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RELATIONSHIP BETWEEN LENGHT AND WEIGHT OF CATFISH (*CLARIAS* SP) FED WITH HOUSEHOLD WASTE

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Catfish, waste feed, growth patterns, length-weight relationship

ABSTRACT

Catfish (*Clariass*p) is one of the most popular freshwater fish in West Java. This research is about the relationship between length and weight of catfish which were fed with household waste. The purpose of this study was to evaluate the growth patterns and condition factors of catfish in waste-based feeding. Sampling is done using a net. Fish samples used were 70 catfish with a composition of 31 females (44.29%) and 39 males (55.71%). The allometric linear model (LAM) was used to calculate parameters a and b through weight and length measurements. The bias correction on the change in mean weight of the logarithmic unit were used to predict the weight of the length parameter according to the allometric equation based on DeRobert& William [18]. The results showed that catfish have negative allometric properties, where it grows longer faster than it grows heavier. R2 value of 0.3462 and 0.5883 means that the associative level between the length and weight of the fish is moderate. The interval 145-154 has an optimum condition factor with a value of a condition factor of 1.05 where the condition of the fish is good but on the thin side. Differences in values of b, R2, r, and K were thought to be influenced by biotic and abiotic factors where the fish live.

Introduction

Catfish (*Clariass*p) is one of the fishes that is cheap and have a high economical value in West Java, Indonesia. Consumer demand for catfish is increasing because it is cheap, tastes good, and has good nutritive value. Catfish also have a calmer and more docile nature [1]. Other names for catfish in various other areas include *kalang, duri, sibakut, keling, pintet, kaleh, penang* or *wiru*. Catfish has an additional breathing apparatus called Arborescent. Arborescent is a respiratory organ that comes from a modified gill arc [2].

There are at least 55-60 species of the Clarias clan members worldwide. Of that number, Indonesia is known to own dozens of the catfish species, some of which have only been recognized and described in the last 10 years [3]. The advantage of catfish is that it has adaptive properties to various types of food and has a wide tolerance for poor water quality. This in turn is an attraction for farmers to grow catfish.

Good feed response to various feeds is one of the characteristics of catfish. Household wastes can be given to catfish as a cost-friendly feed alternative. Provision of household waste as feed requires record of growth patterns and analysis of the length and weight of catfish. Catfish are nocturnal creatures, where it is actively moving in search of food at night. During the day, catfish sit idle and take shelter in dark places [4].

Factors affecting stock availability of catfish are including growth and mortality. Growth is influenced by several factors, such as the amount and size of feed, the number of individuals eating the feed, gonad maturity, fish size, age and water quality[5]. The results obtained in the calculation of the relationship of weight length can be used to estimate the length of the weight or vice versa. Measurement of fish length and weight also aims to find out specific weight and length variations of fish individually or in groups of individuals as a guide to obesity, health, productivity and physiological conditions including gonadal development [6 ; 7].

This research is about the length-weight relationship of catfish that are cultivated by feeding on household waste. The purpose of this study was to evaluate the growth patterns of catfish given different types of feed.

Methods

Location and Time of Reasearch

This research was conducted in July 2019. Cultivation and sampling were carried out in TanjungsariSumedang Village. Observation of the length and weight of catfish was carried out in the Aquaculture Laboratory, Faculty of Fisheries and Marine UniversitasPadjadjaran.

Fish Sampling

Sampling was done using a net. Seventy catfish of each strains were used in this study. This research was conducted using a survey method, while the determination of sample used was carried out randomly. Caught catfish were separated in waring and taken to the laboratory for length and weight analysis.

Weight-length Measurement of Fish

The length of fish was measured using a digital caliper (accuracy level 0.01 mm), while the total weight of fish was measured using is a digital scale with accuracy of 0.1 gram.

Weight-length Data Analysis

The linear allometric model (LAM) is used to calculate parameters a and b through measurements of changes in weight and length. The bias correction on the change in mean weight of the logarithmic unit is used to predict the weight of the length parameter according to the following allometric equation, based on DeRobertis& William (2008).

$$W = a L^b$$

Where :
W is weight of fish (g),
L is total length of fish (mm),
a and b are parameters

Result and Discussion

The relationship of length of catfish weight was calculated to find out the linear equation of fish length and fish weight, and to know the regression of the relationship of fish length and weight [9]. The length and weight relationship of catfish which were fed household waste were recorded in a linear equation, Log W = 0.2736 Log L + 0.832, and can be seen in (Figures 1 and 2).

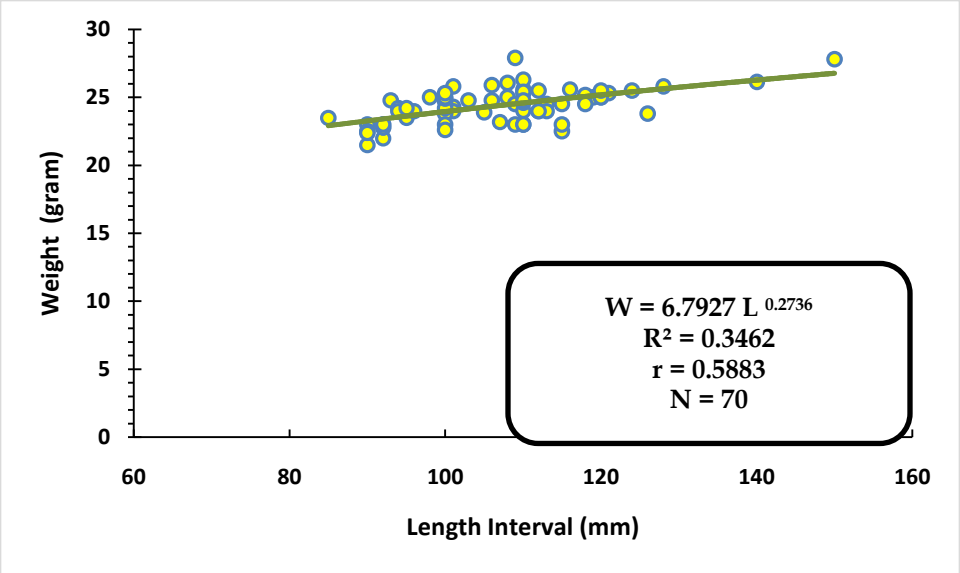

Figure 1. Weight and Length Relationship of Catfish

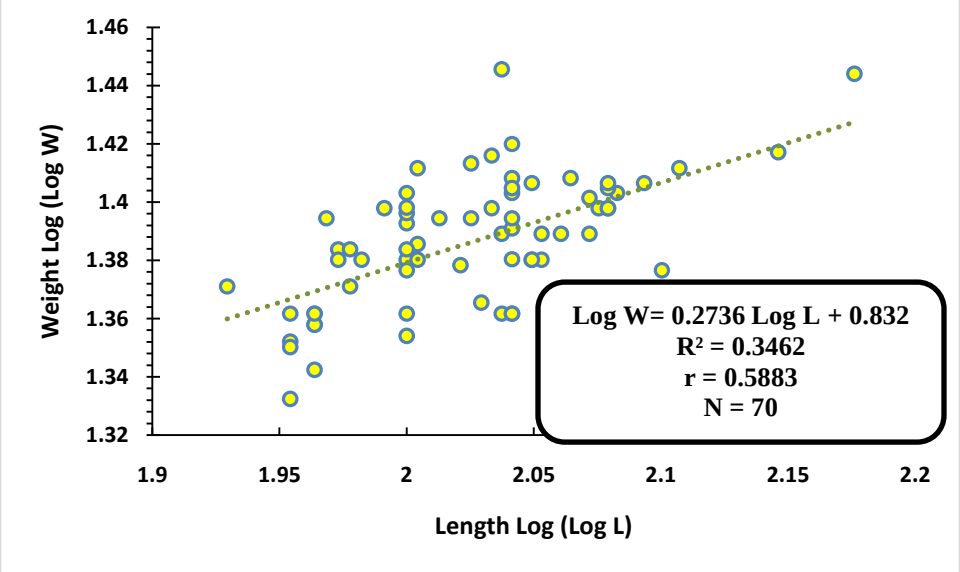

Figure 2. Weight and Length Regression of Catfish

The relationship between length and weight of catfish shows an R2 of 0.3462, which means that 34% of fish length affects the weight of fish and 66% is influenced by environmental factors. Correlation values are obtained from the root calculation of the regression value. The value of r indicates r = 0.5883, which means that the associative level between the length and weight of the catfish is close or balanced. The closer to one, the relationship between length and weight of catfish have a high associative level or very strong closeness.

Fish growth was also supported by the availability of feed in sufficient quantities and supported by optimal fish stocking densities, where the feed consumed was greater than the fish's need for growth [8]. The addition of weight and length in fish shows that the energy content in the feed consumed exceeds the energy requirements for cultivation and bodily activities.

The value of b on the length and weight relationship chart of catfish shows the value of b of 0.2736, which means that catfish is allometric negative, ie the growth of the length is faster than the growth of the weight. This is presumably because the high stocking density causes the growth of catfish is allometric negative. Negative allometric growth illustrates that the energy obtained from the intake of nutrients given to fishtends to be used more for the physiological activities of the fish. So that catfish can have a depressed or slim and elongated body [10]. That the availability of food, the level of gonad maturity, and variations in body size of fish can also be a cause of differences in the value of b [11]. It can also be influenced by the active behavior of fish [12].

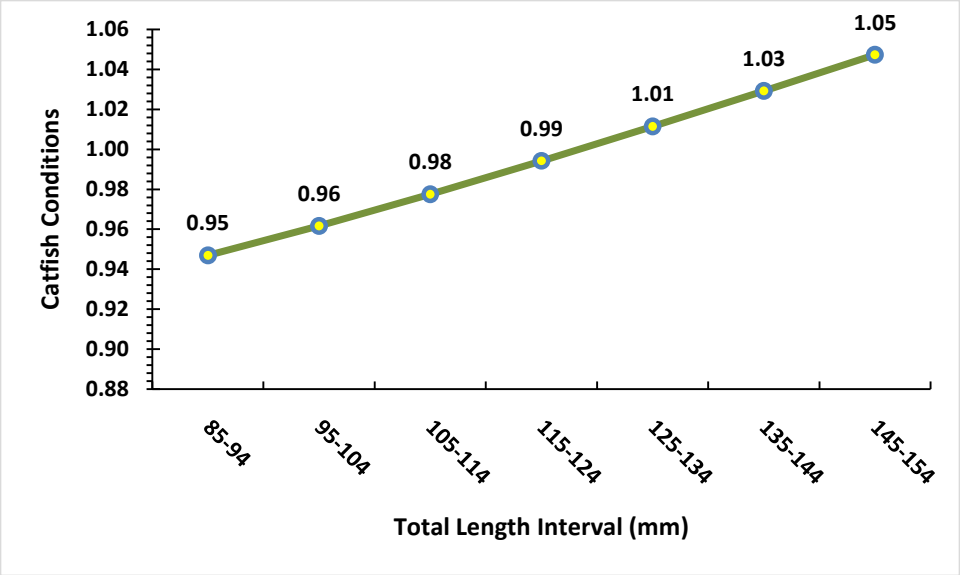

Figure 3. Condition of Catfish

Based on the measured condition of the catfishes, it is known that fish condition is in the interval of 145-154 mm, where it is the optimum condition, with a condition factor value of 1.05. The minimum value in the interval is between 85-94 mm, with a condition factor value of 0.95. Based on the graph, the increasing condition can indicate that the catfish is still in the process of gonad development and if it is associated with growth patterns, the catfishes are in a good condition but thin, because it is seen from the K value of 0.95 - 1.05. Condition factors are calculated to assess general fish health, productivity and physiological conditions of fish populations [6 ; 7]

The condition factor is also influenced by the level of gonad maturity and abundance of food [9]. The condition factor shows the state of fish in terms of physical capacity for survival and reproduction. Commercially, the condition of catfish determines the quality and quantity of fish meat that is available to be eaten. High condition factor in fish indicates fish are in gonad development, whereas a low condition factor indicates that fish get less food intake [13]. The difference in the value of condition factors can be influenced by differences in age, environmental conditions, gonadal maturity, food availability and behavior.

The value of the condition factor will increase towards the peak of spawning and decrease after spawning [14]. This is presumably because the main energy source is used for gonad development and spawning [15]. The theory is supported by the statement of Herawati[16] which stated that the condition factor is not constant at any time because it is influenced by biotic and abiotic factors.

Growth in fish is influenced by internal factors (heredity, sex, age) and external factors (environment and feed). Besides being influenced by the frequency of feeding, growth is also influenced by the quality of the amount of feed consumed. Feeding with right protein content plays an important role in supporting optimal growth for Catfish [17].

Conclusion

1. The effect of length on the weight of catfish (*Clarias*sp) by 34% and 66% is influenced by the environment. R value of 0.5883 which means the level of closeness between the length and weight of medium or near balanced catfish.
2. The growth pattern of catfish (*Clarias*sp) is negative allometric where the growth of the length is faster than the weight growth. Viewed from the b value of 0.2736.
3. Fish measurements between 145-154 have the highest value of the condition factor of 1.05 where it is influenced by biotic and abiotic factors.

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