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THE EFFECT OF USING DIFFERENT BAIT TYPES TO CATCH BLUE SWIMMING CRABS USING TRAPS IN BETAHWALANG WATERS OF DEMAK REGENCY

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ABSTRACT
The catching of blue swimming crabs in Betahwalang Village, Demak Regency was carried out using traps. The fishing process requires bait to lure the crab into the trap. In Betahwalang Village there is a crab processing plant which produces quite a lot of waste in the form of crab shells. This research was conducted to find out the difference between crab catches and Bubu fishing gear using petek fish, crab fish and crab carapace waste and to find out the width of the carapace of the caught crab. The method used in this study was experimental fishing, using 30 units of fishing gear. The baits used were ponyfish, bagrid catfish and swimming crab's shell waste, 10 traps each. The conclusion of this study is that statistical analysis shows the differences in bait on trap fishing gear have no effect on blue swimming crab catches in Betahwalang Village, Demak Regency. This shows that the shell waste can be an alternative bait for catching blue swimming crabs, because the results are not different from those caught using ponyfish or bagrid catfish as baits. The width of the carapace of the blue swimming crab caught is 85 – 122 mm, 73.5% of which are > 100 mm in size which is in accordance with the Regulation of the Minister of Maritime Affairs and Fisheries (PERMEN KP) No. 16 Year 2022.

KEY WORDS
Blue swimming crabs, Betahwalang waters, different bait types.

Blue swimming crab (*Portunus pelagicus*) is one of the marine fishery commodities that has been widely researched because it has high economic value. The market is not only domestic but also international market such as America and Europe. There are many swimming crabs in Indonesian waters, one of which is in Betahwalang Village, Demak Regency. Blue swimming crab for export needs are still rely on catches at sea (Hamid, 2015).

Trap is a type of passive fishing gear that has a shape like a cage and has one or more trap doors. To catch the crab, trap needs bait to attract the crab to get closer to the trap. Martasuganda., (2008) and Widowati *et al*., (2015) states that the characteristics of a good bait are effective in attracting targets, easy to obtain and cheap. The baits commonly used by fishermen in Betahwalang Village are rough fish because the price is cheap, such as ponyfish (*Leiognathus* sp.), sardinella (*Sardinella* sp.) and anchovy (*Stolephorus* sp.).

Blue swimming crab is a one of scavenger animals and also cannibalistic. Cannibalism in swimming crabs is generally related to genetics and living habits (Susanto et al., 2005; Suharyanto *et al*., 2008). The nature of cannibalism and scavengers is taken into consideration in this research, to test the use of shell waste, ponyfish and bagrid catfish (*Mystus* sp.) as bait. The research by Putri *et al*. (2013) and Widowati *et al*. (2015) showed that fresh ponyfish as bait attracted more swimming crabs compared to salted ponyfish and salted puffer fish. Consideration of using bagrid catfish as an alternative bait is because bagrid catfish inhabit estuarine areas with brackish water conditions to rivers and are often in muddy riverbeds (Jutagate *et al*. 2009, and Brinda *et al*. 2010), this fish is easy to find in the Selarak river, Betahwalang Village.

There is a swimming crab processing plant in Betahwalang Village which produces quite a lot of waste in the form of crab shells, because the weight of the shells can reach 40-60% of the total weight of the crabs. This shell can be used as a mixture of animal feed, but

its utilization has not been able to handle the shell waste optimally. Even though the shell waste still contains several chemical compounds, such as 30-40% protein, 30-50% minerals and 20-30% chitin (Srijanto, 2003). The protein in the shell waste is quite high because there is still crab meat attached to the shell. Research on different types of bait for catching swimming crabs needs to be carried out to find alternative bait solutions when the availability of fresh fish bait is difficult because it is influenced by the season.

MATERIALS AND METHODS OF RESEARCH

This research was conducted in March 2022 in the Betahwalang waters, Demak Regency, Central Java (6°43'26" - 7°09'43" South Latitude and 110°27'58"-110°48'47"). In this study the selected fishing grounds had a travel time of >90 minutes or were >15 km from the river mouth. Data collection was carried out by catching blue swimming crab with local fishermen for 9 trips using trap with soaking times from 17.00 – 06.00 WIB.

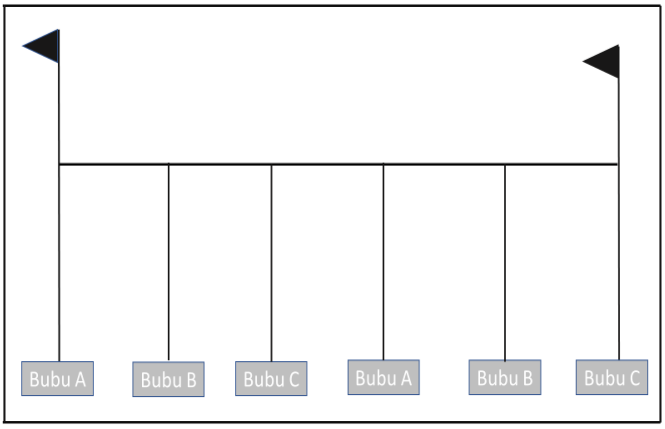
The trap used in this study was a two-door trap which has a length of 40 cm, a width of 30 cm and a height of 20 cm. The trap frame is made of galvanized wire which has a diameter of 3 mm and the cover material is a multifilament PE net with mesh size of 30 mm.

The method used in this research is experimental fishing. The number of traps used was 30 units for three different types of bait treatments (ponyfish, bagrid catfish and swimming crab shell waste) with each treatment using 10 units of traps and the bait weight was 100 g each, the number of repetitions was 9 (nine) times of operation/setting. As a control in this study is ponyfish bait, because this type of bait is commonly used by fishermen in Betahwalang village. The operation of the traps was carried out in continuous series (long line traps) by placing the traps alternately between treatments to provide equal opportunities for each treatment. More details are presented in Figure 1. Data on the number of catches were analyzed using one way analysis of variance (ANOVA). The difference between treatments means to be significant at 95%. SPSS software was applied for the data analysis.

There are two assumptions can be taken, where:

- H_0: The use of different baits has no effect on the number of catches;
- H_1: The use of different baits affects the number of catches.

If the test results shows that calculated F value < F table then H_0 is accepted which means that different baits has no effect on the number of catches. If F value > F table then H_0 is rejected which means that different baits affects the number of catches (H_1 is accepted).



Information:

- Bubu A: Trap with ponyfish bait;
- Bubu B: Trap with bagrid catfish bait;
- Bubu C: Trap with swimming crab shell waste bait.

Figure 1 – Illustration of the operation of traps with various treatments (A, B, C)

RESULTS AND DISCUSSION

The results of observations on 9 points of the swimming crab fishing area, obtained data on the depth of the waters between 15-23 m, with the basic substrate being sandy mud, swimming crabs are generally caught more often on sandy mud substrates than clay silty substrates (Ernawati *et al*., 2014). The total catch during the study was 83 swimming crabs, with details of 27 individuals in trap A, 30 individuals in trap B and 26 individuals in trap C. The number catch during the research is presented in Figure 2.

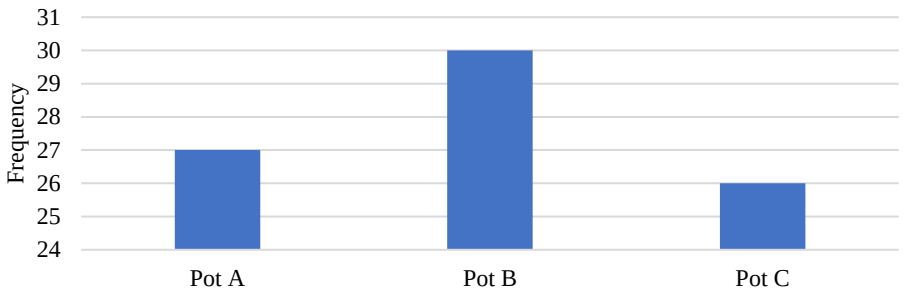


Figure 2 – The number of blue swimming crab catches during the study

Catching swimming crabs using baits of ponyfish, bagrid catfish and swimming crab shells got different catches, with bagrid catfish bait getting the most catch, namely 30 individuals. Bait is one of the most important parts in catching blue swimming crabs using trap as fishing gear. Chemical stimuli contained in the bait can affect the catch. According to Sainsbury's (1996), bagrid catfish contains chemical compounds in the form of 80-85% water, 12.6-15.6% protein and 1.1-3% fat. Meanwhile, ponyfish contains 90% water, 10% protein and 0.14% oil content (Subagio, 2004). The chemical composition of swimming crab shell waste with the remains of meat still attached to the shell, 8.10% water, 15% protein and 0.19% fat (Fawzya, 2004). Based on the chemical composition found in the three baits, the bagrid catfish bait attracts more stimulation from the blue swimming crab's smell than the ponyfish and swimming crab shell baits, because it has higher protein content.

One of the factors that influence the crab's interest in approaching the bait is the specific odor emitted by the bait. Bait that is submerged in seawater containing high salt levels will cause a fermentation process and result in the decomposition of proteins into amino acid peptides and flavour components (Sainuddin, 2012). The amino acids resulting from the breakdown of proteins that can stimulate the crab's smell are alanine, arginine, proline, glutamate, cysteine and methionine (Purwanto *et al*., 2013).

ANOVA

Individuals

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.963	2	.481	1.061	.362
Within Groups	10.889	24	.454		
Total	11.852	26			

Figure 3 – One way analysis of variance (ANOVA) analysis results

Based on the results of the one way ANOVA test on the total number of blue swimming crab catches, it shows that F value < F table (1.061<3.00) which means that the different type of bait has no effect on the number of blue swimming crab catches at Betahwalang waters. Since there is no effect on using of different bait, it is better to use swimming crab shell waste as alternative bait. This can be a way out in utilizing swimming crab shell waste.

The number of swimming crabs caught based on sex obtained during the 9 days of research were: 40 male and 43 female. The female swimming crabs have more numbers

than the male swimming crabs, possibly influenced by the depth of the waters. Prasetyo *et al*. (2014) stated that the more depth of the water, the swimming crab obtained was dominanted by female, while the shallower the water, the swimming crab obtained was dominanted by male. Comparison of the number of swimming crabs caught by traps based on different baits presented in figure 3.

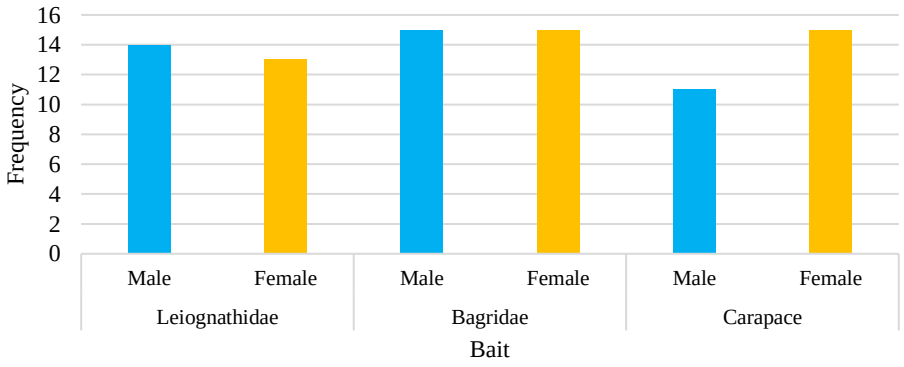


Figure 3 – Blue swimming crabs caught based on sex during the 9 days of research

The number of female swimming crabs in this study was more than the male swimming crabs, this was because the fishing area in this study had a water depth between 15-23 m, according to Rahman and Fuad (2020) male swimming crabs were only found at depths of <10 m and 10-20 m, while female swimming crabs were found at all depths with the highest number at depths >20 m. Similar results were also reported by Adam *et al*. (2006) which stated that the dominant male swimming crab was caught in areas up to 1.4 miles from the coast, while the female swimming crabs dominated catches in offshore waters. King (2007) stated that female and male swimming crabs spawn in the waters around the coast. After the eggs are mature and appear on the belly, the adult female lays eggs (berried eggs female) will migrate to the high seas with a fairly high level of salinity.

Most of the swimming crabs caught in this study had carapace widths in the range of 115 – 119 mm. Swimming crab with carapace width >100 mm can be found every day/repetition. The Regulation of the Minister of Maritime Affairs and Fisheries (PERMEN KP) No. 16 of 2022 stated that the width of the carapace of the swimming crab that is permitted to be caught and traded is >100 mm, this means that fishermen can carry out the fishing process in that fishing area. The total catch of swimming crabs that had a carapace width of less than 10 cm in this study was 22 individuals (26.5%), this was because the research location was far from the coast (± 15 km). According to Hamid *et al*., (2016); Prasetyo *et. al*. (2014) the farther the fishing grounds are from the coast, the fewer small swimming crabs caught.

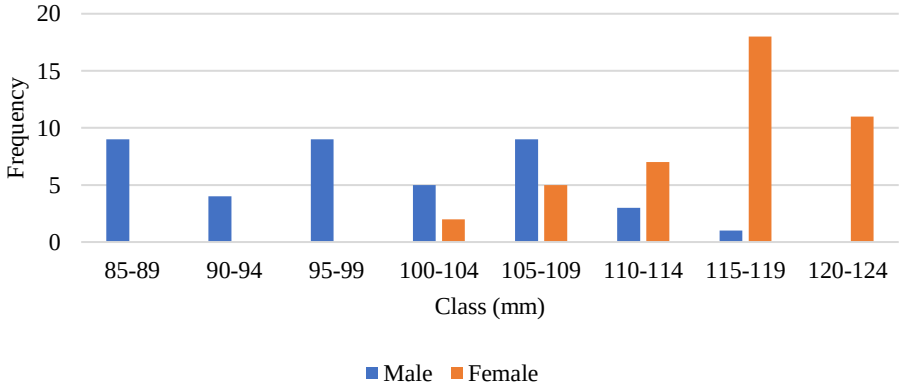


Figure 4 – The size distribution of blue swimming crabs by sex

The fishing process using traps in this study can be said to be environmentally friendly, this is because the average carapace width of the swimming crab caught is 106 mm, with the average male swimming crab caught during this study was 102 mm and for the female swimming crab was 106 mm. According to Ernawati *et al*., (2014) the average size of the carapace width of the first maturity (Lm) is 107 mm. Munthe and Dimenta, (2022) stated that the average size of male swimming crab when the gonads first matured was 87.20 mm and for females when the gonads first matured was 103.55 mm. Mature female swimming crabs tend to be found in abundance in Betahwalang waters in one cycle year, namely in January, April and August with the carapace width class of 110–119 mm, with the smallest width class found in July which has the carapace width class of 70–79 mm. The size of the gonad mature female is relatively small (<100 mm) which is suspected to be under pressure from fishing activities, so that female swimming crabs experience gonadal maturity and even lay eggs more quickly (Tharieq *et al*., (2020).

CONCLUSION

The catch of swimming crabs in traps with ponyfish bait was 27 individuals, 14 males and 13 females, in traps with bagrid catfish bait total 30 individuals, 15 males and 15 females, while in traps with swimming crab shell waste bait was 26 individuals, 11 males and 15 females. Statistical analysis showed that the difference in bait on traps had no effect on swimming crab catches in Betahwalang Village, Demak Regency. This shows that swimming crab shell waste can be an alternative bait for catching blue swimming crabs, because the results are not different from the catch using ponyfish or bagrid catfish bait. The carapace width of the blue swimming crab caught was 85 – 122 mm, 73.5% of them are > 100 mm which means it complies with the Regulation of the Minister of Maritime Affairs and Fisheries (PERMEN KP) No. 16 Year 2022.

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