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Result comparison of catch off the crab with catching tool dragon trap and gill net in the waters of Segeri, Pangkep regency

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Abstract
In general, crabs spread in the coastal districts and the nearest island districts in Pangkep Regency. Bawasalo is a coastal area that makes its inhabitants have a livelihood as fishermen. The purpose of this study was to find out the comparison of crab catches on trap nets and gill nets including a comparison of the number of yields (kg) and the number (head) per fishing gear, size distribution, long-weight relationship, and comparison of the number of male and female sexes. Sampling was carried out 3 times a week so that the number of crabs on the trap fishing gear was obtained as many as 846 individuals with a total weight of 45.9 kg consisting of 502 males and 344 female crabs while the gill catches were obtained as many as 834 individuals with a total weight of 82 .4 kg consisting of 478 males and 356 females. The carapace width range for crab caught by bubu dragon is 7.1 – 14.7 with body weight ranging from 11.7 – 192 grams and for crab caught by gill net carapace width is 7.2 – 15.9 cm with body weight ranging from 14-121 gram.. The relationship between the width of crab weight caught by dragon trap shows a value of b=2.7923 with a value of R^2 = 0.7485, crab caught by gill net shows a value of b=2.9191 with a value of R^2 = 0.7848 which means Growth pattern of both trap and gill net negative allometric.

Keywords: Swimming crab, Caught, Dragon Trap, Gill Net, Pangkep Regency

Introduction

The existence of potential blue swimming crab resources is in fact not evenly distributed throughout the waters of Pangkep Regency, this is partly due to differences in the environmental conditions of the waters. In general, crabs spread in the coastal districts and the nearest island districts in Pangkep Regency. According to the Maritime Affairs and Fisheries Service of Pangkep Regency, in 2010 the production of blue swimming crabs from fishing in the waters of Pangkep Regency amounted to 1819.7 tons (Dinas Kelautan dan Perikanan. 2010) [1].

Blue swimming crab (Portunus pelagicus) (Linn. 1758) (Portunus pelagicus) (Linn. 1758) is a marine sector commodity that has high economic value. The amount of crab production has increased very rapidly in the last decade. Based on FAO data, the amount of blue swimming crab production in 2016 reached more than 265 thousand tons, an increase of more than 44% when compared to 2010. Of this amount, only 29 thousand tons of blue crab production were met from the aquaculture sector. (FAO, 2017).

Dragon trap is a kind of trap or fishing device that has a long shape resembling a dragon snake with alternate doors and a 1 meter long cone as a gathering place for catches. Other fishing gear that can be used to catch blue crabs is the gill net. Gill nets are selective and environmentally friendly fishing gear. Gill nets or gill nets are rectangular nets, with the same size mesh equipped with 49 balls at the top and weights at the bottom.

The purpose of this study was to find out the comparison of crab catches on dragon trap and gill nets including a comparison of the number of results (kg) and the number (head) per fishing gear, size distribution, long-weight relationship, and comparison of the number of male and female sexes.

Research Purposes

Time and place

This research was conducted from March to May 2023 in Bawasalo Waters, Segeri District, Pangkep Regency (Fig 1).

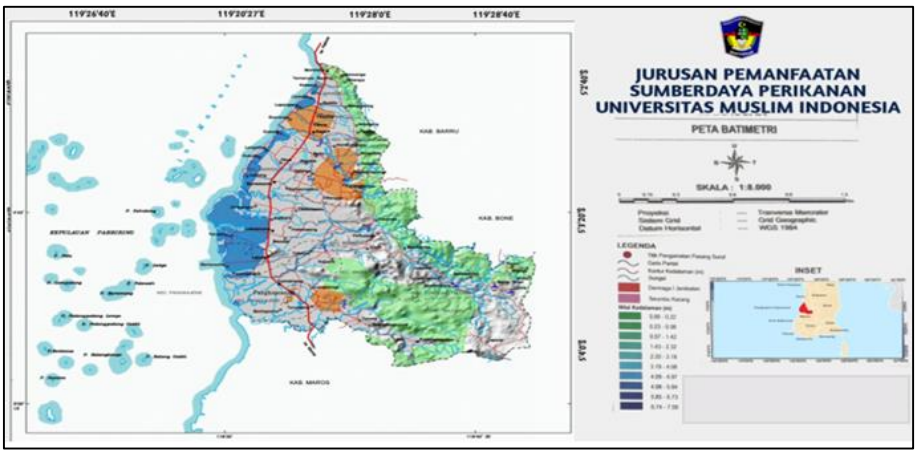

Fig 1: Research Location Map

Data collection was carried out 3 times a week during March-May. The data collection for crab catches was 24 trips, using 30 traps and 30 gill nets. The catch of dragon trap and gill net is counted and weighed for each trip. The measurement of the number of catches is carried out after each catch. The number of catches is counted and weighed using a digital scale with a capacity of 2 kg.

Analysis of weight (kg) and total (tail) catch of Dragon Trap and Gill Net

A comparison of the crab catches from dragon trap and gill net fishing gear was carried out using the Tstudent test analysis, but first standardization of fishing gear was carried out using the Fishing Power Index (FPI). The analysis is presented in the form of tables and bar charts.

Size Distribution

Size distribution analysis is presented in the form of bar graphs between carapace width and crab weight with the proportion of the number of samples obtained.

Relationship between Breadth and Weight

Analysis of the relationship between length and weight aims to determine growth patterns using the parameters of width and weight. applies the equation:

$$W = aL^b$$

Explanation:

W = Crab weight (gram)

L = The width of the crab shell (cm)

a dan b = Constant

If b = 3 then the growth is isometric, that is, the growth rate of the length, width and height of the crab is the same (Everhart and Youngs, 1981). If b > 3 then the growth is positive allometric (weight growth is more dominant than length growth) whereas if b < 3 then allometric growth is negative (length growth is more dominant than weight growth).

Blue swimming crab sex distribution

Comparative analysis of the sexes of swimming crabs is presented in the form of a bar chart between male and female sexes with a total sample of both fishing gears.

Results and Discussion

Analysis of weight (kg) and total (tail) catch of Dragon Trap and Gill Net

The amount of crab caught using dragon trap during the study was 45.9 kg. The highest catch was on trip 5 weighing 4.8 kg with a total of 89 heads, while the lowest catch was on trip 17 with a total of 0.8 kg with a total of 17 heads (Fig 2).

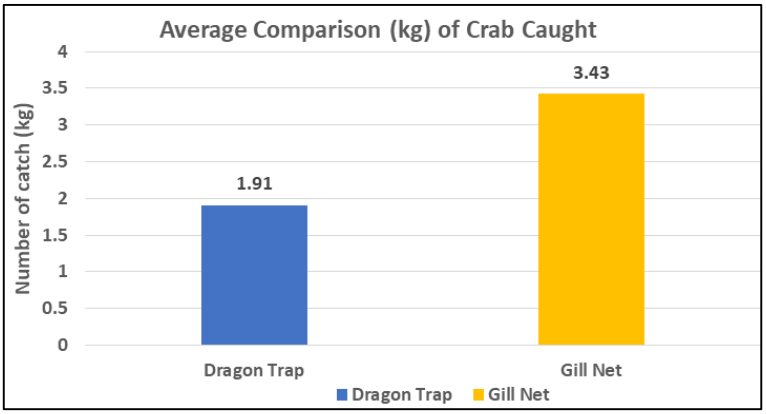

Fig 2: Comparison of Average Weight of Crab Catches with Bubu Naga and Gill Net

The amount of crab caught using gill net during the study was 82.4 kg. The highest catch was on trip 9 weighing 16.8 kg with a total of 111 heads while the lowest catch was on trip 6 with a total of 0.7 kg with a total of 10 heads.

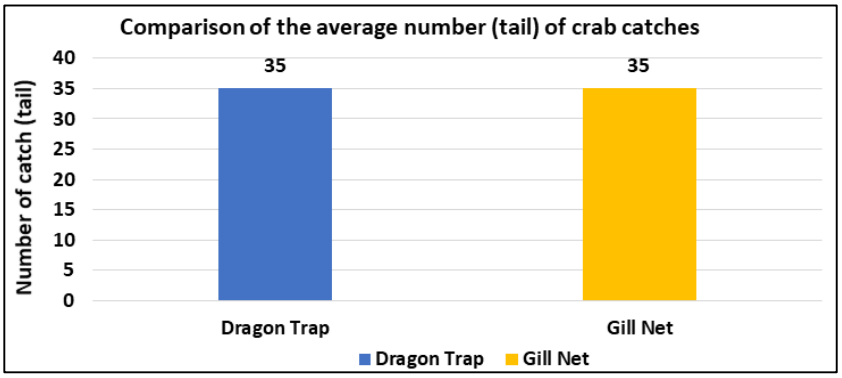

Fig 3: Comparison of the average number (head) of crabs with Bubu Naga and Gill Net

Table 1: T-Student Test Results

No	Catching tool	t_{hit}	t_{tab}	Explanation
1	Dragon Trap dan Gill nett	0,0316	0,05	$t_{hit} < t_{tab}$

Based on (table 3) it can be seen that the results of the T test show that the t-count value is 0.0316 and the t-table value is 0.05. Where the t-count value is smaller than the t-table value. So that the results of the analysis of the T-test concluded that there were differences in the catches of blue crab on the fishing gear of the dragon trap and the gill net.

This difference is thought to be due to the different fishing depths where the dragon trap operates at a depth of 5-7 meters and the gill net at a depth of 7-9 meters. This is because at the time of collecting research data, the condition of the water currents in the sea is relatively calm because water currents play an important role in determining fishing patterns. The current is also very influential on the mesh opening of the gill net so that it also affects the number of crabs that can be caught. Therefore, in this study, the gill net fishing gear caught more blue swimming crabs than the dragon trap.

Size Distribution

The size distribution of the width of the crab carapace in dragon trap from 7.1 – 14.7 cm. The smallest carapace width at class intervals 7.1-7.7 was 25 individuals, the largest carapace width at class intervals 13.4-14 was 1 individual, there was an increase in the number of catches at class 9.2-9.8 interval widths of 198 individuals and a decrease in the number of catches at class 9.9-10.5 intervals of 169 individuals can be seen in (Fig 4).

The size distribution of the crab weight in dragon trap ranges from 11.7 – 192 grams. The smallest weight in class intervals 11.7-28 was 31 fish, the largest weight in class intervals 175.7-192 was 1 fish, there was an increase in the number of catches in class intervals 28.1-44.4 by 286 fish and a decrease in the number of catches in class intervals 44.5-60.8 by 225 can be seen in (Fig 5).

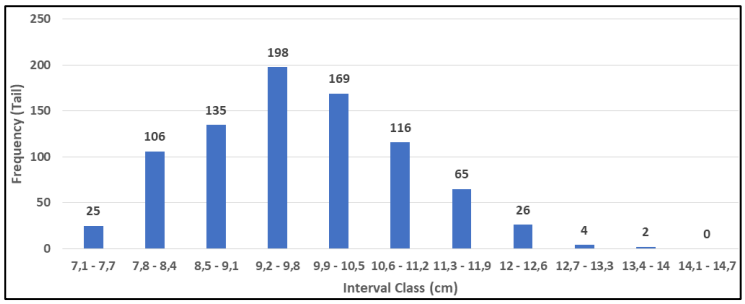

Fig 4: Size Distribution of Crab (Bubu Naga)

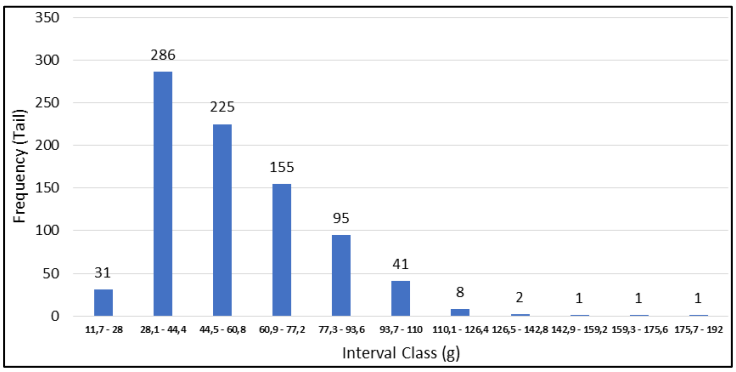

Fig 5: Weight Size Distribution of Crab (Bubu Naga)

The size distribution of the carapace width in gill net fishing gear ranges from 7.2 – 15.9 cm. The smallest carapace width at class intervals 7.2-7.9 was 13 individuals, the largest carapace width at class intervals 15.2-15.9 was 3 individuals, there was an increase in the number of catches at class intervals 10.4-11.1 by 167 individuals and a decrease in the number of catches at class intervals 11.2-11.9 by 154 individuals can be seen in (Fig 6).

The size distribution of crab weight on gill net fishing gear ranges from 10.2 – 2264 grams. The smallest weight in class intervals 10.2 – 29.4 was 10 fish, the largest weight in class intervals 207.2-226.4 was 3 fish, there was an increase in the number of catches in class intervals 48.8-68 by 177 fish and a decrease in the number of catches in class intervals 68.1-87.3 by 173 fish can be seen in (Fig 7).

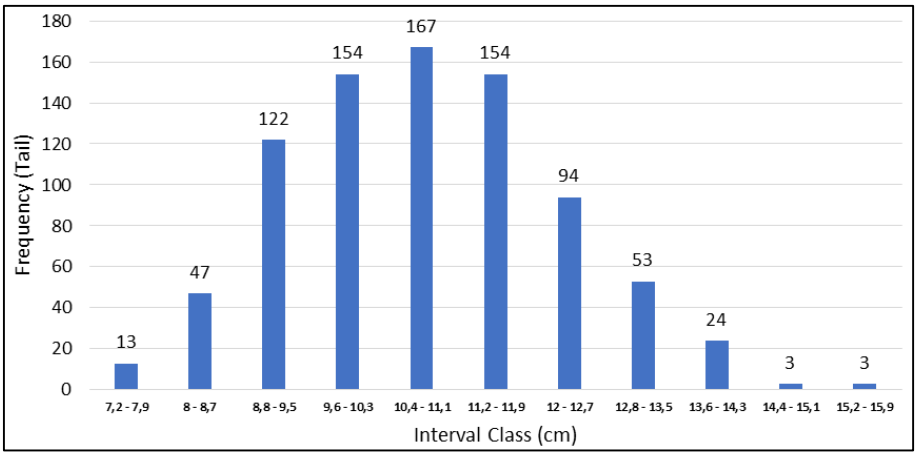

Fig 6: Size Distribution of Carapace Width of Crab (Gill Net)

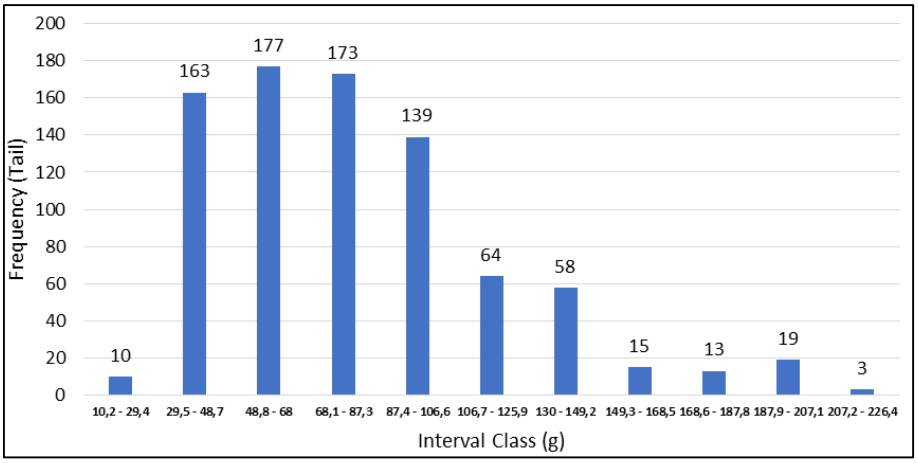

Fig 7: Weight Size Distribution of Crab (Gill Net)

Measuring the carapace width of the crab caught by fishermen from Bawasalo waters using dragon trap and gillnets, around 65% of the crabs met the standards set by the Minister of Maritime Affairs and Fisheries Regulation No.12/PERMENKP/2020 which states that the minimum crab weight is 60 grams and the carapace width is at least 10 cm per head. While the remaining 35% small crab did not meet the standard. This is because fishermen in Bawasalo waters do not limit the size of the crab to be sold. This fishing gear can trap large to small crabs.

The results of measurements of crab weight from both dragon trap and gill nets showed that there were more crabs with higher weights produced by gill nets compared to traps, even though the catch was more traps for dragon trap to gill nets. According to Wulandari *et al*, (2014) said that the increasing depth of water the weight of the crab caught is greater, but the number of tails obtained is not as much as the results of fishing at relatively shallow depths. This is in accordance with the location where the gill net is placed deeper than the dragon trap, so this makes it possible to catch gill nets more dominantly with higher weights.

Relationship between Widthth and Weight

Analysis of the relationship between the width of the crab weight on the dragon trap showed b<3 with a value of 2.7923. This indicates that the crab caught is negative allometric where there is an imbalance in the growth rate ratio between carapace width and body weight. The width and weight have a closeness with the value of R2 = 0.7485 almost close to 1, this shows that every increase in the value of the width of the crab is followed by an increase in the weight of the crab and vice versa, because the two have a close and interrelated relationship can be seen in Fig 8.

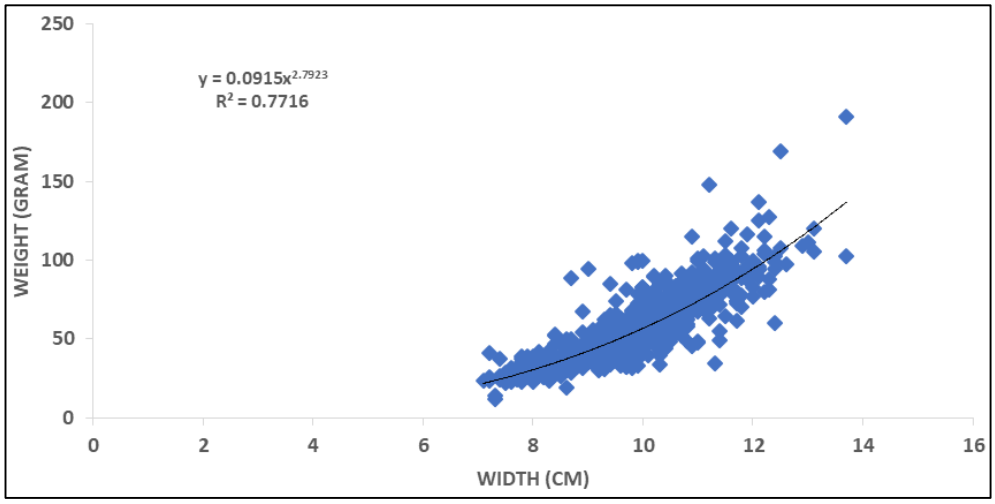

Fig 8: Relationship Between Crab Weight Width And Bubu Naga

Analysis of the relationship between the width of the crab weight on the gill net fishing gear showed b <3 with a value of 2.9191 which indicated that the crab caught was negative allometric where there was an unequal growth rate ratio between carapace width and body weight. The width and weight of the crabs are closely related to the value of R2 = 0.7848, almost close to 1. This indicates that any increase in the value of the width of the crabs is followed by an increase in the weight of the crabs and vice versa, because the two have a close relationship and are interrelated as can be seen in Fig 9.

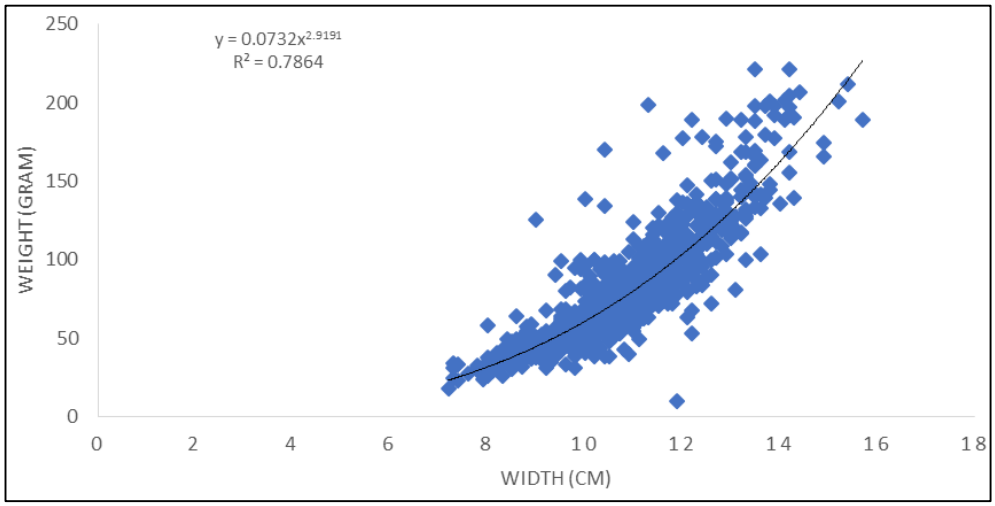

Fig 9: Relationship between BSC Weight Width and Gill Net

Based on the results of the analysis of the relationship between carapace width and body weight, it was found that the crab from the dragon trap had a value of b = 2.7923 and the crab from gill net fishing gear had a value of b = 2.9191. This value indicates that the blue crab on both fishing gears has a value of b <3, the value of b on the crab caught by gill net is greater than the value of b on crab caught by dragon trap. The results of the study are the same as the growth patterns obtained by Rindika, *et al* (2020) [8], namely the value of b = 2.218 for male crabs 1.1783 for female crabs. The results of the same study were also obtained by Makahinda, *et al* (2018) [6] where the growth of blue swimming crabs in both locations showed a negative allometric with a value of b = 1.729 for males and 1.326 for females in Tumumpa Village. However, these results are different from the results of a study by Iksanti, *et al* (2022) [5] with a growth pattern obtained by a value of b = 3.51 for male crabs and 3.33 for positive allometric female crabs. The nature of growth in carapace width and weight that differs from region to region can occur in blue swimming crab because it is influenced by environmental factors, food availability, water temperature and salinity, sex, and reproduction and fishing area (Ernawati dkk, 2014) [2].

Perbandingan Jenis Kelamin Hasil Tangkapan Rajungan

The size distribution of the sex of the swimming crab from the fishing gear of dragon trap with a total sample of 846 individuals. The sex ratio of blue swimming crab is higher, namely 502 males, while 344 females can be folded in Fig 10.

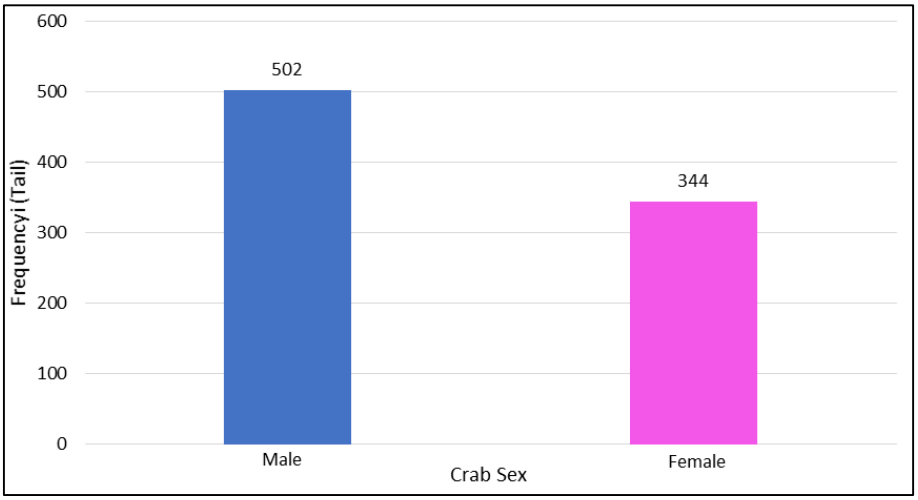

Fig 10: Comparison of crab Sex (Bubu Naga)

Size distribution of crab sex from Gill net fishing gear with a total sample of 834 individuals. The sex ratio of crabs was higher, namely 478 males, while 356 females, can be seen in Fig 11.

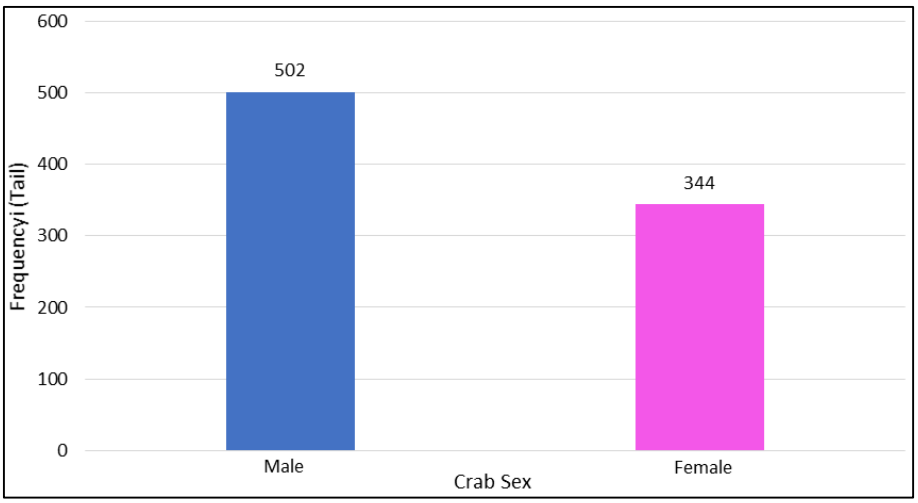

Fig 11: *Comparison of crab Sex* (*Gil Net*)

Based on the results of the study, the male sex was more dominant caught in Bawasallo waters compared to the female sex. The same research results were also obtained by Hidayat, *et al* (2020) with a greater number of male crabs than female crabs with a ratio of 1:0.88. The same research results were also obtained by Philips, *et al* (2022), namely the number of male swimming crabs was found in Kobomo Village Waters with a ratio value of 1.71: 1. However, these results are different from the results of the study by Simanjuntak, *et al* (2020) with a ratio of 0.80: 1 where more female crabs are caught than male crabs. The results of the same study This condition is in accordance with the results of a study conducted by Suadela (2004) which stated that more male crabs were caught. The male crab likes water with low salinity so that it spreads around relatively shallow coastal waters, while the female crab likes high salinity, especially for clearing, so it spreads in deeper waters (Sandi, 1997).

Conclusion

The number of crabs observed was 1680 which were obtained from two fishing gears, namely 846 dragon traps and 834 gill nets. The carapace width range for the crab caught by the dragon trap is .1 – 14.7 with a body weight ranging from 11.7 – 192 grams while the crab on gill fishing gear with a carapace width of 7.2 – 15.9 cm with a body weight ranging from 14-121 grams. The relationship between the width of the crab weight on the dragon ttrap showed a value of b = 2.7923 with a value of R2 = 0.7485, while the relationship between the width of the weight of the crab on gill net fishing gear showed a value of b = 2.9191 with a value of R2 = 0.7848. The sex ratio of blue swimming crab in dragon trap with male sex was 502 and female sex was 344. Meanwhile, the sex ratio of blue swimming crab in gill net fishing gear with 478 males and 356 females.

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