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Catch Comparison and Rate of Floating Liftnet at Different Time of Hauling in Pangandaran, West Java, Indonesia

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ABSTRACT

Pangandaran fishermen use various types of fishing gear to catch fish, one of which is a liftnet. Floating liftnet fishing in Pangandaran is usually carried out at night, especially during dark months so that fish and crustaceans can gather in the area, as such animals are attracted to light (positive phototactic properties). These animals are deemed pelagic as they live on the surface of the waters. The weight and number of catches by fishermen are different depending on the time of hauling. Based on this, it is necessary to conduct research on the effect of the time of hauling on the floating liftnet catch. Accordingly, the optimal hauling time for floating liftnet fishing in Pangandaran was after midnight into early morning (00.00-04.00) and the average total catch is 386.12 kg. The main catch is mostly jawla paste shrimp and squid shrimp with a catch rate of 92.9 kg / hour.

Keywords: catch, catch rate, liftnet, hauling time, Pangandaran, fish, West Java

1. INTRODUCTION

The potential of fisheries resources in Indonesia is relatively large because the geographical and climate conditions in Indonesia allow fish to grow and develop well.

The potential of Indonesian marine fisheries is 10,5 million tons/year. One of them is Pangandaran Fish Landing Base (PPI) which contributes to the potential of capture fisheries in

Indonesia. This area is a mainstay area for the marine tourism sector and capture fisheries. Coastal waters are part of the outer boundary that is still influenced by natural processes that occur on land; this provides an understanding that coastal waters are dynamic ecosystems and have a diverse wealth (Suprpto *et al.*, 2014). Pangandaran waters have a vast potential of marine resources. Therefore, marine fish resources in Pangandaran waters should be optimally utilized. Sustainable fishery resources will continue to support fishing activity in Pangandaran waters, increasing fishery production (Apriliani, 2018).

Pangandaran fishermen use various types of fishing gear to catch fish, one of which is a liftnet. Liftnets are fishing gear belonging to the classification of lift net fishing gear, including floating liftnets. The fishing gear has been around for a long time in Pangandaran and has been widely used by fishermen around. Pangandaran fishermen usually use fishing traps with sticks and floating liftnets.

The operation of floating liftnet fishing gear in Pangandaran is usually carried out at night, especially during dark months so that fish can gather in the area around the light. The light is used to make fish gather in the area around the light, making it easier for fishermen in Pangandaran to catch fish. Fishermen who use a fishing gear liftnet use fish behavior that has positive phototactic properties. Fish that have positive phototoxic properties are pelagic fish or fish that live on the surface of the waters.

Floating liftnets are fishing gear that produce economically important pelagic fish catches, especially small pelagics. Small pelagic fish contribute and play a very important role in Indonesia's economic development. The potential of small pelagic fish in Indonesian waters, based on the study in 2000 was 3,1 million tons/year, spreading across nine fisheries management areas. Moreover, the proportion of marine fish stocks which are intensively exploited is growing (Cisse *et al.*, 2013).

Based on Hapsari *et al.* (2018), lift net is one of the fishing gears that is used widely for catching pelagic fish. The yield of fish captured by these fishing gear has a high economic value, such as fish belt (*Trichiurus* sp.), squids (*Loligo* sp.) and anchovies (*Stelophorus* sp.). The weight and number of catch by fishermen are different floating liftnets, depending on the time of hauling. Based on this, it is necessary to conduct research on the effect of the time of hauling on the floating liftnet on the catch.

2. MATERIALS AND METHODS

The study was conducted in September - October 2017, during the dark moon phase located in Pangandaran Waters, Indonesia. The object of the research is the operation of fishing operations with a floating liftnet. The research method used in this study was an experimental method, with 2 treatments and 9 replications. The treatment used is hauling time, consists of:

- a) Hauling with the time before midnight, at 20.00 to 24.00.
- b) Hauling with time after midnight, at 24.00 to 04.00.

The location chosen for this study is East Coast Pangandaran, because fishing operations using floating gear are only found in the area. The process of removing the net is carried out 4-6 times, starting from 20.00-04.00 (8 hours). The parameters observed in this study include fish catches using floating liftnets before midnight at 20.00-24.00 and after midnight at 24.00-04.00, as well as the catch parameters in the form of total fish caught and weights per species of fish.

The data obtained are then analyzed descriptively, by classification, tabulation, and interpretation of data, and presented in the form of tables and graphs. Capture rate analysis uses the interpretation of the Shindo formulation (Sparre and Venema, 1999) as follows:

$$CR = \frac{C}{R}$$

where:

CR = Catch Rate (kg/jam)

C = Catch (kg)

E = Effort (converted from per towing/hauling/trip in hours).

3. RESULTS

The catches obtained during the study had a different total weight each trip (**Table 1**). The availability of food is one of the factors that determines the abundance of the population and the condition of the fish present in the waters (Rizwan *et al.*, 2014). The research conducted in September - October on the East Coast of Pangandaran has the target of fish being made as the main catch by fishermen, namely jawla paste shrimp and squid, because in these waters the season of jawla paste shrimp and squid is more easily sold in the market. According to Rahmawati *et al.* (2017) a significant increase in catches directly affects the income of fishermen.

Tabel 1. Weight of Catches.

Type of Fish	Before Midnight (kg)	After Midnight (kg)
Main Catch		
Jawla paste shrimp (<i>Acetus indicus</i>)	44	369
Squid (<i>Loligo</i> sp.)	1.41	2.51
Amount	45.41	371.51
By Catch		
Curvespine cuttlefish (<i>Sepia recurvirostra</i>)	0.5	0.5
Hairtail (<i>Lepturacanthus savala</i>)	3.2	5,83
Ovoid toothpony (<i>Gazza dentex</i>)	10.975	0
Tade gray mullet (<i>Chelon planiceps</i>)	1.482	0.468
Scad (<i>Decapterus koheru</i>)	1.036	0

Baracuda (<i>Sphyraena barracuda</i>)	0.078	0.725
Spotted scat (<i>Schatopagus argus</i>)	0	6,4
Sardine (<i>Sardinella sirin</i>)	0.877	1.285
Amount	18.148	15.208
Total	455.3	

The total weight of the catch during the study was 455.3 kg. In treatment A (Hauling before midnight 19.00 - 24.00), 64.2 kg was obtained, and treatment B (Hauling after midnight 24.00 - 04.00) was obtained as much as 386.1 kg (**Table 2**). The difference between the two total weights is 312.9 kg.

Table 2. Weight of Total Catch.

Trip	Before Midnight (kg)	After Midnight (kg)
1	19.315	45.3
2	22.873	43.42
3	4.509	243.025
4	0.198	1.24
5	2.089	1.716
6	4.5	1.285
7	5.125	12.649
8	4.31	17.21
9	6.291	20.275
Total	64.2	386.1

The catch after midnight is greater than before midnight. Only on trips 5 and 6 the catch before midnight is greater than after midnight. Puspito and Suherman (2012) state that fish are more active and show maximum phototoxic properties before midnight. The timing of fishing operations between 18.00 and 21.00 is the time for fish adaptation from light to dark. At that time, the environmental conditions that turned dark resulted in fish being attracted by artificial light. Sultana and Islam (2017) stated that the hauling time at midnight was the most optimal time. On trip 3, we get the highest total catch compared to other trips.

This is because the moon phase on trip 3 is the third quarter phase which shifts to the dark moon phase which makes the sky darker and produces light on a brighter chart, so that jawla

paste shrimps are collected under more light and the catch of jawla paste shrimp obtained on trip 3 is greater than that on the other trip. According to Akbar *et al.* (2013), jawla paste shrimp is a small type of shrimp that lives in shallow and muddy coastal waters and is a type of shrimp that has positive phototoxic properties. Positive phototoxic is shrimp behavior that is attracted to near light sources. The drastic decrease in catch after midnight occurs starting from trips 4 to 6. This is due to the increase in a high rainfall which makes the total weight of the catch decreases very far. According to Carles *et al.* (2014), the results of the field survey found that catch productivity (CPUE) was affected by weather conditions. Rainfall affects fishing activities and the surrounding aquatic environment. High rainfall makes the water quality parameters on the East Coast Pangandaran decrease. Based on Ling *et al.* (2017), a rainfall event is an important factor that can greatly affect the water quality of a river, particularly in a tropical country where the seasonal variations of river water quality are mainly dominated by precipitation. In addition, rivers that flow into the coastal area also have an impact on the level of water salinity due to the high freshwater runoff from the river when the rain occurs which impacts on the orientation of migration and distribution of fish in these waters, so that the catches of fishermen also decrease. The total weight of the catch on trips 7 to 9 tend to increase again. This is because there is no rain, and rainfall in the East Coast waters of Pangandaran tends to be low which makes the caught fish increase again.

The catch rate (**Table 3**) target fish before and after midnight is 11.4 - 92.9 kg / hour, and the by-products are between 4.5 - 3.8 kg / hour. This shows that chart capture equipment has a high selectivity, because the main catch results are greater than the by-catch results.

Tabel 3. Catch Rate.

Catch rate	Sebelum tengah malam (kg/jam)	Sesudah tengah malam (kg/jam)
Main	11.4	92.9
By-catch	4.5	3.8

4. CONCLUSIONS

Based on the results of the study, the conclusions obtained were that the optimal hauling time for floating liftnet fishing gear in Pangandaran was at the time after midnight (00.00-04.00) with a total catch of 386.12 kg. The main catch is mostly jawla paste shrimp and squid with a catch rate of 92.9 kg/hour.

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