



UDC 639

CATCH COMPOSITION OF PURSE SEINE IN EAST ACEH, INDONESIA

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ABSTRACT

Fish catch data is crucial for analyzing policy decisions aimed at conserving available fish resources. The lack of quality data and information on fishing gear catches is a significant obstacle in fisheries management in almost all regions of Indonesia. This research aims to analyze the production, fish species composition, and productivity of purse seine fishing gear at Idi Fishing Port, using a case study approach. To achieve the research objectives, we analyzed catch data to determine the production and species composition of the fish caught using purse seine from 2018 to 2022. This study also compared the amount of catch production with fishing effort to determine fishing productivity. The study revealed that the purse seine method caught 14 distinct fish species, of which seven were target fish (pelagic fish) and seven were bycatch. Tuna, skipjack, and mackerel were the most commonly caught species, accounting for 95% of the total catch. Mackerel was the primary target fish species, with the highest production from a total catch of 31,611,140 kg. Pomfret had the highest bycatch production of 254,690 kg.

KEY WORDS

Aceh, fisheries catch data, composition, productivity, purse seine.

Indonesia's marine waters have diverse fishery resources. This has led to the use of different types of fishing gear to catch fish. Fishing gear has undergone dynamic technological changes in recent decades to improve fishing efficiency (Wain et al., 2021). The aim is to respond to the economic factors of the fishing industry, to optimize production to gain profit from the catch and to respond to government policies (Nelwan et al., 2010). However, overfishing will cause damage. This is a challenge that Indonesia must face in order to sustainably manage its fisheries resources (Tuhuteru et al., 2015). Therefore, efforts are needed to control fishing activities.

Fishing activities should be based on sustainable use by not exceeding sustainable potential (FAO, 1996). To support this, data and information on the level of exploitation of fishery resources in each area of Indonesian waters is needed. Therefore, it is necessary to analyze the data preventively to avoid over-exploitation and extinction of fish resources. Monitoring the level of utilization of fish resources in important water areas is essential to prevent overexploitation and consequent depletion of fish resources (Stephan et al., 20-22; Simbolon et al., 2011). Currently, fishing activities in Indonesia are dominated by fishermen using purse seine gear (Tanjov et al., 2016; Imron et al., 2020). Purse seine is a fishing gear that has many types. The main target is pelagic fish, but in many cases in Indonesian waters, the catch is very diverse. This diversity of catches is considered a threat to marine biodiversity (Samudra et al., 2021).

Fishing ports serve as the first point of entry for fishermen's catch data. As an infrastructure for fishing activities, fishing ports play an important role in managing data and information on fish catches (Ariani et al., 2020). The role of fishing ports is closely linked to fishing vessels, with one of the main functions being a place for vessels to dock and load and



unload caught fish (Lubis, 2011). Fishing ports act as data and information centers on the level of exploitation of fishery resources in marine waters.

Idi Fishing Port is one of the fishing centers in East Aceh District, Aceh Province, where fishing activities are dominated by purse seine vessels. Based on preliminary observations, it is known that there are 243 purse seine vessels operating in this area, accounting for about 84.67% of the total fishing fleet. However, data and information on the production and composition of fish caught by these gears are not yet available. This information is crucial for the analysis and formulation of government policies to conserve fish resources in the future (Coro et al., 2016). The purpose of this study was to analyse the production and composition of fish species caught and to calculate the productivity of purse seine vessels in Idi Fishing Port based on the catches.

METHODS OF RESEARCH

This research was conducted in November 2023 in Idi Fishing Port, located in Idi Rayeuk District, East Aceh Regency. The research method used was case study. The data collected in this research are quantitative secondary data, including data on the composition of fish species caught by purse seine vessels and landed at Idi Fishing Port during the period 2018-2022, as well as fishing productivity data, which can be obtained by comparing the amount of fish caught. The catch production for one year with fishing effort in the form of number of fishing trips (during the period 2018-2022):

$$\text{Productivity per fishing trip} = \frac{\Sigma \text{Production of catches}}{\Sigma \text{Trip}} \text{ (kg/trip/year)}$$

RESULTS AND DISCUSSION

Purse seine fisheries in Idi Fishing Port consist of small, medium, and industrial scale businesses. The vessels varied in size from 5 GT to 99 GT. Purse seine fishing operations were performed using FADs. FADs aid in the collection of fish using attractors such as coconuts, areca nuts, and nipah leaves as well as other solid objects (Zuriat et al., 2019). In general, FADs used by purse seine fishers help increase the number of fish catches (Nurwahidin et al., 2016). Purse seine vessels in Idi Fishing Port usually have approximately 4-5 FADs that are usually installed at 100-200 meters of sea depth with a distance of approximately 5-10 miles between FADs, while the most commonly used FAD materials are coconut leaves, areca nut leaves, and palm leaves (Chaliluddin et al., 2019; Yustom, 2009).

During fishing activities at sea, the success of fishing operations depends on the expertise of each fisherman on board. The number of fishermen on a purse seine vessel in Idi Fishing Port in one fishing trip usually amounts to 3-10 people for vessels of 5-20 GT, where as for vessels above 20 GT the number of fishermen is 15-30 people. The duties and roles of each crew member on the boat were directly coordinated by the skipper to achieve smooth fishing activities. In addition, most of the purse seine vessels in Idi Fishing Port conduct fishing activities up to the 12 nautical mile limit of eastern Aceh waters and there are several vessels that fish up to the waters of the Malacca Strait. Frequent fishing areas include the waters of East Aceh, North Aceh, Pidie, Aceh Besar, and Banda Aceh with an average duration of fishing activities carried out for 4-7 days in one trip.

The results showed that the composition of fish species caught by purse seine vessels at Idi Fishing Port during the 2018-2022 period consisted of seven pelagic fish species that were the main targets of the catch. The seven types of fish were mackerel scad (*Decapterus sp.*), long jawed mackerel (*Rastrelliger brachysoma*), anchovy (*Stolephorus sp.*), mackerel (*Selaroides leptolepis*), mackerel tuna (*Euthynnus affinis*), skipjack tuna (*Katsuwonus pelamis*), and bigeye tuna (*Thunnus obesus*) (Figure 1).

Based on Figure 1, mackerel tuna is the type of fish with the highest production during 2018-2022 period with a total production of 31,611,140 kg. The second highest catch production position is mackerel scad with a total production of 24,592,350 kg, and the third position is skipjack tuna at 7,193,350 kg. These three types of fish are the dominant catch



production that obtained by purse seine fishers in Idi Fishing Port. Overall, the proportion of catch of the three types of fish was 95% of the total amount of all catches. In general, the most dominant pelagic fish resources caught by purse seine vessels in Aceh waters are macakrel tuna, mackarel scad, and skipjack tuna (Fajri, 2018; Anwar et al., 2017).

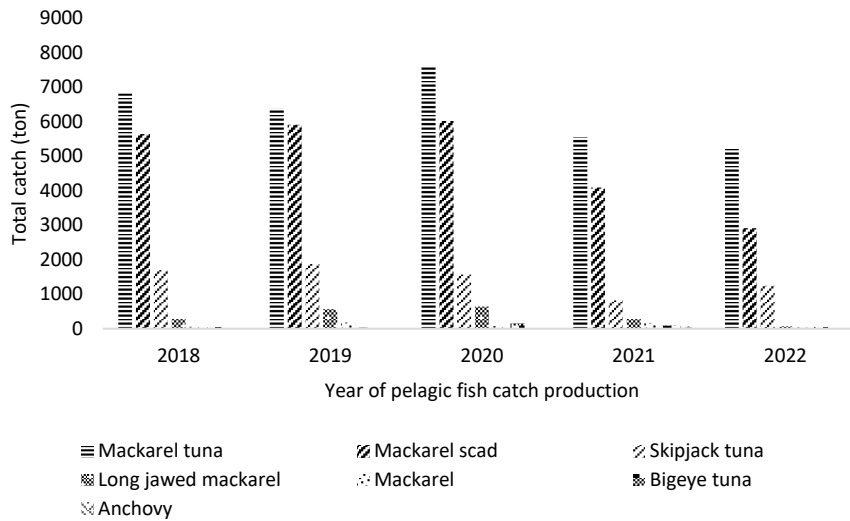


Figure 1 – Total catch of pelagic fish by purse seine vessels during 2018-2022

In addition to the main target catch, purse seine vessels at Idi Fishing Port also receive bycatch. The fish species caught included croacker (*Johnius carouna*), swordfish (*Trichiurus lepturus*), pitcher (*Mene maculata*), starry triggerfish (*Abalistes stellaris*), ponyfish (*Leiognathidae*), spanish mackarel (*Scomberomorini*) and pomfret (*Pampus spp.*) (Figure 2).

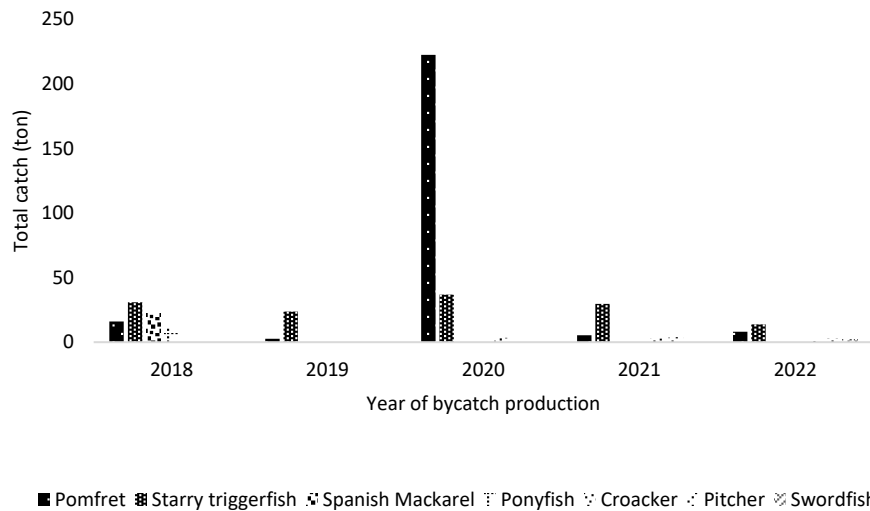


Figure 2 – Total bycatch of purse seine vessels during 2018-2022

The total bycatch of purse seine vessels at Idi Fishing Port during the 2018-2022 period amounted to 439,150 kg, with the type of fish that had the highest production being pomfret fish at 254,960 kg. The proportion of bycatch obtained by purse seine fishermen in VAT Idi did not reach 3% of the total number of catches. It can be said that the purse seine gear used by fishermen is quite selective in catching the target fish. The diversity of catches obtained quite often occurs even though the proportion is only small. In general, the purse seine is a multispecies fishing gear because in many cases in Indonesia a very small mesh size is found, which can affect the catch obtained (Rambun et al., 2016).



The research data related to the total fish catch production as a whole showed that the total catch of purse seine vessels at Idi Fishing Port experienced fluctuations that tended to decrease. During the period 2018-2022, the highest total catch production was recorded in 2020, however from 2021 to 2022 the catch of purse seine vessels decreased. This occurred because the fishing efforts of purse seine vessels also tended to decrease due to a decrease in the number of fishing fleets. It is known that the decrease in the number of purse seine vessels in Idi Fishing Port is caused by changing the base port or selling the vessel unit.

Another research results related to the productivity of purse seine vessels based on the number of fishing trips also experienced fluctuations that tended to decrease. Table 1 shows the productivity value of purse seine vessel catches at Idi Fishing Port based on the number of fishing trips during the 2018-2022 period.

Table 1 – Productivity of purse seine vessels at Idi Fishing Port based on fishing trips

Year	Total Catch (kg)	Total Trip	Productivity (kg/trip)
2018	14.619.160	3.449	4.238,67
2019	14.956.720	3.137	4.767,84
2020	16.357.300	3.558	4.597,33
2021	11.108.690	3.428	3.240,57
2022	9.557.510	3.316	2.882,24

Based on Table 1, the highest productivity value of purse seine vessels at Idi Fishing Port during the 2018-2022 period occurred in 2019 at 4,767.84 kg/trip. Productivity will continue to decline until 2022. From these data, it can be seen that fluctuations in the total catch of purse seine vessels which tend to decrease also affect fishing productivity. However, an anomaly occurred between 2019 and 2020. In 2019, the total number of fishing trips was low but the productivity value was the highest. Meanwhile, 2020 was the fishing activity with the most trips where as the productivity value did not exceed the productivity value in 2019. The number of fishing trips does not necessarily indicate the amount of catch obtained in that year, however the higher the fishing effort, the more catches will be obtained (Rahmah et al., 2021).

Based on the description above, it can be explained that within five years the catch of purse seine vessels at Idi Fishing Port tended to decrease. The causes may still be broad in scope, therefore it is necessary to further analyze the internal and external factors that cause this to occur. Each fishing area has different characteristics, therefore the conditions and availability of fish resources is also differ. However, the thing can also affect fish gathering in a water area is FADs. Most studies show that FADs stimulate fish to gather so that fishermen can easily get a lot of fish caught around FADs (Mardiah et al., 2020; Mirnawati et al., 2019; Kuswoyo and Rahmat, 2018).

The declining catch of purse seine vessels at Idi Fishing Port also indicates that Aceh waters for tuna, kite and skipjack have experienced high fishing efforts in recent years and the possibility of remaining resource stocks continuing to decline. Fishermen may have realized this, so their fishing effort then tends to decrease because the catch is also decreasing. This can be seen from the number of fishing trips that will continue to decline from 2020 to 2022. Therefore, further research is needed to determine projections of future fish catches at Idi Fishing Port so that the level of utilization of fish resources in this area can be controlled properly.

CONCLUSION

The composition of the types of fish caught by the purse seine vessels at Idi Fishing Port in the 2018-2022 period consisted of seven types of main target fish which were pelagic fish and seven types of by-catch fish. Mackarel tuna is the target fish species that has the highest production during the period with a total catch of 31,611,140 kg while pomfret is the type of by-catch fish with the highest production of 254,960 kg. Overall, the catches of purse seine vessels were dominated by mackarel tuna, mackarel scad, and skipjack tuna with the



proportion of catches reaching 95% of the total amount of all fish catches. The highest purse seine vessel fishing productivity occurred in 2019 with a productivity value of 4,767.84 kg/trip. Thus, it is hoped that the results of this study will provide an overview of the level of utilization of captured fish resources obtained by purse seine fishers at Idi Fishing Port in 2018-2022.

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