Productivity of Bottom gillnet fishing gear on fish landing results at Fish Landing Base (PPI) Ujong Seurangga

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Abstract. The bottom gillnet is a passive fishing gear resembling a rectangle, designed with floats on the top and sinkers on the bottom. Evaluating the productivity of the bottom gillnets is crucial for assessing their effectiveness in catching fish. This study examines the productivity of bottom gillnets using two mesh sizes: 1 3/4-inch and 2-inch. Conducted in 2 months in 2024 at the Fish Landing Base (PPI) Ujong Seurangga, the research employed survey and interviews methods with purposive sampling. Data analysis included calculation of production value per trip and per unit length of the net. The findings reveal that bottom gillnets with a 1 3/4-inch mesh size achieved a productivity of 1,870 kg/trip, while those with a 2-inch mesh size recorded 3,975 kg/trip. Productivity per sheet of net was 0.1 kg/sheet for the 1 3/4-inch mesh size and 0,2 kg/sheet for the 2-inch mesh size. A total of 33 fish species were identified during the study. The 1 3/4-inch mesh size caught 30 species (436 fish, 27,878 kg), while the 2-inch mesh caught 24 species (393 fish, 58,944 kg). These results highlight the efficiency and selectivity of different mesh size for bottom gillnet fishing.

1 Introduction

Aceh Barat Daya is a district located in the South West coastal area of Aceh Province, the vast sea area makes the waters of Aceh Province have great potential in the marine and fisheries sector, one of the largest fishing and landing activities in Aceh Barat Daya is the Ujong Seurangga Fish Landing Base (PPI). According to [1] Fish Landing Base (PPI) Ujong Seurangga is the largest fish landing site in Southwest Aceh Regency where catch landing activities occur every day starting at 07.00 am until 12.00 pm. One of the commonly used fishing gears at the Fish Landing Base (PPI) Ujong Seurangga is the bottom gillnet.

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The bottom gillnet is one type of fishing gear whose design resembles a rectangle and is passive, with the top equipped with a buoy and the bottom equipped with ballast, so that with the two opposite directions of force will make the gill net can be operated in the fishing area with an upright position blocking the swimming direction of the target fish [2]. According to [3] gillnet is not a new technology for fishermen, this is because the material is easier to obtain, technically easy to operate, economically accessible to fishermen, and more selective on the size of fish caught.

Productivity is one of the indicators to determine the ability of fishing activities carried out using a type of fishing gear, while [4] states that the catch per unit time as output and effort as input. Productivity of bottom gillnet gear is an important review in order to know the ability of bottom gillnet gear to the catch obtained. Information on bottom gillnet catches landed at the Ujong Seurangga Fish Landing Base (PPI) is still very limited, therefore it is necessary to collect data on catches so that it can be known the catches obtained by bottom gillnet fishermen at the Fish Landing Base (PPI) Ujong Seurangga, Susoh District, Southwest Aceh Regency.

The purpose of this study was to determine the level of productivity of bottom gillnet fishing gear based on the mesh size of 1 3/4 inches and 2 inches on the catch at the Ujong Seurangga Fish Landing Base (PPI) and Knowing the catch of bottom gillnet landed at the Ujong Seurangga Fish Landing Base (PPI).

2 Research methods

2.1 Time and place

This research was conducted in 2 months in 2024, located at the Fish Landing Base (PPI) Ujong Seurangga, Susoh District, Southwest Aceh Regency, the research location map can be seen in the figure below.

Fig. 1. Research location.

2.2 Data Capture Method

The methods used when collecting data in this study are survey and interview methods. Sample determination in this method was carried out using purposive sampling technique. The criteria for respondents selected were bottom gillnet fishermen with mesh sizes of 1 ¾ inches and 2 inches at the Ujong Serangga Fish Landing Base (PPI). The determination of the number of samples in this study was calculated using the slovin technique according to [5]

2.3 Data analysis

The productivity of bottom gillnet gear was analyzed by calculating the vessel value per trip and the production value based on the length of net used. Fishing production is calculated based on the volume of catch per trip (kg) and the number of trips made. Mathematically it can be written in the calculation formula as follows [6]:

$$\text{Productivity per trip } \left(\frac{kg}{trip}\right) = \frac{Catch\ per\ trip}{\Sigma trip} \quad (1)$$

$$\text{Productivity per net sheet } \left(\frac{kg}{lembar}\right) = \frac{catch\ per\ trip}{\Sigma net\ length\ (lembar)} \quad (2)$$

While the catch of bottom gillnet will be analyzed descriptively. Descriptive analysis is used to analyze data by describing or describing the data that has been collected as it is in the form of tables or diagrams.

3 Result and discussion

3.1 Results

Bottom gillnets with a 2-inch mesh size showed higher productivity than 1 3/4-inch mesh size. Based on the research that has been done, the productivity results of the bottom gillnet fishing unit on the catch at the Ujong Seurangga Fish Landing Base (PPI) are carried out by calculating the production value per trip and the production value based on the length of the net used. The productivity value of the bottom gillnet can be seen as follows.

Table 1. Productivity of Bottom Gillnet.

No	Type Gillnet	Productivity Per Trip (Kg/Trip)	Productivity Per Net Sheet (Kg/Sheet)
1	*Gillnet* 1 3/4 inch	1,870	0,1
2	*Gillnet* 2 inch	3,975	0,2

Based on the research that has been done, observations of the catch using a mesh size of 1 3/4 inches and 2 inches. The use of a mesh size of 1 3/4 inches caught 436 individual fish. Meanwhile, fishing using a 2-inch mesh size caught 393 individual fish. This difference can be explained that larger mesh sizes tend to target larger fish, as can be seen in the diagram below.

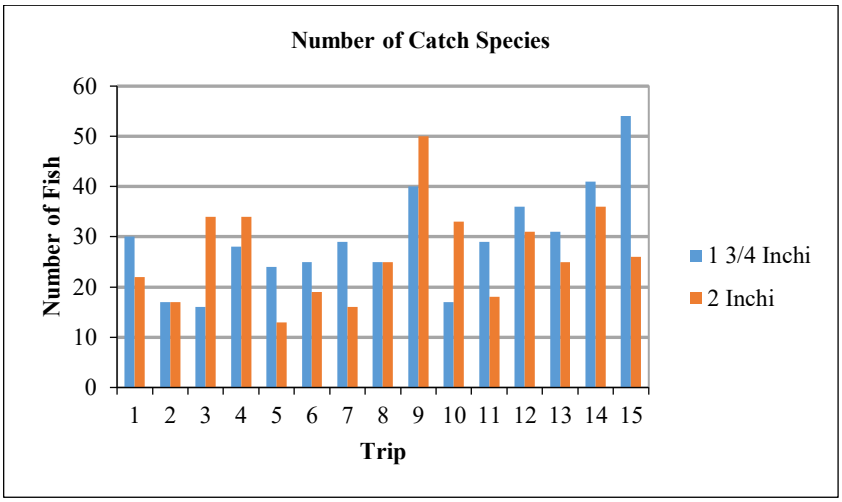

Fig. 2. Catch size diagram.

Based on the research that has been done, the total weight of the catch shows that the mesh size of 1 3/4 inches weighs 27.878 grams, while for a mesh size of 2 inches weighs 58.944 grams. The total weight of the catch can be seen in the diagram below.

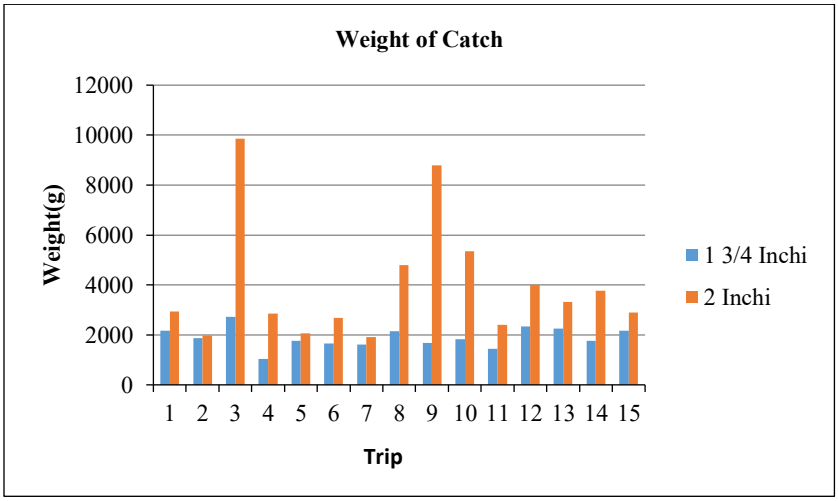

Fig. 3. Catch weight diagram

The catches obtained during the study obtained some differences between the types of catches using mesh sizes of 1 3/4 inches and 2 inches. The catches of 1 3/4 inch and 2-inch bottom gillnet can be seen in table 4.2 as follows.

Table 2. Data Catch.

No	Fish Type	Total Tails		Weight (Gram)		Length (cm)	
		1 3/4 Inch	2 Inch	1 3/4 Inch	2 Inch	1 3/4 Inch	2 Inch
1	*Splendid ponyfish*	115	4	3,591	96	11-15	12-19
2	*Common silver- biddy*	38	0	1,654	0	12-22	0
3	*Sardinella goldstrip*	40	1	1,720	28	15-18	15

4	*Orange-stripedemperor*	30	1	1,725	184	13-19	21
5	*Bigeye trevally*	22	0	1,629	0	15-20	0
6	*Smallmouth threadfin*	16	9	824	800	12-19	18-19
7	*Savalai hairtail*	21	5	4,214	878	56-74	59-60
8	*Oxeye scad*	23	55	1,761	7,158	16-23	18-25
9	*Celebesthreadfin bream*	9	44	1,104	5,503	17-24	15-30
10	*Indian mackerel*	15	38	1,176	5,036	11-25	16-26
11	*Goldband goatfish*	28	40	1,136	3,599	12-16	14-27
12	*Torpedo scad*	4	57	342	10,758	17-24	20-30
13	*Longfin grouper*	5	8	716	1,198	19-24	21-27
14	*Yellowstripe scad*	8	21	518	3,158	16-22	17-32
15	*Malabar trevally*	4	25	554	3,984	17-20	14-29
16	*Pickhandle barracuda*	7	8	731	1,095	20-36	23-37
17	*Jarbua terapon*	12	1	861	108	14-22	20
18	*White sardinella*	16	0	410	0	12-17	0
19	*Barred queenfish*	9	1	493	158	16-20	29
20	*Bigeye snapper*	3	29	146	2,935	16-19	15-26
21	*Red bigeye*	2	2	191	166	18	17-18
22	*Johnius croaker*	1	0	270	0	29	0
23	*Red coat*	1	1	55	47	16	15
24	*Bluelined hind*	1	0	210	0	24	0
25	*Stingray*	1	0	1,451	0	50	0
26	*Stoklephorus*	1	0	8	0	10	0
27	*Peacock hind*	1	0	74	0	18,5	0
28	*Maned goby*	1	36	146	10,054	26	18-38
29	*Indo-pacificking mackerel*	1	1	106	403	27	37
30	*Saddle grunt*	1	0	62	0	16	0
31	*Spottet golden goatfish*	0	4	0	935	0	24-28
32	*Caesio xanthonota*	0	1	0	473	0	34
33	*Blackfin slatey*	0	1	0	190	0	26
Total		436	393	27,878	58,944		

3.2 Discussion

Fishing productivity is a measure of the production ability of a fishing gear in a unit of fishing effort [7]. According to [8], fishing productivity involves various factors, namely the type of fishing gear, fishing effort, dimensions of fishing gear and labor. The calculation of productivity in this study was carried out by calculating the production value per trip and the

production value based on the length of the net used. The productivity per trip of the bottom gillnet with a mesh size of 1 3/4 inch is 1,870 Kg / Trip, while the bottom gillnet with a mesh size of 2 inch is 3,975 Kg / Trip, it can be seen that the productivity per trip with a mesh size of 2 inch is higher than the mesh size of 1 3/4 inch, Meanwhile, the productivity per net sheet with a mesh size of 1 3/4 inch is 0.1 kg/sheet, while with a mesh size of 2 inch is 0.2 kg/sheet. These values indicate that there is an influence of the length of the net with the success of capture. The greater the length of the net, the wider the fishing ground reached. According to [9], in addition to being influenced by the mesh size and fishing area, the productivity of gillnet fishing gear is also influenced by fishing time.

The bottom gillnet is a passive fishing gear. Passive fishing gear will catch fish with an active nature or fish that are sensitive to the stimulation of the sense of smell or touch. Fishing gear with components in the form of nets tends to produce catches in good condition even though there are slight defects in certain body parts [10]. The catch of gillnets is generally demersal fish with different types and sizes [11]. According to [12], gillnet fishing gear is a widely used fishing gear. The fishing time is done every day with a variety of catches. According to [13] Fish that are larger or smaller than the mesh can be caught in the gillnet without having to penetrate the mesh.

During the study, 33 species of fish were caught, where fish caught with a mesh size of 1 3/4 inches were 30 species with a total of 436 individuals and a weight of 27,878 grams. Fish caught with a mesh size of 2 inches were 24 species consisting of 393 individuals with a total weight of 58,945 grams. The more dominant catches for both mesh sizes used were jackfruit seeds, mackerel, kurisi, pepetek, and mackerel and were often caught from other species. This is based on the experience of fishermen that catches are also influenced by water conditions, weather and fishing seasons so that at certain times there are not many fish caught.

Fishes caught with 2-inch meshes tend to be larger and provide insight into the presence of more dominant fish species in these waters. Catches using a 2-inch mesh showed that this larger mesh size was dominated by larger fish and had a greater variety of sizes. The large pelagic fish caught also tended to be larger and more diverse than the 1 3/4-inch mesh.

4 Conclusion

Productivity of bottom gillnet gear with a mesh size of 1 3/4 inches is 1,870 Kg / Trip, while bottom gillnet with a mesh size of 2 inches is 3,975 Kg / Trip, while for productivity per sheet of net with a mesh size of 1 3/4 inches is 0.1 Kg / Sheet, while with a mesh size of 2 inches is 0.2 Kg / Sheet. These values indicate that there is an influence of the length of the net with the success of catching the fish. Fish caught during the study were 33 species of fish. At a mesh size of 1 3/4 inches there were 30 species with a total of 436 fish and a weight of 27,878 grams, while at a mesh size of 2 inches there were 24 species consisting of 393 fish with a total weight of 58,944 grams.

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