
Composition of Fishing Gear Pengerih at Day and Night in Meskom Village, Bengkalis District

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Abstract

Pengerih is one of the trapping gears used by fishermen in Meskom Village. The purpose of this study was to determine the composition of the catch of Pengerih including the type and weight of fish caught during the day and night. This research was conducted in September 2022 in Meskom Village, Bengkalis Regency. The method used in this research is the survey method. The analysis used is by calculating the level of main catch and bycatch using the formulation of Akiyama. Based on the results of the study, it was found that the catch of curler gear was 9 types with a total catch of 5.030 fish with a total weight of 51,08 kg. The dominant types of catch during the study were red shrimp (*Parapenaeus longirostris*) 1.272 fish weighing 10,64 kg, striped shrimp (*Parapenaeopsis sculptilis*) 1,158 fish weighing 9,71 kg, white shrimp (*Panaeus merguensis*) 1,115 fish weighing 9,34 kg, thorn shrimp (*Panulirus* sp) 883 fish weighing 7,34 kg, Moustached thryssa (*Engraulis mystax*) 302 fish 3,84 kg. While the bycatch consisted of print shrimp (*Harpiosquilla raphidea*) 39 fish weighing 1,46 kg, Bombay duck (*Harpodon nehereus*) 75 fish weighing 5,42 kg, Panna croaker (*Otolithoides microdon*) 93 fish weighing 1,46 kg, Shorthead hairfin anchovy (*Setipinna breviceps*) 93 fish and weighing 1.87 kg. If you look at the results of the catch more tend to be a lot of catches at night 2.813 fish weigh 28.84 while during the day 2.217 fish weigh 22.24 kg.

1. Introduction

Bengkalis Regency is one of the regencies in Riau Province, where the area is located on the east coast of the island of Sumatra with a geographical location between 00 56-20 30' North latitude and 1000 52 -102'0 31' East longitude. The administrative boundaries are as follows: the north borders the Malacca Strait; the south is bordered by Siak Regency and Meranti Islands Regency, The west is bordered by Rokan Hilir Regency, Rokan Hulu Regency, and Dumai City, and the east borders the Malacca Strait.

The Bengkalis Regency area is drained by several rivers. Among them, several rivers are very important as the main means of transportation in the population's economy, namely, the Siak River with a length of 300

km, the small Siak River 90 km, and the Mandau River 87 km. The area of Bengkalis Regency is 7.773.93 km², consisting of islands and oceans. There are 16 main islands in addition to other small islands in this regency (Bengkalis Regency Fisheries Service, 2019).

The waters in Meskom Village are very strategic as a fishery area, located directly adjacent to the Malacca Strait. There are several types of fishing gear used by fishermen in Meskom Village to catch fish such as Ambai, gombang, pengerih, net, and rawai. Of the several types of fishing gear, the dominant fishing gear is pengerih.

The waters in Meskom Village are muddy and along the edge of the waters are overgrown with mangrove forests and other types of plants. This water location is favored

by shrimp and fish to breed and find food and is good for operating fishing gear.

Pengerih is a static fishing gear that waits and traps fish and shrimp that enter the pengerih bag with the help of currents and is installed against the current movement. As Pulungan (2012) said, pengerih fishing gear is a shrimp and fish catching tool, where this fishing gear is against the direction of the water current, namely, tidal currents and ebbs.

Water conditions during the day and night are changes in tides and ebbs that can affect changes in currents. At night the current experiences a higher speed than during the day. According to Yani (2020), the current is a flowing movement of a mass of water that can be caused by wind blowing, differences in seawater density, and long undulating movements caused by tides. High current speeds will affect the swimming power of fish; fish that are carried away by the current if the current exceeds the swimming speed of the fish.

The movement of seawater masses from one location to another during tides causes tidal currents. Usually, the direction is more or less alternating, that is, if the water level moves down then the current flows in, while when the water level moves up then the current flows out. These tidal currents play a role in coastal processes such as sediment dispersal or coastal abrasion. The rising tide will cause sedimentation near the shore, while the receding tide will cause sedimentation towards the open sea. Tidal currents are generally not so strong that they cannot transport large sediments (Opa, 2007).

The catches on the main catch target (main catch) in the waters of Meskom Village are shrimp and fish. Such as red shrimp, white shrimp, thorn shrimp, striped shrimp, and chicken feather fish. With the above targets, the mesh size must be small. The operation of a pengerih fishing gear cannot be separated from the presence of catches that are not the main target in fishing is often called bycatch. With this background, the authors are interested in conducting research

This study aims to determine the types of main catches and bycatch and to identify the dominant types and sizes of fish caught. While the benefits of this research can be information about the species that are the catch of the main catch and by-catch of the pengerih fishing gear

and are expected to become basic data in the study of the sustainability of the trap fishery.

2. Methodology

2.1. Time, Place, and Materials

This research was conducted in September 2022. Located in Meskom Village, Bengkalis Regency. The materials and tools used in this study include a ruler, digital scales, vernier, secchi disk, thermometer, current drogoue, basket, camera, stationery, and laptop.

2.2. Method

The method used in this research practice is the survey method. This method aims to obtain data on the composition of the catch in the form of fish weight, and fish species, as well as to obtain other supporting data in the form of identification of the construction of fishing gear used during the research. The data collected in this study are data; a). the overall weight of the catch, b) the type of fish caught data were taken for 7 (seven) consecutive days. Data collection and sample measurement were carried out by sorting the main catch and bycatch, then identified using the Saanin book.

2.3. Data Analysis

According to Hutomo *et al.* (1987), the catch calculation method is as follows:

$$P (\%) = N1/N \times 100$$

Description:

P = Percentage of one type of fish caught (%)

N1 = The specific gravity of fish at each sampling time (kg)

N = Total weight of catch per hauling (kg).

Data analysis in this study used the normality test, multicollinearity analysis, and multiple The data obtained were then tabulated in the form of tables and figures, then analyzed descriptively in the form of graphs. Catch composition data were analyzed using Akiyama's (1997) formulation, using the main catch and bycatch comparison method, namely:

$$\text{Maincatch} = \frac{\sum \text{Maincatch}}{\text{Total of catch}} \times 100\%$$

$$\text{Bycatch} = \frac{\sum \text{Bycatch}}{\text{Total of catch}}$$

The results of the descriptive and quantitative analysis will describe the percentage (%) of main catch and bycatch.

3. Result and Discussion

3.1. General Condition

Meskom Village is located in Bengkalis District, Bengkalis Regency, Riau Province. The village is located on the north side of Bengkalis Island. Geographically located in the position 101°56'31.2702" - 102°2'51.5565" East longitude and 1°35'4.2364" - 1°48'10.0874" North latitude. The boundaries of Meskom Village are to the west with Tanjung Jati Village, to the east with Tanjung Pengalih Luar Village, to the north with Pengalih Dalam Village, and to the south with Simpang Ayam Village. The waters of Meskom Village are muddy waters and the depth is not found in basins, around the beach many mangrove trees grow.

3.2. Pengerih Fishing Gear

The pengerih fishing gear used in Meskom Village is 7 meters long, made of multifilament PE (*polyethylene*) net material, and has *mesh sizes* of 4 inches, 2 inches, and 1 inch. The mesh size gets smaller towards the bag. The 4-inch mesh size is used for the mouth of the dryer. The 2-inch mesh size is used for the body, while the 1-inch mesh is used for the bag. The use of stakes of the type of mangrove wood 3 m long and 15-20 cm in diameter. The arm rope functions as a balance tool in the

water mounted on the right and left of the mouth of the scraper with polyamide material with a length of 5 m. The rope is made of polyamide Buoys that function to regulate the position of the tool body in the water. There are 3 buoys used by fishing gear, 2 buoys are located at the top right and left of the mouth. Pengerih bags are made from paint drums that are shaped in such a way. The bag functions as a gathering place for the catch. The exit door serves as a place for the exit of the catch. In general, the specifications of the materials and construction of the pengerih fishing gear are presented in Table 1.

The fleet used to go to the location of the fishing area is a rowing canoe consisting of 1 fisherman. with a ship size of 5 m long, 1.2 meters wide, and made of wood with a ship size of 1 GT. The sequence of fishing activities consists of the preparation of fishing gear installed in the fishing area (setting), and the lifting of fishing gear (hauling).

Pengerih fishing gear is usually operated by fishermen every day. The fishing time is divided into two times, namely during the day (06.00-14.00 WIB) at this time interval, hauling is carried out because this fishing gear is settled in the waters, while at night (20.00-05.00 WIB) a second hauling is carried out to take the catch.

Table 1. Material and Construction Specifications of Pengerih Fishing Gear

Fishing gear parts	Material /Material	Quantity/Length
Mouth	<i>Polyethylene (PE)</i>	4 inches
Curler body	<i>Polyethylene (PE)</i>	2 inches
Pockets	Drum paint	1 inch
		1 m
Arm strap	<i>Polyamide (PA)</i>	5 m long
Rope	<i>Polyamide (PA)</i>	3 m long
Patok	Mangrove wood	3 m long
		15-20 cm diameter
Buoy	Aqua bottle	2 pieces (above the left and right of the mouth)
Lifeline	<i>Polyethylene (PE)</i>	5 m
Exit door	Drum paint	0,5 m

3.3. Catchment Area of Drift Gears

In this study, the operation of pengerih was operated in Meskom Village with a water depth of 8-16 m. The waters were muddy. Waters with muddy bottoms. The length of time traveled to the fishing area using a paddle canoe is 10-15 minutes.

Water conditions determine the abundance and distribution of organisms in it, but each organism has different needs and preferences for life-related to its environmental characteristics. Water temperature is closely related to fish growth and activity. Water temperature during the research in Meskom Village ranged from 28-31°C. According to

Trubus (2005), aquatic organisms such as fish and shrimp can live well in the range of 20-30°C. Based on interviews with fishermen, the direction of water currents influences the catch of fishermen, and the direction of the current is influenced by wind direction or seasonality.

Seawater currents are the movement of water masses vertically and horizontally towards their balance, or the vast movement of water that occurs throughout the world's oceans. The current is also a flowing movement of a mass of water due to wind or density differences or long wave movement (Hutabarat, 1986). The current velocity obtained during the study ranged from 4.75 to 5.25 cm/s, this agrees with Ihsan (2009) which states that the speed of water currents can be divided into 3 categories, among others, the current velocity ranging from 0-0.25 m/s is included in the slow current category, the current velocity ranging from 0.26-0.50 m/s is included in the medium current category, the current velocity ranging from 0.51-1 m/s is included in the very fast current category.

In general, the circulation of surface currents in Bengkalis waters towards the Malacca Strait is influenced by the surface current circulation system in Southeast Asian waters. thus this surface current fully follows the wind pattern. While the movement of currents in the estuary and the Bengkalis Strait is dominated by tidal currents. In the estuary,

tidal currents will move upstream at high tide and out downstream at low tide.

The tides in Meskom Village range from 1.8-2.6 m. Tide is one of the physical parameters, which is a vertical movement of a mass of water from the surface to the deepest part of the seabed caused by the influence of the force of attraction of the earth and celestial bodies, especially the sun and the moon, then the phenomenon of tides on earth is more dominantly influenced by the force of attraction to the moon. According to Mihardja *et al.* (1994), the sea surface is always changing at any time due to tidal movements, this situation also occurs in narrow places such as bays and straits that cause tidal currents. The movement of tidal currents from the high seas that propagate to coastal waters will change, the factors that influence it include a decrease in water depth.

The depth of the waters in Meskom village ranges from 11.8-16.6 m. In general, all marine areas in Bengkalis Regency are shallow seas because they are still part of the continental shelf. The average depth is only 25 meters, and even around 25% have depths below 10 meters. Most of the zone of this area consists of mud and sand subsurface (Muchlizar, 2018)

3.4. Catch of Pengerih

The type and amount of catch of pengerih are presented in Table 2.

Table 2. Type and number of catches of Pengerih

Fish Name	Catch (fish)		Fish Weight (kg)	
	Afternoon	Night	Afternoon	Night
Red shrimp (<i>Parapenaeus longirostris</i>)	564	708	4,70	5,94
Striped shrimp (<i>Parapenaeopsis sculptilis</i>)	506	652	4,24	5,47
White shrimp (<i>Panaeus merguensis</i>)	502	613	4,21	5,13
Thorn shrimp (<i>Panulirus</i> sp)	383	500	3,08	4,26
Printed shrimp (<i>Harpiosquilla raphidea</i>)	15	24	0,56	0,90
Mustached thryssa (<i>Engraulis mystax</i>)	140	162	1,81	2,03
Bombay-duck (<i>Harpodon nehereos</i>)	32	43	2,31	3,11
Panna croaker (<i>Otolithoides microdon</i>)	37	56	0,57	0,89
Shorthead hairfin anchovy (<i>Setipinna breviceps</i>)	38	55	0,76	1,11
Total	2.217	2.813	22,24	28,84

Based on Table 2 shows the catch based on the weight of the catch of red shrimp (*Parapenaeus longirostris*) at night more obtained is 5.94 kg and during the day 4.70 kg, striped shrimp (*Parapenaeopsis sculptilis*) at

night more obtained is 5,47 kg and during the day is 4.24 kg, white shrimp (*Panaeus merguensis*) at night more obtained is 5.13 kg and during the day 4.21 kg, thorn shrimp (*Panulirus* sp) at night more obtained is 4.26.

After installing the fishing gear in the fishing area, the traps will be left or soaked in the water for about 2 days, and then the fishermen will take the catch they get and also check the bait that is still there or is no longer suitable for use and replaced for re-installing the fishing gear and during the day 3,08 kg, Bombay duck (*Harpodon nehereus*) at night was mostly obtained, namely 3,11 kg and during the day 2,31 kg, Moustached thryssa (*Engraulis mystax*) at night was mostly obtained, namely 2.03 kg and during the day 1,81 kg, Shorthead hairfin anchovy (*Setipinna breviceps*) at night was mostly obtained, namely 1,11 kg and during the day 0,76 kg, print shrimp (*Harpisquilla raphidea*) at night more is obtained at 0,90 kg and during the day 0,56 kg, Panna croaker (*Otolithoides microdon*) is the lowest obtained at night more is obtained at 0.89 kg and during the day 0.57 kg.

Table 2 shows the catch based on individual catches of red shrimp (*P.longirostris*) at night obtained 708 fish and during the day 56 fish, striped shrimp (*P.sculptilis*) at night obtained 652 fish and during the day 506 fish, white shrimp (*Panaeus merguensis*) at night was found to be 613 and during the day 502, thorn shrimp (*Panulirus* sp) at night was found to be 500 and during the day 383, printed shrimp (*H.raphidea*) at night was mostly obtained, namely 24 fish and 15 fish during the day, chicken feather fish (*E.mystax*) at night was mostly obtained, namely 162 fish

Table 4. Percentage of Main catch and Bycatch during the day

Day	Afternoon Main catch (fish)	Percentage (%)	Afternoon Bycatch (fish)	Percentage (%)
1	505	94,74%	28	5,26%
2	437	94,79%	24	5,21%
3	369	92,94%	28	7,06%
4	299	93,73%	20	6,27%
5	235	96,31%	9	3,69%
6	146	95,42%	7	4,58%
7	104	94,54%	6	5,46%
Total	2,095		122	

Table 4 shows the total number of main catch individuals was highest on day 1 with 505 fish and the lowest number was on day 7 with 102 fish. While the highest bycatch was on days 1 and 3 with 28 fish, and the lowest number was on day 7 with 6 fish. While the percentage of Main catch and Bycatch at night is presented in Table 5.

and 140 fish during the day, Bombay duck (*H.nehereus*) at night is more obtained, namely 43 fish and during the day 32 fish, Panna croaker (*O.microdon*) at night is more obtained namely 56 fish and during the day 37 fish, Shorthead hairfin anchovy (*Setipinna breviceps*) is more obtained, 55 fish and during the day 38 fish. The overall comparison of catches by weight and number of individuals between day and night is presented in Table 3.

Table 3. Comparison of Daytime and Nighttime Catches

N o.	Time	Weight (kg)	Number of Individuals (fish)
1.	Afternoon	22,24	2.217
2.	Night	28,84	2.813

Table 3 shows the comparison of catches, where it can be seen that the total weight of the catches made during the day, weighing 22,24 kg, is less than the catches made at night, which is 28,84 kg. In addition, the number of individual species was greater at night at 2,813 than during the day at 2,217.

3.5. Main Catch and By-catch

During the 7-day study, there were 5 shrimp species and 4 fish species. Where 4 species of shrimp and 1 species of fish are the main catch and 1 species of shrimp, 3 species of fish are not the main target catch (Bycatch).

Table 5 shows that the total number of individuals of the main catch is highest on day 1 as many as 582 fish and the lowest number is on day 7 as many as 126 fish. While the highest bycatch was on day 1 as many as 45 fish, and the lowest number was on day 7 as many as 9 fish. A comparison of the percentage of main catch and bycatch during the study can be seen in Figure 1.

Figure 1 shows the percentage comparison of the main catch which is 94.04% and bycatch which is 5.96%. It can be seen that

the catch is dominated by the main catch. Then the recapitalization of species and the total catch is presented in Table 6

Table 5. Percentage of Main Catch and Bycatch at Night

Day	Night Main catch (fish)	Percentage	Night Bycatch (fish)	Percentage
1	582	92,82%	45	7,18%
2	536	93,54%	37	6,46%
3	503	93,14%	37	6,86%
4	487	94,56%	28	5,44%
5	225	94,93%	12	5,07%
6	176	94,62%	10	5,38%
7	126	93,33%	9	6,67%
Total	2,635		178	

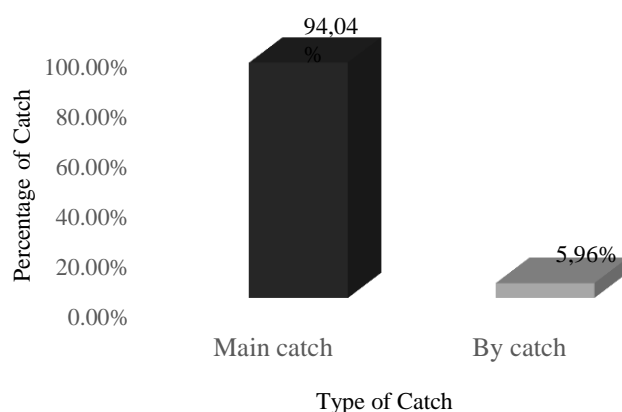


Figure 1. Comparison of Main Catch and Bycatch Percentages

Table 6. Recapitulation of Species and Total Catches

Local Name	Latin Name	Number of Individuals (fish)	Percentage (%)
Red shrimp	<i>Parapenaeus longirostris</i>	1,272	25,28 %
Striped shrimp	<i>Parapenaeopsis sculptilis</i>	1,158	23,02 %
White shrimp	<i>Panaeus merguensis</i>	1,115	22,16 %
Prawn thorns	<i>Panulirus</i> sp	883	17,55 %
Printed shrimp	<i>Harpiosquilla raphidea</i>	39	0,77 %
Mustached thryssa	<i>Engraulis mystax</i>	302	6,00 %
Bombay-duck	<i>Harpodon nehereos</i>	75	1,49 %
Panna croaker	<i>Otolithoides microdon</i>	93	1,84 %
Shorthead hairfin anchovy	<i>Setipinna breviceps</i>	93	1,84 %
Total		5,030	

Table 6 shows the number of main and side catches for 7 days, whereas Table 8 shows that the dominant catch is red shrimp (*P.longirostris*) which is as many as 1,272 shrimp and the least is 39 print shrimp. The percentage value of red shrimp is 25.28%, striped shrimp with a percentage value of 23.02%, white shrimp with a percentage value of 22.16%, thorn shrimp with a percentage

value of 17.55%, Moustached thryssa with a percentage value of 6.00%, Panna croaker and Shorthead hairfin anchovy with a percentage value of 1.84%, Bombay-duck with a percentage value of 1.49%, the lowest percentage is printed shrimp with a percentage value of 0.77%.

The number of species of main catch and bycatch from day 1 (one) to 7 (seven) days. red

shrimp (*P.longirostris*) is the shrimp species with the highest total catch of 1,272, striped shrimp (*P.sculptilis*) with 1,158, white shrimp (*P.merguensis*) with 1.115, thorn shrimp (*Panulirus* sp) (883), Moustached thryssa (*E.mystax*) (302), Panna croaker (*O.microdon*) and Shorthead hairfin anchovy (*S.breviceps*) (93), Bombay-duck (*H.nehereus*) (75), print shrimp (*H.raphidea*) (39) were the lowest number of species caught. Tracing the dominance of shrimp catches based on interviews with Pengerih fishermen, red shrimp, striped shrimp, white shrimp, prickly shrimp, and Moustached thryssa are the main targets sought or expected by Pengerih fishermen. In connection with the high catch of shrimp, water conditions are very influential on the distribution of shrimp, one of the most important environmental factors for the life and growth of shrimp is temperature, at the time of the Pengerih fishing operation the water temperature ranged from 28-31°C, in agreement with (Swarsih, 2016) which states the optimal temperature for shrimp life ranges from 26-30°C.

White shrimp lives in the scope ranging from river areas overgrown with mangrove trees in estuary waters, lagoon waters, and bay waters (Mulya, 2011). Print shrimp can live in marine and brackish waters and are often found in coastal areas. Shrimp habitat is the beach, happy to live on the bottom of the water, especially muddy water. According to Ahyong et al. (2008), this shrimp is found on the north coast of Java, from the Malacca Strait to the Pacific Sea. Panna croaker is a carnivorous fish, which can live in muddy waters. Panna croaker is a type of carnivorous fish and type of fish that lives in marine and brackish waters. its natural food is small fish and shrimp. This fish uses river estuaries to breed and spawn to raise children. Panna croakers live in waters that are low temperature, very turbid, and muddy

4. Conclusion

Based on the results of the research and discussion, the following conclusions and suggestions can be drawn: the catch of drift gears during the study obtained as many as 9 species, 5 main catch, and 4 bycatch. The main catches of drift gears were red shrimp, striped shrimp, white shrimp, duri shrimp, print shrimp, Moustached thryssa, Bombay-duck, Panna croaker, Shorthead hairfin.

In this study, the author feels the need for a more in-depth study of pengerih fishing gear. In addition, the author also hopes and suggests to readers to continue research and data collection related to pengerih fishing gear

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