
Catch Composition and Selectivity Drift Gillnet in Pambang Pesisir Village Bantan Subdistrict Bengkalis Regency

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Abstract

Gill nets are placed perpendicular to the water to block the swimming direction of the fish. Fish are caught by being entangled in the meshes or entangled (spun) in the body of the net. This research was conducted in Pambang Pesisir Village, Bantan District, Bengkalis Regency, to know the composition of the catch and the selectivity of drift gill nets, comparing the composition of the number, type, weight, and size of the catch from different mesh sizes, and knowing how to catch fish (entangled, gilled, snagged, wedged) on the same mesh used. This research was carried out in December 2020 using the experimental fishing method, which is a research method that uses samples of research objects caught on fishing gear for observation. The research results of drift gill nets are species-selective fishing gear. Moreover, drift gill nets with a mesh size of 7.62 cm are more selective than nets of 5.72 cm because they have a catch ratio value closer to 1 and catch more large fish (worth catching). How to catch fish with a mesh size of 5.72 cm, many fish were caught by snagged; namely, 65 fish (30%), wedged 61 fish (28%), gilled 59 fish (27%), and 33 fish entangled (15%). Meanwhile, for the mesh size of 7.62 cm, 30 fish (31%) were caught wedged, 27 fish (29%) snagged, 27 fish (29%) gilled, and ten fish entangled (11%).

1. Introduction

Water Bengkalis Regency consists of eight sub-districts, and six are located in coastal areas; with these coastal areas, fishermen dominate the community's livelihoods. Statistical data of Fishery Households (RTP) with a total of 5,058 consisting of 3,386 fishing RTP and 1,670 aquaculture RTP. The potential of capture fisheries is supported by the condition of the Bengkalis Regency area, which has 17 islands and is in the Fisheries Management Area (WPP) 571 of the Malacca Strait as a fishing ground, and other straits which are traditional fishing grounds (DKP, 2021).

The development of types of fishing gear in Bengkalis Regency per unit in 2020, namely gill nets (57,636), trammel nets (7,314), Bubu (158), rawai (1,257), penggilar (2,074), fishing rods (350) (DKP, 2020). One of the fishing

units operated in Pambang Pesisir Village is a gill net fishing unit of 62 units. A gill net is a net set perpendicularly in the water to block the swimming direction of fish. Fish are caught by getting entangled in the mesh or twisted in the body of the net. Based on observations, gill nets catch many fish by twisting. If the fishing gear catches much fish by twisting, then the function of the mesh as an entangler cannot function properly. Fish larger or smaller than the mesh can be caught in the gill net without breaking through the mesh (Pondaag et al., 2018).

Mackerel is a pelagic fish species widely caught with drift gillnet gear and is included in the economically important category in Pambang Pesisir Village. Currently, mackerel fishing with gillnet gear tends to ignore the rules of fish resource sustainability, so the tendency to catch small and young fish continues (Atmaja et al., 2003).

Since mackerel is a commodity with a substantial economic value, if fishing efforts are not controlled, it can threaten the sustainability of fish resources. The level of selectivity of fishing gear influences the creation of sustainable fish resources.

2. Methodology

2.1. Time and Place

This research was conducted in December 2020 in Pambang Pesisir Village, Bantan District, Bengkalis Regency, Riau Province.

2.2. Method

The research method used in this study is experimental fishing, which is a research method that uses a sample of research objects caught in fishing gear for observation.

2.3. Procedure

Before conducting definitive tests, preliminary In this study, the primary and secondary data are used. Primary data is obtained based on the results of fish measurements and direct observations in the field. The fish measurements taken are fish body length, fish spout length, fish body width, fish body circumference, and fish weight. Several steps are taken in the data collection process: 1) Preparation of supplies during fishing, 2) Departure from the fishing base to the fishing ground. 3) After arriving at the fishing ground, lower the fishing gear, 4) lift the fishing gear, 5) return to the fishing base, and 6) measure the fish and weigh the catch obtained.

2.4. Data Analysis

2.4.1. Catch Composition

The analysis used to calculate the composition of the catch is descriptive analysis, where the composition of the catch will be calculated based on the type of fish caught. After that, a percentage of the species obtained during the catch is made. In addition, how fish are caught in the net is also recorded and presented in tabular form.

2.4.2. Analysis of selectivity test in drift gillnet gear

For selectivity test analysis, previously collected data, namely fish size data, is then entered into a class interval, and the frequency

of each class is entered so that the average length of the most caught fish will be obtained.

3. Result and Discussion

3.1. General Situation of the Research Area

Pambang Pesisir Village is part of the eastern part of Bengkalis Island, directly opposite the Strait of Malacca. It is located between two capes, Tanjung Senekep and Tanjung Parit. This area extends from north to south for 5000 m and is bordered to the south by Pambang Baru Village; from the east, a Malaysia from the expansive shoreline to the west for 5000 m, bordered by Pambang Baru Village. The boundaries of Pambang Pesisir Village are as follows: North bordering Muntai Village and Pambang Baru Village, East bordering the Malacca Strait, South bordering Pambang Baru Village, West bordering Pambang Baru Village (Bantan, 2020).

3.2. Composition of Catch

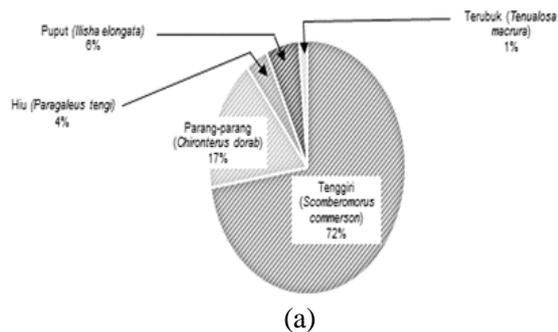
Based on the catch of gill net fishing gear conducted ten times fishing, the total number of fish was 312 fish caught in both meshes, consisting of 5 species of fish. Furthermore, in the drift gill net with a mesh size of 5.72 cm, there are 218 fish consisting of 5 species, while at a mesh of 7.62 cm, 94 fish consisting of 3 species (Figure 1).

Figure 1, it can be seen that the types of fish caught at a mesh size of 5.72 cm are mackerel (*Scomberomorus commerson*) 72%, parang-parang (*Chirocentrus dorab*) 17%, Shark (*Paragaleus tengi*) 4%, puput (*Ilisha elongata*) 6%, and terubuk (*Tenulosa macrura*) 1%. In Figure 1, the mesh size of 7.62 cm, the types of fish caught were mackerel (63%, parang-parang 34%, and puput 3%.

The total weight of the catch in the drift gill net gear with a mesh size of 5.72 cm is 72.1 kg. The total weight of the catch in the drift gill net fishing gear with a mesh size of 7.62 cm is as much as 95.1 kg. The most catch in mesh sizes 5.72 cm and 7.62 cm are mackerel, as much as 52.31 kg and 53.19 kg.

The mesh size of 5.72 cm was seen in more significant numbers than the mesh size of 7.62 cm. This is also following the statement of Dincer & Bahar (2008) that the mesh on the gillnet is a factor that significantly affects the size of the catch. The number of catches obtained by fishermen also varies daily due to differences in fishing locations carried out by

these fishermen, and other factors can also



influence it.

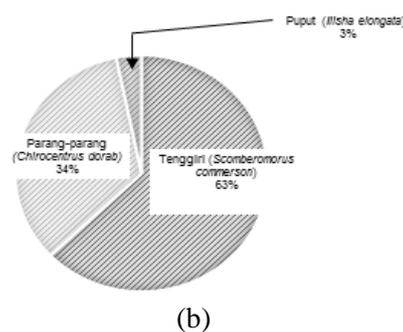


Figure 1. Composition of Catch, (a) at 5.72 cm mesh size; (b) 7.62 cm mesh size

If the proportion of catches with the main target is getting bigger, then the fishing gear can be considered selective in terms of type. Rofiqo et al. (2019) stated that the composition of the main target catch shows the selectivity of the fishing gear. If the proportion of the main target catch produced is more significant, then the fishing gear can be considered selective in terms of type.

The composition of the catch at a mesh size of 5.72 cm and 7.62 cm looks selective in terms of type, but at a size of 7.62 cm also looks more selective to the size compared to the mesh size of 5.72 cm. so it shows that this fishing gear has selectivity to the type and effectively catches mackerel.

3.3. Fish Caught

The way fish are caught in gill nets with mesh sizes of 5.72 cm and 7.62 cm can be grouped into four types: entangled, gilled, snagged, and wedged. The following is the percentage of the way fish are caught ten times during fishing for ten days with two mesh sizes, which will be presented in Table 1.

Table 1 shows how fish are caught in gill net fishing gear: gilled, snagged, wedged, and entangled. From the results of the research conducted, it is known that at a mesh size of 5.72 cm, many fish are caught in snagged; namely, 65 fish, with a percentage of 30%, wedged as many as 61 fish with a percentage of 28%, gilled as many as 59 fish with a percentage of 27% and entangled 33 fish with a percentage of 15%. While at a mesh size of 7.62 cm, many fish are caught in wedged as many as 30 fish with a percentage of 31%, snagged as many as 27 fish with a percentage of 29%, gilled as many as 27 fish with a percentage of 29% and entangled as many as ten fish with a percentage of 11%.

Table 1. Percentage of Ways Fish are Caught

Cara Tertangkap	Ukuran Mata Jaring			
	5, 72 cm		7,62 cm	
	Jumlah (ekor)	Presentase (%)	Jumlah (ekor)	Presentase (%)
Entangled	33	15	10	11
Gilled	59	27	27	29
Snagged	65	30	27	29
Wedged	61	28	30	31
Total	218	100	94	100

From both mesh sizes, it was found that both fishing gear were caught more gilled, snagged, and wedged than entangled. According to Anggraeni et al. (2017), the smaller the fish caught entangled, the more likely the gear is selective. The number or proportion of fish caught by entangled gillnet determines the selectivity of the gillnet gear, so it is vital to know the proportion of the catch and the way fish are caught in the catch.

The condition of the fish caught also depends on the size and resistance of the fish when escaping from the net. Pertiwi et al. (2017) stated that tiny fish can break through the net at a specific mesh size, and massive fish cannot penetrate deep enough to escape. The smallest fish caught have a specific maximum circumference, and the largest fish caught have a head circumference equal to the mesh perimeter, causing the fish to become entangled and then twisted.

3.4. Selectivity Analysis

Gear selectivity is the ability of fishing gear to select specific types and sizes of fish to catch. A selectivity curve is a curve that describes the probability of catching a specific type of fish at a certain interval using a particular type of fishing gear.

Selectivity tests using two different mesh sizes of 5.72 cm and 7.62 cm. Selectivity was also tested using the type of fish that often appeared in both meshes, and the fish that often appeared in both meshes was mackerel. Therefore, the mackerel fish was used as a

selectivity test material to see the selectivity value at both mesh sizes.

Calculations were made by creating a frequency distribution table on the length of mackerel presented in Table 2.

Table 1. Frequency of Mean Values of Fork Length of mackerel (*S.commerson*) Caught at Mesh Sizes of 5.72 cm and 7.62 cm

Class interval	Centre value (x)	Number of fish caught		In = cb/ca
		5.72 cm	7.62 cm	
		Ca	Cb	
22,0 - 25,7	23,85	31	0	0
25,8 - 29,5	27,65	25	1	-3,218875825
29,6 - 33,3	31,45	61	7	-2,164963715
33,4 - 37,1	35,25	41	16	-0,940983344
37,2 - 40,9	39,05	0	5	0
41,0 - 44,7	42,85	0	17	0
44,8 - 48,5	46,65	0	8	0
48,6 - 52,3	50,45	0	2	0
52,4 - 56,1	54,25	0	3	0

The results were calculated using the gill net selectivity equation for mackerel. Ca and Cb are the fork lengths of fish in the same class caught at mesh sizes ma and mb, respectively. The slope and intercept values were obtained from a linear regression between the logarithm of the total catch and the class mean value of the fork length of fish in both mesh sizes. The intercept and slope values were used to calculate SF (selection factor), maximum and minimum length (Lm), and standard deviation (S2). The intercept, a = -11.53455305, and slope, b = 0.299722695, were obtained. The SF value was obtained as 5.769727578, and Lm at mesh sizes of 5.72 cm and 7.62 cm were 33.002 cm and 43.965 cm, respectively. The value of (S2) was obtained as 36.5754165.

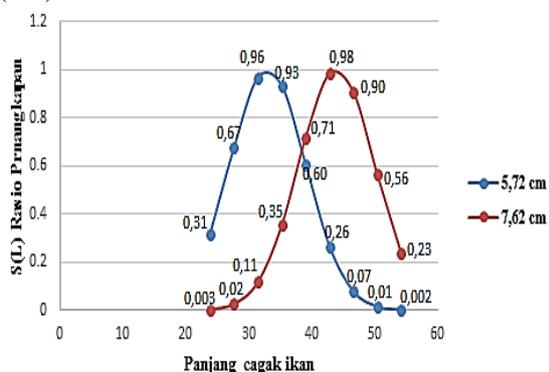


Figure 3. Graph of Drift Gillnet Catches Selectivity for mackerel at Mesh Sizes of 5.72 cm and 7.62 cm

The level of selectivity can be assessed by looking at the L and S values. According to Indah (2014), the greater the L value and the closer the S value to 1.00, the more selective the fishing gear will be. From the selectivity graph in Figure 2, it gives a steep shape. The highest capture ratio of mackerel in gill nets with a mesh size of 5.72 cm was caught at a ratio of 0.96. The highest capture ratio of mackerel at a mesh size of 7.62 cm was caught at a ratio of 0.98.

Based on the selectivity curve of the drift gillnet, it can be seen that the chances of catching mackerel at a mesh size of 5.72 cm, the highest capture ratio is caught at a size of L 31.45 cm and S (La) or a capture ratio of 0.96. While at a mesh size of 7.62 cm, the highest capture ratio was caught at a size of L 42.85 cm and S(Lb) or a ratio of 0.98. This follows Indah (2014), which states that the greater the value of L and the closer the value of S is to 1.00, the more selective the fishing gear will be. So, mesh size 7.62 cm can be considered more selective than mesh size 5.72 cm because the capture ratio is more significant, and the S (La) value is closer to 1.

The drift gillnet selectivity curves for these two mesh sizes gave a steep curve shape. The probability of catching fish is more significant in the net with a mesh size of 5.72 cm, although the mesh size comparison is not too far away. Based on the value of the

selectivity equation for mackerel, it was found that the length range of fish at mesh sizes of 5.72 cm and 7.62 cm ranged from 22 - 37 cm and 28 - 55 cm. The circumference of the fish body at mesh sizes of 5.72 cm and 7.62 cm ranged from 14 - 24 cm and 19 - 29 cm.

This also shows that different mesh sizes can affect the size of mackerel caught. A mesh size of 5.72 cm could catch smaller fish compared to a mesh size of 7.62 cm, which could catch larger or adult fish.

Therefore, with a smaller mesh size, the fishing gear will catch fish with smaller fish sizes and vice versa. If the mesh size is larger, it will also catch fish with larger sizes. This is similar to Manalu's (2003) statement that the larger the mesh size, the larger the fish caught. Furthermore, according to Naesje et al. (2004), the gillnet is a selective fishing gear. In its operation, different mesh sizes capture different types and sizes.

4. Conclusion

from the research that has been done on drift gill net fishing gear in Pambang Pesisir Village that the total number of fish is 312 fish caught in both meshes consisting of five fish species including mackerel, parang - parang, shark, puput, and terubuk. The dominant fish caught in both mesh sizes is the mackerel fish, totaling 217 or 69%. The total weight of the catch in drift gillnet gear with a mesh size of 5.72 cm is 72.1 kg, and in drift gillnet gear with a mesh size of 7.62 cm is 95.1 kg.

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