

DESCRIPTION OF TROLL LINE UNIT AT PALABUHANRATU FISHING PORT, SUKABUMI, INDONESIA

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ABSTRACT

*Troll line fishing fleet is one of the most common capture fisheries business units found at the Palabuhanratu Fishing Port, Sukabumi, Indonesia. However, information and descriptions of fishing activities in the troll line fishing fleet and the proportion of catches are still not widely known. The existence of this information gap is the background for conducting this research. This research was conducted to describe the various fishing activities of the troll line fishing fleet including the catch production and composition. This research was conducted in March 2021 at the Palabuhanratu Fishing Port, Sukabumi, Indonesia. The survey and direct observation methods were used to obtain various information regarding the fishing activities of the troll line fishing fleet. A total of 30 respondents were also appointed as informants consisting of 10 ship owners, 14 captains, and 6 fishermen. Secondary data in the form of the catch production of troll line fishing fleet in 2020 was also obtained from the Central of Capture Fisheries Statistics, Sukabumi Regency. The troll line fishing fleet at the Palabuhanratu Fishing Port consists of 5 fishermen, 6-8 GT fishing vessels, and various types of fishing gear. The production of troll line catches varies depending on the conditions of the fishing season. During peak season, capture fisheries production can reach twice the normal season. The catch composition from the troll line fishing fleet consists of the main catch and by-catch. The main catch is dominated by tuna fisheries commodities such as skipjack (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), and bigeye tuna (*Thunnus obesus*). The by-catch of the trolling line fishing fleet consisted of striped marlin (*Tetrapturus audax*), squid (*Loligo sp.*), common dolphinfish (*Coryphaena hippurus*), narrow-barred Spanish mackerel (*Scomberomorus commerson*), sailfish (*Istiophorus platypterus*), and rainbow runner (*Elagatis bipinnulata*). All catches obtained by the troll line fishing fleet are classified as fish with high economic value. This shows the high potential for business development for the trolling fishing business unit at the Archipelagic Fisheries Port Palabuhanratu, Sukabumi, Indonesia.*

Keyword: Catch composition, catch production, economic value, fishing season, troll line fishing fleet.

1. INTRODUCTION

Palabuhanratu Fishing Port is a fishing port located in Palabuhanratu Bay and is directly opposite the Indonesian Fisheries Management Area (WPP) 573 [1]. Its strategic location makes Palabuhanratu Fishing Port has great potential in providing marine fisheries commodities, especially tuna [2]. The high demand for tuna commodities both in local and export markets makes Palabuhanratu Fishing Port has a great and promising opportunity as an economic area for capture fisheries, especially for tuna fisheries [3]. There are various fishing gear found in Palabuhanratu Fishing Port, one of which is the

troll line. Troll line is a fishing tool that targets tuna as its main catch [4].

Troll line is a traditional fishing unit that uses artificial bait and is operated by pulling using an inboard engine or small boat [5]. Artificial bait used in fishing serves to trick fish [6]. The catches obtained are generally large and small pelagic fish species [7]. The main and secondary catches in catching using troll line fishing gear consist of various marine product commodities that have high economic value [8].

The absence of information regarding the description of troll line fishing activities in the Palabuhanratu Fishing Port and the proportion of

catches that have not been widely discussed is the background of this research. The results of this study are expected to be a source of scientific literacy regarding the development of the troll line fishing fleet at PPN Palabuhanratu, Sukabumi, Indonesia.

2. METHODOLOGY

The research was conducted at Palabuhanratu Fishing Port in March 2021 using a survey method. This method is used to collect data through observation activities [9]. The data collected in this study consisted of primary and secondary data. Primary data were obtained from the interview process of 30 respondents who were designated as sources of informants. The 30 respondents consisted of 10 owners, 14 captains, 6 fishermen.

The secondary data obtained in the form of production data from troll line catches from the Palabuhanratu Capture Fisheries Statistics Center in 2020 [10]. Production data are used in the analysis of catch composition. The composition of the catch is the proportion of each type of catch obtained and is generally presented in the form of a ratio or percentage [11]. The composition of the catch is used to distinguish the main catch (HTU) and by-catch (bycatch). The composition of the catch can be calculated using the following formula [11].

$$P = \frac{n_1}{N} \times 100\%$$

Where :

P : The proportion of the species of fish caught on the troll line (%)

n₁ : Production of catch of fishery commodity - i (kg)

N : Total catch (kg)

3. RESULTS AND DISCUSSION

3.1. Overview of Troll Line at Palabuhanratu Fishing Port

Troll line is a traditional-scale capture fisheries unit with catches in the form of large and small pelagic fish. Troll line units consist of boats, fishing gear, and fishermen. In carrying out their capture operations, the troll line fleet is equipped with attractors in the form of FADs.

3.1.1. Fishing Vessels

The vessels used in troll line fishing operations in Palabuhanratu are generally made of wood with the main dimensions (L; B; D) 12.3; 2.9; and 1.0 meters. The size of the troll line vessels that were found during the study range ranged from 6-8 GT with an average of 6 GT. Troll line ships generally use 2 engines with a capacity of 22-30 PK/HP. The engine brands used on the troll line vary from Phanter, Mitsubishi, Yanmar, MWM (Motoren Werke Mannheim), and Jiangdong.

Troll line is one of the capture fisheries business units that are commonly found in Palabuhanratu Fishing Port, Sukabumi. In 2020, the Sukabumi Regency Marine and Fisheries Service noted that as many as 90 troll line vessels were still actively carrying out fishing operations (Figure 1).



Figure 1 Troll line fishing vessel

3.1.2 Fishing Gear

The troll line fisheries business unit in Palabuhanratu generally uses 5 types of fishing gear, namely tonda, taber, tomba, hand line, and kite fishing. The troll line, kite fishing, and handlines are used to catch fish measuring 5-20 kg with hook numbers ranging from 6-8. The tomba fishing line is used to catch fish measuring more than 30 kg with fishing line numbers ranging from 1-3. Meanwhile, the taber line is used by fishermen to catch small pelagic fish and squid.

Troll line fishing business units generally operate around FADs that have been installed and owned by a group of fishermen. FADs are used to collect target fish for fishing. FAD attractors are made from coconut leaves which are routinely replaced every 3 months.

3.1.3 Operating Hours and Fishing Area

The operating time of the troll line depends on the feeding response of the fish. Generally, pelagic fish

have certain hunger times which will be related to their feeding response. For this reason, before carrying out fishing operations, fishermen generally check the fish's response to food by spreading live bait. Next, the arrest process is carried out around FADs. The FAD installation location and fishing area are carried out around 105°30'-106°50' East Longitude and 6°59'- 8°22' South Latitude Indian Ocean.

3.1.4 Fishermen and Fishing Season

Each troll line vessel that carries out fishing operations generally consists of 5 fishermen. The five fishermen consist of 1 captain who doubles as a fishing master and 4 others as crew members who are tasked with operating fishing gear. Based on the results of interviews, there are two main factors that become fishermen's concerns about the condition of troll line fisheries. The first factor is the lack of knowledge of troll line fishermen to changes in peak seasons and uncertain famine seasons. Other factors include competition and seizure of fishing grounds with purse seine fishing gear. The conflict over the fishing area was also triggered by the similar catch target between the two fishing gears, namely tuna.

Purse seine catches are mostly dominated by large pelagic fish which are also the main catch targets for troll lines such as yellowfin tuna (5,462,075.62 tons/ship/year), skipjack (14,094,446.88 tons/ship/year), and big eye (3,896,025.97 tons/ship/year) [12]. Based on the production value of the catch, it is known that the purse seine fishing gear has a much larger production than the troll line production which is not more than 500 tons per year.

The shift in the fishing season becomes erratic due to climate change. The shift in fishing seasons that cannot be predicted by fishermen is the biggest obstacle in determining the timing of fishing operations. Many fishermen claim to have suffered heavy losses due to errors in determining the timing of fishing operations. Generally, local fishermen only determine when to go to sea based on the exchange of information between fishermen about the condition of fish in the fishing area.

According to fishermen's information, generally the peak season occurs in June-September, while the famine season occurs in December-February. Seasonal factors greatly affect troll line catches. Based on oceanographic conditions, the peak

season is in the east monsoon, where the water conditions are relatively calm. In the east monsoon, monsoon winds blow which allows the transport of ekman to carry surface water away from the waters south of Java. This is what results in the occurrence of anomalous voids in sea level which causes the movement of water from the water column area to the water surface (upwelling) [13].

This upwelling phenomenon will continue to occur at low Sea Surface Temperature (SST) conditions. This will cause the density at sea level to increase and move the water mass to the water column [14]. There are other studies that have proven that during the peak season, the presence of the southeast monsoon (May-September) causes upwelling in the waters of Southern Java [7].

In the east monsoon (June-August) there was also a significant increase in chlorophyll-a as a result of the upwelling process. The high concentration of chlorophyll-a indicates the large availability of food for fish at the primary consumer level. With the availability of small fish, it will also be followed by the presence of predatory fish such as other large pelagic fish. This explains the seasonal conditions that greatly affect the catch obtained from the troll line fleet [15].

3.3. Troll Line Capture Production

The production of troll line catches is influenced by seasonal conditions. During the peak season (June-September) production of troll line catches can increase up to twice the normal condition. Increased production of troll line catches in the peak season occurred for both main catch and bycatch.

Until now, accuracy in predicting the peak of the fishing season is still a major obstacle for troll line fishermen. The method of estimating the peak of the fishing season is needed by troll line fishermen to maximize income and avoid fishing losses. The production of troll line catches in 2020 is presented in Table 1.

Table 1 Produksi hasil tangkapan armada troll line

Commodity	Peak season	Mid season	Famine season
<i>Katsuwonus pelamis</i>	137.06	82.23	54.82
<i>Thunnus albacares</i>	96.71	52.75	26.37
<i>Thunnus obesus</i>	9.48	6.32	5.27
<i>Loligo sp.</i>	6.87	5.93	4.23
<i>Coryphaena hippurus</i>	8.72	5.24	3.49
<i>Tetrapturus audax</i>	46.14	13.18	6.59
<i>Scomberomorus commerson</i>	0.66	0.59	0.22
<i>Istiophorus platypterus</i>	0.62	0.44	0.18
<i>Elagatis bipinnulata</i>	0.79	0.36	0.29

3.3. Troll Line Catch Composition

Catch composition is used to describe the catch structure of the troll line fleet at Palabuhanratu Fishing Port, Sukabumi, Indonesia. The composition of the catch describes the percentage of the overall type of catch obtained. The composition of troll line catches in one year in 2020 is presented in Figure 2.

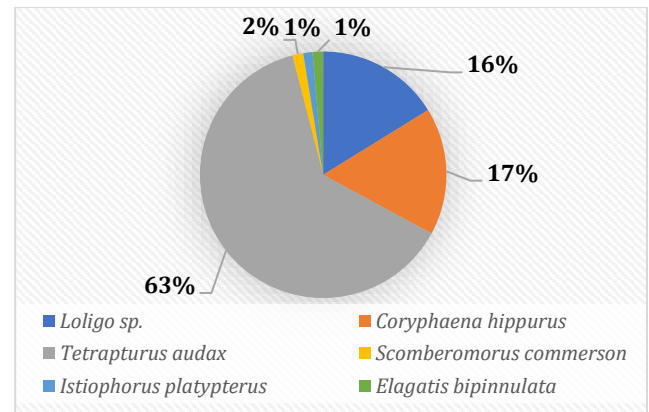
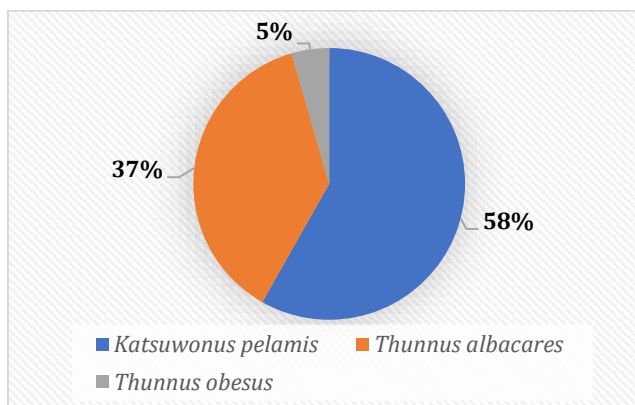
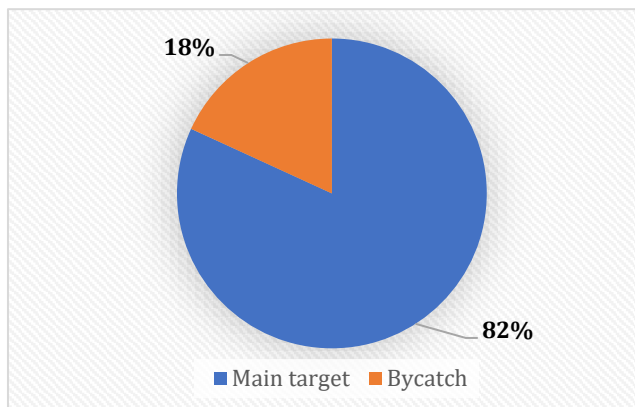


Figure 2. Composition of troll line catches at Palabuhanratu Fishing Port in 2020

Based on the main structure, troll line catches are dominated by main catches at 82%. Skipjack tuna (*Katsuwonus pelamis*) is the main catch commodity that dominates, followed by yellowfin tuna (*Thunnus albacares*) and bigeye tuna (*Thunnus obesus*). The by-catch was dominated by striped marlin (*Tetrapturus audax*) followed by squid (*Loligo sp.*), common dolphinfish (*Coryphaena hippurus*), Narrow-barred Spanish mackerel (*Scomberomorus commerson*), sail (*Istiophorus platypterus*), and rainbow runner (*Elagatis bipinnulata*).



All types of catch, both from the main catch group and by-catch from troll line fishing gear, are classified as fish with high economic value. The high selling price of the caught fish shows the high business potential of the troll line fishery business unit. In the midst of an uncertain changing fishing season, the troll line fleet is one of the many capture fisheries business units that still survive and operate at Palabuhanratu Fishing Port, Sukabumi, Indonesia.

4. CONCLUSION

The troll line fishing unit at Palabuhanratu Fishing Port consists of fishermen (5 people), 6-8 GT vessels, and various types of fishing gear. The shift in fishing seasons and conflicts over fishing areas with purse seine fleets are the main problems experienced by troll line fishermen at this time. The troll line fishing fleet obtains various main catches and by-catch that have high economic value. This shows the high potential for developing troll line fisheries.

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