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FISH BEHAVIOUR OF HUMPBACK GROUPER (*Cromileptes altivelis*) ON FISH TRAPS WITH DIFFERENT FUNNELS

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BACKGROUND

A species of grouper that has high economic value is the Humpback Grouper (*Cromileptes altivelis*). This species has the highest price among other grouper species. The trap is a fishing gear which is used by fishermen in the Moluccas to capture the Humpback Grouper in inshore areas. Traps are installed permanently in the water for a certain period of time and are chosen because it is easy to release the fish from the trap. One effort to optimize fishing gear (fish trap) is not just the construction and materials used, but includes the capturing techniques and tactics. Capturing tactics affect the fish behavior against the trap so that it improves the efficiency of the capturing method which requires a comprehensive information support.

The aims of this study are (1) to determine the response and behavior patterns of fish grouper (*Cromileptes altivelis*) against fishing gear traps with different funnels; (2) to determine the amount of fish which are caught in the trap based on the funnel type, round or rectangular, when the fish enters the trap.

METHODOLOGY

Material used to make the trap is iron measuring 270 x 230 x 97 cm. The funnel mouth shape is either round or rectangular. This study uses an experimental method in the laboratory. In this study, tubs are made in such a way that the condition is approximately similar to the condition in nature and can be controlled.

A Humpback Grouper (Cromileptes *altivelis*) was inserted into the tub and the fish was acclimatized to the new environment for 2 days. The study was conducted 24 hours round, hourly observations for 30 days, 15 days respectively for the round funnel trap and 15 days for the rectangular funnel trap. The observations at night used light illumination. Data were analyzed by using the Test-T and Test-One Way Anova, to determine the difference of the fish caught using round and rectangular funnel traps.

RESULTS AND DISCUSSION

The **Humpback** Grouper (Cromileptes *altivelis*) Behavior in Approaching and Entering Traps

This study showed that the fish came close to the trap, stayed in front of the funnel, and entered the funnel, but some just passed the trap. Fish approached the trap from various directions, moved around or dwelled in front of the funnel and then entered the trap. At some other observations, the fish which entered the trap remained motionless with its tail in front of the funnel, and others entered the trap tail first or backwards.

Fish that do not fit into the funnel will be replaced by another fish that are clustered outside the trap. There are several reasons that made fish enter the trap such moving away from the other fish or there are other traps blocking its entrance. The longer the fish was soaked in the trap, the better response of the fish to the fishing gear. It was observed that the fish only took less than 1 minute to get into the trap.

Behaviour of Humpback Grouper (Cromileptes *altivelis*) in the Traps

The observations showed that after the Humpback grouper fish entered the trap, it would be looking for a place to hide and stayed silent, usually at a location between the funnel and walls which formed an angle and some even swam back and forth. The fish moved quite actively in the trap if it did not find the right place in its school, in overlapping positions to each other. During the observations, the patterns of fish movement in the trap were as follows:

1. Fish turned clockwise or counter-clockwise, inside the trap
2. Fish moved back and forth in the trap
3. Fish moved into the trap from various directions, after the fish enter the trap it escaped through the gap escape.
4. Fish moved in any direction without any pattern.
5. Fish stayed near the funnel.

Number of fish Caught by the Round Funnel Trap

The average number of fish caught by a round funnel trap from 30 observations is shown on Figures 1 and 2.

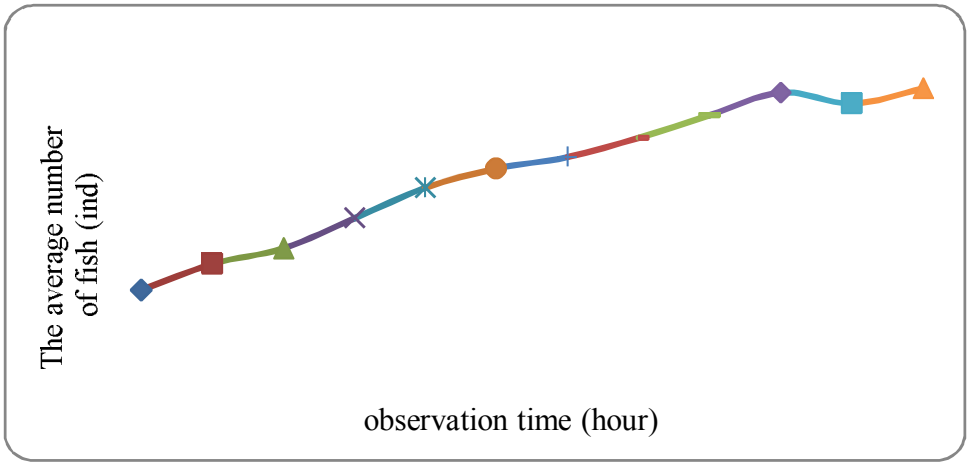

Figure 1 The amount of fish caught by a round funnel trap from 6:00 am to 6:00 pm

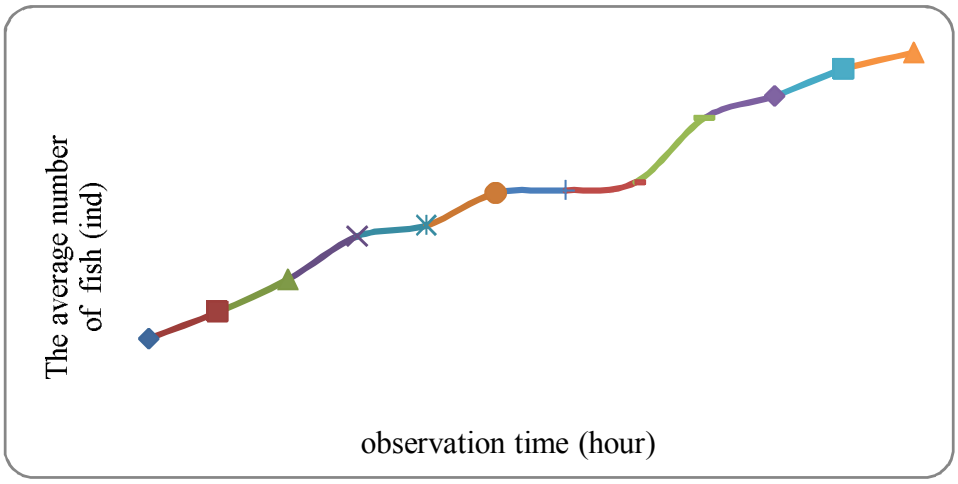

Figure 2 The amount of fish caught by a round funnel trap from 6:00 pm to 6:00 am

The Number of Fish Caught in the Rectangular Funnel Trap

Number of fish caught by a rectangular funnel trap from 30 observations is shown on Figure 3 and 4. Effectiveness of the operation of a fishing gear depends on fish migration patterns and behavior of fish to the placement/installation of the gear. One of the other environmental factors in the success of fishing using fishing traps is associated with the tool design and the attraction factor (bait, equipment manufacture, and the dimensions of the entrance). Critical phase in trap fishing is the time

when the fish move into the entrance. Funnel trap design greatly affect the number of fish caught as well as the rate of exit from the target catch. In this study it was shown that the use of funnel-shaped trap-necks resulted in greater number of fish trapped and smaller number of escaping fish, because funnel neck design makes the fish difficult to get out. Funnel rectangle that has a straight shape showed that the number of fish caught was less, this was due to the straight shape of a rectangular funnel which made the Humpback grouper (*Cromileptes altivelis*) escape easily, shown by the greater number of fish escaped.

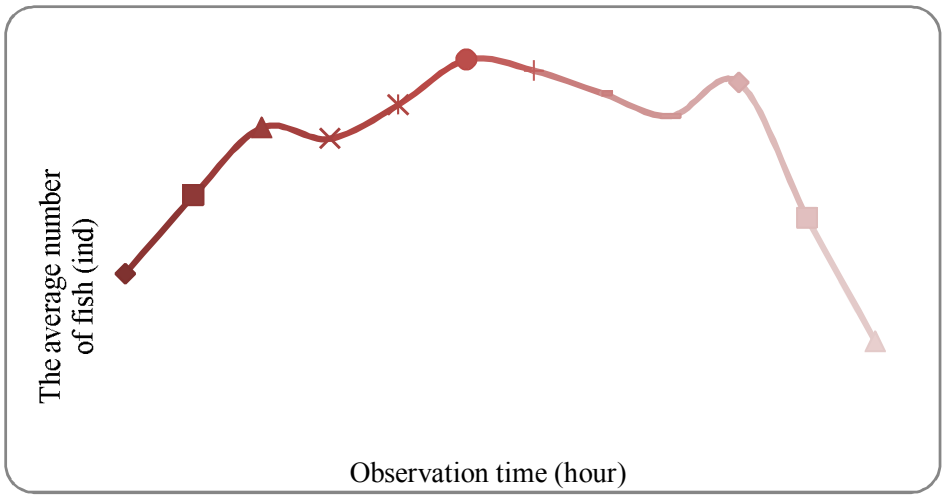

Figure 3 The number of fish caught by a rectangular funnel trap from 6:00 am to 6:00 pm

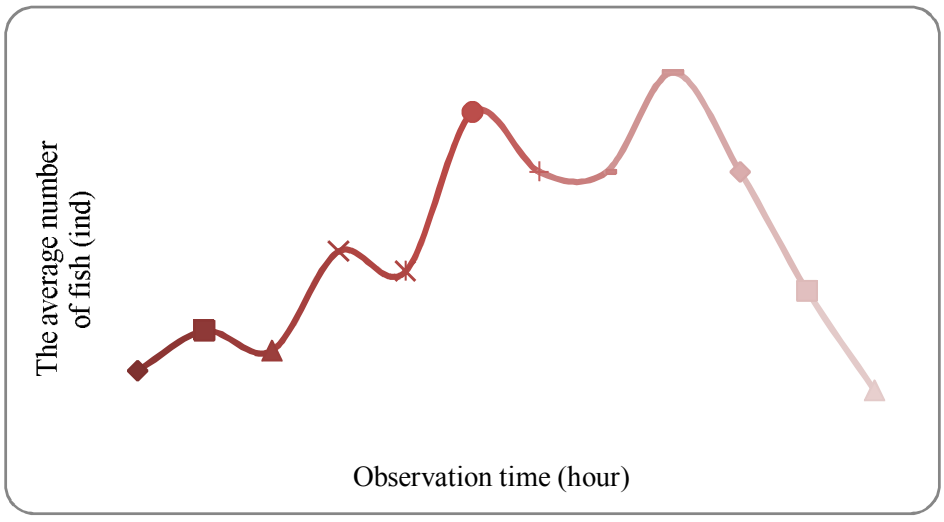

Figure 4 The number of fish caught by a rectangular funnel trap from 6:00 pm to 6:00 am

The Catch Analysis Based of the Type of Funnel Trap

The influence of different funnel traps towards caught grouper fish on the laboratory scale was analyzed using the Test-T and Test-One Way Anova. In the Test-T, the value of T calculated =7.446 and table value of T=2.001, which means hit reject H0 since T > Ttable, it shows that there is a difference in the amount of fish caught using round funnel traps and rectangular funnel traps. The form of funnel traps affects the number of fish caught.

The result of Test-One Way Anova showed that the value of F = 4,00655.446 and F table. This means reject Ho is number of fish caught is not the same for different traps of funnel. The different outcomes need to be followed by Honestly Significant Difference test or HSD-test to calculate the difference between the two funnel traps. Results of Honestly Significant Difference (HSD-test) showed that the difference between the round funnel trap and rectangular funnel trap SE of 2.4 and 0.226, q where q table count 10.641(0.05, 30.2) is equal to 2.89. It can be concluded that reject H_o or any real difference between the round funnel trap and rectangle funnel trap.

CONCLUSIONS AND RECOMMENDATIONS

Response of the grouper approaching traps in various ways, among others, tried alone or clustered was studied. Different types of funnel traps influenced the catch, the round funnel was better than the rectangular funnel.

To optimize the number of the catch, it should be done using a round mouth funnel from 6:00 am. to 6:00 pm. A further research is expected to obtain more information and knowledge about the fish behavior.

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