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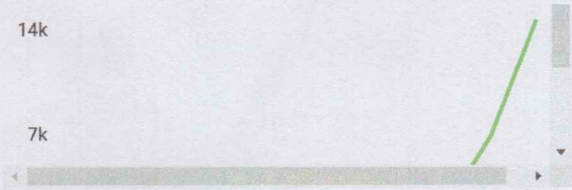

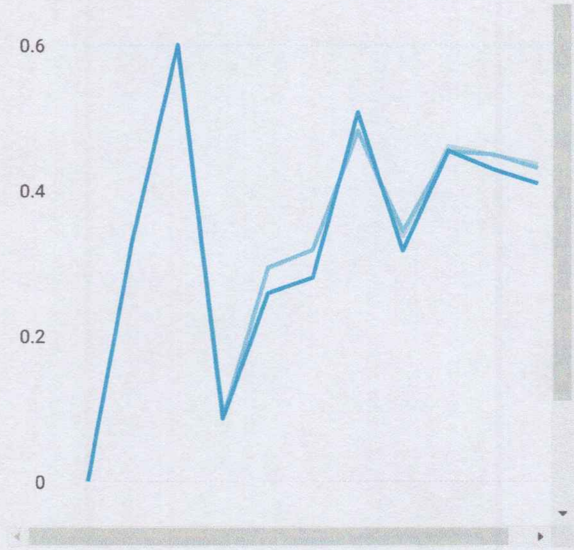

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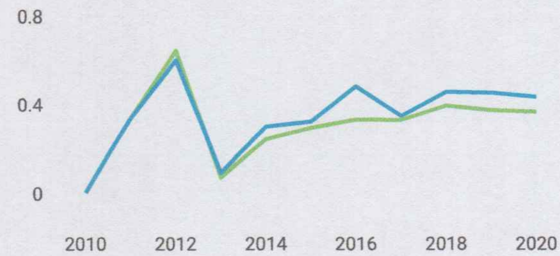

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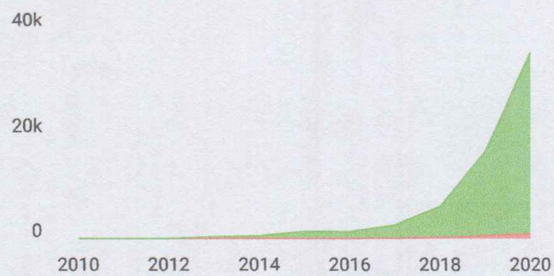

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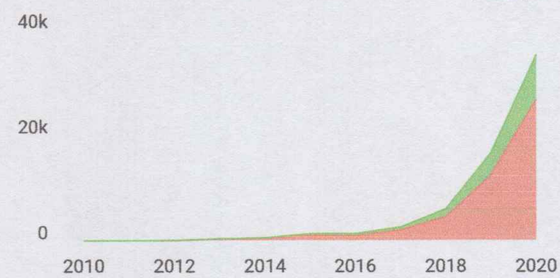

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Reproductive characters of hampala fish (hampala macrolepidota kuhl & Van Hasselt, 1823), correlation with body length

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Reproductive characters of hampala fish (hampala macrolepidota kuhl & Van Hasselt, 1823), correlation with body length

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Abstract. Hampala macrolepidota Kuhl & van Hasselt, 1823, known as Hampala barb or Hampala (Java), have habitat in rivers, lakes and reservoirs. Hampala barb is a member of Cyprinid family, that has an economical value, but it has not been cultivated, its entirely catch from their natural habitat. To anticipate the over need excessive exploitation of domestication efforts. The success of these efforts require a lot of information, one of which is the character of reproduction. This study aims to determine the analysis of multiple characters that include the reproduction of fish trough Gonado Somatic Index (GSI), and fecundity correlated with total length. The research method is survey, fish samples obtained every month, with a simple random sampling technique. The data are carried out by statistical analysis of the correlation between Somatic Gonado Index fund fecundity, with the total length. The results showed that the correlation between IGS male with a body length were positively correlated (r = 0.602), as well as on the female were positively correlated (r = 0.696). Fecundity ranged from 39240-256080 eggs, between fecundity with total length were positively correlated (r = 0.729).

1. Introduction

Hampala macrolepidota Kuhl & van Hasselt, 1823 known locally in Java as the Hampala fish, Ampalong (Saanin, 1984), in Malaysia known as Sebarau (Kamarudin et al., 2011) is a carnivorous fish (Setiadi et al., 1987)). Hampala fish can be found in the Mekong and Chao Phraya, the Malay Peninsula and Indonesia. The most prominent characteristic of this fish is the black stripes on the sides of the body between the dorsal and anal fins (Binohlan, 2011). In Indonesia, hampala fish are found, among other, in Sumatra, namely the Batang Toru River (Roesma et al, 2016) and in rivers in the Harapan Jambi forest (Sukmono et al., 2013. The Hampala genus is represented by five Southeast Asian species. : H. macrolepidota (Valenciennes), H. ampalong (Bleeker), H. bimaculata (Popta), H. lopezi (Herre) and H. dispar (Smith).

H. macrolepidota is a predatory and dominant species at all levels of water depth (Zainudin, 2005) In Central Java, in particular hampala fish can be found in the waters of the Serayu River downstream, namely in Cilacap Regency (Murtiningsih et al., 2009), in the Klawing River which flows in Purbalingga Regency (Suryaningsih et.al., 2018)), in the PB Soedirman Reservoir and in the Serayu River before and after the PB Soedirman Reservoir area (Suryaningsih et al, 2018) as well as in the three tributaries of the Serayu River that flow in Banjarnegara Regency, namely in the Tulis, Mrawu and Kalisapi Rivers (Suryaningsih et. al., 2020).

The hampala fish is a freshwater fish species that is included in the Subfamily Cyprininae and Family Cyprinidae (Kottelat, 2013). The habitat of hampala fish is in rivers, which is an important consumption fish with moderate prices (Kottelat et al., 1993). In several rivers found in Central Java, most of the hampala fish are sold fresh and processed, partly because of their large body size and thick meat. The high demand for hampala fish can cause a decrease in the number and size of fish caught. It is feared that the existence of hampala fish and several economically important fish species will be threatened, even though the hampala fish can be used as an indicator of water quality conditions, considering that these fish are generally only found in rivers or reservoirs where the water quality is still good, because it is very sensitive to the condition of water quality. bad. Since 2013, hampala fish have been included in the IUCN Redlist with a threatening condition.

In order to anticipate over-exploitation, it is necessary to conserve the hampala fish. The success of these efforts requires a lot of information, including about reproductive characters. Several reproductive characters are often used for correlation analysis with body length, one of which is fecundity. Body length is a morphometric character that is commonly used for correlation analysis because the shrinkage of fish body length is very small compared to weight, which can shrink easily (Effendie, 2002). In addition to fecundity, there are reproductive characters that have a correlation (correlation) with body length, namely the Somatic Gonado Index (IGS), Gonad Maturity Level (TKG) as found in brek fish (Suryaningsih et al., 2011). Based on the above, this study aims to determine the correlation analysis between several reproductive characters of hampala fish, including the somatic gonado index (SGI) and fecundity, with body length.

2. Methodology

The materials used were samples of fish caught in the Serayu River and PB reservoir. Sudirman in Banjarnegara, Central Java. This research was conducted by survey method, using simple random sampling technique. Sampling was carried out 6 times with an interval of one month, starting from June to October 2020. The observed variables were IGS and fecundity which were correlated with body length. The body length used is the total length. IGS is calculated according to Effendie (2002), with the formula = [gonad weight: (body weight + gonads)] x 100%. Fecundity was calculated using the Gravimetric method) and was determined on the gonads with TKG III and above.

3. Result and Discussion

3.1 Sex ratio

Sex ratio is the ratio of the number of male fish divided by the number of female fish plus male fish. Sex comparison is useful, among other things, to estimate population balance. The number of hampala fish caught during the study consisted of 33 male fish (56.90%) and 25 female fish (43.10%). The number of fish caught during the study and the sex ratio calculations are presented in Table 1.

Table 1. Sex ratio of Hampala fish (n male =33, n female=25)

Area	Male	Female	Total	Ratio
Reservoir of PB. Sudirman	24	7	31	3.43:1
Upstream	7	8	15	1:1.43
Downstream	2	10	12	1:5
Total/average	33	25	58	1:1.32.

In Table 2, it appears that the sex ratio of caught hampala fish varied in each area during the study. The ideal sex ratio of hampala fish occurs in the upstream area, with a ratio of 1: 1.43. and the total sex ratio was 1: 1.32. The number of male fish is relatively more than that of female fish. In order to maintain the survival of a population, the ratio of male and female fish is expected to be in a balanced condition, or at least more female fish (Sugiharto et al., 2009). The total sex ratio value is 1: 1.43, meaning that it is still close to 1: 1, thus the hampala fish population is still in the ideal category.

3.2 Somatic Gonado Index and its correlation with body length

The Gonado Somatic Index of hampala fish during the study ranged from 0.064 - 13.773 for male hampala fish, while for female fish ranged from 0.71 - 12.22. According to Effendie (2002), in general, the IGS of male fish is smaller than that of female fish, but in the sampala fish the results of the sampling are just the opposite, this is presumably because the number of fish caught is limited. This index value will increase in line with gonad development, and reach the maximum range when spawning will occur. IGS values for male fish that are ready to spawn generally range from 5 - 10%, while for female fish it is between 10 - 25%. When compared with other species of members of the Cyprinidae, namely Caputa caputa umbla, which has the highest IGS of 7.972 ± 1.269 for male fish, and 8.817 ± 0.816 for female fish (Erdogan et al., 2002), then the IGS of hampala fish is high. A high IGS value will produce a high milt volume, so that it has the ability to fertilize more eggs. This is beneficial in terms of reproduction and conservation.

Furthermore, the correlation between the IGS value and the body length of the hampala fish has a positive correlation in male fish, following the equation Y = 16.294X + 0.914 and the closeness of the correlation is quite strong, which can be seen from the correlation coefficient of 0.602. (Figure 1.)

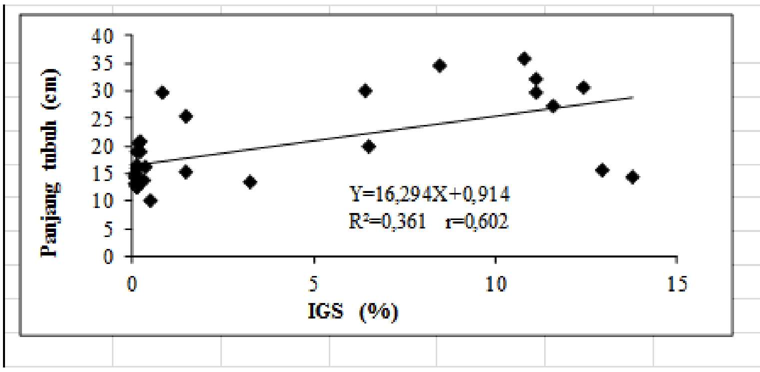

Figure 1. Correlation between body length and GSI of male hampala fish in S. Serayu and PB. Sudirman Reservoir during the research (Juni–October 2020), n = 33

Similarly, in female hampala fish, the relationship of IGS values with body length is positively correlated as is the case in male fish, following the equation Y=0.022X +0.248. The correlation properties are also quite strong as seen from the correlation coefficient of 0.696. In other words, the correlation between IGS values and body length in female hampala fish is quite strong (Figure 2.) However, when compared to male hampala fish the correlation is stronger.

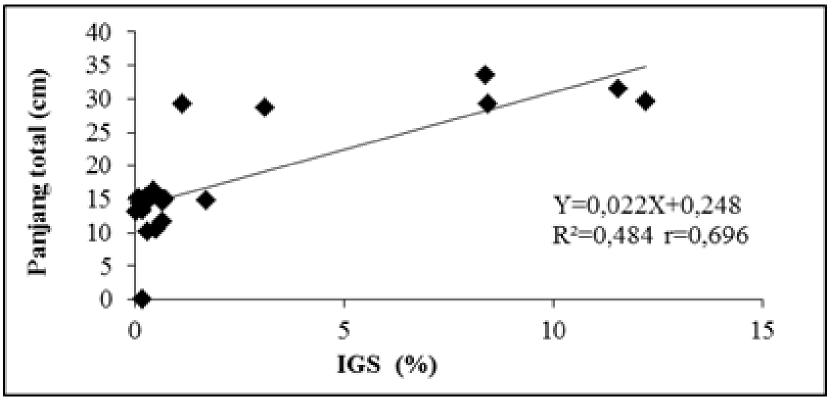

Figure 2. Correlation between body length and GSI of male hampala fish in Serayu River and PB. Sudirman Reservoir during the research (Juni – Oktober 2020), n = 25

3.3 Fecundity and its relation to body length

The observed of fecundity during the study was the number of eggs at Gonad Maturity Level III-IV. The average Gonad maturity level during the study is presented in Table 2.

Table 2. The average Gonad Maturity level during the study

No.	Area	Fecundity
1.	Reservoir of PB. Sudirman	40.792,00 ±10.419,67[c]
2.	Upstream	113.915,00 ± 103.683,07[a]
3.	Downstream	52.344,50 ± 6.436,79[b]

The fecundity of the hampala fish ranges from 39240-256080 eggs. The smallest fecundity was obtained from fish with a body length of 29.3 cm and the greatest fecundity was obtained from fish with a body length of 32.0 cm. The larger number variation was shown by the brek fish population as fellow Cyprinid fish from the Klawing River, Purbalingga Regency (Suryaningsih et al., 2011), with a range of 3222–32794. The fecundity of hampala fish is greater when compared to fellow members of the Cyprinidae family, lalawak fish from the Cimanuk River, West Java with fecundities ranging from 12224-207261 (Rahardjo and Sjafei, 2004) and lelan fish from Lake Singkarak which ranges from 28140-129042 grains (Uslichah and Syandri, 2003).

Fecundity is more often associated with length than with weight, because length has a relatively small reduse, while weight can be reduced easily (Effendie, 2002). According to Helfman et al. (2002), that a larger female fish will produce a larger number of egg cells. Figure 3. shows the relationship between fecundity and body length of brek fish during the study. It can be seen that fecundity with body length has a positive correlation, following the equation Y = 0.509X - 0.271. The correlation is quite close, which can be seen from the large correlation coefficient, which is 0.729. When compared with the Puntius orphoides fish from the Klawing River, Purbalingga Regency with a correlation coefficient value = 0.956, the correlation is less tight (Suryaningsih et al., 2012). Likewise, when compared to sasau / hampala fish from Lake Singkarak with a perfect correlation coefficient of = 1.00, the correlation is also less strong (Uslichah and Syandri, 2003).

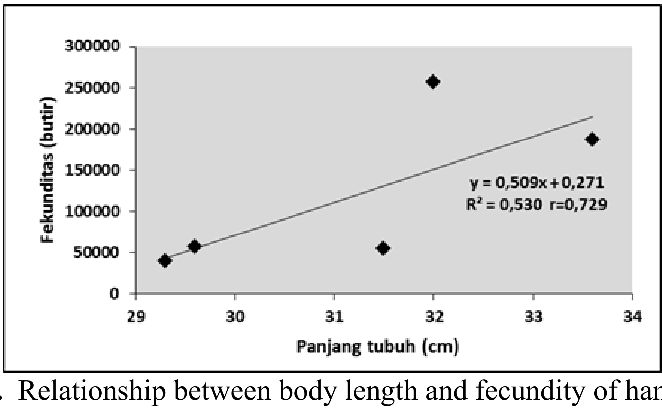

Figure 3. Relationship between body length and fecundity of hampala fish in the Serayu River and PB Reservoir. Sudirman during the research (Juni –October 2020), n = 5

4. Conclusion

a. Somatic Gonado Index with body length of male fish has a positive correlation (r = 0.602), also for female fish has a positive correlation (r = 0.696). The strong correlation, both in male and female fish, can be used as a basis for estimating that the longer the hampala fish, the higher the value of the somatic gonado index.

b. Fecundity ranged from 39,240-256,080 eggs, between fecundity and body length had a positive correlation (r = 0.729). The strong correlation between the body length of the female hampala fish can be used as a basis for supposing that the longer the body, the higher the fecundity value.

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