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Catches Analysis of Scottish Seine Net Modification of Cod-end in Majene Waters, Makassar Strait

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Abstract. Research on Scottish Seine Net Modification of cod-end was conducted to analyze the catch. This research was carried out in the western coastal waters of Majene Regency, West Sulawesi, following the fishing operation of one unit of Scottish Seine Net, which had modified its fishing gear. The study results found ten species of fish caught with a total catch of 115.4 kg. The four most caught species were Indian scad 46.5 kg, mackerel tuna 21.5 kg, skipjack tuna 19.2 kg, rainbow runner 17.8 kg, and six other species 10.4 kg. The total catch was 115.4 kg consisting of 1753 individuals, with the composition of the species of catch consisting of Indian scad (*Decapterus russelli*) 56.7%, Bigeye scad (*Selar crumenophthalmus*) 22.6%, skipjack tuna (*Katsuwonus pelamis*) 9.9%, Mackerel tuna (*Euthynnus affinis*) 3.1% and the other six species 7.7%. The four most common catch species are the Indian scad, 7.3-25.8 cm. Bigeye scad, 6.5-20.5 cm. Skipjack tuna, 10.8-25.5 cm. And Mackerel tuna, 14.5-45.1 cm. Indian scad as the catch with the highest composition caught 62.7% were suitable for catching.

1. Introduction

Scottish Seine Net is a Seine Net with a bag that is used to catch schools of surface fish (pelagic schooling fish) with both wings that are useful for scaring or surprising and herding fish into the bag [1]. Scottish Seine Net is a fishing gear that Indonesian fishermen have long known and used. This fishing gear can be categorized as a gear with high productivity and can be classified as traditional fishing gear, considering that this fishing gear has long been used by Indonesian fishermen [2]. The operation of the Scottish Seine Net is carried out by circling the school of surface fish and then pulling it to the boat that is at rest through both the wings and the rope so that this fishing gear can be classified as active fishing gear in terms of how it operates [3].

Based on Ministerial Regulation No. 2/Permen-KP/2015 concerning the prohibition of trawls and seine nets in Indonesian waters, the operation of Scottish Seine Net as a type of seine net will, of course, also be prohibited. However, the most fishing community does not accept the prohibition of Scottish Seine Net. Scottish Seine is a traditional fishing gear handed down from the past until now and is the dominant fishing gear for small pelagic fish in Majene and Mamuju regencies [4]. The enactment of Ministerial Regulation No.2/Permen-KP/2015 was a polemic due to the implementation of policies that



did not pay attention to the socio-legal aspects of society, thus reaping the pros and cons among fishing communities, especially fishermen who use trawls for fishing [5].

Scottish Seine Net is prohibited from operating in waters because this fishing gear catches fish that are still small due to the construction of the enclave that uses a net with a small mesh size [2]. Scottish Seine Net in Kendal Regency has a construction of the bag section made of “*waring*” with very small mesh sizes, which, of course, cannot allow young fish to grow and develop [1]. Therefore several modifications at the cod-end of Scottish Seine Net has done, such as modification at the side window with a quite bigger mesh size [6,7] as well as rectangular windows at the top of the cod-end [1] to pass the small fish.

Based on the description above, it is necessary to evaluate how to modify the construction of the Scottish Seine Net cod-end to allow small fish to grow and develop. This study aimed to analyze the composition of the type of catch, the proportion of catches that were released, and the worth catch size of the main catch.

8 Materials and methods

This research was carried out from August to November in the waters of Majane Makassar Strait with a fishing base at coordinates 3°32'43,738" South Latitude and 118°57' 52.773" East Longitude and fishing ground at several coordinates of FAD locations as fishing aids as shown in Figure 1.

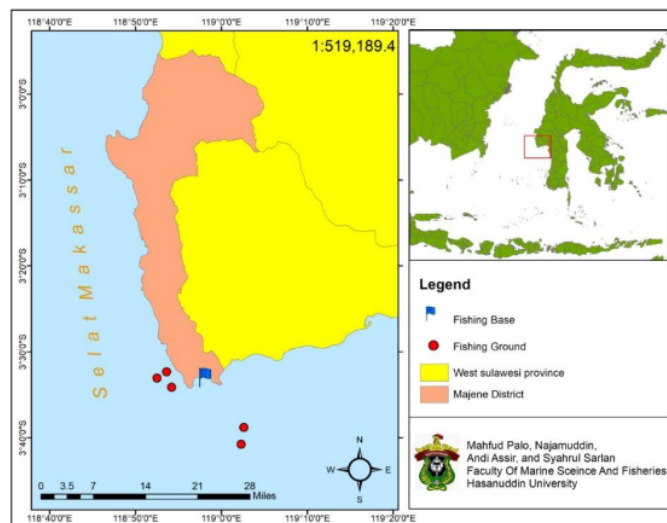


Figure 1. Research location with fishing base and Scottish Seine Net fishing ground.

The fishing gear used was a modified Scottish Seine Net by changing the design of one part of the bag net from a 1-inch (2.5 cm) mesh to a 1.25-inch (3.125 cm) mesh (Figures 2 and 3).

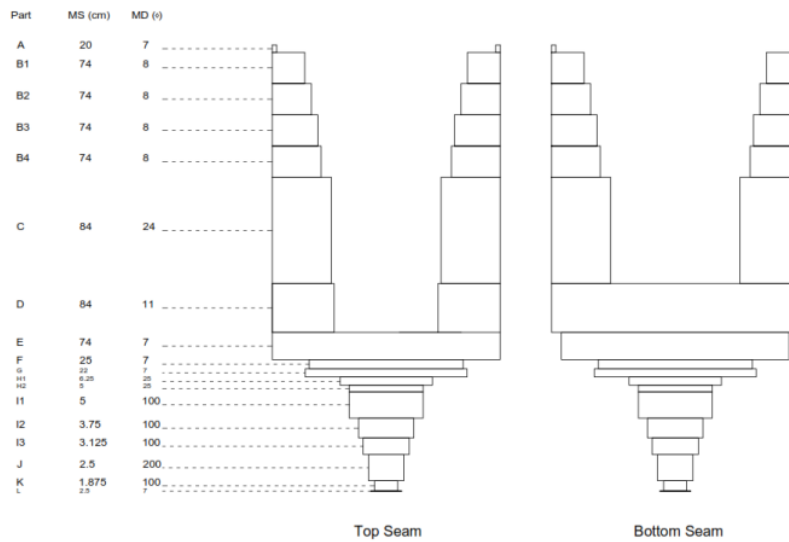


Figure 2. Scottish Seine Net design without cod-end modification.

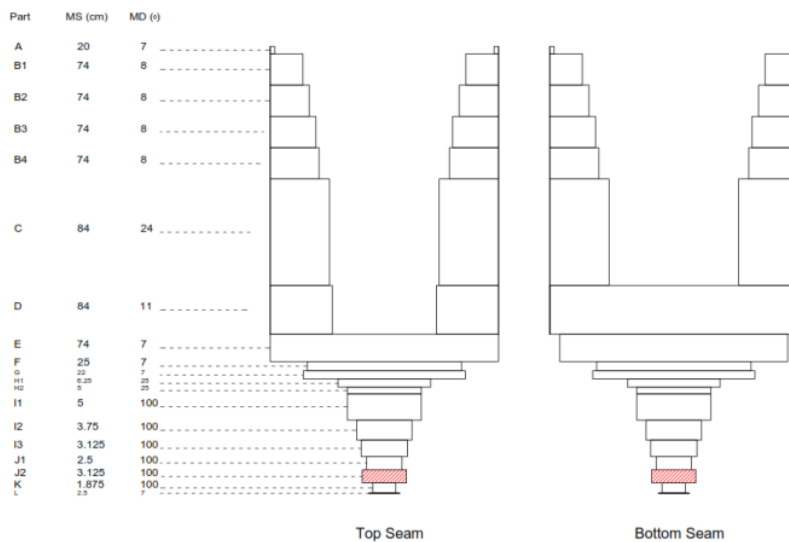


Figure 3. The design of the modified cod-end Scottish Seine Net.

The method used in this research is a case study, namely operating one unit of Scottish seine net in which cod-end construction has been modified by replacing one of the cod-end sections of 2.5 cm mesh size nets with a 3.125 cm mesh size net and adding a “waring” net for wrapping the main cod-end for catching fish that escape from the bag. This fishing operation with modified Scottish Seine Net was carried out in several fishing areas where FAD was installed on as many as 31 trips.

The observed data were the fish caught species and the length and weight of each fish. The main catch was assessed based on the proportion of the highest catch of each type of fish, While the first gonad maturity from the sample was used to score the sustainable catch criteria.

3. Results and discussion

The results of the 31 trips from August to November, namely the season in the first transitional season to the west season, got 10 types of fish caught with a total catch of 115.4 kg. Four types of catch with the highest weight were scad at 46.5 kg, little tuna at 21.5 kg, skipjack at 19.2 kg, rainbow runner at 17.8 kg, and the other six species at 10.4 kg. The total catch was 115.4 kg or 2065 individuals consisting of 1753 individuals in the main bag and managed to escape 312 individuals (15.1%) in the outer bag. The composition of the catch species in the main pocket consisted of Indian scad (*Decapterus russelli*) 56.7%, bigeye scad (*Selar crumenophthalmus*) 22.6%, skipjack tuna (*Katsuwonus pelamis*) 9.9%, mackerel tuna (*Euthynnus affinis*) 3.1 % and the other 6 species 7.7% (Figure 4). The composition of the catch species all consisted of pelagic fish species, which were very different from the composition of Scottish seine net catches in Jakarta Bay, 55.18% demersal fish, 44.1% pelagic fish, and 0.7% non-fish [8], Scottish Seine net in Pasuruan Regency, East Java, consisting of anchovies 27%, squid 24%, fringe scale sardinella 18%, mackerel 12%, pomfret 6%, Scad 5%, Spanish mackerel 3% and threadfin (2%) [9] and west monsoon Scottish seine in Gorontalo Bay, which received 69 % hairtail, 10% prawn, 8% Spotted Sardinella, 5% trevally, and 4% Indian mackerel and short-bodied mackerel [10]. This difference is thought to result from the condition and geographical position of the fishing area, fishing season, and habitat.

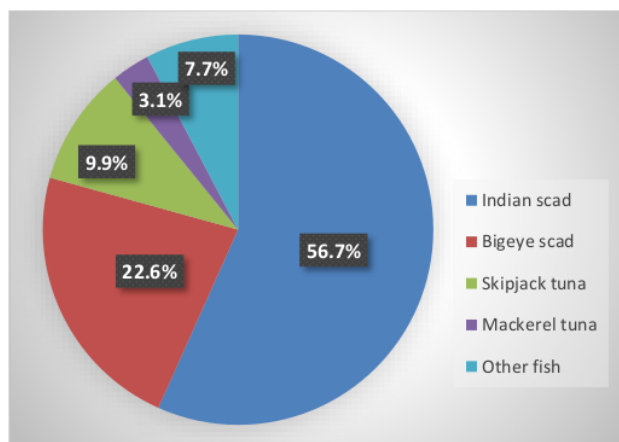


Figure 4. Species Composition of caught fish.

The main catch of Scottish Seine in this study was Indian scad (*Decapterus russelli*), as much as 56.7% with a length range of 7.2-25.8 cm and an average length of 17.3 cm. the highest length ranged at 18.0-19.7 as many as 228 individuals and the lowest was 7.2-8.9 cm and 25.2-27.9 cm each (Figure 5). The range of lengths obtained in this study is smaller than the range of fork lengths of Indian scad obtained in Ternate, North Maluku, with a range of 17.9-29.6 cm [11], in the waters of Likupang, North Sulawesi, with a size distribution of 11.7-29.6 cm. 21.1 and the dominant size is 19.2-20.6 cm [12] as well as in the waters of the Malacca Strait which is between 8.5-28.70 cm, but the average length first caught (Lc) is smaller, namely 16.2 cm and the length of first gonad maturity (Lm) was 17.9 cm [13], In contrast, the Lm Indian scad data obtained from Fishbase, Date assessed: 04 February 2009 [14] was 16.1 cm.

The size and age of fish at first gonad maturity are not the same between one species and another. Fish belonging to the same species will also be different if they are in different geographical conditions and locations, fishing seasons, number of samples, and habitats [15,16]. The Lc value, which is smaller than the Lm value, indicates that the management of these fish resources is still not good and overexploited because the fish caught are immature gonads [11,13]. The catch of Indian scad in the waters of the Malacca Strait that was landed in PPS Belawan with a size distribution of 9.9-22.4 cm with a value of 16.1 cm for males and 15.5 cm for females, 22.5 cm for males and 21.0 cm for females. Also indicated experiencing biological overfishing [17].

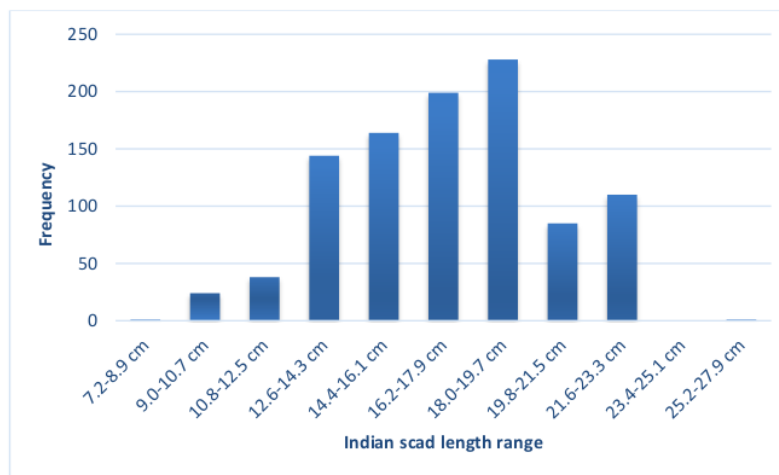


Figure 5. Length range composition of the captured Indian Scad.

The bagged modified Scottish Seine Net construction in Majene Makassar Strait resulted in a total catch of 10 fish species with an individual number of 2065 individuals and managed to escape 5 species, as many as 312 (15.1%) with a length range of 2.3-16.9 cm. This result is still smaller than the Scottish Seine Ampera pouch modification with a window square model with a surface mesh size of 2 inches (5.08 cm) by 42.6% [1]. The difference in the percentage of escape was due to differences in the mesh size of the modified net, namely the Scottish Seine used in this study using a mesh size of 1.125 inches (3.125 cm) while the Scottish Seine Ampera pouch was 2 inches (5.08 cm).

Indian scad (*Decapterus russelli*) as the main catch of Scottish Seine Net in this study were 994 fish (56.7%) of the total catch with a length range of 7.2-25.8 cm, 623 fish (62.7%) of which were suitable for catching based on the length of the first gonad maturity of 16.1 cm [14].

4. Conclusion

The composition of the catch species consisted of Indian scad (*Decapterus russelli*) 56.7%, bigeye scad (*Selar crumenophthalmus*) 22.6%, skipjack tuna (*Katsuwonus pelamis*) 9.9%, mackerel tuna (*Euthynnus affinis*) 3.1% and the other 6 species are 7.7%, the percentage of escape catches is 15.1% and the percentage of catch fit for the main catch is 62.7%

Acknowledgement

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