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Bioscience Research

Print ISSN: 1811-9506 Online ISSN: 2218-3973

Journal by Innovative Scientific Information & Services Network

RESEARCH ARTICLE BIOSCIENCE RESEARCH, 2019 16(2): 1510-1514. **OPEN ACCESS**

Biological Analysis of Population of Red Snapper Fish *(Lutjanus Gibbus)* In Alor Sea, East Nusa Tenggara, Indonesia

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This study aims to examine the stock of red fish populations (*Lutjanus Gibbus*) based on biological aspects in the Alor sea, East Nusa Tenggara, Indonesia. This research was conducted for approximately 3 month, which represented the fishing season, namely the East season, in the Alor sea. To determine the frequency of length and weight of the catch using the distribution of long frequencies and frequency of weights through a long size distribution in certain length groups. The distribution of long frequencies is obtained by determining the class interval, class middle value, and frequency in each long group. In this study, to analyze the long frequency distribution help to use excel software. In the analysis of the relationship length is calculated using equation (Ricker, 2001). The highest number of red snapper caught was in the class category 22,25 cm - 28,3 cm of 649 fish (42.3%). The largest amount of weight or weight of the catch of red snapper in Alor sea is in the range 205 gr - 391 gr as much 1154 fish or 75.2%. The value of b only reached 0.887 (<3) indicating an allometric growth pattern where the length growth of red snapper did not affect the growth of fish weight. Based on the results of a regression analysis of the amount of red snapper catches totaling 1535 Red Snapper male, female and combined showed negative allometric growth pattern where b <3, meaning that the length of the body faster than the body weight gain.

Keywords: Biological, Red Snapper, Population

INTRODUCTION

Fisheries of Red Snapper (*Lutjanus Gibbus)* in Alor sea were more exploited by fishermen with fishing activities in their respective regions. Utilization of fishery resources, especially marine fisheries (catch), is still dominated by small- scale fisheries which generally have characteristics, small scale businesses, simple technology applications, limited fishing operations around the coast and relatively low productivity. The level of utilization of demersal fish including Red Snapper fish has undergone *over fishing* so it needs caution in the utilization of these resources, in accordance with information from the Ministry of Maritime Affairs and Fisheries released by the Directorate General of Capture Fisheries (2014).

Management of Red Snapper fish by Alor Regency fishermen has not been well organized so that its exploitation activities run according to the wishes of fishermen which can result in a decrease in catches. The activity of the upcoming Red Snapper fishing must have accurate data on the catch. Beside production data as one of the efforts to optimally and rationally exploit Red Snapper fish in the future, information about the biology of fisheries population dynamics should be known (Sparre et al., 1989). The size pattern of

the size of the fish population from a stock area exploited in a steady state based on each size class (age) of individuals through the catch data (Pitcher and Hart, 1982) needs to be well known. In biology fisheries, the most way well for degradation of fish an age group according to time is by exponential degree or following mortality from other fish groups at the same time (Pauly, 1980 and Sperre et al., 1989). Catching fish types economical with management can lead to excess arrest *(overfishing),* even at risk to the threat of extinction. This is common in Red Snapper fish in Alor sea because there is no good management and low attention and government support in management and conservation programs. Based on this, this study aims to examine the stock of red fish populations (*Lutjanus Gibbus)* based on biological aspects in the Alor sea, East Nusa Tenggara, Indonesia.

MATERIALS AND METHODS

Time And Location

This research was conducted for approximately one year, which represented the fishing season, namely the East season, and the West season in the waters Alor. The sampling location was adjusted to the potential areas of Red Snapper *fishing* based on *fishing base* (*fishing base* for capturing Red Snapper on Alor Sea), namely on Treweng Island (Pantai Timur District).

Sample and Collect Data Method

Determination of the station is based on the position of potential areas for completing fish, namely where fishing gear is located, as well as information on the area and catching season of local fishermen in the Alor Sea. Sampling is done twice in a row following fishing activities, a tool used by GPS to determine and know the sampling coordinates. Sample fish was taken using simple random sampling and the number of sample fish was taken 10% of the number of fish caught. Samples were taken 10% of the population studied.

Data Analysis Method

In determine the frequency of length and weight of the catch using the distribution of long frequencies and frequency of weights through a long size distribution in certain length groups. The distribution of long frequencies is obtained by determining the class interval, class middle value, and frequency in each long group. In this study, to analyze the long frequency distribution help to use excel software.

In the analysis of the relationship length is calculated using equation (Ricker, 2001).

$W = a$

The equation can be transformed into a logarithmic form and a linear equation is obtained as follows:

$\text{Log } W = \text{Log } a + b \text{ Log } L$

where :

W = Weight of sample fish (g);

L = sample fish length (cm); and

b = Constants of the equation

The data criteria for the analysis result are long weight relationships:

To test the value of $b = 3$ or $b \neq 3$ a t-test (partial test) is carried out, with the hypothesis:

H0: $b = 3$, the relationship between length and weight is isometric.

H1: $b \neq 3$, the relationship between length and weight is allometric, where:

Positive allometric, if $b > 3$ (weight gain faster than length increment) and negative allometric, if $b < 3$ (length increment is faster than weight gain).

RESULTS

Time And Location

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The data criteria for the analysis result are long weight relationships:

To test the value of b = 3 or b ≠ 3 a t-test (partial test) is carried out, with the hypothesis:

H0: b = 3, the relationship between length and weight is isometric.

H1: b ≠ 3, the relationship between length and weight is allometric, where:

Positive allometric, if b> 3 (weight gain faster than length increment) and negative allometric, if b <3 (length increment is faster than weight gain).

red snapper *(Lutjanus Gibbus)* obtained in this study :

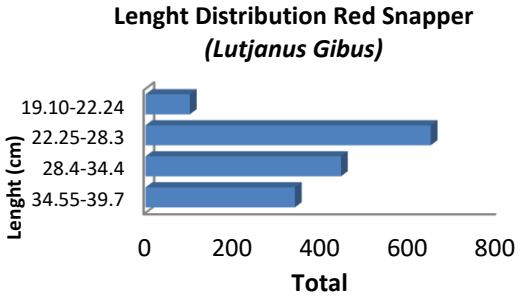

Figure 1. Diagram Fish Length Distribution Red Snapper *(Lutjanus Gibbus)* in Alor Sea, NTT.

Based on the table above shows that the long frequency in this study is divided into 4 class categories namely (i) 1 9,10 cm - 22,24 cm, (ii) 22,25 cm - 28,3 cm, (iii) 28,4 cm - 34, 4 cm, (iv) 34.55 cm - 39.7 cm. The division based on the class is assumed in this study as a standard stating the number of long proportions or frequencies of red snapper catches in the Alor Sea, NTT. The frequency results showed that the highest number of red snapper caught was in the class category (ii) of 649 fish (42.3%) of the total number of catches, then continued in the class category (iii) of 445 or 29%. In the length of the catch in the class category (iv) red fish were caught as many as 340 fish or by 22.1% and the lowest number was in the long category in the class (i) with a total catch of 101 or 6.6%.

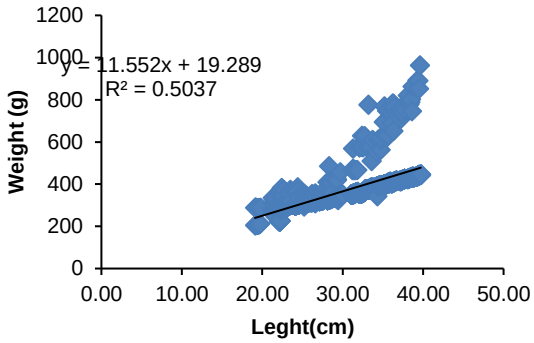

Figure 3. Relationship Between Weight (g) and Leght (cm) in Red Snapper Fish (*(Lutjanus Gibbus)*

The number of catches of snapper based on the long category in the alor sea is in the class (ii) in the range of 22.5 cm - 28.3 cm based on the use of fishing rods used by stretcher fishermen in Alor sea who use number 7 fishing rods to number 10 so that the catches of red snapper are dominated by small size. Raslton (1989) Results showed neither model in its simplest form depicted hook selectivity well, while small substantially more small fish, large caught hooks were somewhat more effective in curing the larger size classes in snapper.

Frequency of Weight Catch of Red Snapper

Based on this study the average frequency of weights caught by red snapper *(Lutjanus Gibbus)* in the Alor sea, NTT has a mean weight with a margin of size that is far between a fish caught one with another catch. The presence of weight or weight of red snapper caught is also determined by the condition of spawning fish with average red snapper which has a greater weight in the spawning process than the smaller weight. The following is the frequency of heavy weights (grams) of red snapper catches in the waters of Alor NTT:

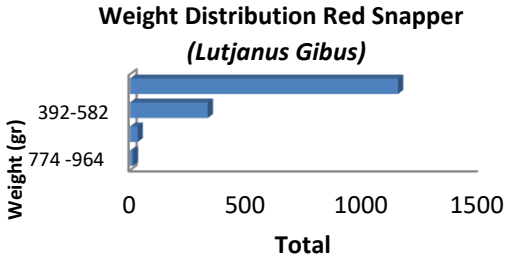

Figure 2. Chart Bar Weight Distribution Red Snapper *(Lutjanus Gibbus)*

Based on the graph image above the heavy frequency categorization of the catch consists of 4 classes, namely class (i) 205 gr - 391 gr, (ii) 392 gr - 582 gr, (iii) 583 gr - 773 gr, and (iv) 774 gr - 964 gr. The largest amount of weight or weight of the catch of red snapper in Alor sea is in the range (i) as much 1154 fish or 75.2% while in the next sequence are in class (ii) as many as 335 fish or 21.8%. The highest number of weights between 774 grams to 964 grams in the class category (iv) only caught 13 fish or 0.8% of the total number of red snapper catches in the Alor sea NTT.

The number of catches of fishing fishermen in Alor Waters with the target of catching on red snapper during this study was dominated by the weight between 205 grams to 391 grams due to fishing locations located not far from the shoreline with the ability of a fleet that could only reach the depth of fishing location just 30-70 meters ground. Baddarudin, et al (2008) explained that adult red snapper habitat inhabits rocky waters and coral reefs to a depth of 60 meters, while young fish prefer coastal areas that have mangrove areas. Syc and Szedlmayer (2012) The red snapper may show more behavior among reefs, it appears that many snapshots reside on particular reefs for several years and if the other reefs were providing more resources, we would have higher growth rates, especially the relatively young (<10-year-old) individuals that have a nearly linear growth rate.

Relationship between Length and Weight on the Biological aspects of Red Snapper Fish in Alor Sea

Red snapper fish in catch activity *(Lutjanus Gibbus)* in Alor Sea by East Nusa Tenggara fishermen who made the fish as the target of the catch not only caused by the economic value contained in the fish species, but also the size of the catch found to be an attractive level of size to catch.

Based on the results of a regression analysis of the amount of red snapper catches totaling 1535 Red Snapper male, female and combined showed negative allometric growth pattern where b <3, meaning that the length of the body faster than the body weight gain.

According to Effendie (2002) which affects fish growth consists of two factors, namely internal factors and external factors. Internal factors include heredity, gender, age and disease, while external factors that influence growth are parasites, food and water temperature. The following is a graph of the relationship between the length and weight of red snapper *(Lutjanus Gibbus)* caught in Alor Sea during this study :

Based on the picture above, there is a considerable gap between the length of the forked red snapper and the condition of the weight or weight of the catch.

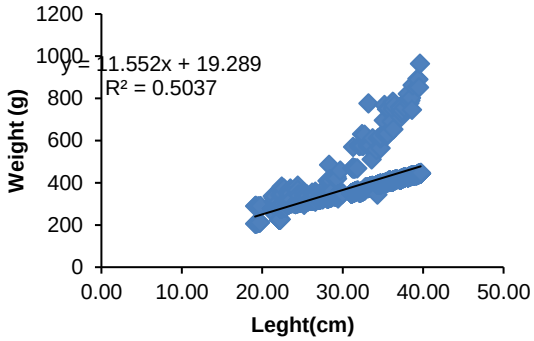

Figure 3. Relationship Between Weight (g) and Leght (cm) in Red Snapper Fish (*(Lutjanus Gibbus)*

This causes the value of b to only reach 0.887 (<3) indicating an allometric growth pattern where the long growth of red snapper does not affect the growth of fish weight. This is different from the study of Prihatiningsi, et al., (2017) who assessed the long weight relationship of red snapper caught in the waters of southern Banten in an isometric position. Jennings and Kaiser et al., (2001), explain that population b values are dependent on physiological conditions of fishes, for example, gonad development stage and food availability.
In addition, Muchlisin et al., (2010) stated that the value is also affected by fish behavior; for example, active swimming fish may show lower b values compared to passive swimming fish. This is probably related to the energy allocation for movement and growth.

CONCLUSION

the value of b only reached 0.887 (<3) indicating an allometric growth pattern where the length growth of red snapper did not affect the growth of fish weight.

The largest amount of weight or weight of the catch of red snapper in Alor sea is in the range 205 gr - 391 gr as much 1154 fish or 75.2%.

The highest number of red snapper caught was in the class category 22,25 cm - 28,3 cm of 649 fish (42.3%)

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

ACKNOWLEGEMENT

The Authors would thanks all participants.

AUTHOR CONTRIBUTIONS

All authors contributed equally in the development of research design, data collection, data analysis writing and editing the manuscript.

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