Composition of the Stow Net Catches Operated at Full Moon Phase and Full Dark Moon Phase in Sialang Pasung Village Rangsang Barat District Meranti Islands Regency

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Abstract. Sialang Pasung waters as a part of Selat Air Hitam Waters were the area for operating tidal fishing gears. The height of tide is affect by the moon phase. This research undertook to compare the catches of stow net as tidal fishing gear at highest tide condition namely the full moon and the full dark phases. In the village of Sialang Pasung, regency Meranti Islands. This study revealed the composition and the bulk of catches of the stow net which is operated at both phases. The method used in this study is the survey method, collected all need data from the fishing operation spot.Filter net as a trap is classified as a passive fishing gear by utilizing the tidal migratory behavior of fish. So high tidal oscillations associated with moon phases could influence the catch of filter net. But this kind of scientific information, particularly on filter net, has not available yet. Therefore, this study aimed to study the effect of the moon phases on the catch of filter net to identify the kind of catch and environmental factors. This research was done in Selat Air Hitam waters, based on descriptive method, starting from August 12th–14th, and September 25-28th 2018. The main catches of stow net of both phases were peapay shrimp (Mysis relicta), and anchovy fish Stolephorus indicus). While the by-catches were indian mackerel (Rastrelliger kanagurta), Common Hairtail (Thrichius savala), Elongated Ilisha (Fishe elongata), Bombay duck (Horpodon neherus), Dorab wolf-herring (Chirocentrus dorab), Mullet ((Valamugil seheli),Gangetic anchovy (Tryssa mystax)), spotted scat (Scatophagus argus), vannamee ((Litopenaeus vannamei), red prawn (Penaeus monodon), Mud spiny lobster (Panulirus sp), Padachirus (Psettodes erumeri)), white pomfret (Pampus argentus), Sagor catfish (Hexanematichthys sagor) and Squid (Loligo sp.) and Spanish mackerel (Cybium commersoni). Full moon phase bring more catches than full dark moon phase in weight. The dominan catches during full moon Bombay duck and Common hairtail.

Keyword: Stow net, New moon phase, full moon phase, hight tide

1. Introduction

The fishing potential is quite high in the waters which is reflected in the number and variety of catches that have been landed. Exploitation of fisheries resources has long been done using the help of fishing gear. Fishing gear used to catch fish is very diverse, ranging from traditional to modern.

Various fishing methods and fishing gear have been used by fishermen, including fishing methods using a filter net. One traditional fishing gear that has been known for a long time is that stownet (gombang) functions as a tidal trap for seashore migrate fish or those fishes inhabit around the coast.
Stownet as fishing gear used by the fishermen in Sialang Pasung villages with total stownet are 12 units. Stownet catched fish and shrimp, as a static gear is operate by installing semi-permanently by opposing the direction of water currents, namely the tides of sea waters [1].

Fishing operation of stownet carried out the local fishermen at peak of tidal time, namely in period of dark and fullmoon phases. The catches was taken by the fishermen of Sialang pasung Village during the daytime.

Based on the description above, the writer is interested in conducting research to find out the comparison of stownet catches in the dark and full moon phases and comparing the catches when the water is heading for high tide and when the water is going to low tide.

1.1. Formulation of the problem

Considering that stownet as a passive fishing gear, the catches obtained will be influenced by tidal conditions that are closely related to the moon phase. However, information about the effect of the moon phase on the stownet is still lacking. This is what underlies the authors in conducting this research. The formulation of the problem in this study is that there is no research due to the influence of the moon phases on the catch of fish resources in the waters of the Air Hitam Strait, Sialang Pasung Village, especially in the stownet operation area.

1.2. Objectives and benefits

This study aims to identify the types of catches, determine the ratio and percentage of catches in the period of dark and full moon and at high tide and low tide so that more precise fishing time is known based on the number of catches.

The benefits of this study are as information for those who need especially local fishermen to find out the species that are the main and side catches and to compare the catches of stownet based on differences in hauling time.

1.3. Research Method

1.3.1. Time and location

This research carried out in the part of southern season (July-September) which know as peak season of the local fishermen. Sialang Pasung Village waters as suitable location for tidal fishing gear operation.

1.4. Instrument and materials

The instrument used in this research, namely meters, sacle, GPS, current meters and cameras, while material use in this research is note book.

1.5. Research Method

The method used in this study is a survey method, participating in fishing operation and observing the stownet catching process such as setting and hauling in two phases moon cycles. Then identifying the catches species, note the weight of catches (gr).

1.6. Research Procedure

The procedure of this research starts from the study of literature. Literature study is useful to strengthen the implementation of this research process carried out by gathering theories that discuss the construction of the sea waves, the time and area of the sea waves, the catch of the sea waves and the analysis of data processing. The next stage is the implementation of research, in conducting research it is necessary to prepare for fishing. Preparation of fishing consists of preparation for supplies, determination of fishing ground (fishing ground) and preparation of fishing gear.

Field Data Collection Procedure
Data collection in the field is as follows:
1. Preparation of fishing operation.
This preparation consists of preparing supplies for the fishing ground (fishing ground) and separation of fishing gear.

2. Operation of fishing gear.
   Catch operations are carried out at high tide and low tide.
3. After the fish have been trapped in the fishing gear for 6 hours once a day, the waves are taken to the boat.
4. The catches is then identified by species, weight and amount. The results of the identification are entered into a table which is then analyzed to see differences in the number and species of catches the stownet.

1.7. Data Analysis
   To find out whether there is a comparison of the amount of weight and species composition of the catches in different moon phases used t-test or hypothesis testing of the t distribution according to [2].

2. Result And Discussion

2.1. Results

2.1.1. General Condition of Research Area
   Sialang Pasung Village is located at position 102°40'33.69" -102°41.89 'W and 01°12'53.38" -01°27'54.50 " N. Has a territorial boundary, namely: the north borders the Anak Setatah village, the west borders the Bantar village, the east borders the Lemang village and the south borders the Meranti Islands [3].

2.1.2. Stownet (Gombang)
   Stownet is a fish and shrimp catching gearl, it is settled in the bottom waters used by fishermen in the village of Sialang Pasung shaped like a cone like an elongated pocket that shrinks at the edges, the sea wave is mounted against the direction of water currents by trapping fish and shrimp techniques to be pushed into the bag. A stownet have mesh size that varies in the direction of the bag (the end) then the size gets smaller. Stownet material made of multifilament knitted with a type of English knot knot.

2.1.3. Catches species
   Stownet catches as along as the research carried out consist of small pelagic fish dan demersal species in table 1.

| Table 1. Catches category of this research |
|------------------------------------------|
| No | CATEGORY                  |
|----|---------------------------|
| A.  | PELAGIC SPECIES           |
| 1  | Anchovy fish (Stolephorus indicus). |
| 2  | Indian mackerel (Rastrelliger kanagurta) |
| 3  | Dorab wolf-herring Dorab (Chirocentrus dorab) |
| 4  | Mullet ((Valamugil seheli), |
| 5  | White pomfret (Pampus argentus), |
| B.  | DEMERSAL SPECIES          |
| 1  | Pepay shrimp (Mysis relicta), |
| 2  | Gangetic anchovy (Tryssa mystax)), |
3  Common Hairtail (Thirchius savala)  
4  Elongated Ilisha (Iisha elongata)  
5  Bombay duck (Horpodon neherus)  
6  Spotted scat (Scatophagus argus)  
7  Vannamee ((Litopenaeus vannamei)  
8  Red prawn (Paneus monodon),  
9  Mud spiny lobster (Panulirus sp)  
10  Padachirus (Psettodes erumeri)),  
11  Sagor catfish (Hexanematicthys sagor)  
12  Squid (Loligo sp.).  
13  Spanish mackerel (Cybium Commersoni)  

The capture of pelagic fish species is caused by the depth of the fishing ground are shallow waters with depth around 40-50 m so that it often happens that pelagic fish can reach the bottom of the water to find food or vice versa in certain types of fish. Besides that, another very important and influential factor is the large current strength so that the fish are dragged into the sea wave.

2.1.4. Stownet catche in high tide

In this study divided into two groups of observations namely catches at high tide and low tide during the dark moon phase and catches at high tide and low tide during the full moon phase. The catches is analyzed only during the daytime.

![Figure 1. The fluctuation the three class categories of catches on the tide during the study](image)

In general, the three catches categories was collected during the research in respectively from the high catches namely shrimp, fish, and cuttlefish. Shrimp catches are caught more at high tide during the Dark moon phase than in the Full moon phase, the amount of daily catch of fish is not much different during the study while cuttlefish is only caught at the full moon phase.
Figure 2. Composition of caught fish species (kg) to high tide in the dark moon and full moon periods

In general, the daily catch in the dark moon phase is higher than the full moon phase as shown in Figure 1. At high tide the dark moon phase is the highest catch is papay shrimp while in the full moon phase is small anchovies.

Figure 3. Percentage of weight according to composition of fish species caught in the period of the dark moon and Full Moon to high tide.

The highest percentage of the average daily catches in the dark moon phase is the type of pepay shrimp while the full moon is the small anchovy fish as shown in Figure 3.

Specifically, the shrimp group that was the dominant catch in this study consisted of the types of pepay shrimp, thorn shrimp and white shrimp.
Figure 4. Catches of shrimp species at the high tide time.

The catch of papay shrimp is almost twice more caught at high tide during the dark or new moon phase compared to at high tide at the full moon phase. (Figure 4).

Figure 5. Fluctuations in catches of various types of pelagic fish caught in high tide during the study.

Special catches of fish groups based on the amount of weight, small anchovies are the most catches obtained in the full moon phase followed by gangetic anchovy which are actually caught in the dark moon phase. The catches in low tide, the biggest catch is shrimp group of 10.86 kg (53%) which means that the main catches has exceeded half of the total catches of stownet.
Figure 6. Daily average catch composition (kg) according to the dark moon period and Full moon at low tide.

The number of catches by weight in the full moon phase is far greater than the catches in the dark moon phase. The most caught species are pepay shrimp, thorn shrimp and lomek, white shrimp and cuttlefish.

Figure 7. Percentage of daily stownet catches by type of catch.

The percentage of catches according to the type of fish caught at high tide during the full moon phase is higher than in the dark moon phase. The highest percentage of catch is pepay shrimp.

The most catch is the type of papay shrimp caught in the full moon phase, while in the dark moon phase the white shrimp are caught. The period of the new moon or the dark moon is from 30 to 02 of lunar day catches is lower than the catches in the full tidal phase 13 to 16 lunar day.
There are 4 types of dominant fish caught which are predatory fish species of crustaceans and the most are bombay duct fish and gangetic anchovy which experience the peak of catching in the period before the full tide but then run again after the full tide.

The most dominant fish catches caught are layur fish and lomek fish, which are caught more in the full moon phase than in the dark moon phase. The three groups of catches, namely shrimp, fish and cuttlefish, are caught by the sea turtle when the sea water to low tide.
The daily catch of the stownet according to the class of the three groups of organisms that are caught more in the full tidal period is the type of shrimp otherwise the number of fish caught tends to decrease in the full moon period, whereas in the dark moon phase period it is the most fish class, at the full moon phase period the number of fish caught actually decreases at the peak of the full moon.

2.2. Discussion

These results indicate that the period of the day of the month has a significant influence on the catch of the waves in the study location. In this study, the types of fish caught were predominantly demersal fish, whereas small pelagic fish were predatory fish. [4], states that the total catch and pelagic fish catch on static liftnet in Serang waters are influenced by factors of differences in day of month, time of capture, interaction between the two and the most influential factor is the difference in lunar day catching.

When viewed based on the class of catches obtained that the catch of stownet at the time of to high tide becomes more and tends to decrease in the full moon phase, while at the time to low tide the opposite occurs where more shrimp are caught in the full moon phase while the fish actually decreases dramatically in the phase full moon.

2.2.1. Corelation current speed and catches

Based on the linear regression analysis was known that the current speed in low tide have a strong relation with the catches which mean the more speed the current of waters will bring more catches while in the hight tide the current speed and catches has a weak relation or the more speed the current no significant influence to catches specifically at low tide see Figure 10 a and b.

![Figure 10](image.png)

Figure 10. Regression relationships (a) Current velocity to high tide with catches, (b) Current velocity to low tide with catch during the study.
The main catches caught of this stownet are anchovy fish (Stolephthalmus sp) and shrimp pepay (Acetes sp). The anchovy is one of the fish that has special features because starting from the head, meat to bones can be directly consumed. Small an chovies fish have long being known by the people of Indonesia as a side dish to eat everyday because it is easily obtained and can be cooked for a variety of menus. This anchovy has a big meaning in Indonesian trade and has economic value. This proves that anchovy (Stolephthalmus sp) is a type of small fish that has high economic value [5].

While the pepay / rebon shrimp (Acetes sp) is a shrimp belonging to the family sergestidae and the genus Acetes, because morphologically the small-sized shrimp is difficult to identify. Rebon shrimp is classified into penaid shrimp which has a relatively high price when it becomes dried shrimp. The color of the pink rebon shrimp faded, this shrimp habitat lives in marine waters [6].

From Figure 2 it is known that the main catch in the dark moon of the papay shrimp more than doubled was caught, while in the full moon phase very little was caught. Anchovies catches are caught more in the full moon phase compared to pepay shrimp. This is due to the fact that the low tide current velocity has more influence on the catch of the papay shrimp.

High current speed will affect the swimming power of fish, the fish will be carried by the current because the current exceeds the swimming speed of the fish. This causes a lot of small fish to be caught, because small fish will be more easily carried by strong currents and trapped into fishing gear that is good. When the fish have been trapped into the fishing gear, the fish will be difficult to get out because the fishing gear expands carried by the current of water, so the fish will continue to be pushed into and filtered into the codend This is in accordance with the opinion of [7] who said that the parameters of the current speed become the dominant factor in determining the operation of the stownet fishing gear and the catch of stownet. High tide current velocity has a weak relationship while the velocity of the tidal current influences the catch stownet, with a positive and strong enough correlation pattern. During the research, the current velocity in the waters of the Selat Panjang in Sialang Pasung Village ranged from 0.2 to 0.7 m/s.

The bycatch caught on the sea wave is white shrimp / vanname (Litopenaeus vannamei), red shrimp (Panus monodon), Mud spiny lobster (Panulirus sp), bombay duct (Horphodon neherus), common hairtail (Trichiurus lepturus), gangetyc anchovy (Tryssa mystax), elongated ilisha (Ilisha elongata), ketang (Scatophagus argus), mackerel (Cybium commersoni), machete (Chirocentrus sp), mullus (Valamugil engeli), next to (Pardachirus pavonicus), white pomfret (Cybium commersoni), machete (Chirocentrus sp), mullus (Valamugil engeli), next to (Pardachirus pavonicus), white pomfret (Cybium commersoni), machete (Chirocentrus sp), mullus (Valamugil engeli), next to (Pardachirus pavonicus), white pomfret (Cybium commersoni), machete (Chirocentrus sp), thorns (Hexanematichthys sagor) and cuttlefish (Loligo sp), all of these fish are caught fish that are not the main target of capture but still have high selling points or economic values. In this bycatch including shrimp that become their catch, this is because of the influence of muddy waters that are good for breeding shrimp.

If seen from the number of fish catches caught, the catch of the dark moon phase is higher than the catch of the full moon and both at the time of catching up to the tide and going downward. This is caused by the condition of the dark moon the fish do not have an orientation point so it is more likely to be discharged currents compared to waters with light conditions. From the calculation of the t-test according to the amount of weight (gr) or there is no significant difference in the daily catch of the dark moon phase and the full moon phase.

3. Conclusion and recommendation
3.1. Conclusion

There are 5 pelagic and 13 demersal species was caught by stownet which operated on dark phase of moon and full phases consist of species namely fish class, shrimp class and cuttle fish.

T-test indicated that there are a significan different weight which caught in the dark moon phase fullmoon, while the fullmoon phases. Catches of darkmoon is highly significan than fullmoon phase.
3.2. **Recommendation**

The next work must stress to compare all moon phase catches in order to map the characteristic of stownet fishery in that area.

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