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(RESEARCH ARTICLE)



Sexual dimorphism, length-weight relationship, and condition factor of *Hampala ampalng* (Bleeker, 1852) from Kalong Floodplain, Ogan Komering Ilir Regency

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Abstract

Sumatra hampala or kebarau fish, *Hampala ampalng* (Bleeker, 1852) is one of the fish species found in Kalong Floodplain in the Ogan Komering Ilir Regency, South Sumatra, Indonesia. This study aimed to determine sexual dimorphism, length-weight relationship and condition factor of *H. ampalng*. The study method used was direct observation with purposive sampling technique. The total fish obtained consisted of 12 male and 12 female. The results showed that almost all morphometric characters of female were longer than male except for head length which determined that male longer than female. The head length of male was 2.28 ± 1.04 while the head length of female was 2.27 ± 0.85 it could be assumed that the sexual dimorphism seen from the difference in head length. While the meristic characteristics there was no difference between male and female; dorsal fin spine and rays (I. 7-8), ventral fin rays (6-8), pectoral fin rays (13), anal fin rays (6-9) and caudal fin rays (18). The length-weight relationship of male obtained a linear regression equation $y = 0.0092x^{3.0418}$ with $R^2 = 89.45\%$, the value of b obtained was 3.0418 which means that the growth pattern of male was isometric ($b=3$), while the linear model regression equation of female fish $y = 0.0238x^{2.6975}$ with $R^2 = 76.74\%$, the value of b obtained was 2.6975 which indicates that the growth pattern of female includes negative allometric ($b<3$). The value of the relative condition factor of male and female were $K>1$ which means the value of fish condition were in good.

Keywords: Floodplain; Growth pattern; *H. ampalng*; Sexual dimorphism

1. Introduction

Floodplains are widely used by the people of South Sumatera to describe seasonally inundated waters. Floodplains are part of freshwater public waters consisting of swamps, lebung, and rivers that naturally provide fish breeding during the high tide and paddy field planting during the low tide season (Muslim, 2012). The area of floodplain in Ogan Komering Ilir Regency is estimated to reach 146.279 ha, or 58.96% of the total floodplain area in South Sumatera (Rosana, 2021). Kalong floodplain, located in Ogan Komering Ilir Regency, South Sumatera Province, Indonesia, has an important role in the lives of local people and also as a habitat for flora and fauna. Its existence plays an essential role in the ecological and economic aspects of the community; ecologically, it functions as a freshwater reservoir and fish habitat, while economically, it plays a role in horticulture, water transportation, fish farming, and fishing activities (Muthmainnah *et al.*, 2012).

Sumatra hampala (*H. ampalng*) is one of the native species in the floodplains of South Sumatera. Generally, this fish has other names in several places in Indonesia, namely: kebarau, barau, sebarau, and barau-barau. *H. ampalng*, belonging to the Cyprinidae family, has an elongated and flat body shape, is scaly and silvery in color on the back and abdomen, and the tail fin is reddish with black longitudinal lines (Kottelat *et al.*, 1993; Samuel and Suryati, 2014). This

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fish is an economically valuable species that is quite commonly found in the open waters of Ogan Komering Ilir Regency. This species is caught by fishermen using traditional fishing gear such as bubu (fish traps), sengirai (fish traps), nets, and kemilar (fish traps). For the processing of this fish to maintain quality and a longer storage time, fishermen generally process it into salted fish or preserve it by fermentation, which local people know as pekasem. *H. ampalong* is one of Indonesia's native species with potential for cultivation (Muslim *et al.*, 2020).

Sexual dimorphism is a biological study in morphology and reproduction that's used as a basic reference to differentiate males and females. Some aspects of observation that could be a basic source of information for knowledge of differences between males and females include morphometric characters, meristics, length-weight relationships, and condition factors to determine fish age. Research related to sexual dimorphism has been widely reported in freshwater and marine fish species (Timahakim *et al.*, 2019; Putra *et al.*, 2023; Garcia and Zuanon, 2019; Sukmaningrum *et al.*, 2019; Abduh *et al.*, 2020; Mainero *et al.*, 2023).

Length-weight relationships and condition factors have an important role in fisheries science studies due to their ability to provide essential knowledge on fish growth, fish welfare conditions, and other data on fish biology (Sajid Khan *et al.*, 2020; Narzary and Khangembam, 2022). The assessment of length-weight relationships is also important for the sustainability of fisheries conservation in aquatic systems (Lawson, 2011) and quite essential in formulating recommendations for aquatic resource management (Ergüden, 2021; Sonowal *et al.*, 2019). Research related to the length-weight relationship and condition factors of *H. ampalong* has been reported by several researchers, such as Zakaria *et al.* (2000) in Kenyir Lake, Malaysia; Hamid *et al.* (2015) in Temengor reservoir; Herawati *et al.* (2022) in Jatigede reservoir, West Java; Makmur *et al.* (2014) in Lake Ranau, Indonesia; Soetignya *et al.* (2016) in Betung Kerihun National Park, West Kalimantan Province, Indonesia; Tesssier *et al.* (2019) in a subtropical reservoir (Lao PDR).

Studies on length-weight relationships and condition factors have been reported by several researchers previously. However, information on sexual dimorphism, length-weight relationship, and condition factor of *H. ampalong* in the Kalong floodplain is not available. This study is important to conduct so that it becomes a source of initial information for the development process of fisheries resource management to maintain species sustainability. The purpose of this research was to obtain accurate fisheries biology data from morphometric analysis, meristics, length-weight relationships, and condition factors of *H. ampalong*. With this research, it is expected to be a reference in the management of sustainable fisheries resources in the Kalong floodplain waters of Ogan Komering Ilir Regency.

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2. Material and methods

2.1. Site and Time

This research was conducted from June to July 2023 in the Kalong floodplain in Ogan Komering Ilir Regency. Determination of sampling points using the purposive sampling technique based on the catch area of local fishermen. Sampling was carried out at three stations: Station 1 (-3°16'33", 104°49'10"), Station 2 (-3°16'1", 104°48'55") and Station 3 (-3°15'39", 104°48'47") (Figure 1). Biometric measurements of fish samples were conducted at the Fisheries Laboratory, Faculty of Fisheries, Universitas Islam Ogan Komering Ilir Kayuagung.

2.2. Samples Collection

Samples of *H. ampalong* were caught using traditional fishing gear used by local fishermen, namely bubu (fish traps), sengirai (fish traps), kemilar (fish traps), and gillnets. A total of 24 specimen were obtained, consisting of 12 females and 12 males. Fish samples that have been obtained are put into plastic, then put into a cool box filled with broken ice blocks. Fish samples were transported to the laboratory for measure length, weight, morphometric characters, and the calculation of meristic characters. Measurement of the length of the sample fish using a caliper (with an accuracy of 0.05 cm) and the weight of the sample fish using digital scales (with an accuracy of 0.01 g).

2.3. Measurement of Morphometric Characters

Measurement of morphometric characters using a caliper with an accuracy of 0.05 mm. A total of 14 morphometric characters were measured, namely TL = total length; SL = standard length; HL = head length; HH = head height; ED = eye diameter; M-DF = mouth to dorsal fin distance; M-PF = mouth to pectoral fin distance; PFL = pectoral fin length; BD = body depth; VFL = ventral fin length; DFL = dorsal fin length; V-AF = ventral to anal fin distance; WBC = width base caudal; CFL = caudal fin length (Figure 2).

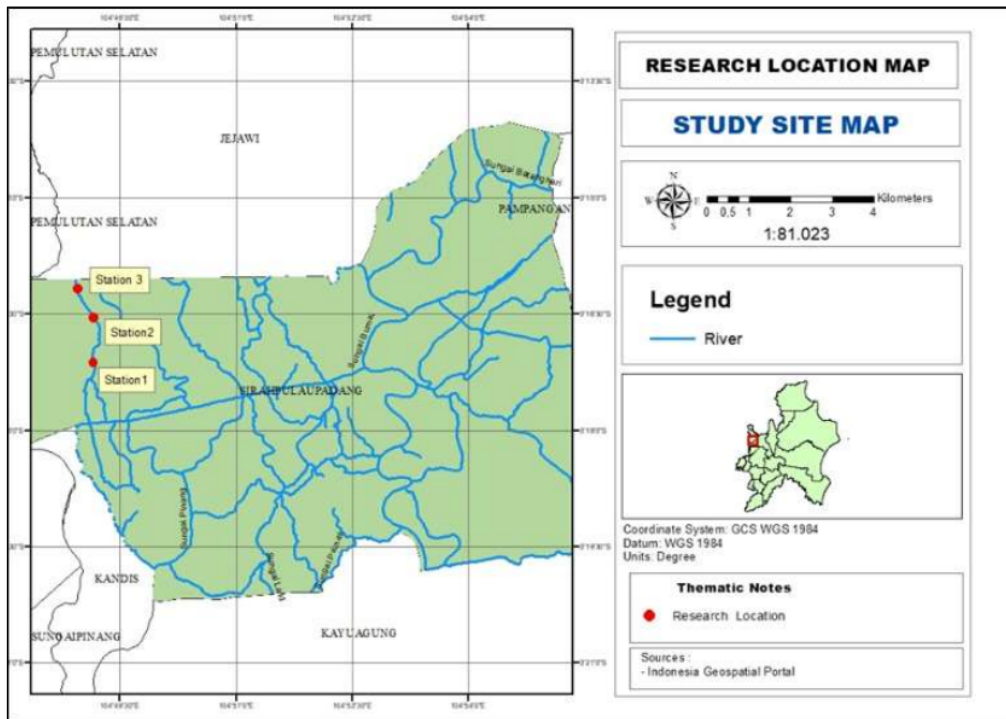


Figure 1 Sampling site of Hampala (*Hampala ampalong*, Bleeker 1852) in the Kalong Floodplain, Ogan Komering Ilir Regency, South Sumatra, Indonesia

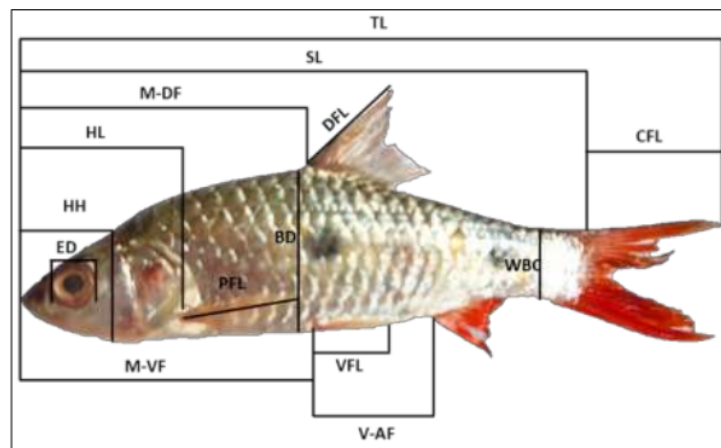


Figure 2 Morphometric characters measurement of *Hampala ampalong* (Bleeker, 1852). TL = total length; SL = standard length; HL = head length; HH = head height; ED = eye diameter; M-DF = mouth to dorsal fin distance; M-VF = mouth to ventral fin distance; PFL = pectoral fin length; BD = body depth; VFL = ventral fin length; DFL = dorsal fin length; V-AF = ventral to anal fin distance; WBC = width base caudal; CFL = caudal fin length

2.4. Calculation of Character Meristic

The meristic characters of *H. ampalong* calculated in this study include the number of spines and rays on the dorsal fin (D), ventral fin (V), pectoral fin (P), anal fin (A), and caudal fin (C).

2.5. Length-Weight Relationship

Length-weight relationships were calculated using the equation; $W=aL^b$ (Pathak *et al.*, 2022), where W is weight of samples (g), L is total length of samples (cm), a and b are constant values. When $b=3$, it indicates isometric growth; $b<3$ indicates negative allometric growth, and when $b>3$, growth is positive allometric. The parameters 'a', 'b' and coefficient of determination (R^2) were estimated at 95% confidence level. All the data of length and weight were log transformed for ensuing least square linear regression with the weight as dependent variable and the parameters 'a' and 'b' were estimated by the linear regression on the transformed equation; $\text{Log } W = \text{Log } a + b \text{ Log } L$.

$$\text{Log } a = \frac{\sum \log W \times \sum (\log L^2) - \sum \log L \times \sum (\log L \times \log W)}{n \times \sum (\log L^2) - (\sum \log L)^2}$$
$$b = \frac{\sum \log W - (n \times \text{Log } a)}{\sum \log L}$$

2.6. Relative Condition Factor

The relative condition factor (Kr) is defined for each fish by the ratio between its observed mass and its calculated theoretical mass: $Kr = W / a L^b$ (Ouahb *et al.*, 2021). For each fish, the Kr value places it on the length-weight curve established for the sample. If $Kr > 1$, the fish has a mass superior to the average mass of individuals of its size. If $Kr < 1$, its mass is smaller than the average mass. $Kr \geq 1$ refers to the good growth condition and well-being of the fish compared to an average individual of the same length (Pathak *et al.*, 2022).

2.7. Statistical Analysis

The data documentation and all statistical analyses presented in the study were performed using Microsoft Excel 2013 software under the Windows operating system. The coefficient of determination (R^2) determined during regression is a measure of linear regression's prediction quality, and a value close to 1 indicates a better model.

3. Results and discussion

3.1. Morphometric characteristics

The results of this study have successfully measured 14 morphometric characters of *H. ampalong*. The results of morphometric character measurements are presented in Table 1.

The study of sexual dimorphism of *H. ampalong* in the Kalong Floodplain is not yet available, and this study could provide the latest information on the determination of sexual dimorphism of *H. ampalong*. Sexual dimorphism is particularly important in biodiversity assessment, fisheries biology, fish biometry knowledge, and sex determination (Bahuguna *et al.*, 2010). Morphologically, there are almost no morphometric and meristic differences between males and females; both have a silvery color on the body; the dorsal, ventral, and pectoral have a light silvery color; the anal tail is reddish; and the tail has a bright reddish color. The most attractive part of this fish is that there is a fairly wide black spot in the middle of the body and near the base of the tail. The similarity of black spots on the part of the body of *H. ampalong* is also found in other species of *Hampala* sp., as reported by Herawati *et al.* (2023) from Jatigede Reservoir, Sumedang, West Java, Indonesia. On the other hand, the sexual differences in morphological dimorphism listed in Table 1 showed that nearly all morphometric characters of females are longer than males except for head length. Hence, sexual dimorphism in *H. ampalong* can be recognized in head length. These results illustrate that, morphologically, males are smaller than females. The associated research that stated the sexual dimorphism of males was smaller than females has been reported by Bahuguna *et al.* (2010) in the cyprinidae fish *Puntius ticto* (Hamilton-Buchanan) from Kumaun Himalaya and Pramono *et al.* (2019) in *Mystus singaringan* from Klawing River in Central Java, Indonesia.

Table 1 Morphometric characteristics of *H. ampalong* (Bleeker, 1852) from Kalong Floodplain, Ogan Komering Ilir, South Sumatra, Indonesia

Morfometric characters	Male		Character/TL (%)	Female		Character/TL (%)
	Range (cm)	AVG±SD		Range (cm)	AVG±SD	
TL	10.6-17.5	13.52±2.26	-	10.6-23	16.18±3.61	-
SL	8.4-14	10.98±1.75	79.63	8-18	12.78±2.82	79.06
HL	1.2-4.2	2.28±1.04	16.18	1.5-4.5	2.27±0.85	14.32
HH	2.4-3.7	2.92±0.45	21.50	2.1-5.6	3.60±1.05	22.23
ED	0.5-0.9	0.73±0.11	5.42	0.6-1.1	0.84±0.15	5.30
BD	0.5-3.6	2.48±1.05	17.58	0.3-4.7	2.93±1.34	17.49
PFL	1.5-2.2	1.80±0.22	13.14	1.5-3.3	2.15±0.52	13.34
CFL	2.2-3.8	3.03±0.47	21.96	2.4-5.6	3.59±1.00	22.09
WBC	1.1-1.8	1.41±0.20	10.25	1.1-2.7	1.67±0.45	10.30
DFL	1.6-2.5	2.08±0.32	15.45	1.3-3.5	2.52±0.61	15.71
VFL	1.4-2.4	1.96±0.31	14.31	1.6-3.00	2.29±0.41	14.36
V-AF	1.8-3.4	2.57±0.48	18.61	1.6-4.00	2.93±0.69	18.06
M-PF	4.3-7.2	5.72±0.84	41.51	4.2-9.4	6.68±1.52	41.31
M-DF	4.5-7.5	5.80±0.81	42.22	4.4-8.6	6.70±1.28	41.76

3.2. Meristic Characteristics

The results of meristic observations and calculations including the number of spines and rays on the dorsal fin (D), ventral fin (V), pectoral fin (P), anal fin (A), and caudal fin (C) are shown in Table 2.

Table 2 showed that all the fin rays of males and females have the same number, so it can be concluded that the body length of males and females does not affect the number of fin rays. The results of the calculation of meristic characters can be concluded to show that there are no differences in sexual dimorphism observed from the meristic aspects.

Table 2 Meristic characters of *H. ampalong* (Bleeker, 1852) from Kalong floodplain, Ogan Komering Ilir, South Sumatra, Indonesia

Meristic characters	Male	Female
Number of spine and ray of the dorsal fin (D)	D. I. 7-8	D. I. 7-8
Number of rays of the ventral fin (V)	V. 6-8	V. 6-8
Number of rays of the pectoral fin (P)	P. 13	P. 13
Number of rays of the anal fin (A)	A. 6-9	A. 6-9
Number of rays of the caudal fin (C)	C. 18	C. 18

3.3. Length-weight relationship

Analysis of the length-weight relationship of males obtained a linear model regression with the equation $y = 0.0092x^{3.0418}$, while the linear model regression equation of females was $y = 0.0238x^{2.6975}$. Based on the coefficient of determination (R^2), the relationship between length and weight of males shows a high correlation, assuming that 89.45% of weight growth is influenced by length growth, while in females the relationship between length and weight shows a high correlation of 76.74%, which means that the addition of fish weight is also influenced by the addition of fish length. Meanwhile, the results of the growth pattern analysis of males show an isometric growth pattern, which is

the same length growth pattern as the weight growth pattern. While the results of the analysis of the growth pattern of females have a negative allometric growth pattern, which is faster length growth than weight growth (Figure 3).

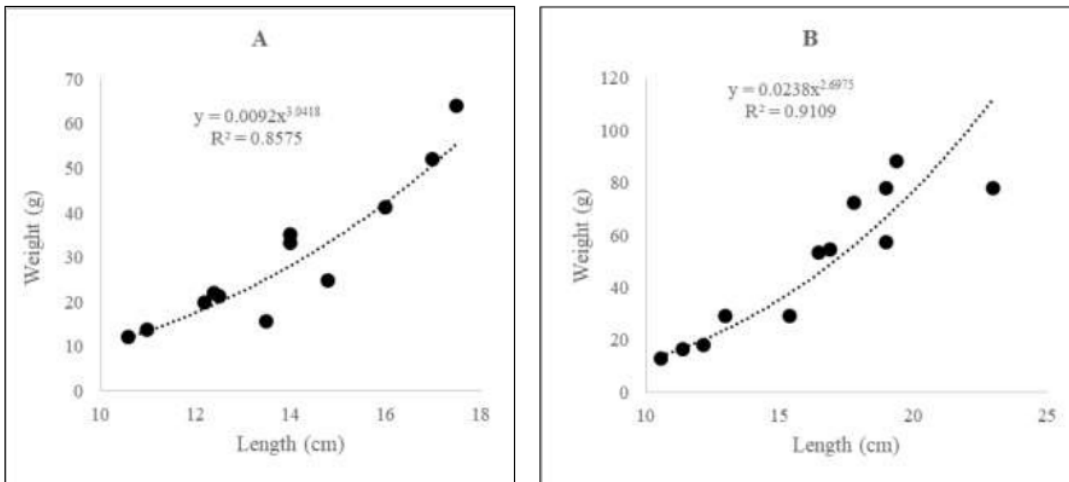


Figure 3 Length-weight relationship of *Hampala ampalong* (Bleeker, 1852) from Kalong Floodplain, Ogan Komering Ilir (A = male, B = female)

Information related to the length-weight relationship of *H. ampalong* is still limited, so this research could be a baseline reference in fisheries management or further research. Length-weight relationship analysis is needed in fisheries management to determine the size of fish in a population as well as conservation efforts, describe the physiological conditions of fish such as body shape, and determine growth patterns (Muslim *et al.*, 2022). The results of the regression analysis in Figure 3 indicate that there are differences in growth patterns between male and female. Male have a coefficient value of $b = 3.041$ which means that the growth pattern of male fish has an isometric pattern ($b = 3$) so that it can be interpreted that length growth is equal to weight growth. These results have been reported by Samuel and Nuryati (2014), who explained that the growth pattern of barau fish (*Hampala macrolepidota* Kuhl & van Hasselt 192) in Lake Kerinci Jambi is isometric. While the value of the coefficient b in female fish is 2.697, which means that the growth pattern of female fish has a negative allometric pattern ($b < 3$). Similar results have also been reported by Zakaria *et al.* (2000), who showed the growth pattern of sebarau fish (*H. macrolepidota*) in Lake Kenyir, Malaysia, is negative allometric with a coefficient b of 2.8. Risdawati *et al.* (2020) reported that the growth pattern of *Hampala macrolepidota* in Lake Singkarak, West Sumatra, Indonesia, is negative allometric and found in both males and females. Several factors that influence the difference include fish age, size, food availability, competitors, and aquatic environmental factors (Muslim *et al.*, 2022).

3.4. Relative condition factor

The condition factor describes the status of fish, which is expressed in numeric terms based on length and weight data. Condition factors for males and females are displayed in Table 3.

Table 3 Relative condition factors of *H. ampalong* (Bleeker, 1852) from Kalong Floodplain, Ogan Komering Ilir, South Sumatra, Indonesia

Sex	Relative condition factor (K _r)	
	Range	Mean
Male	0.617 – 1.241	1.015
Female	0.768 – 1.377	1.075

The results showed that, on average, the relative condition factor value of male and female fish was > 1 . Fish development is categorized as good if the $K > 1$, so it can be concluded that the development of male and female fish in

the waters is still in good condition. The condition factor value was obtained from the length-weight relationship of fish and has a relationship with growth patterns. The negative allometric growth pattern explains that the fattiness of the fish is not too large; this is related to the fact that the value of the female condition factor is higher than the value of the male condition factor; these results indicate that females are fatter than males (Timahakim *et al.*, 2019). There are several factors that influence, among others, the condition of the aquatic environment. The availability of food and competitors in obtaining food in the population also affect the level of fattiness and condition factors of fish (Manik, 2009; Bhatt *et al.*, 2021; Jisr *et al.*, 2018).

4. Conclusion

Sexual dimorphism of *H. ampalng* could be viewed from morphometric characters of head length; males longer than females. The growth pattern of males has an isometric growth pattern ($b = 3$), while females have a negative allometric growth pattern ($b = 3$). The relative condition factor of male and female fish has a $K > 1$, which implies that the development of fish in the water is in good condition.

1 Compliance with ethical standards

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Disclosure of conflict of interest

The authors declared that there is no any conflict of interest for publishing this article.

References

- [1] Abduh MY, Norazmi-Lokman, N. H., Syahnon, M., Roslan, G. A. G., Ismail, N. H and Abol-Munafi, A. B. Sexual dimorphism of Malaysian Mahseer, *Tor tambroides* broodstock reared in captivity: Morphometric measurements dataset. *Data in Brief*. 2020; 33, 106557.
- [2] Bahuguna P, Kumar S, Kumar R, Joshi HK and Verma R. Studies on sexual dimorphism in the cyprinidae fish *Puntius ticto* (Hamilton-Buchanan) from Kumaun Himalaya, India. *International Journal for Environmental Rehabilitation and Conservation*. 2010;1(2):88-93.
- [3] Bhatt DM, Sarma KJ, Thakkar NJ and Mankodi PC. Length-weight relationship and condition factor of *Rhinomugil corsula* (Hamilton, 1822) (Actinopterygii, Mugiliformes, Mugilidae) in four major estuaries of Gujarat, India. *Journal of Fisheries and Environment*. 2021; 45(3):53-63.
- [4] Ergüden SA. Length-weight relationships and condition factor of *Garra turcica* Karaman, 1971 from Asi River Basin, Turkey. *Natural and Engineering Sciences*. 2021; 6(2): 102-111.
- [5] Garcia EQ and Zuanon J. Sexual dimorphism in the electric knifefish, *Gymnorhamphichthys rondoni* (Rhamphichthyidae: Gymnotiformes). *Acta Amaz*. 2019; 49(3):213-220.
- [6] Hamid M, Mansor M and Mohd Nor SA. Length-weight relationship and condition factor of fish populations in Temengor Reservoir: Indication of environmental health. *Sains Malaysiana*. 2015; 44(1):61-66.
- [7] Herawati T, Untung M, Agung K, Yustiati A, Suwartapradja S. Characteristics of meristics ,morphometrics , and analysis of cytochrome oxidase gen fragmen subunit 1 (CO1) *Hampala Barb (Hampala sp.)* from Jatigede Reservoir, Sumedang, West Java, Indonesia. *Journal of Survey in Fisheries Sciences*. 2023; 10(1):2396-2406.
- [8] Herawati T, Yustiati A and Nurhayatia A. Growth patterns and reproduction of *Hampala Barb (Hampala macrolepidota)* Kuhl and Van Hasselt 1823 in Jatigede Reservoir, West Java Indonesia. *Indones J Limnol*. 2022; 3(2):66-75.
- [9] Jisr N, Younes G, Sukhn C, El-Dakdouki MH. Length-weight relationships and relative condition factor of fish inhabiting the marine area of the Eastern Mediterranean city, Tripoli-Lebanon. *Egypt J Aquat Res*. 2018; 44(4):299-305.
- [10] Junaidi E, Indriani DP and Yusma M. Species diversity of swamp fish in Kuro Village, Pampangan Sub-district, Ogan Komering Ilir Regency, South Sumatra. *Sriwijaya Bioscientia*. 2021; (2):3.

- [11] Kottelat MJA, Whitten, N. Kartikasari S, Wiryoatmojo. Freshwater Fishes of Western Indonesia and Sulawesi. Periplus Edition and EMDI Project Indonesia, Jakarta. 1993; 221 p.
- [12] Lawson EO. Length-weight relationships and fecundity estimates in mud-skipper, *Periophthalmus papilio* (Bloch and Schneider, 1801) caught from the mangrove swamps of Lagos Lagoon, Nigeria. Journal of Fisheries and Aquatic Science. 2011; 6, 264-271.
- [13] Makmur S., Arfiati D, Bintoro G and Ekawati AW. Food habit of hampala (*Hampala macrolepidota* Kuhl & Van Hasselt 1823) and its position in food web, food pyramid and population equilibrium of Ranau Lake, Indonesia. J Bio Env Sci. 2014; (6):167–177.
- [14] Mainero., H. A, Al-Jufaili SM, Jawad L and Reichenbacher B. Sex dimorphism and evidence of sexually selected traits: A case study on the killifish *Aphaniops stoliczkanus* (Day, 1872). Acta Zool. 2023; 104(3):473–487. DOI:10.1111/azo.12436.
- [15] Manik N. Length weight relationship and condition factors of laying (*Decapterus russelli*) in Likupan Bay Waters, North Sulawesi. Jurnal Oseanologi dan Limnologi Indonesia. 2009; 35(1):65-74.
- [16] Muslim M, Wardani WW, Sahusilawane HA, Oktarina S, Rifai R, and Heltonika B. Length-weight relationship and environmental parameters of Indonesian leaffish (*Pristolepis grootii*, Bleeker 1852) in Kelekar River, South Sumatera, Indonesia. Int J Progress Sci Technol. 2022; 31(1):110–117.
- [17] Muslim M. Perikanan rawa lebak lebung Sumatera Selatan. Palembang. 2012. Unsri Press.
- [18] Muslim M, Heltonika B, Sahusilawane HA, Wardani WW, dan Rifai R. Ikan lokal perairan tawar Indonesia yang prospektif dibudidayakan. Purwokerto. 2020. Pena Persada.
- [19] Muthmainnah D, Dahlan Z, Susanto RH, Gaffar AK and Priadi DP. Utilization of Lowlands Swamp for Rice Field in Accordance with Fisheries and Animal Husbandry (Case Study in Pampangan, South Sumatra Province, Indonesia). Proceeding of International Workshop on Sustainable Management of Lowland for Rice Production. Indonesian Agency for Agricultural Research and Development. 2012; 307-314.
- [20] Narzary B and Khangembam BK. A study on the length-weight relationship and condition factor of five small indigenous fish species of Sareswar Beel in lower Assam, Northeast India. Iran. J. Ichthyol. 2022; 9:204–212.
- [21] Ouahb S, Bousseba M, Ferraj L, Moujtahid AEL and Hasnaoui M. Length-weight relationship and relative condition factor of *Micropterus salmoides* (Lacépède, 1802), *Cyprinus carpio* (Linnaeus, 1758) and *Oreochromis niloticus* (Linnaeus, 1758) caught in the Al-Massira Dam Lake. E3S Web of Conferences. 2021; 314, 01005.
- [22] Pathak AK., Kantharajan, G., Dayal, R., Kumar, R., Saini, V. P., Mohindra, V and Lal, K. K. Length-weight relationships and relative condition factor of fish species dwelling in the inland saline river Luni, India, with a note on the associated risks and encounters obstructing the fish diversity and ecosystem services. Indian Journal of Fisheries. 2022; 69(4), 59–64.
- [23] Pramono TB, Arfiati D, Widodo MS, Yanuhar UUN. Sexual dimorphism in morphometric characters of *Mystus singaringan* from Klawing River in Central Java, Indonesia: Strategic instruction for conservation development. Biodiversitas. 2019; 20(4):1133–1139.
- [24] Putra PR and Taufiq MN. Sexual dimorphism and length-weight relationships of eel (*Anguilla* spp.). J Mar Res. 2023; 12(2):283–292.
- [25] Rosana D. OKI Regency's wetland auction contributes 7.1 billion to PAD. <https://sumsel.antaraneews.com/berita/599329/lelang-rawa-lebak-kabupaten-OKI-sumbang-pad-rp71-miliar>. Cited 27 August 2023.
- [26] Risdawati R., Dahelmi D, Nurdin J, Syandri H. Bioecological aspects of *Hampala macrolepidota* in Lake Singkarak, West Sumatera, Indonesia. AACL Bioflux. 2020; 13(2):893–901
- [27] Sajid Khan M., Hayat S, Ishtiaq A, Malik A, Akhtar MN, Zaman Khan G, Khan ZI and Ali Q. Length-Weight relationships of *Cyprinus carpio* from the Indus River at Chashma Lake, District Mianwali, Punjab, Pakistan. J Wildl Biodivers. 2020; 4(4):72–80.
- [28] Samuel and Nuryati NK. Population parameters of barau fish (*Hampala macrolepidota* kuhl & van hasselt 1923) in Kerinci Lake, Jambi. J. Lit. Perikan. Ind. 2014; (20):4 191-198.
- [29] Soetignya WP., Suryobroto B, Kamal MM and Boediono A. Sex ratio, size structure and fecundity in *Hampala bimaculata* (Cyprinidae) from Betung Kerihun National Park, West Kalimantan Province, Indonesia. AACL Bioflux. 2016; 9(3):713–721.

- [30] Sukmaningrum S., Suryaningsih S, Nurhaeni A. Sexual dimorphism characterization of splendid threadfin (*Philimanus perplexa* Feltes, 1991). IOP Conf Ser Earth Environ Sci. 2020; 550(1).
- [31] Sonowal N., Nayak, N. Dohutia, S. Borah, R. Biswas, S.P. Length-weight relationship of fingerlings of *Channa stewartii* (Family: Channidae) reared under captive condition. Journal of Bioresources. 2019; 6(2): 80-84.
- [32] Tessier A., Beaune D, Guillard J, Kue K, Cottet M, Chanudet V, Descloux S, Panfili J. Life history traits and exploitation of Hampala barb (*Hampala macrolepidota* - Cyprinidae) in a subtropical reservoir (Lao PDR). Cybium. 2019; 43(4):351–365.
- [33] Timahakim RD, Supratman O and Utami E. Sexual dimorphism and growth rate of emperor fish wick are landed in Pelabuhan Perikanan Nusantara (PPN) Sungailiat, Bangka Regency. Aquatic science. 2019; 1:21–31.
- [34] Zakaria MZ., K.C.A Jalal, Ambak, MA. Length weight relationship and relative condition factor of sebarau, *Hampala macrolepidota* (Van Hasselt) in Kenyir Lake, Malaysia. Pakistan J Biol Sci. 2000; 3(5):721–724. DOI: 10.3923/pjbs.2000.721.724.

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