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GROWTH PATTERN STUDY OF SLENDER WALKING CATFISH (*Clarias nieuhofii*) AS ENVIRONMENTAL BIOLOGY INDICATOR

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ABSTRACT

Slender walking catfish (Clarias nieuhofii) is a consumption fish that has a fairly high economical value. Local market prices can reach IRD 50.000-70.000/kg. People love this fish because of the delicious taste of the meat, which very different from the aquaculture catfish. Until now the production relies only on natural catches and there have been no cultivation efforts. But in recent years these out catfish are increasingly difficult to find in nature. The conversion of land into plantation areas caused the loss of the fish's original habitat. Based on community information, the habitat of this fish is found in Pasir Putih Village, Silangkitang District, Labuhan Batu Selatan Regency, and Bandar Tinggi Village, Bilah Hulu District, Labuhanbatu Regency, Indonesia. Differences in habitat conditions are known to affect fish growth patterns, including C. nieuhofii. This research aims to determine the pattern of the growth of the slender walking catfish in these different habitat conditions. Exploratory methods were used in this research and observation stations were determined through purposive sampling. Fish sampling was done using a fishing rod. The samples of fish captured were measured by the total length and weight. The results of the research show that the pattern of fish growth in Pasir Putih Village is negative allometric ($W = 0.6944$, $b = 0.2463$ and $R^2 = 0.9468$) and in Bandar Tinggi Village shows negative allometric ($W = 10.207$, $b = - 129.56$, and $R^2 = 0.9711$).

Keywords: Clarias nieuhofii, growth pattern, indicator biology

INTRODUCTION

The Famous catfish commonly consumed by people are slender walking catfish (*C. nieuhofii*). This fish is popular because it has a good taste image and has a thick flesh (Muttakin, 2018). *C. nieuhofii* has several local names in Indonesia such as Keli (Kepulauan Bangka Belitung), Limbek (Kampar, Riau), Lembat (Jambi and Sumatra Utara), Kaleh (Kalimantan), and Lindi (Jawa Barat, Jawa Tengah, and Jakarta). In plain English is called slender walking catfish. *C. nieuhofii* commands a higher market price compared to other

Clarias (Pechsiri & Vanichanon, 2016). IUCN data by Ng (2019), *C. nieuhofii* is regarded as 'critically endangered' in Singapore (Lim et al., 2008).

C. nieuhofii is classified as a catfish that is characterized by the dorsal fins and the anus (anal) extending and united with the tail fin, at least on its base. Dorsal fin with 87-106 soft fingers, anal fin 63-93 soft fingers (Kottelat et al., 1993). One type of catfish that is commonly consumed by the community is slender walking catfish (*C. nieuhofii*). This fish is favored by society because it has a good taste image and has a thick flesh (Muttakin, 2018). *C nieuhofii* is widespread in Southeast Asia including in the Malay Peninsula, Indonesia (Java, Sumatra, and Kalimantan), Singapore, Thailand, and the Philippines (Kottelat et al., 1993; Lim et al., 2008; Pechsiri & Vanichanon ,2016).

In Kepulauan Bangka Belitung Province at the local level, only the price of this fish can reach $2.7–3.7/kg (Muttakin, 2018). *C. nieuhofii* price is more expensive when compared to the aquaculture catfish. At the Glugur market in Rantauprapat City, Labuhanbatu Regency, the price of *C. nieuhofii* can reach $ 3.37-4.7/kg. However, *C. nieuhofii* has begun to be difficult to obtain in nature. Based on community information, this is due to land conversion, arrest using toxins, and electrical fish and insecticide in plantation land (Personal Interview, 2020) According to Pechsiri & Vanichanon (2016) population and the density of the walking catfish has decreased significantly over the last two decades, mainly because of over-exploitation, reduction in habitat areas as a result of peat swamp forest reclamation, and unwise insecticide applications in the rice fields.

Based on information from the habitat community *C. nieuhofii* is still found in several locations in Labuhan Batu Selatan Regency (Pasir Putih Village) and Labuhanbatu Regency (Bandar Tinggi Village). But so far it has not been known bioecological conditions. Research related to bioecology of *C. nieuhofii* is still very little in Indonesia, whereas this fish is a genuine germplasm Indonesia.

One important study was about the growth pattern of this fish, remember the information about it is still very rare to find. Hopefully, this research data can be the key information for stakeholders to make the management efforts of the *C. nieuhofii* genetic resources in the study area. The potential genetic power of *C. nieuhofii* needs to be utilized wisely to keep its sustainability intact.

RESEARCH METHODS

Fish sampling was carried out in January, February, and March 2020, so there were three samples taken at each observation station. Observation Station 1 is located in Pasir

Putih Village, Silangkitang District, Labuhan Batu Selatan Regency, and observation Station 2 in Bandar Tinggi Village, Bilah Hulu District, Labuhanbatu Regency. Furthermore, taking the coordinates of the point to make a map of research locations using the Global Positioning System (GPS). Station 1 (1^0 48'23.880 N $99^0$52'30.98 E), is a natural habitat that has been switched into palm oil plantation and Station 2 ($2^0$0'54.29 N $99^0$52'40.68 E), is a natural habitat that has switched function into a bathing tour. The research map can be seen in Figure 1.

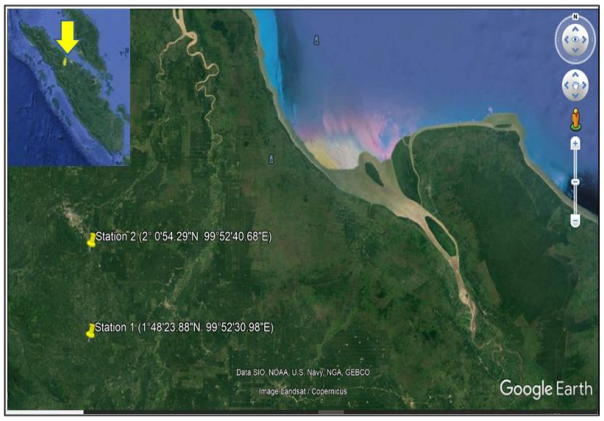


Figure 1. Map of Observation Station

Sampling using fishing rods with worm bait. Fish caught during the day, at 9.00 – 15.00 WIB and night, at 19.00–22.00 WIB. All samples of fish caught in total length measurements by using a standard ruler 30 cm long and for a total weight measured by a scale with 0.01 g accuracy. Growth patterns of fish calculated using the formula (Effendie, 1979):

$$W = aL^b$$

Description: W = total weight (g), L = total length (cm), a and b = constants.

Data of research results created in the form of data tabulation for subsequent processing of data using Microsoft Excel application 2010. The research results are made in exponential curve-shaped graphs.

RESULTS AND DISCUSSION

The number of fish samples caught at Station 1 as many as 25 individuals. *C. nieuhoffii* growth pattern Data analysis results in Pasir Putih Village with value W = 0.69, B = 0.25 and ^{R2} = 0.95 or 95%, which means the data analysis results show highly significant (P>0.05).

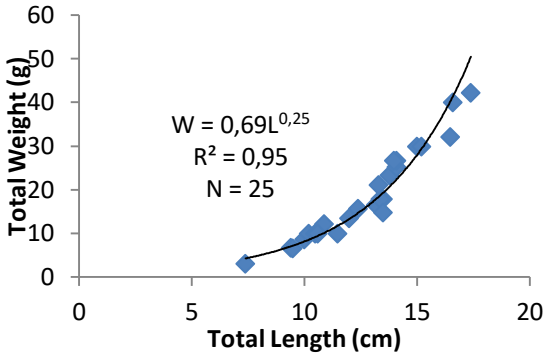


Figure 2. *C. nieuhofii* Growth Pattern in Pasir Putih Village

The number of fish samples caught at Station 2 [c46] as many as 25 individuals. Based on data analysis shows the growth pattern of *C. nieuhofii* in Bandar Tinggi village Value W = 10.21, B =-129.56, and R^2 = 0.97 or 97%, means the data analysis results show highly significant (P>0.05).

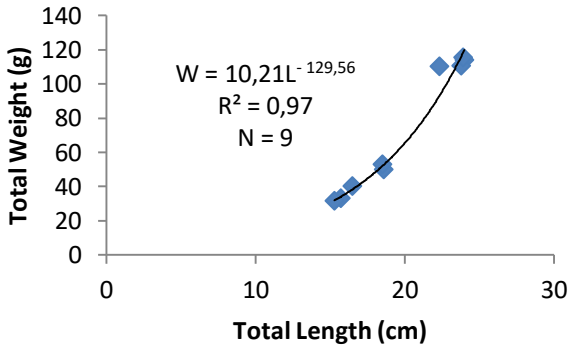


Figure 3. *C. nieuhofii* Growth Pattern in Bandar Tinggi Village

Based on the data analysis result is known that the value b on station 1 (0,25) and station 2 (-129.56). On both observation stations obtained b value of < 3. According to Effendie (1979) if the b value of < 3 indicates the growth pattern is negative allometric. Determination coefficient (R^2) on Station 1 is 0,95, describing the diversity of data by 94.68%, while at Station 2 of 0.97 or 97.11%. The value of R^2 approaching 1 means it has a strong correlation. The R^2 value of Station 1 of 0.95 interpreted that a 94.68% weight increase of C nieuhofii is influenced by total length increase. At Station 2 It was so, the R^2 value obtained by 0.97 or 97.11% of fish weight increase was influenced by total length. The length-weight relationship for the five treatments were 3.3, 3.03, 3.0, 2.9 and 2.7 with corresponding coefficient of determination (R^2) values of 0.8313, 0.9517, 0.9629, 0.9223, and 0.8726. T4 and T5 exhibited a negative allometric growth pattern (Olapade & Conteh, 2019).

According to Santana et al., (2016) standard length Iheringichthys labrosus (Lütken, 1874) varied from 6.0 to 20.5 cm. Growth showed negative allometry for both sexes. Negative allometric growth pattern, where the total length of body size increase faster than the weight increase of fish (Barrata et al., 2019). But when the growth of fish is isometric indicates that there is a balance between the length and weight of fish (Nurhayati et al., 2016; Faizah & Anggawangsa, 2019). The results of the research related to some patterns of fish growth as comparison, can be seen in table 1.

Table 1. Comparative Research Results Based on Variation Value Constants b of Fish Growth Pattern

Species	b Value	Growth pattern	Lacation	References
Gerres oyena	5,436 ♂ 5,291 ♀	Positive allometric	Tondonggeu Waters	Sarfila et al., 2018
Chlorurus strongycephalus	2,5877	Negative allometric	Wakatobi Waters	Patanda & Rahmani, 2018
Labiobarbus ocellatus	3,284 ♂ 3,272 ♀	Isometric	Tulang Bawang River	Yudha et al., 2015

Long and heavy variables in fish growth patterns are known to have strong relationships (Suwarni, 2009). Overexploitation through arrest by fishermen may affect the long-heavy fish (Suruwaky & Gunaisah, 2013). Muchlisin (2010) states that the small value of b is influenced by the behavior of fish, such as active swimming fish shows a lower b value when compared to a passive swimming fish. The different views of growth patterns can be caused by environmental conditions as well as the biological condition of catfish. Another strong suspicion is because of the aquatic conditions capable of supporting the life of fish quite well (Sihaloho *et al*, 2017). The growth pattern of fish as aquatic organisms certainly varies, depending on the environmental conditions and availability of food utilized to support its sustainability and growth (Nikolsky, 1963). In the field of long biological analysis, fisheries are one of the factors that need to be known, because it relates to the management of fishery resources. Fish growth Data can provide information about the production of a type of fish (Sasmito et al., 2016; Sihaloho et al., 2017). Moreover, the long analysis of fish weight is carried out as a biological indicator of the condition of the aquatic ecosystem (Courtney et al., 2014).

CONCLUSION

The pattern of the growth of *C. nieuhofii* in both fields of study is negative allometric, meaning the increase in body length faster than body weight. This indicates that the environment as a living habitat *C. nieuhofii* in a stable condition. Based on the results of

field observations need to know *C. nieuhofii* species is a type of catfish that loves the clear water habitat and pollution-free.

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