

Study on fishing gears and crafts operating target sciaenid fish in Mon Coastal waters

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ABSTRACT

Study of fishing techniques in Mon Coastal waters was carried out in three different areas in the year of June 2016 to May 2017. The information about different types of gears and crafts were taken by monthly visit to the important fishing sites. The aim of this paper is to record the fishery related technological knowledge specially fishing gears and crafts target two commercial sciaenid fish used in Mon Coastal regions. Fishing gears were bottom gill net, stationary bag net and otter trawl net. Fishing crafts were small fishing boat, nga-paung-hlay, ye-pyan-hlay and wan-lat.

Keywords: fishing gears, crafts, sciaenid fish.

INTRODUCTION

In Mon State, Zephyuthaung area support a rich fishery in varied intensities, consisting of sciaenids (croaker). These fishes are purchased by the few processing plants in the village for export, mainly to China and Thailand. Fisheries catches of the study areas include multiple species of fish and crustacean shellfish. These are annually harvested using traditional (bag nets, gill nets fishery) fishing gears and crafts.

The present paper dealt with some aspects of the fishery of two commercial sciaenid fish (*Chrysochir aureus* and *Otolithoides pama*), which were the most important species as regard to abundance, in the bottom gill net catches at selected landing centres: Mawlamyine, Kyaikkhami and Zephyuthaung study areas. Gill net fishing vessels are second most important in Myanmar fishery in Mon State at that time (Sann Aung, 2003).

Khin Maung Aye *et al.* (2006) stated that the fishing gears used in inland fisheries were traditionally developed from small-scale fishing activities and it could fish in large quantity during the rainy season from June to September. He also stated that fishing could be done all year round in rivers and inn. In inshore fishery, fishing was operated within around 9.66 km from the shore and at the depth of 15 m while offshore fishery operated in the wide area of 96.56 km of the shore at the depth of 15 – 70 m as reported by Khaing Myat Myat Htwe (2012).

Aamir (2015) investigated in Punjab of India that the different types of water bodies spread over vast area and eight different types of gears (drag net, stationary gill net, cast net, ring cast net, entangling net, encircling net, fish trap and hook and line) and two fishing crafts (pirogue and dinghy). Then he also described that the passive and active gears. Passive gears are stationary gears. It does not have to be draffed, pulled or toward to capture fish. The catch is recovered by simply removing the gear from the water a time period. No energy is expended on towing, pulling or dragging of gear. Active gears have to be moved, dragged, or towed in

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Thus, the present study was conducted with the following objectives:

- ## MATERIALS AND METHODS

An interaction based data collected from fishing site, professional fishermen, net makers and net shopkeeper. At the sites the photos of different types of gears and crafts were captured by a digital camera and sketch were also described. The measurement of length, diameter (width), height (in crafts) and length, depth (width), mesh size (in gears), were taken by scales.



RESULTS AND DISCUSSIONS

1. Description of ~~bottom gill net~~ **in marine capture (Bottom gill net - passive gear)**

The bottom gill net in marine capture was shown in Figure 2 and 3. Nylon monofilament was popular and was used more than nylon multifilament for netting material for gill net. The specifications such as the mesh size, the length and depth of the net and hanging ratio vary for different species.

The length of net was (64) m and the depth was (12) m. The mesh size was (85) mm. The most common kind of net rope for gill net was nylon of (0.4) mm diameter. These nets were fixed to the bottom or at a certain distance above it, by means of bamboo poles.

Bottom gill nets were operated in shallow waters or sea areas where the depth ranged between (5) m or (30) m. The upper rope of net, which was used to straighten the net, was 8 mm in diameter, while the bottom rope of net, which was tied to the lead ball, was 4 mm. The number of floats tied to the net was 90 in each set of net. The distance between each float was 0.7 m.

The number of lead balls tied to the base of net was 100 in each set of net. The weight of one lead ball was from 25 gm to 30 gm. The total weight of lead in one set of net was about 2500 gm. The distance between one lead ball and the next was 0.6 m. The distance between marker floats which are on the water surface was 32 m.

The length of marker float was 0.3 m and the diameter of marker float was 0.1 m. The length of rope between the upper tip of net and marker float was 30 m. The diameter of the rope was 0.3 mm and the type was nylon. The diameter of nylon rope tied to each float to make the net straight was 0.5 mm.

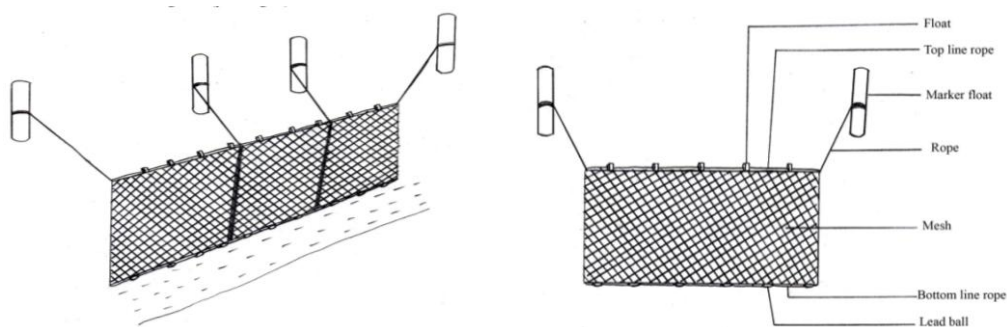


Figure 2. A-B. Sketch bottom gill net in marine capture (passive gear)



Figure 3. A) Net maker, B) Marker float, C) Float, D) Lead

2. Description of fishing gear target *Otolithoides pama* (sciaenid fish) inland capture (Stationary bag net or tidal set bag net - passive gear)

The stationary bag net for inland capture was shown in Figure 4 and 5. It was conical in shape like trawl net, with or without wings depending on the local practice and experience. The mouth of the net was fastened to two fix poles against the current. When the current carrying the fish goes through the net, fishes were collected in the cod-end.

Small scale bag nets were operated year round during day or at night. They were used four times daily; twice during high tide and twice during ebb tide. During high tide, the net's mouth faces towards the incoming tidal current and in ebb tide, the net's mouth faces towards the outgoing tidal current.

The length of net was (65) m and the depth of the mouth was (6) m. Mesh size was (100) mm at the net mouth-end and (10) mm at the cod-end. The most common kind of net rope for bag net was made of polyethylene twine of 380 D/6 to 380 D/12 nylon multifilament of (0.5) mm in diameter. The diameter of upper rope of net, which was used to straighten net, was 25 mm. The number of floats tied to the mouth of net was 80 in each set of net. The distance between each float was 0.5 m.

One line fixed poles consisted of a total of 60 woody poles were tied together and planted into the floor of the river. On the other side, about 60 m away another similar 60 wooden poles were tied together and planted into the floor of the river. The length of each wooden pole was about 4 m and 80 mm in diameter. Sixty iron wire ropes, each measuring 7 m in length and about 10 or 20 mm in diameter were used to tie each planted woody poles to the knob ring. A 0.5 m long, molar block was tied to the knob ring with 35 mm diameter wire.

In shallow waters, the wire was about 16 m long and in deep waters, the length was about 20 m. Between molar block and arm of net was 10 m long join wire. Three bamboo poles were tied together at that junction. These bamboo poles were submerged in the water. Eight net eyes were situated around the net's mouth, between two arms of net.

At net's mouth, 9 m long and 100 mm in diameter supported bamboo pole were used at the site of net's eyes to prevent the constriction of net's mouth and to maintain the net's expansion. These nets were operated in shallow waters or sea areas where the depth ranges between 15 m or 20 m.

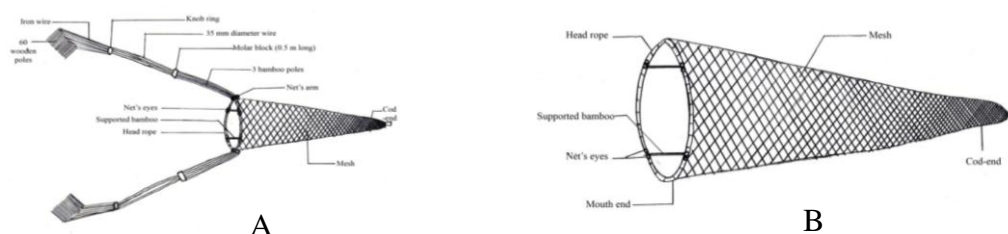


Figure 4. A-B. Sketch tidal bag net in inland capture (passive gear)

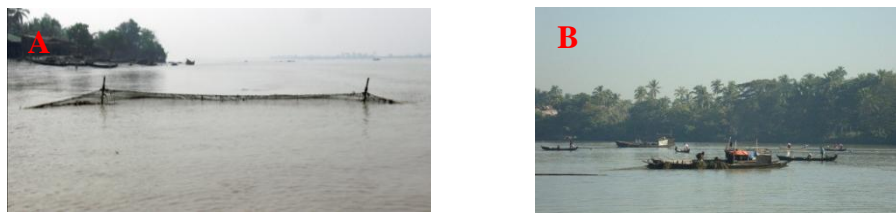


Figure 5. A-B. Tidal bag net in inland capture

3. Description of fishing gear target two sciaenid fish in marine capture (Otter trawl net – active gear)

The otter trawl net has a bag of netting in shape and larger (Figure 6 and 7). They are the major nets used for demersal fishing. The sides of the bag are extended outwards by the addition of wings of netting to large, rectangular, wooden “otterboards”. The otterboards are towed by a pair of very strong steel cabins, the warps, which are attached to the otterboards in such a way that the pressure of water causes the otterboards to diverge as they move, pulling the mouth of the net wide open horizontally.

The under-edges of the otterboards slide over the seabed and are shod with steel for protection. The head-rope to which the upper lip of the trawl net is laced, is usually about 30 - 40 meters long, and bears numerous hollow metal floats which keep it a few meters above the bottom. These nets were used in sea areas where the depth ranges between 80 - 90 m.

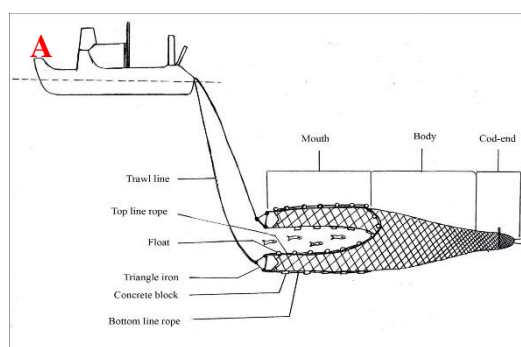


Figure 6. A. Sketch otter trawl net marine capture (Active gear)



Figure 6. B. Selecting and preparing the otter trawl net



Figure 7. Otter trawl net in marine capture (Active gear)
A) Net, B) Marker floats, C) Hollow metal float, D) bottom sand bags

4. Description of small fishing boat target *Otolithoides pama* in the Thanlwin river (Figure 8)

The small fishing boat / Nga-hpan-hlay has a capacity of only two fishermen that can propel the boat at the two end points. The boat is usually 1.5 m long, 0.3 m width and equipped Chinese engine. Internally partitioned by multi-piece wooden logs from strength and nesting to overcome jumbling of fishes. The boat is usually used for carrying fishes from catchment area to bank of the river.



Figure 8 (A-B). Small fishing boat / Nga-hpan-hlay

5. Description of fishing boat target *Chrysochir aureus* in marine capture (Figure 9)

The dimension of gill net boat was about 13 m long, 3 m wide and 4 m high. Chinese engine, HP 80 was used. The cost of some boats was about 150 to 200 lakhs kyats. Each gill net boat had about 200 sets of net for catching fish and 8-10 workers. About 20% of the boats were anchored in the sea and went to the jetty about once in three months. The fish were carried to the jetty by using carrier boat, locally called “Kae” hlay or Nga-paung-hlay.

However, about 80% of gill net boats made 4-6 days fishing trips, carried ice in insulated fish-holds. One trip carried about 12-15 ice boxes. One ice box contained about 500 kg of fish. After landing, fish was transported to market by yoked baskets, trolley cars, etc. Almost 30% of the landed fish was marketed fresh; about 40% was transported as fresh fish with ice and marketed; 20% was sun-dried and salted and the rest was made into nga-pe.



Figure 9 (A-B). Nga-paung-hlay / “Kae” hlay

6. Description of fishing boat target *Otolithoides pama* inland capture (Figure 10)

Ye-pyan-hlay or daily trip fishing boat was a round bilge carvel planked boat, usually built with 'Thitmar' or hard wood. They are used for catching fish with gill nets in Mawlamyine and engaged in daily fishing; do not carry ice on board for preservation of the catch. The catching is done two times within 24 hours, once during high tide and another during ebb tide.

After landing, fish was transported to market by car or by motorbike. The landed fish was marketed fresh or was transported to the company as iced fish. The cost of Ye-pyan-hlay or daily fishing boat was about 50 lakhs kyats. The dimension of the boat was about 9.5 m long, 1.5 m wide and 3 m high and used Chinese engine HP 40. One boat has eight sets of net and four workers. One trip carried about 4 ice boxes. One ice box contained about 50 kg of fish.

Some fishing boats cost about 20 lakhs kyats. The dimension of the boat was about 8.5 m long, 1.0 m wide and 1.0 m high and used Chinese engine HP 25. One boat had three sets of net and two workers. One trip carried about 2 or 3 ice boxes. One ice box contained about 25 kg of fish.



Figure 10 (A). Ye-pyan-hlay
(about 50 lakhs kyats)



Figure 10 (B). Ye-pyan-hlay
(about 20 lakhs kyats)

7. Description of fishing boat target the two economically important sciaenid fishes in marine capture (Figure.11)

Bottom trawl or otter board trawler (Wan-lat) were used for deeper regions marine fish at Ye township. The cost of this boat was about 800 lakhs kyats. A fishing trip last for about 8 months. The dimension of the boat was about 13.5 long, 4 m wide and about 9 m high. The boat used Hino engine EH. 500. Each otter trawler had over 100 sets of net for catching fish and about 12 to 13 workers.

The fish available depended on the fishing area, the amount of fishing gears, the experience of the workers and expenditure. The earning for boat workers depended upon the weight of fish caught, and the average price of fish. The workers were given 10% of the income. In some fishing boats, not only the boat owner but also the workers could equipped the fish boat with own sets of net. The fish caught were entitled according to the number of sets of net owned. The boat owners did not need to pay additional money to these workers.

Field survey was done to study in detail about gill nets in Kyaikkhami, about set bag nets in Mawlamyine, and about otter trawl nets in Ye areas. The owner of the bag nets and otter trawl nets had to auction for the fishing ground and paid license fees yearly. Gill nets could be used in any fishing ground after paying license fees to the Department of Fishery (DOF).



Figure 11. Otter board trawler (Wan-lat)

In Mon coastal waters, exploitation is almost entirely by traditional crafts and gears. All of the villagers earn their livelihood wholly or partially from marine and estuarine fishing. In particular, bag net fishing for a variety of fishes is the backbone of the fisheries sector in the Mon coastal regions, especially in Mawlamyine and Kyaikkhami areas. The gill nets fishing for a variety of fishes are Mawlamyine, Kyaikkhami and Zephyuthaung areas.

In the study areas, three types of fishing gears used by fishermen are bottom gill net, stationary bag net and otter trawl net target two commercially sciaenid fish (*Chrysochir aureus* and *Otolithoides pama*). Four common fishing crafts (small fishing boat, nga-paung-hlay, ye-pyan-hlay and wan-lat) have been investigated. The average catch per net fishing varied depending on the fishing months and fishing grounds although small scale of bottom gill net fishing operation was made year round.

The demersal fishes are distributed according to depth. Different species complexes may occur in the same general area but at different depths according to FAO (2005). Stromme *et al.* (1981) stated that the deep sea fishes were generally found below 100 m and includes various snappers (*Lutjanus sp.*) and groupers (*Epinephelus sp.*). Of the collected data in the study areas, two commercial sciaenid fish (*C. aureus* and *O. pama*) were found at depth less than 100 m. Therefore, the distribution of sciaenid fish species in this study followed the pattern as reported by Stromme *et al.* (1981).

CONCLUSION

The mesh size of the fishing gears varies. Out of these gears, it has been observed that severe damage the fish is caused by bag net. The mesh size of the bag net (cod-end) should be increased from 10 mm to 20 mm. So that the sand, very small fish fingerlings and other wastes should not be retained in the net, otherwise it conserves decrease in fish population by caught.

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