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Growth Pattern and Condition Factors of Kurisi Fish (*Nemipterus nematophorus*, Russel 1990) Landed at Lempasing Fishing Port

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ABSTRACT

Kurisi fish (*Nemipterus nematophorus*) is one of the demersal species caught in the Lempasing PPP using purse seine nets. This research aims to obtain information regarding the growth patterns and condition factors of kurisi fish found in the waters of Lampung Bay and landed at PPP Lempasing. The method used includes direct data collection through random sampling of fish which then analyzes the relationship between length and weight as well as fish condition factors. The results showed that the total catch of kurisi fish reached 350 fish, with a total length ranging from 140 to 256 mm, which were categorized into 9 size classes. The growth pattern of kurisi fish is negative allometric, with a b value of 2.4405, which indicates that the growth in length of the fish occurs faster than the increase in weight. The average condition factor value for kurisi fish is 0.9763, which indicates that this fish has a flat body shape. This negative allometric growth pattern can indicate environmental stress that affects fish growth, such as limited food or suboptimal water conditions, which are directly related to fish condition factors.

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1. INTRODUCTION

Kurisi fish (*Nemipterus nematophorus*) caught at the Lempasing Coastal Fishing Port (PPP Lempasing) using purse seine nets. PPP Lempasing has Fisheries Management Areas (WPP) 572 and 712. Lampung Bay Waters as a habitat for kurisi fish which is favoured by the community because of its affordable price, has good economic value, and includes demersal fish caught using cantrang found at a depth of 25-40 m[12],[15], [21]. Some fishing gear that is often used to catch kurisi fish in Banten Bay Waters, such as seine, gill net, purse seine, and bagan tancap[11], [24].

The kurisi fish (*Nemipterus* sp.) s usually solitary and slow-moving. They are often found on the bottom of the water, searching for food such as small organisms and plankton. Although generally solitary, small groups of these fish may congregate when searching for food [2]. Kurisi fish has thick white meat and its affordable price makes it popular at home and abroad. The succulent quality of its meat makes it a favourite choice in various dishes [22]. Morphologically, kurisi fish has a pink body with a golden yellow stripe running along its sides [10].

The catch of kurisi fish is decreasing based on the annual report from PPP Lempasing where the number of fish landed at PPP Lempasing in 2020 reached 42.827 tonnes, in 2021 it was 35.186 tonnes. The sustainability status of the use of kurisi fish (*Nemipterus* sp.) in the waters of

Lampung Bay is classified as quite sustainable [15]. Kurisi fish show a negative allometric growth pattern (b < 3) where the increase in fish length is not balanced by a proportional increase in weight [19][13][2].

Data on growth patterns of kurisi fish from various research sites provide insight into catch statistics and fish population estimation. The relationship between fish length and weight is important information for fishing practices[16]. Penelitian mengenai pola pertumbuhan dan faktor kondisi ikan kurisi di perairan Teluk Lampung Research on growth patterns and condition factors of kurisi fish in Lampung Bay waters landed at PPP Lempasing has never been conducted. Length-weight parameters and condition factors reflect fish health and indirectly indicate food availability, gonad maturity level, and environmental conditions [6]. Therefore, this study is needed as a consideration in the management of capture fisheries at PPP Lempasing to achieve sustainable kurisi fishing practices.

2. METHOD

This research method involves direct data collection through random sampling techniques on the fish being observed. Kurisi fish were caught by fishermen using purse seines. Primary data were obtained by measuring fish length (in millimetres) and weight (in grams). The study was conducted from July to August 2024 at PPP Lempasing, located in Lampung Province. Sampling was conducted daily, where fish length and weight were measured consistently. For weighing, a digital scale with an accuracy of up to 0.001 grams was used, while fish length was measured using a caliper with an accuracy of 0.1 millimetres. This method allows accurate and representative data to be collected, which can be further analysed to understand the growth and condition of fish in the habitat.

3.1. Data Analysis

The data obtained was then processed into a database using ms. excel software. This process aims to analyse the length distribution of fish, as well as understand the relationship between length and weight of kurisi fish, and the condition factors that affect fish health. The use of ms.excel makes it easy to visualise the data through graphs and tables, so as to quickly identify patterns or trends in the data and evaluate the condition of the kurisi fish population in these water.

a. Growth Pattern

Growth patterns can be explained as the increase in length and weight of fish in a certain period of time. The relationship between length and weight of fish can be measured using a predetermined equation where the value of b = 3 indicates isometric (body length and weight are balanced), b < 3 negative allometric (body length is greater than its weight), and b> 3 positive allometric (body weight is greater than its length) [5]. The formulation is as follows:

$$W = aL^b$$

Description:
W = weight of fish (g)
L = fish length (mm)
a and b = constants

If the formula for the relationship between length and weight of fish is transformed into logarithmic form, the resulting equation will become linear or straight line. This logarithmic transformation is done to simplify the calculation and analysis of the relationship between length (L) and weight (W) of fish which is usually non-linear. The equation obtained after logarithmic transformation is:

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

Description:

W = weight of fish
L = length of the fish

a = constant
b = exponent that describes the growth pattern of the fish

After transformation, this equation becomes a linear form that is easier to analyse. In logarithmic form, the relationship between fish length and weight can be analysed by a simpler statistical method, the least squares method.After the values of a and b are calculated, the value of a obtained from the logarithm calculation must be antiloged to get the original constant value. This antilog process is done because in the original equation, the value of a is in logarithmic form. The value of b can be used directly because it is the exponent in the allometric equation.

b. Condition Factor

Condition factor analysis is useful for assessing the physical state of fish using a matrix system based on the relationship between length and weight [5]. Fish condition factor values range from 0 to 1, indicating that the fish may be thin or flat-bodied. If the fish condition factor value is in the range of 1 to 2, it indicates that the fish is slightly fatter. In this condition, the fish has relatively better growth, with greater accumulation of body weight in proportion to its length. This may indicate that the fish is getting enough food and living in favourable environmental conditions[4]. In addition, if the growth pattern of the fish is allometric, the relationship between length and weight can be described using the following mathematical equation:

$$Kn = \frac{W}{aL^b}$$

Description::
Kn = condition factor
W = weight
L = length
a dan b = constants

3. RESULTS AND DISCUSSION

3.1. Length Size Distribution of Kurisi Fish

From the observation of kurisi fish at PPP Lempasing, a total catch of 350 fish was obtained with lengths ranging from 140 to 256 mm, divided into 9 size classes. These results can be seen in Figure 1 which shows the species of kurisi fish, and Figure 2 which illustrates the size distribution of fish length. The highest number of kurisi, 123 fish, was found in the 166-178 mm length class. The maximum length of kurisi fish landed at PPP Lempasing was 255 mm, which is smaller than the size of kurisi fish in Kupang Bay Waters, which reached 321 mm [8]. The frequency distribution of kurisi fish length size showed that male and female fish were dominated by the 206-222 mm length class in Puupi Village waters [18]. In Labuhan Maringgai, the frequency distribution of total length of kurisi fish ranged from 115 to 230 mm with weight between 18 to 159 g [20].

The data obtained showed variations in the size and number of kurisi fish caught in various locations such as Semau Island and Kera Island [7]; Labuhan Maringgai [20]; Puupi Village [18]. Some environmental conditions, such as food availability, water temperature, and the presence of competitors and food factors, play a more important role in tropical waters than water temperature itself [5]. Food availability greatly affects fish growth and health, while the presence of competitors can affect fish accessibility. In the context of tropical waters, these factors are often more crucial than temperature, as food conditions and interactions between species have a greater influence on the ecosystem.

Figure 1. Kurisi fish (*Nemipterus nematophorus)*
Source: Personal documentation

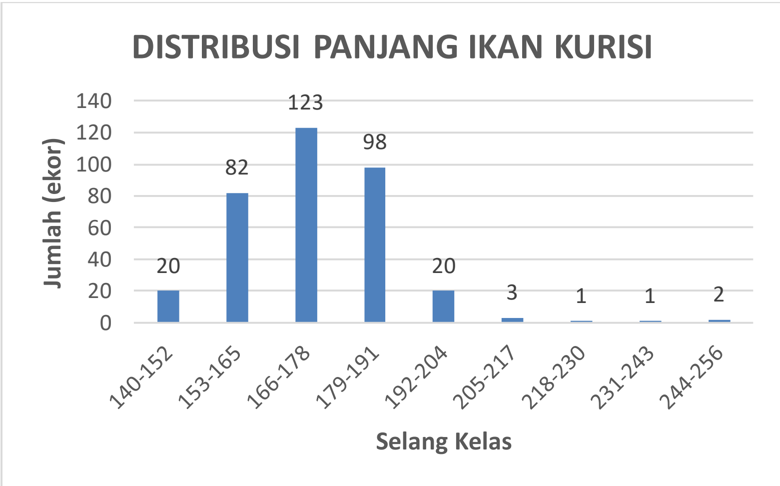

Figure 2. **L**ength distribution of kurisi fish (*Nemipterus nematophorus*)

3.2. Length Weight Relationship of Kurisi Fish

Based on the analysis of the length and weight relationship of kurisi fish shown in Figure 3, the growth model of kurisi fish can be expressed by the formula $W = 0{,}0003L^{2{,}4405}$. rom these calculations, the intercept value a = 0.0003 and coefficient b = 2.4405 were obtained, indicating the nature of negative allometric growth. This means that the length gain of kurisi fish is faster than its weight [5]. The results of this analysis provide a clear understanding of the growth dynamics of kurisi fish. The negative allometric trait indicates that this fish grows faster in length than in weight, which could have an effect on fisheries resource utilisation and management strategies.

Kurisi fish landed at PPP Labuhan Maringgai showed that 77% of fish weight was influenced by length, while the remaining 27% was influenced by other factors. These factors may be due to sample non-uniformity, variations in water conditions at the time of capture, or differences in the time of capture in each observation [20]. The equation of length and weight relationship is related to condition factors [3]. The results of kurisi fish research have a negative allometric growth pattern in several locations [1];[14]; [17]; [7]. The growth of kurisi fish in Puupi Village waters is categorised as allometric, with pH as one of the influential factors [18].

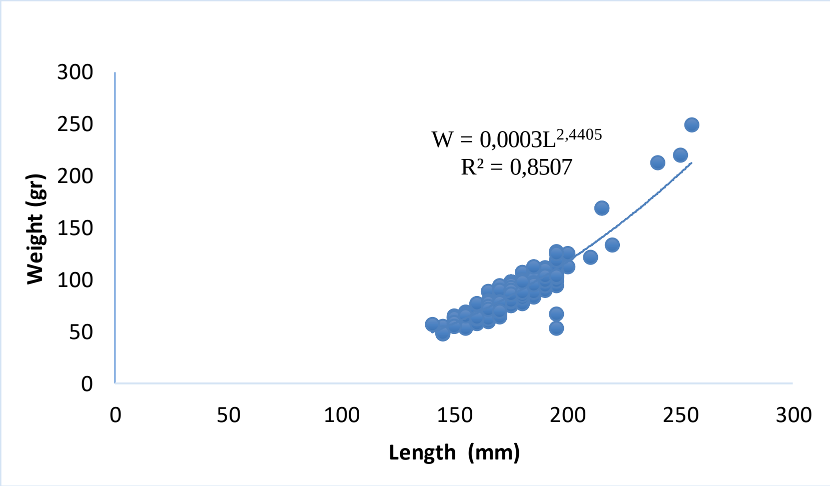

Figure 3. Length-weight relationship of kurisi fish (*Nemipterus nematophorus*)

3.3. Condition Factors of Kurisi Fish (*Nemipterus nematophorus*)

Fish condition factor is measured through the relationship between length and weight. This condition factor value describes the physical state of the fish, which is crucial for its survival and reproduction [23]. good condition factor indicates that fish have sufficient resources to grow and reproduce, which ultimately contributes to the sustainability of fish populations in the ecosystem. When fish have good condition factors, it signifies that they not only have enough nutrients to survive, but are also in optimal conditions for reproduction. This supports the stability and sustainability of the fish population, which is crucial for maintaining the balance of the aquatic ecosystem. Condition factor values can be seen in Figure 4.

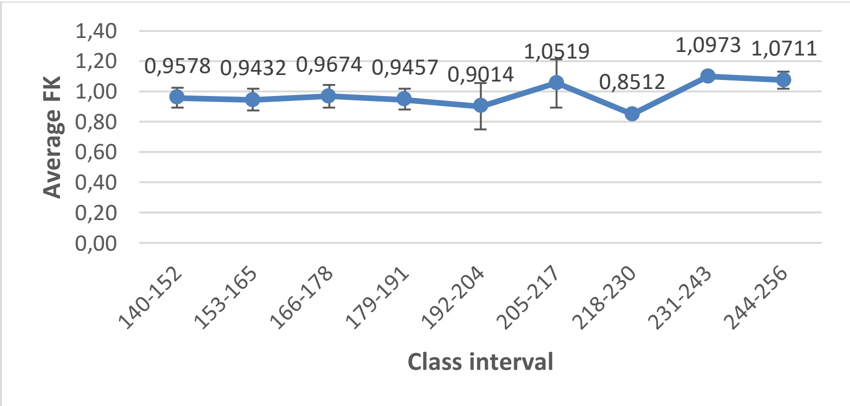

Figure 4. Condition faktor of kurisi fish (*Nemipterus nematophorus*)

The largest condition factor obtained was 1.0973 in the 231-243 class interval, while the lowest value was 0.8512 in the 218-230 class interval. The sum of the mean condition factor values of all class intervals is 0.9763. This result shows that the average value of the condition factor of all class intervals ranges from 0 - 1, which means that the body of the fish is thin or flat. The fish condition factor ranges from 0 - 1, meaning that it can identify that the fish is thin or flat [4]. A low condition factor value indicates that the fish's physiological function is less than optimal, presumably due to unfavourable water conditions [6]. A low condition factor may indicate that the fish is facing challenges in its environment, such as lack of food, presence of pollutants, or inappropriate temperatures. This can affect the health and ability of the fish to reproduce, thus negatively impacting the population and the ecosystem as a whole.

The condition factor of a fish species is dynamic in that any sudden change in the aquatic environment can affect the condition factor of the fish [9]. This can result in stress or a decline in fish health, which in turn can affect the fish's ability to survive and reproduce. Poor water conditions, suspected overcrowding of fish populations in a body of water, resulting in reduced fish stocks in the water.

One of the factors affecting the growth of kurisi fish in the waters of Puupi Village is salinity because it directly changes osmotic pressure and physiological activity. In the waters of Puupi Village, kurisi fish are able to adapt to salinities of 27 and 30 ppt [18]. he condition factor values of male and female kurisi fish were 0,6961-0,9292 dan 0,9819-1,1241 [1]. hese values are relatively comparable to the location in PPI Tambak Lorok Semarang, which found condition factors ranging from 0,91-1,11 [17]. The adaptation of kurisi fish to salinity variation indicates its physiological flexibility, which is important for survival in different habitats.

4. CONCLUSION

The conclusion of this study revealed that the growth pattern of kurisi fish (*Nemipterus nematophorus*) is negative allometric, with a b value of 2.4405. This negative allometric pattern indicates that the growth of kurisi fish is not balanced between length and weight. That is, these fish grow faster in terms of length than weight. This could be due to several factors, such as limited food resources or unfavourable water conditions, which could slow down the accumulation of body weight compared to length.

Fish condition factor values in the range of 0 to 1 indicate that the kurisi fish in these waters tend to be slender and not overly fat. These low condition factors are often associated with sub-optimal environmental conditions, which can affect the quality of food available to the fish, as well as their overall health. A low condition factor can signify environmental stresses that affect the growth process of the fish, such as poor water quality or lack of availability of plankton as a primary food source.

Thus, this negative allometric growth pattern, followed by a low condition factor, suggests the presence of potential ecological stresses or limiting factors in the aquatic ecosystems where curies live. Decreased habitat quality or lack of food resources may be the main factors limiting the fish's ability to thrive. Therefore, the results of this study are important for consideration in the management of fisheries resources in these waters, with efforts to improve habitat quality and food availability for fish in order to support the sustainability of kurisi fish populations.

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