatch. This bycatch included tiger prawns (Penaeus monodon), milkfish (Chanos chanos), and tilapia (Oreochromis mossambicus).

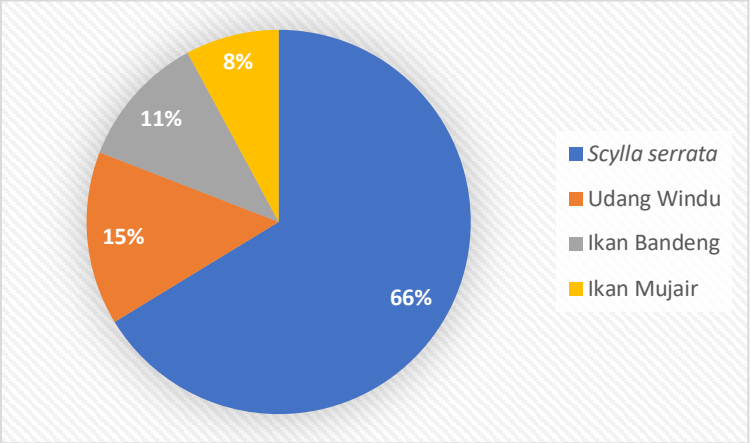

Figure 3. Diagram of Bycatch Results

Water quality parameters in this study included measurements of tides, waves, current speed, and temperature. These measurements were conducted to assess the quality of the waters.

Table 4. Water Quality Parameters

Replication	Ups and down	Wave	Current	Temperature
1	1-1,3	0,7	0,3	28
2	0,8-1,4	0,9	0,3	27
3	0,4-1,5	0,8	0,4	27
4	0,2-1,6	0,7	0,3	27
5	0,0-1,6	0,6	0,3	27
6	-0,1-1,6	0,8	0,5	27
7	-0,1-1,6	0,8	0,5	27
8	0,1-1,6	0,9	0,4	28
9	0,3-1,6	0,8	0,5	28
Range	-0,1-1,6 m	0,6-0,9 m	0,3-0,5 m/s	27-28°C

DISCUSSION

Based on Table 1, the ANOVA test results show that the use of trash fish bait, rice field snail bait, and shrimp bait significantly affected the catch of mud crab (Scylla serrata) (0.001 < 0.05). The number of mud crab (Scylla serrata) catches with trash fish bait treatment was more than with the use of rice field snail bait and shrimp bait. The Fhit value = 9.733 is greater than the Ftab value = 3.402, so it is concluded that H0 is rejected and H1 is accepted. The use of trash fish bait, rice field snail bait, and shrimp bait significantly affected the catch of mud crab (Scylla serrata). In Table 2, it can be concluded that the BNT test with a 95% confidence level shows that treatment 1 is not significantly different from treatment 3 or $p > 0.05$, but both are significantly different from treatment 2, which is < 0.05. This is because trash fish and shrimp bait have a stronger fishy odor than rice paddy snail bait, which attracts mud crabs (Scylla serrata). Table 3 shows that the total catch of mud crabs (Scylla serrata) using rice paddy snail bait was 14, with the highest catch being 2 and the lowest being 1. Trash fish bait yielded the highest catch of 23, and shrimp bait yielded 22. The average catch using trash fish bait was 2.56, shrimp bait 2.44, and rice paddy snail bait 1.56.

This difference in mud crab catches is thought to be due to the different baits used, which have a fishy odor. According to Fitri (2008), the higher the water content in the bait, the faster the dispersion process and the distribution of the odor in the water, allowing the fish to respond more quickly to the odor. Diana et al. (2018) explained that mud crabs (Scylla serrata) are carnivores that prefer shellfish, shrimp, and animal carcasses, as the odor they emit strongly stimulates them to approach and prey. The low catch rate for using rice field snail bait is due to the fact that the aroma and texture of rice field snails are less responsive to crabs than the fishy odor of small fish and shrimp. This is consistent with Muhamad's (2018) research in Kwandang, which found that rice field snail bait yielded the lowest catch of mud crabs compared to chicken head and scad.

Based on Table 1, the total weight of mud crabs (Scylla serrata) caught using small fish bait was 5,444 grams, the total weight of shrimp bait was 4,668 grams, and the total weight of rice field snail bait was 2,587 grams. The average weight of small fish bait was 605 grams, the average weight of shrimp bait was 512 grams, and the average weight of rice field snail bait was 287 grams.

Trash fish bait produced the highest total weight and average catch compared to shrimp and rice field snail bait. The total weight of the mud crab (Scylla serrata) caught was influenced by the amount of catch. This is thought to be because this bait is a type of animal bait that emits a strong fishy odor. This is supported by Z.A. et al. (2012) who stated that providing trash fish resulted in higher growth of mud crabs compared to rice field snail bait. Trash fish and shrimp bait had a higher total weight compared to rice field snail bait because rice field snails have a hard texture and have a low water content, so the dispersion of chemical compounds that stimulate feeding in the water is slow. As a result, crabs are less attracted to rice field snail bait.

Based on Table 1, the average carapace width of mud crabs (Scylla serrata) caught on trash fish bait was 288 mm, 264.3 mm on shrimp bait, and 158.3 mm on rice field snail bait. The above description shows a slight difference in carapace width between mud crabs caught on trash fish and shrimp bait, compared to the carapace width of rice field snail bait. The mud crabs (Scylla serrata) caught varied in carapace width, ranging from 74 to 122 mm. A mud crab is considered sexually mature if its carapace width exceeds 100 mm (Wijaya et al., 2010).

Based on the diagram in Figure 2, male mud crabs (Scylla serrata) predominate over females. The number of male mangrove crabs caught was 42, representing 71% of the total catch, and 17 female mangrove crabs, representing 29% of the total catch.

The difference in the number of mangrove crabs caught by sex is thought to be due to the migration patterns of female crabs, which migrate to deeper waters with higher salinity (Australian Department of Fisheries, 2013). Meanwhile, male mangrove crabs tend to remain in mangrove forests. Mature female mangrove crabs, based on their life cycle and reproductive migration behavior, tend to move away from the mangrove forests and head for the sea in search of waters with relatively stable environmental parameters.

Figure 3 shows the bycatch obtained: tiger prawns (Penaeus monodon), milkfish (Chanos chanos), and tilapia (Oreochromis mossambicus). Tiger prawns accounted for 15% of the catch, milkfish for 11%, and tilapia for 8%. According to Wang et al. (2010), the high proportion of the main catch (target catch) demonstrates the environmentally friendly nature of the fishing gear used during the study.

Based on Table 2, the tides in this study ranged from -1 to 1.6 m. Supangat (2003) stated that faster ocean currents result in greater catches, while lower currents result in lower catches. A tide of 1.6 m generally produces an ideal current of 0.1–0.4 m/s, making traps more effective.

Wave heights ranged from 0.6 to 0.9 m. According to Hewitt et al. (2023), crabs are more likely to forage during high tide than during low tide, between -0.5 and 0.25 m. This indicates that wave heights in Tanjung Pecinan waters are within a range that supports crab survival.

Current speeds in this study ranged from 0.3 to 0.5 m/s. Current speed affects mangrove crabs, particularly during migration and spawning. Currents play a crucial role in waters; high levels of organic matter can serve as a feeding ground for mangrove crabs (Tahmid et al., 2015).

The temperature in this study was in the range of 27-28°C. According to Hanjani (2019), the optimal temperature for the growth and survival of mangrove crabs (Scylla serrata) is between 23-32°C. This indicates that the temperature conditions in the Tanjung Pecinan waters meet the environmental range required for the crabs to thrive.

CONCLUSION

Based on the research that has been conducted, it can be concluded that the use of different types of bait in the folding trap fishing gear has a significantly different effect on the catch of mangrove crabs (Scylla serrata) and the use of trash fish bait provides better catch results compared to shrimp bait and rice field snail bait on the catch of mangrove crabs (Scylla serrata) in the folding trap fishing gear in the waters of Tanjung Pecinan, Mangaran District, Situbondo Regency.

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