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Identification of Belat Bycatch in Anak Setatah Village Rangsang Barat District Meranti Island Regency Riau Province

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ABSTRACT

The belat is a passive fishing gear that belongs to a group of traps operated in areas around the coast. In its operation, the belat not only produces the main catch but also gets bycatch. This study aims to identify the main catch and by catch. The research method used is the survey method by making direct observations of the belat catch and then the catch is identified as the type of fish, the number of individuals, and the weight of the fish. The results of descriptive analysis showed that the main catches were two types of shrimp, namely white shrimp (*Penaeus indicus*) and striped shrimp (*Penaeus monodon*) with a weight of 30400 g. The main catches were white shrimp (*Penaeus indicus)* and striped shrimp (*Penaeus monodon*). The by-catches were small fish and young fish, the by-catches consisted of 6 species with a total weight of 29300 g.

Keywords: Belat, Main catch, By-catch

1. INTRODUCTION

Meranti Islands Regency is an expansion of Bengkalis Regency and is located on the East Coast of the island of Sumatra.The bordering areas of the Meranti Islands Regency are, namely, the North bordering the Malacca Strait and Bengkalis Regency, the South bordering Siak Regency and Pelalawan Regency, the West bordering Bengkalis Regency, and the East bordering Karimun Regency, Riau Islands Province.

Capture fisheries business in Rangsang Sub-district is a fishing business carried out in shallow seas using trapping-type fishing gear consisting of gillnet, rawai, trammel net, bubu, belat, empang, songko/langgen, pukat pantai, pengerih, and gombang. Anak Setatah Village is one of the villages that has abundant fishery potential and one of the widely used fishing gear is the belat fishing gear (Siregar, 2015).

One of the problems faced in the utilization of fish resources is the capture of fish that is not the purpose of fishing, namely in the form of bycatch which is not the target of fishing objectives. The population of belat in Anak Setatah village in the past decade has continued to decline, partly because the catch tends to decrease both in quantity and quality (Reza et al., 2017).

Based on the description above, the author is interested in researching to see and identify the types, numbers, main catches, and bycatch in belat fishing gear in the waters of Rangsang Sub-district, Anak Setatah Village. This study aims to identify the types of bycatch, determine the percentage of the main catch, and bycatch and identify the types and sizes of fish that are dominantly caught. The benefits of this research can provide information on the species that are the main and bycatch targets of belat fishing gear and are expected to become basic data in the study of the sustainability of belat fisheries.

2. RESEARCH METHODS

Time and Place

This research was conducted in July 2022. The research location is in Anak Setatah Village, Rangsang Barat District, Meranti Islands Regency, Riau Province.

Procedure

The procedures carried out in this study are as follows: 1) Data collection on the general condition of the study area, 2) Conducting interviews with belat fishermen, 3) Calculating the main catch and by-catch, 4) Documenting and tabulating the data obtained during the

research.

Data Analysis

By-catch results were analyzed descriptively through tables and figures, to determine what percentage of the main and by-catch caught in the fishing gear used. To determine the catch based on the type of catch, the data was collected and calculated the by-catch and discard rate with the following formula

$$\text{Main catch rate: } \frac{\sum \text{Main catch}}{\text{Total fish caught}} \text{ x } 100\%$$

$$\text{By-catch rate: } \frac{\sum \text{By-catch}}{\text{Total fish caught}} \text{ x } 100\%$$

3. RESULT AND DISCUSSION

General Situation of the Research Area

The area of Anak Setatah village is 980 ha. Anak Setatah's northern boundary borders the Malacca Strait and Segomeng village, its eastern boundary borders Sialang Pasung village, its western boundary borders Bantar village and the Malacca Strait, and its southern boundary borders Bantar village. The waters of Anak Setatah village are muddy and the shape of the beach is sloping, around the beach, many mangrove trees grow.

The community in Anak Setatah Village earns income from gardening, daily labor, and fishing. Fishing is one of the dominant livelihoods of the Anak Setatah Village community. Fishermen in Anak Setatah Village operate various fishing gear such as shrimp nets, fishing nets, belat, gill nets, rawai, and shrimp trawls. In Anak Setatah village, fishermen who are still actively operating the belat fishing gear with the number of fishing gear 1 unit.

Belat fishing gear

The belat is one of the fishing gear used by fishermen in Anak Setatah Village, the shape and construction of the belat used by fishermen on the Anak Setatah beach can be seen in the attachment (1). Made of Polyethylene (PE) material, the mesh size is 1 inch in the belat leaf or playing area, the murder part of the belat fishing gear has a smaller mesh size of 0.5 inches so that the opportunity for fish to escape the belat fishing gear is more difficult. The upper iris rope and lower ris rope are used to open and form the belat fishing gear by lashing each stake with a net. The belat fishing gear is shaped like the letter V, with a net length of 300 m and there is one room for murder at the end of the belat fishing gear. The number of piles used is 200 pieces, with a length of 2meter piles, stuck into the muddy beach sand with a depth of about 30-50 cm and a distance of 1.5 m from each pile.

This fishing gear is a passive fishing gear that operates on the beach. Belat fishing gear is a fishing gear that relies on tides, the way this tool operates is by blocking fish. Belats or tidal traps are fishing tools that are classified as traps. Traps are fishing devices made of nets or other materials that aim to trap fish so that they enter the trap and cannot get out again (Ihsan, 2009).

Anak Setatah Village is a vast coastal area where many people still work as fishermen such as belat fishermen. The belat operated are not fixed and look for fishing areas around the waters of Anak Setatah, for the fishing areas of the belat fishermen have been regulated in a collective agreement between fishermen to minimize conflicts between belat fishermen.

Operation Technique

The technique of operating the belat fishing gear first determines the fishing area; the belat fishing area in this study is in the coastal area of Anak Setatah which has a sloping. After the fishing area is determined, the installation of fishing gear is carried out when the tide is high around 10.45 WIB. The net that has been tied to the stake is then installed on the shoreline by plugging the stake one by one, the belat installed is shaped like a V, which has one room or murder at the end of the belat fishing gear.

After the water receded at around 1:15 pm., the fishermen prepared the equipment to take the catch such as catak, dipper, and container made from used derigen. Furthermore, fishermen take the catch that has been locked in the murder, then sorting is done directly on the boat. After the fishermen sort the catch, they only wait for the tide to pull out the belat fishing gear.

Fishermen in Anak Setatah Village operate belat fishing gear along the coast of Anak Setatah, with water depths of 2-4 m with murky and muddy water characteristics, close to mangrove forests. The length of the journey from the fisherman's house which is not far from the coastal to the fishing ground *is* about

30 minutes. The fishing area of the belat fishing gear is divided and determined by fellow belat fishermen in the Meranti islands who regulate and limit belat fishermen in Meranti, such as the belat fishermen of Anak Setatah village can only fish in the waters of Anak Setatah village and cannot reach the waters of Merbau Island and other islands and vice versa.

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 Anak Setatah 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 belat fishermen, the direction of the water current influences the catch of the belat, 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 equilibrium, 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 & Evans, 1985). 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.

The tides in Anak Setatah Village range from 1.6-2.6 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 reduction in water depth.

For fishing businesses, tides are very important, especially for trap-shaped fishing gear whose main purpose is to catch various types of fish carried by the tides. In tidal areas, fish will be pushed to the river mouths and shores during high tide and will be pushed back to the sea during low tide. This situation is utilized in the type of fisheries activities that use the trap-shaped fishing gear. The type of current found in the waters of Anak Setatah Village is the type of tidal current because it is influenced by sea level due to tides. Belat fishermen operate fishing gear when the water is high, namely during the full moon and dead/new moon. The belat is a static fishing gear and is included in the trapping gear, which in its operation utilizes tidal currents and fish ranges. This operation is very dependent on tidal currents because it requires tides; the belat is operated in shallow waters around the coast. Tidal currents influence the catch of the eel, shrimp, and fish generally have the nature to move along the coast to spawn and look for food, during this journey the current will lead the fish to accidentally enter the fishing gear. Trawl operations are conducted at high tide and harvested at low tide.

Table 1. Catch Results

Day	Date	Catch Results	
		Weight (g)	**Number (fish)**
1	27-07-22 /28 Dhulhijjah	13700	5165
2	28-07-22 /29 Dhulhijjah	10200	2673
3	29-07-22 /30 Dhulhijjah	9300	2434
4	30-07-22 /1 Muharram	11800	3241
5	31-07-22 /2 Muharram	11500	2215
6	01-08-22 /3 Muharram	5900	1630
7	02-08-22 /4 Muharram	7400	1543
	Total	59700	18901

Catch Results

Based on the observation of the catch, the type, number (tails), and weight (kg) of belat fishing gear with 7 fishing trips were obtained.

From Table 1, it can be seen that the highest catch based on weight (g) on the first day, or 28 Dhulhijjah is 13700 g, and the lowest catch on the sixth day or 3 Muharram is 5900 g.

Main Catch

There are 2 types of main catches (*target species*) in this study, namely white shrimp (*Penaeus indicus)* and striped shrimp (*Penaeus monodon*). The highest catch type based on weight is white shrimp (*Penaeus indicus*), as much as 24600 g (80.92%) and a total of 16109 individuals with lengths ranging from 5-12 cm, and the lowest catch type is striped shrimp (*Penaeus monodon*) as much as 5800 g (19.08%) and a total of 1740 individuals with lengths ranging from 7-12 cm.

Table 2. Types of the main catch

No.	Main Catch	Weight (g)	Weight (%)	Fish (Amount)	Fish (%)	Length (cm)
1.	White Shrimp (*Penaeus indicus)*	24600	80,92	16109	90,25	5-12
2.	Striped Shrimp (*Penaeus monodon)*	5800	19,08	1740	9,75	7-12
	Total	30400	100%	17849	100%	

By-catch

Based on Table 3, it can be seen that the bycatch in the belat fishing gear consists of 6 types, namely sembilang (*Euristhmus microceps*), ketang (*Scatophagus argus),* belat (*Chelon subviridis),* pomfret (*Parastomsteus niger),* and Sebelah (*Pleuronectiformes*), and kurau (*Eleutheronema tetradactylum*).

The highest catch species by weight is ketang fish (*Scatophagus argus*) as much as 9800 g (33.45%) which totaled 306 fish (47.66%) with a length of 8-12 cm. Then the species with the lowest catch by weight is kurau fish (*Eleutheronema tetradactylum*) as much as 1300 g (0.47%), totaling 3 fish with a length of 29-35 cm.

Table 3. The bycatch in the belat fishing gear consists

No.	By-catch	Weight (g)	Weight (%)	fish (Amount)	fish (%)	Length (cm)
1.	Sembilang (*Euristhmus microceps)*	6400	21,84%	42	6,54%	16-25
2.	Catfish (*Scatophagus argus)*	9800	33,45%	306	47,66%	8-12
3.	Belat (*Chelon subviridis)*	7300	24,91%	139	21,65%	18-25
4.	*Pomfret* (*Parastomateus niger)*	2300	7,85%	100	21,81%	10-15
5.	sebelah (*Pleuronectiformes)*	2200	7,51%	12	1,87%	15-18
6.	Kurau (*Eleutheronema tetradactylum)*	1300	4,44%	3	0,47%	29-35
	Total	**29300**	**100%**	**602**	**100%**	

Comparison of main catch and by-catches

As can be seen in the graph, for the proportion of the two categories, the main catch has the highest amount of 30400 g with a percentage of 50.92%, and the *bycatch* has a total weight of 29300 g with a percentage of 49.08% of the entire catch of belat fishing gear during the study.

The following are observations of catches based on the maturity of fish caught as seen from the length of the fish body based on FishBase and existing research (Figure 2).

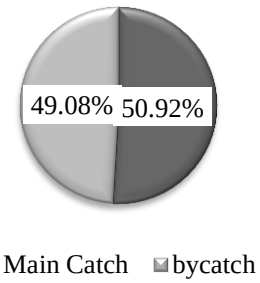

Figure 1. Catch comparison

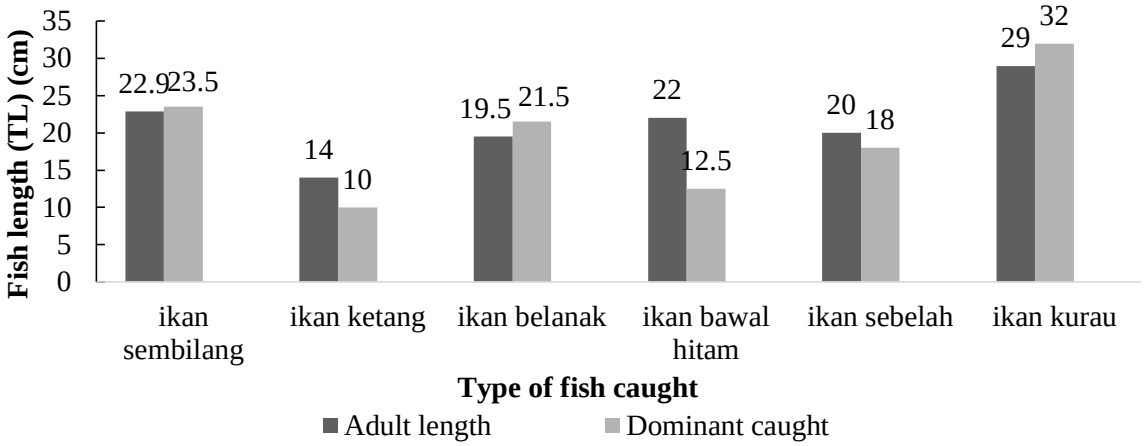

Figure 2. Maturity of fish caught

From the graph above, we can see the comparison between the maturity of the fish caught and the dominant fish caught. The belat, kurau, and sembilang fish that are dominantly caught are mature fish while the ketang, black pomfret, and side fish are still dominated by immature fish.

During the study, it was shown that the fish resources in the coastal area were quite diverse, both in terms of the type and size of fish caught. The dominant catch in the use of belat fishing gear is from the *Crustacean* class, including white shrimp (*Penaeus indicus*) and striped shrimp (Penaeus *monodon*), with the highest main catch of white shrimp (Penaeus *indicus*) as much as 24600 g (41.21%) totaling 16109 tails with a length of 5-12 cm, and already including desawa based on the results of Wahyuni et al. (2017) research which states that white shrimp are worth catching or adults ranging from 4.7-12.2 cm. The lowest main catch type was striped shrimp as much as 5800 g (9.72%) which amounted to 1740 fish with a length of 7-12 cm and partly included adult size based on the results of research by Herlina (2017) which states adult striped shrimp measuring 10-20 cm.

Tracing the dominance of shrimp catches, based on interviews with belat fishermen white shrimp and striped shrimp are the main targets sought/expected by belat 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 belat fishing operations the water temperature ranged from 28-31˚C, in agreement with (Swarsih et al., 2016) which states the optimal temperature for shrimp life ranges from 26-30˚C.

By-catch is the catch that is accidentally caught on fishing gear. Bycatch caught during the study consisted of pelagic and demersal fish species. According to the results of research (Mashiswara, 2004) states that demersal fish resources that inhabit the exposure area or nearshore waters have high biodiversity compared to pelagic fish.

4. CONCLUSIONS

From the results of the study, it can be concluded that the main catch of the belat fishing gear is a type of shrimp, namely white shrimp and striped shrimp. Apart from the type of the two types of shrimp is a type of bycatch. The main catch had a total weight of 30400 g with a percentage of 50.92%, and the *bycatch* had a total weight of 29300 g with a percentage of 49.08% of the entire catch of belat gear during the study. Most of the fish species caught during the study were not yet mature fish judging from their body lengths such as ketang (*Scatophagus argus*), black pomfret (*Parastomateus niger*), and sebelah (*Pleuronectiformes)*.

Belat gear catches fish species other than the main catch, so research can be done on the design of selective belat gear against *bycatch* to minimize or prevent the capture of *bycatch*, and the length of fish caught still does not reach its adult size so it is necessary to make a policy regarding the operation of belat gear in terms of the size of the gear used to achieve fisheries

sustainability.

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