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Inventory of Catch Results in Seine Net Fishing Gear in Carocok Tarusan Coastal Waters, Pesisir Selatan Regency

Inventarisasi Hasil Tangkapan pada Alat Tangkap Payang Di Perairan Pantai Carocok Tarusan Kabupaten Pesisir Selatan

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ABSTRACT

The The waters of Carocok Tarusan Beach in Pesisir Selatan Regency have strong fisheries potential, with many coastal residents working as fishermen. This study aimed to inventory catches from seine net fishing gear and was conducted from July 20 to August 20, 2023, using a survey method with one 5 GT vessel and 10 landings. Data were collected through field observations and interviews. The results showed three species were caught, with tuna *(Euthynnus affinis)* as the main catch totaling 10,510 fish (1,251 kg; 77%), while anchovies *(Stolephorus* spp.*)* (128,100 fish; 173 kg; 11%) and peperek *(Leiognathidae)* (100,600 fish; 204 kg; 13%) were bycatch. The most frequent tuna sizes ranged from 282–305 mm and 338–359 mm, indicating tuna as the dominant catch in these waters.

Keywords: main catch, bycatch, seine net (payang), catch composition

ABSTRAK

Perairan Pantai Carocok Tarusan di Kabupaten Pesisir Selatan memiliki potensi perikanan yang besar, dengan sebagian besar masyarakat pesisir bekerja sebagai nelayan. Penelitian ini bertujuan untuk menginventarisasi hasil tangkapan alat tangkap pukat cincin (seine net) dan dilakukan pada 20 Juli hingga 20 Agustus 2023 menggunakan metode survei dengan satu kapal berukuran 5 GT dan 10 kali pendaratan. Data dikumpulkan melalui observasi lapangan dan wawancara. Hasil penelitian menunjukkan terdapat tiga jenis ikan yang tertangkap, dengan ikan tongkol *(Euthynnus affinis)* sebagai tangkapan utama sebanyak 10.510 ekor (1.251 kg; 77%), sedangkan ikan teri (*Stolephorus* spp.) (128.100 ekor; 173 kg; 11%) dan ikan peperek *(Leiognathidae)* (100.600 ekor; 204 kg; 13%) sebagai tangkapan sampingan. Ukuran ikan tongkol yang paling sering tertangkap berkisar antara 282–305 mm dan 338–359 mm, yang menunjukkan bahwa ikan tongkol merupakan tangkapan dominan di perairan tersebut.

Kata Kunci: hasil tangkapan utama, hasil tangkapan sampingan, payang, komposisi hasil

INTRODUCTION

The waters of Carocok Tarusan Beach are in Pesisir Selatan Regency. Geographically, it is located at coordinates 0° 59' South Latitude – 2° 28' South Latitude, 100° 19' East Longitude – 101° 18' East Longitude with an area of 5,749.89 km² and a coastline of 218 km² or 2.19 ha (BPS Pesisir Selatan Regency, 2020; (UPTD PPP Region I, 2014). The fishing fleet used by fishermen is 151 units consisting of 60 units of bagan boat fishing gear, 45 units of payang, 20 units of trolling rods, 1 unit of purse seine and 25 units of gillnet. The number of payang fishing gear at the Carocok Tarusan Coastal Fishing Port decreased in 2016, which was 45 units from the previous year's 51 units (PPP Carocok Tarusan, 2010).

Most fishermen use payang fishing gear as equipment in fishing, this is because the Carocok Tarusan Coastal Waters have abundant natural resources, especially pelagic fish species, so payang fishing gear is a fishing gear that is suitable for the target of fishing. This fishing gear has a length of around 300–400 meters. Purbayanto et al., (2014) stated that the types of fish that are the target of fishing with payang are fish that live in groups on the surface layer of the water, either in groups of the same type or in different types.

A purse seine is a fishing gear that is included in the purse seine type which usually consists of a pouch, has wings (left and right), weights, body, line (top and bottom), float and a piece of rope to pull the fishing gear (Murni et al., 2018). This fishing gear is made of net material, namely black polyamide (PA). Each section of the net on the payang has a different size. In general, the mesh size of the bag is small. The size of the bag net of the payang fishing gear has a length of 3.6 m, a mouth opening of 4.5 m and a mesh opening of 2,032 cm. The pouch section has the smallest mesh size because the pouch serves as a gathering place for the catch (Sinaga et al., 2020). The two parts of the payang wings function to scare or surprise and herd fish into the pouch (Brandt, 1984).

The difference in the payang fishing gear in the waters of Carocok Tarusan Beach compared to other areas is in the size of the net and the materials of the payang fishing gear such as the floats, namely the sign float material used comes from used goods (oil jerrycans) and the sign float material comes from flip-flops which are shaped in such a way that they can be used as floats. Aji et al., (2013) stated that the sign float on the payang fishing gear is usually made of styrofoam equipped with a flag, while the main float is made of PVC (polyvinyl chloride) which is shaped like a ball.

The net is typically operated on the water's surface by encircling a school of fish and then pulling the net toward the boat. The two wings on the right and left sides of the net serve to scare or surprise the fish and herd them into the net. The way the net is operated during this fishing effort suggests the possibility of bycatch, which is not the primary target.

The catch consists of the main catch and bycatch. Bycatch is usually caught larger than the main catch. Ardill et al., (2011) stated that bycatch averages 27 million tons of fish discarded annually, equivalent to 30% of the world's fish landed. Although there are reports stating that some fish may have been landed and consumed. In fact (WWF, 2013) in (Nugraha and Setyadji, 2013) estimates that at least 40% or 38 million tons of the world's annual marine catch is bycatch and discards. Given the high percentage of bycatch, an environmentally friendly fisheries approach is needed. This is intended to reduce the amount of bycatch and protect waters from fishing activities that damage the environment.

Based on this description, it is necessary to conduct research on the inventory of catches from the Payang fishing gear in the waters of Carocok Tarusan Beach, Pesisir Selatan Regency. The aim of this research is to determine the extent to which the Payang fishing gear can record the types of pelagic fish that are the main and by-catch.

RESEARCH METHOD

The data collection method, namely the survey method and sampling, was carried out using the simple systematic sampling method, a probability sampling technique in which samples are selected from a population ordered at fixed intervals, starting from a randomly selected starting point. Data collection was carried out using primary and secondary methods. Primary data is data collected or obtained directly from the field. Secondary data was obtained from the literature and related agencies. Catch samples were obtained

from the landing of fish caught using payang fishing gear. Sampling was carried out immediately after the landing process, with a sample size of 15 fish for each type of fish. Next, each sampled fish was weighed to determine its weight and measured its length using an appropriate measuring instrument. The weight and length data obtained were then systematically recorded for further analysis.

The data analysis used in this study was an analysis of the catch composition and catch size of the payang fishing gear. The data obtained was analyzed descriptively and quantitatively to determine the percentage (%) of the catch, including the main catch (HTU) and bycatch (HTS), which are presented in diagram form. The analysis formula used is as follows.

Composition of Catch Results

The calculation of catch composition aims to determine the level of selectivity of the fishing gear used by looking at the HTU and HTS of the payang fishing gear. The catch composition is calculated using the formula according to Akiyama (1997):

$$HTU\ (\%) = \frac{\Sigma\ HTU}{\Sigma\ spesies} \times 100\%$$

$$HTS\ (\%) = \frac{\Sigma\ HTS}{\Sigma\ spesies} \times 100\%$$

Descriptions:
HTU: Main Catch
HTS: Bycatch

Catch Size Structure

Measuring the length of the catch serves to identify the catch size that matches the indicators (EAFM, 2014). The main catch size structure uses the calculation of Walpole and Meyers (1995) to determine the length, weight, and size class intervals of fish based on the total length of a fish. The calculation is as follows:

$$N = 1\ + 3.32 \log n$$

$$C = \frac{L \max - L\ min}{N}$$

Descriptions:
N = Number of Classes
n = Number of Fish
C = Class Interval
Lmax = Total Length of the Largest Fish
Lmix = Total Length of the Smallest Fish

RESULTS AND DISCUSSION

General Conditions of the Location

Pesisir Selatan Regency is geographically located between 0° 59'-2° 28.6' South Latitude and 100° 19'-101° 18' East Longitude, with an area of 5,749.89 km2 stretching from north to south with a coastline of approximately 234 km. Administratively, Pesisir Selatan Regency has the following boundaries:

- To the north, it borders Padang City;
- To the east, it borders Solok Regency, South Solok Regency, and Jambi Province;
- To the south, it borders Bengkulu Province; and
- To the west, it borders the Indian Ocean.

The capture fisheries sector in Nagari Ampang Pulai plays a significant role for both the community and the local government, as one of the largest contributors to capture fisheries production in Pesisir Selatan Regency. This is evident in the PPP capture fisheries production data in Carocok Tarusan. Carocok Tarusan PPP capture fisheries production contributes 60% of Pesisir Selatan Regency's capture fisheries production, amounting to 1,873.21 tons per year.

Carocok Tarusan Coastal Fishing Port is located in Koto XI Tarusan District, Pesisir Selatan Regency, West Sumatra Province. The distance of the location of the Fishing Port to the sub-district center is 4 km, to the center of Pesisir Selatan Regency is 20 km and to the center of West Sumatra Province (Padang) is 65 km. Based on the Regulation of the Governor of West Sumatra Number 65 of 2009 concerning the Organization and Work Procedures of the Technical Implementation Unit of the Maritime Affairs and Fisheries Service of West Sumatra Province, Carocok Coastal Fishing Port is a Regional Technical Implementation Unit of the UPTD in the Maritime Affairs and Fisheries Service of West Sumatra Province. The UPTD of Carocok Tarusan Coastal Fishing Port has the Main Task of carrying out some of the Technical Operational activities and/or Technical Supporting activities of the Service in the field of Coastal Fishing Ports. The location map can be seen in the Figure 1.

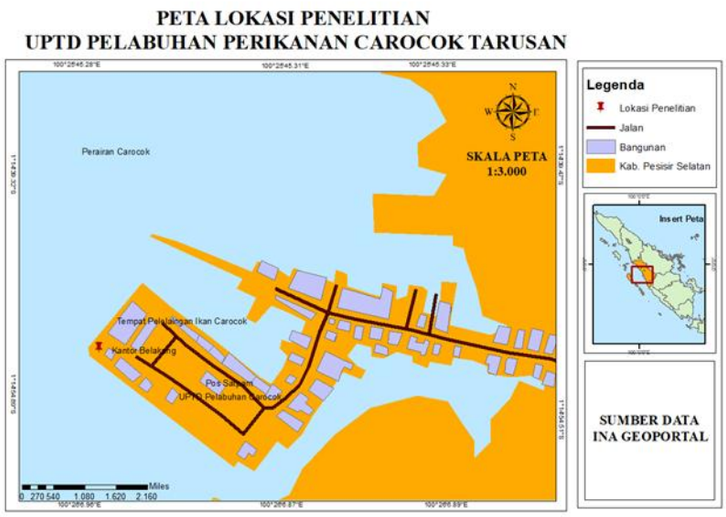

Figure 1. Research location map

Composition of Catch Results

The primary catch is the catch that is the target of fishing activities or operations because it has high economic value. According to Suadela (2004), generally, the fish most often caught in catches from trawl fishing operations are small pelagic fish. If the proportion of the primary catch is greater, the fishing gear can be said to be selective in terms of species. The primary catch is tuna. Bycatch is any catch outside the operational target but accidentally caught during fishing. According to Nofrizal et al. (2018), bycatch is any catch that is not a target catch. This includes any species or other species accidentally caught by fishing gear. Bycatch includes anchovies and peperek fish.

The catches of three species of tuna fishing gear in the waters of Carocok Beach, Pesisir Selatan Regency include tuna *(Euthynnus affinis)*, anchovies (*Stolephorus* sp.), and peperek (*Leiognathus* sp.). Table 1 shows that tuna fishing gear has varying catch sizes.

Table 1 shows the total number of species caught using tuna fishing gear in the waters of Carocok Tarusan Beach, Pesisir Selatan Regency. The total number of fish was 239,210, weighing 1,628 kg. (Prastyo, 2014) stated that catches and species vary from one fishing area to another, influenced by the number of fishermen fishing at the same fishing location. The total catch weight is the sum of the total weight of all species caught using tuna fishing gear in the waters of Carocok Tarusan Beach, Pesisir Selatan Regency.

Based on the catch obtained from the payang fishing gear, the total weight was 1,628 kg. The highest total weight of the payang catch was tuna *(Euthynnus affinis)* at 1,251 kg with a percentage of 77%. While the lowest payang catch was anchovies (*Stolephorus* sp), weighing 173 kg with a percentage of 11%. This is because tuna is one of the most dominant resources in the coastal waters of Carocok Tarusan, Pesisir Selatan Regency. In addition, tuna is the target of fishing from payang gear due to its high economic value. The number of catches from the main payang fishing gear is tuna *(Euthynnus affinis)* at 10,510 fish weighing 1,251 kg (77%), this shows that tuna is a large pelagic fish that often groups.

The bycatch is 100,600 peperek fish (*Leiognathus* sp) weighing 204 kg (13%) and 128,100 anchovies weighing 173 kg (11%). Environmental factors also influence the number of fish in the coastal waters of Carocok, Pesisir Selatan Regency, because the deeper and wider the waters, the more fish there are in them. This is related to (Purbayanto, 2004) that the distribution of fish in waters is horizontal and vertical so that the movement of fish in their habitat becomes wider. The size of the catch is influenced by several factors, including the determination of fishing grounds (Mujib et al., 2013). Hakim et al. (2018) explain that the type of fishing gear, the size of the boat, and the way the fishing gear is operated. The selection of fishing gear refers to the behavior of the fish species and the habitat where the fish are located. External factors that influence the diversity of fish species are exploitation pressure, environmental degradation and internal factors that influence the diversity of fish species are predators and competition between species. The percentage of catches from the payang fishing gear, namely tuna,

anchovies, and peperek fish, is presented in a diagram in Figure 6.

Table 1. Composition of the Catch

N0	Species name	Scientific name	number of fish (tails)	Weight (kg)	(%)	Kategori
1	Tongkol*	*Euthyunus Offinis*	10.510	1.251	77%	HTU
2	Teri**	Stolephorus sp	128.100	173	11%	HTS
3	Peperek**	Leiognathus sp	100.600	204	13%	HTS
Total			239.210	1.628	100%	

Descriptions:
* = Main Catch (HTU)
** = Bycatch (HTS)
Source: Data Processing

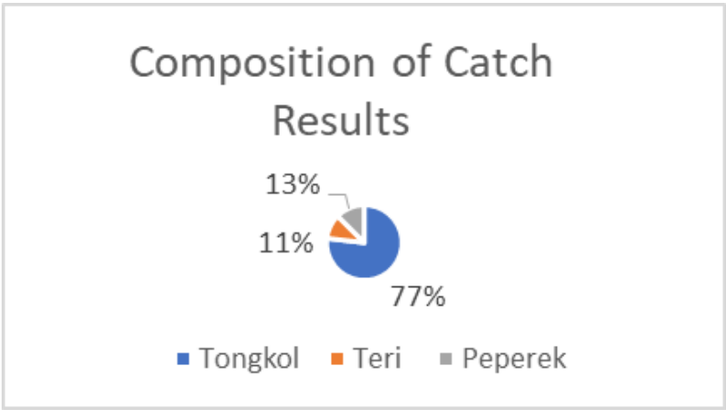

Figure 6. Percentage of Catch Results from Payang Fishing Gear
Source: Data Processing

The catch caught in the Payang fishing gear operating in the Carocok Tarusan Coastal Waters of Pesisir Selatan Regency at the time of the study had a diverse catch, consisting of the main catch and by-catch. Based on the results of the study there are 3 types of main catch and by-catch. The main catch consists of 1 type of fish and by-catch consists of 2 types of fish. The types of fish and percentage (%) caught in the payang fishing gear are tuna *(Euthynnus affinis)* 77%, anchovies (*Stelephorus* sp.) 11%, Peperek fish (*Leiognathus* sp.) 13%. The highest volume percentage of catch is 77%, namely the type of tuna, while the lowest percentage is the type of anchovy (*Stelephorus* sp.) 11%.

Based on observations made during the operation of the Payang fishing gear, it is known that the catches that are often caught in the Payang fishing gear are types of tuna *(Euthynnus affinis)*, anchovies (*Stelephorus* sp.) and Peperek fish (*Leiognathus* sp.). The species of catch obtained during the study using the Payang fishing gear operating in the coastal waters of Carocok Tarusan, Pesisir Selatan Regency are very varied. (Usman and Brown, 2006) stated that the difference in catches according to species is caused by differences in behavior in each type of fish. There are types of fish that are directly attracted to light or often referred to as positive phototaxis fish, like to be around bright fishing areas and the second is a type of fish that does not like light and the presence of fish in the fishing area is more due to the presence of prey in the fishing area.

Composition of Main Catch Types

The composition of the main catch of the Payang fishing gear operating in the coastal waters of Carocok, Pesisir Selatan Regency obtained during the study was 1,628 kg (100%) during 10 trips. The largest catch based on the weight of the tuna *(Euthynnus affinis)* was 1,251 kg (77%). Tuna fish are included in the scombridae family that live in tropical seas. This, when associated with the operational area of the payang, namely in a fairly shallow area, clearly becomes the catch that dominates the main catch species of the lampara fishing gear. This statement is also supported by the explanation (Rita, 2015), that the composition of species formed in fishing areas in the waters is dominated by pelagic

fish, namely tuna. The main catch of the payang fishing gear operating in the coastal waters of Carocok, Pesisir Selatan Regency varies greatly. This is likely due to the fishing operations carried out by fishermen not always getting the same results at every time.

The current month's catch is certainly different from the previous month, even though fishing operations are carried out with the same effort and in the same fishing area. Therefore, this difference in catch production is also suspected to be related to the presence of fish in a body of water. Because to maintain their survival, fish always move from one place to another in search of areas where they can survive. Fish will prefer areas whose water conditions suit their body's adaptation capabilities, are plentiful in food, and are safe from predators. This statement is also supported by the explanation (Nababan, 2008), which states that differences in catch production are closely related to the fertility of an aquatic environment that has sufficient food availability for fish.

Composition of Bycatch Types

The composition of the bycatch of Payang fishing gear operating in the coastal waters of Carocok, South Pesisir Regency during the study was 1,628 kg (100%) during 10 trips, with the catch being peperek fish (*Leiognathidae*) of 204 kg (13%) and anchovies (*Stelephorus* sp.) of 173 kg (11%) which are pelagic fish in coastal waters. The movement of peperek fish and anchovies is generally related to their diet and habitat preferences. Peperek fish (*Leiognathus* sp.) is a demersal fish that lives in groups in bottom waters, Meanwhile, anchovies are small pelagic fish that tend to gather near the surface and are very responsive to light, therefore they are often caught using light assistance (Jereb and Roper, 2006). The capture of fish species in the fishing gear that operates from morning to evening is due to the attraction of these species to light, where the light really helps the sense of sight of these species to see their prey around the fishing area

Catch Size Structure

Frequency Distribution of Length Size of Skipjack Tuna *(Euthynnus affinis)*

Measurement of the length of tuna *(Euthynnus affinis)* caught using a payang fishing gear in the coastal waters of Carocok, Pesisir Selatan Regency can be seen in Figure 7.

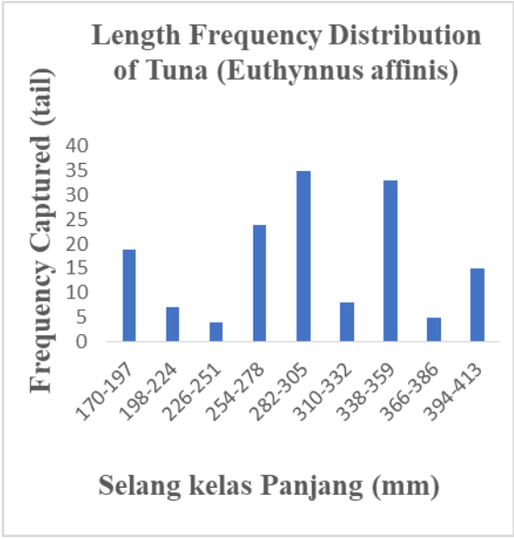

Figure 7. Frequency Distribution of the Length of Skipjack Tuna *(Euthynnus Affinis)*
Source: Data Processing

Based on the image above, it can be seen that the size range of the class of tuna caught ranges from 170 - 413 mm. The fish caught with the highest size were 282 - 305 mm with a total of 35 fish and the lowest were 226 - 251 mm with a total of 4 fish. According to (Hidayat et al., 2018) differences in the size of tuna are caused by several factors, namely the location of the catch, water conditions, and the level of excessive exploitation. (Motlagh et al., 2010) in (Kaymaram and Daryishi, 2012) also stated that water conditions can result in differences in the length range of fish. According to (Taher et al., 2018) the length of fish caught can be affected by

excessive fish exploitation. The more caught, the smaller the fish size. The large catch is also supported by the selectivity of the payang fishing gear used by fishermen in the coastal waters of Carocok, Pesisir Selatan Regency. Good fishing gear is environmentally friendly and selective. Based on research conducted in the coastal waters of Carocok, Pesisir Selatan Regency, the payang fishing gear is recommended for use by fishermen because it meets the criteria for environmentally friendly fishing gear (Pramesthy, 2019).

Frequency Distribution of Anchovy Length Size (*Stoplephorus* sp.)

Measurement of the length of anchovies (*Stolephorus* sp.) was carried out to determine the biological suitability (length) of anchovies caught by the payload fishing gear which can be seen in Figure 8.

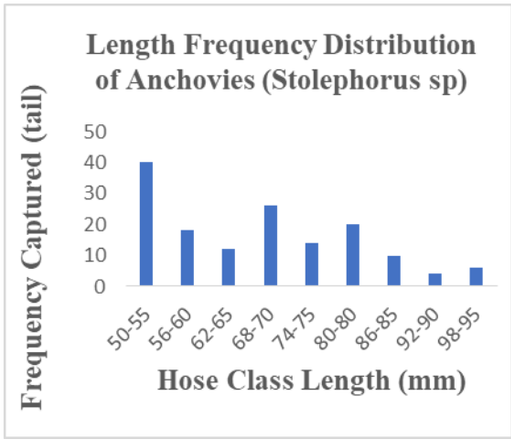

Figure 8. Frequency Distribution of the Length of Anchovies (*Stolephorus* sp.)
Source: Data Processing

Based on Figure 8, determining the length of the fish caught is a criterion in determining whether a fishing gear is selective or not for catching target fish by knowing the length limit of the fish when they first reach gonad maturity. Catching fish above the size of the first gonad maturity can provide an opportunity for the target fish to be able to reproduce and spawn before being caught, so that the recruitment process from the small fish phase to the adult fish phase can proceed properly (Sudirman et al., 2004). The size distribution of the anchovies caught was obtained by measuring the length of 150 anchovies caught by the payang. The anchovies whose length was measured came from the same boat. The results of the length measurements of the anchovies caught by the payang fishing gear were in the range of 50-95 mm. The most anchovies caught were in the size of 50-55 mm with a total of 40 anchovies, while the least number of anchovies caught were in the size of 92-90 mm with a total of 4 anchovies.

Frequency Distribution of Length Size of Peperek Fish (*Leiognathus* sp.)

The peperek fish collected from the waters of Carocok Tarusan Beach, Pesisir Selatan Regency, have a flat (compressed) body shape, a forked tail, and a protracted mouth. The number of fish samples obtained was 150, measuring between 70 and 151 mm, as seen in Figure 9.

Based on Figure 9, the peperek fish caught were predominantly 90–97 mm in size, with 31 individuals, while only 6 individuals were 100–106 mm in size. This indicates that the average peperek fish landed in the waters of Carocok Beach, Pesisir Selatan Regency were larger. Size differences in fish are generally influenced by environmental factors and food availability in the waters (Nur et al., 2022). According to Prayitno (2011), the waters of Carocok Tarusan Beach, Pesisir Selatan Regency, have abundant water resources, but this has not yet led to an increase in the fish population. It is suspected that the peperek fish have sufficient food availability so they can grow and develop well.

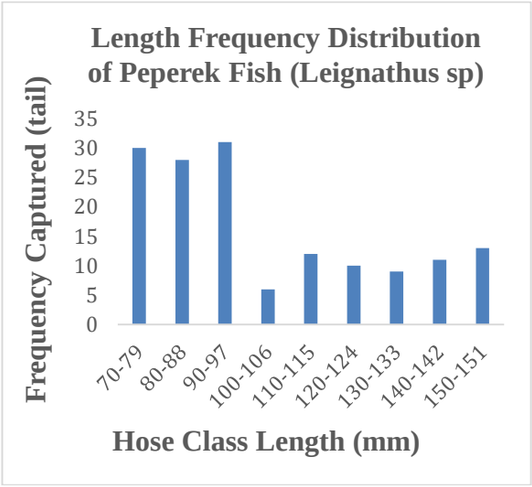

Figure 9. Frequency Distribution of the Length of Peperek Fish (*Leiognathus* sp.)
Source: Data Processing

CONCLUSION

From the results of the inventory of catches from the payang fishing gear, it was concluded that the payang fishing gear is a selective and environmentally friendly fishing gear. This can be seen from the frequency of catching skipjack tuna as the main catch, with a length of 282-305 mm, as many as 35 fish, and a length of 338-359 mm, as many as 33 fish.

RECOMMENDATIONS

Fishing activities using payang gear are carried out in a controlled manner to prevent a decline in the tuna population, which is the primary catch. Monitoring of the size of fish caught also needs to be tightened to ensure that they have reached gonad maturity before being caught, thus maintaining the sustainability of fish stocks.

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