



Research Article

STUDIES ON THE LENGTH-WEIGHT RELATIONSHIPS AND CONDITION FACTORS OF MYSTUS CAVASIUS, GULSHA TENGRA FROM TANGUAR HAOR IN GREATER SYLHET REGION

Estiak Ahmad¹, Md. Jahidul Islam¹ and Md. Moslem Uddin²

¹Department of Aquatic Resource Management, Sylhet Agricultural University, Sylhet-3100, Bangladesh

²Department of Aquaculture, Sylhet Agricultural University, Sylhet-3100, Bangladesh

Article info

Article history

Received: 05.10.2025

Accepted: 22.12.2025

Published: 31.12.2025

Keywords

Mystus cavasius;
Length-weight
relationship (LWR);
Condition factor (K);
Small indigenous fish
(SIS); Tanguar Haor;
Freshwater fisheries

*Corresponding author

Md. Jahidul Islam

E-mail:

mjislam.arm@sau.ac.bd

Abstract

The present study focused on investigating the Length-Weight Relationships (LWRs) and condition factors of *Mystus cavasius* species in Tanguar Haor, Bangladesh, over a time frame from November 2022 to June 2023. A total of 800 *Mystus cavasius* specimens were collected using a variety of equipment and nets with the assistance of local fishermen. The length of each fish was measured in centimeters (cm) using a digital slide caliper, while their body weight was determined in g by using a digital balance. The analysis revealed significant differences in the LWR parameters such as rate of change of weight with length (a), weight at unit length (b), condition factor (k), and the co-efficient of correlation (r²), across different months. The maximum value of parameter a (intercept) for *M. cavasius* was observed in June 2023, reaching 4.4106, whereas the lowest a value occurred in May 2023 of 0.5605. Similarly, the maximum b value of 1.4463 was recorded in May 2023, while the lowest b value of 0.6155 was observed in December 2022. The condition factor (k) exhibited its peak value in March 2023 (0.8400), followed by a subsequent increase to 1.0221 in May 2023. Regarding the coefficient of correlation (r²), the highest value of 0.9531 was documented in December 2022, indicating a strong relationship between length and weight. Conversely, the lowest r² value of 0.8563 was observed in May 2023, suggesting a relatively weaker correlation during that period. These findings provide valuable insights into the length-weight relationships and condition factors of *M. cavasius* in Tanguar Haor, such information is crucial for understanding the growth and overall well-being of this species in the study area, thereby facilitating effective fisheries management and conservation efforts.

Copyright ©2024 by authors and SAURES. This work is licensed under the creative Commons attribution International License (CC-BY-NC 4.0)

Introduction

Freshwater, a vital and ever-changing resource, holds a precarious position in sustaining life on our planet, and its increasing scarcity demands urgent attention. Throughout history, civilizations have been drawn to freshwater ecosystems, particularly river systems; however, intense and persistent human influence has left only a few rivers relatively unaltered (Malmqvist & Rundle, 2002). The importance of aquatic ecology is deeply embedded within economic systems, especially in Bangladesh, where the fisheries sector plays an exceptionally promising role. Fish cultivation in ponds using mixed polyculture techniques provides an accessible pathway for sectoral expansion (Jena et al., 2008). The inseparable connection between fish and Bangladeshi culture, cuisine, and economy is captured in the well-known saying “Macchee Bhatee Bangali,” meaning fish and rice make a Bengali. Bangladesh is endowed with extensive and rich fisheries

Cite This Article

Ahmed E, Islam MJ and Uddin MM. 2025. Studies On the Length-Weight Relationships and Condition Factors of *Mystus Cavasius*, Gulsha Tengra from Tanguar Haor in Greater Sylhet Region. J. Sylhet Agril. Univ. 12(2): 105-116, 2025. <https://doi.org/10.3329/jsau.v12i2.87852>

resources, supporting remarkable freshwater biodiversity that includes approximately 260 indigenous bony fish species belonging to 145 genera and 55 families, a testament to the country's biological wealth (Hossain, 2010a; 2010b).

The length-weight relationship is a fundamental concept in fisheries science that provides critical insights into fish growth, condition, and overall population health (He et al., 2023). This quantitative relationship describes how fish length corresponds to body weight and is essential for fisheries management, stock assessment, and conservation planning (Ji et al., 2022). Length-weight relationships vary among species and can be influenced by sex, age, habitat, season, and nutritional status (Chandran et al., 2023). Sexual dimorphism often results in differences between males and females, while age affects growth patterns, with younger fish typically displaying different relationships compared to older individuals. Environmental factors such as temperature, food availability, and water quality further influence fish growth and condition, leading to variability in length-weight relationships (Sanaye et al., 2017). Seasonal changes in feeding intensity and reproductive activity also affect fish weight and condition (Irigoyen-Arredondo et al., 2023). Practically, length-weight relationships allow for weight estimation when direct measurements are impractical, particularly in large-scale population assessments (Froese et al., 2014). They are also used to calculate condition factors, which reflect fish well-being and nutritional status (Özvarol, 2014; Hossain, 2010a), and to estimate biomass and abundance in stock assessment models essential for sustainable fisheries management (Hossain et al., 2009). Understanding these relationships enables informed management decisions, including size regulations and harvest quotas, to ensure long-term sustainability (Roos et al., 2003).

Condition factors are widely used indices that assess the general health, growth performance, and reproductive potential of fish populations by relating body weight to length or size (Imam et al., 2021). These indices are influenced by food availability, habitat quality, and physiological condition (Pan et al., 2018). Evaluating condition factors of *Mystus cavasius* in Tanguar Haor is therefore important for assessing species fitness and understanding broader ecological dynamics of the wetland ecosystem (Xia et al., 2022). *Mystus cavasius*, commonly known as the Gangetic mystus or Indian river catfish, is a small indigenous species of the family Bagridae native to rivers and freshwater bodies of the Indian subcontinent (Gupta, 2014). It has an elongated, slender, slightly compressed body, usually reaching 20–25 cm in length, although some individuals may grow up to 35 cm. Its coloration ranges from grey to olive-brown with a lighter underside, and it possesses long barbels around the mouth that aid in environmental sensing and food detection (Rahman et al., 2004). The species is widely distributed across major river systems such as the Ganges, Brahmaputra, Mahanadi, and Godavari, as well as lakes and reservoirs in India, Bangladesh, Nepal, and Myanmar (Karim et al., 2022). It is tolerant of low-oxygen conditions and variable water quality (Hossen et al., 2014), primarily nocturnal, solitary, and bottom-dwelling, feeding on small invertebrates including insects, crustaceans, and worms (Ashashree et al., 2013; Krishna, 2007). Although its breeding behavior remains poorly documented, it is believed to be an egg-scattering species, with fertilized eggs developing independently (Chaturvedi & Saksena, 2013). The species is commonly harvested using traditional fishing methods and serves as an important food source for local communities (Santoshsing & Gupta, 2007).

Tanguar Haor, located in the Sunamganj district of northeastern Bangladesh, is bordered by Tahirpur, Golapganj, and Dharmapasha upazilas and is fed by tributaries of the Surma River (Sultana et al., 2022). Renowned for its rich biodiversity, the wetland supports a wide array of aquatic and terrestrial flora and fauna and is considered one of the largest inland fish sanctuaries in the country (Bhuiyan et al., 2020). More than 200 fish species inhabit Tanguar Haor, including both indigenous and migratory species such as *Mystus cavasius*, *Clarias batrachus*, *Anabas testudineus*, and several carp and snakehead species (Ahmed, 2013).

The haor also provides critical habitat for over 200 resident and migratory bird species, serving as a breeding, wintering, and stopover site of high ecological significance (Hussain, 2021). Diverse aquatic vegetation, including floating plants like water hyacinth, water lily, and lotus, as well as submerged species such as *Hydrilla* and *Vallisneria*, supports fish and other aquatic organisms (Islam et al., 2014). Recognized as a Ramsar Site, Tanguar Haor is globally important and plays a key role in sustaining local livelihoods through fishing, agriculture, and tourism; however, unsustainable fishing practices, habitat degradation, and pollution continue to threaten its ecological integrity (Mamun et al., 2013). To address these challenges, various conservation initiatives have been implemented, including the establishment of fish sanctuaries, enforcement of fishing regulations, promotion of sustainable practices, and community awareness programs, led by government bodies, non-governmental organizations, and international agencies (Mustafi et al., 2022; Pandit et al., 2023). Within this ecological and socio-economic context, the present study aims to analyze the length-weight relationships (LWRs) of *Mystus cavasius* to contribute to a better understanding of its growth patterns and support informed conservation and management strategies for Tanguar Haor.

Materials and Methods

Fish Sample Collection

A total of 800 *M. cavasius* were collected from Tanguar Haor, including nearby beels (Patlai Beel, Ghoniar Kuri, Haroar Doba, Borodop, Ghashi Gang, and Boner Beel) and villages (Introphur, Birendronoghor, Ratanphur, Ramsinghophur, and Vabhaniphur), using various equipment and nets with the assistance of local fishermen. The collected specimens were placed in polybags filled with water to ensure their survival and well-being during transportation. The length of each specimen was measured in centimeters using a digital slide caliper, and body weight was measured in grams using a balance. Field data such as latitude and longitude were recorded at each sampling site using a Global Positioning System.

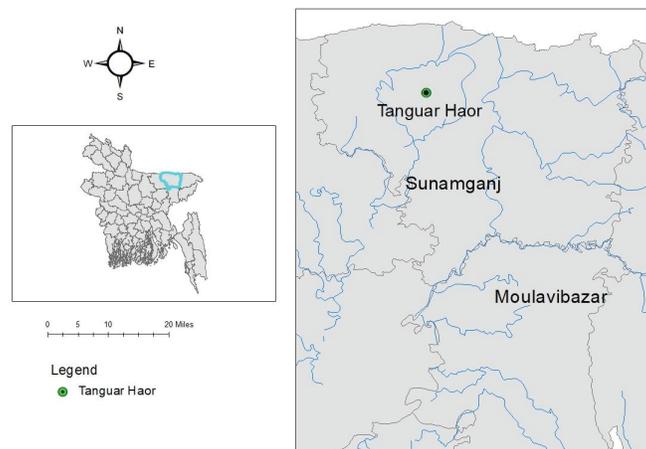


Figure 1. Study area *Tanguar haor*.

Morphometric Analysis

For taxonomic and morphometric analyses, all collected species were identified based on morphometric examination and external morphological traits. Slide calipers and measuring tapes were used to determine different length measurements. Identification of fish genera and species followed the references of Conway et al. (2009) and Siddiqui et al. (2007). To ensure accuracy, data were cross-referenced with reports from other researchers and personnel familiar with the same or related taxa.

Length-Weight Measurement

Individuals' standard length (SL) and total length (TL) were accurately measured using a digital slide caliper (Mitutoyo, CD-6" CSX) with a precision of 0.1 mm. TL was determined by measuring from the snout's tip to the posterior end of the caudal fin, while SL was measured from the snout's tip to the base of the caudal fin. The body weight (BW) of everyone was measured using a digital balance (AND FSH, Korea) with an accuracy of 0.01 g. All measurements were conducted irrespective of the individuals' sex and recorded in a Microsoft Excel spreadsheet for data analysis.

Length- weight relationship statistical analysis

The (LWRs) was analyzed by using the equation below:

Linear Regression Analysis

$W = aL^b$ (Pauly, 1983).

Where,

W= weight of fish in gram (gm). L= Total length of fish in (cm).

a = describe the rate of change of weight with length (intercept).

b = weight at unit length (slope).

b = 3 (isometric growth).

b \neq 3 (allometric growth).

These parameters of a and b was used to calculate the 95% CI (confidence interval) (Froese, 2000). The degree of the well-being of fish in their habitat, also known as the condition factor, was calculated using the following equation:

Condition factor

Fulton's condition factor (k) was calculated everyone using the equations given by Fulton's (1904).

$$K = BW / (TL)^3 \times 100$$

Where, BW=Mean body weight (g) TL= Mean Total length (cm)

The collected data were analyzed statistically using MS Excel Spreadsheet 2021.

Results

The condition factor (*k*), *a*, *b* and Co-efficient of correlation (*r*²) of the LWR of *M. cavasius* species of Tanguar haor, Bangladesh is shown on (Table 1). All these parameters were significantly different from each other at different months. *a* value 4.4106 of *M. cavasius* was maximum at the month of June 2023 while the lowest *a* value was observed in the month of May 2023 with the value of 0.5605. *b* value 1.4463 of *M. cavasius* was maximum at the month of May 2023 while the lowest *b* value was observed in the month of December 2022 with the value of 0.6155. Condition factor (*k*) was seen maximum during the time of March 2023 with the value of 0.8400 and was documented with its peak value of *k*=1.0221 in the month of May 2023. The Coefficient of correlation *r*² in this experiment was observed higher 0.9531 in the month of December 2022 on the other hand, *r*² was seen lowest with its value 0.8563 during the time of May 2023. All calculated data and variables with each month were illustrated in the (Table 1).

Table 1. Documentation of analytical data and calculated variables of LWRs of *M. cavasius*

SL No	Sampling months	No of Samples	Mean weight(g)	Mean Total Length(cm)	a	b	Condition Factors(K)	r^2
01.	NOVEMBER-2022	100	15.5	11.65	2.43	0.73	1.002	0.90
02.	DECEMBER-2022	100	16.15	12.2	3.51	0.61	1.001	0.95
03.	JANUARY-2023	100	12.95	20.99	1.06	1.22	1.010	0.91
04.	FEBRUARY-2023	100	13.55	23.19	0.56	1.44	1.007	0.90
05.	MARCH-2023	100	14.57	26.09	1.35	1.14	0.84	0.92
06.	APRIL-2023	100	12.35	18.69	1.61	1.08	1.016	0.92
07.	MAY-2023	100	12.15	17.49	0.75	1.34	1.022	0.92
08.	JUNE-2023	100	24	13.05	4.41	0.65	1.002	0.91

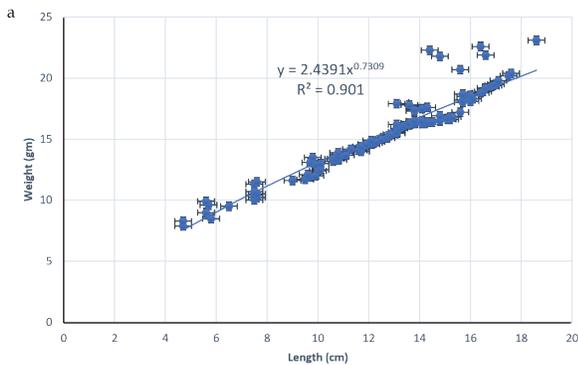


Figure 2. Co-efficient of correlation (r^2) between length and weight of *M. cavasius* in November 2022.

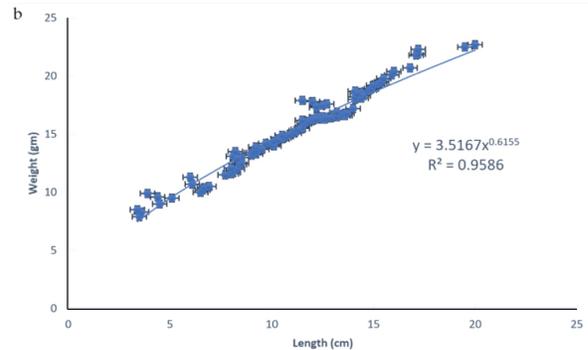


Figure 3. Co-efficient of correlation (r^2) between length and weight of *M. cavasius* in December 2022.

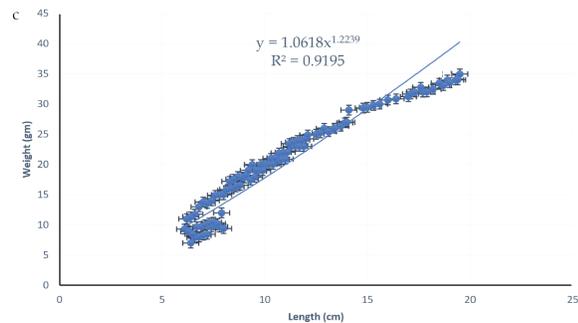


Figure 4. Co-efficient of correlation (r^2) between length and weight of *M. cavasius* in January 2023.

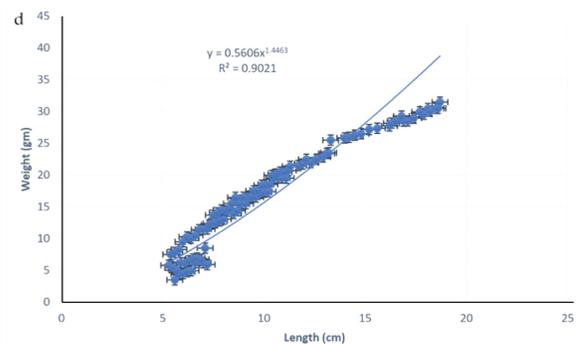


Figure 5. Co-efficient of correlation (r^2) between length and weight of *M. cavasius* in February 2023.

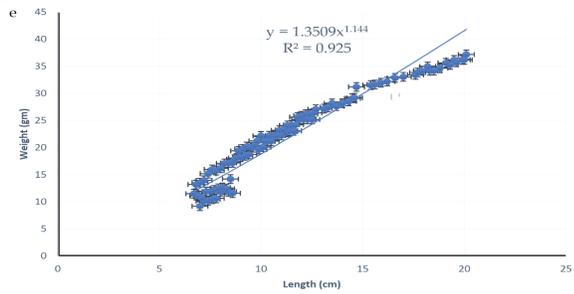


Figure 6. Co-efficient of correlation (r^2) between length and weight of *M. cavasius* in March 2023.

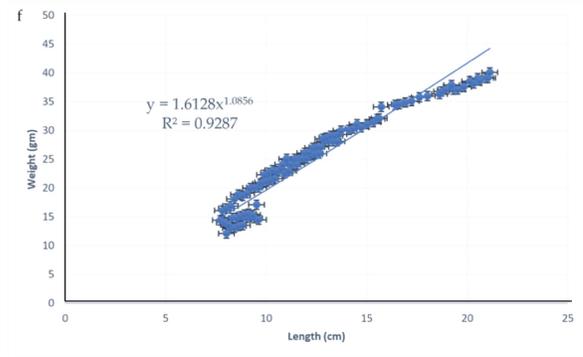


Figure 7. Co-efficient of correlation (r^2) between length and weight of *M. cavasius* in April 2023.

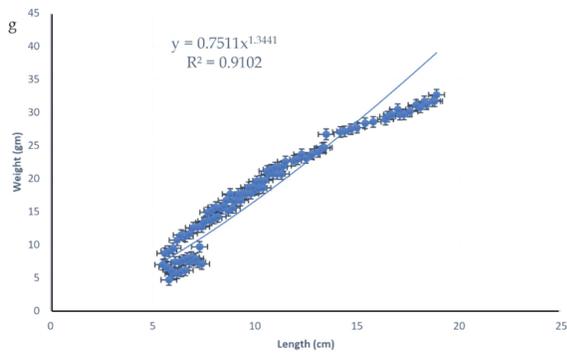


Figure 8. Co-efficient of correlation (r^2) between length and weight of *M. cavasius* in May 2023.

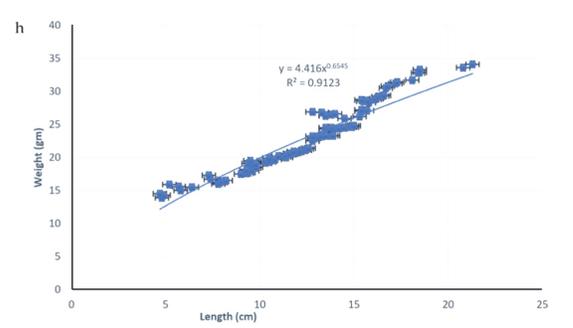


Figure 9. Co-efficient of correlation (r^2) between length and weight of *M. cavasius* in June 2023.

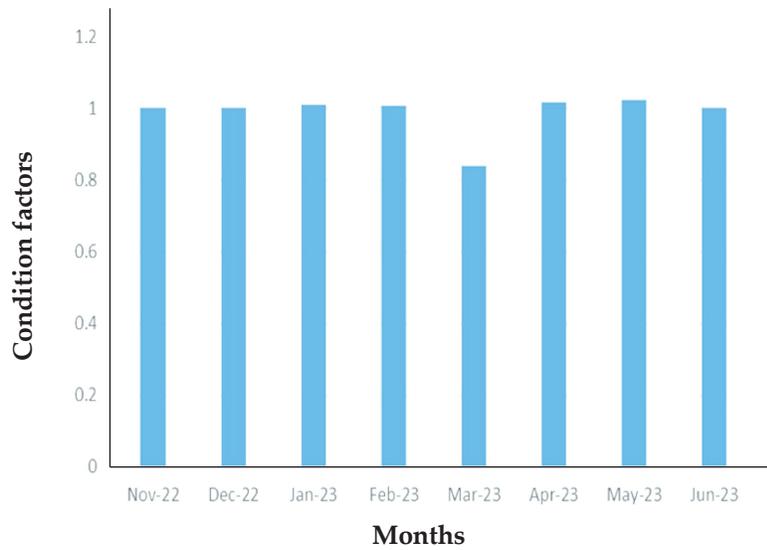


Figure 10. Condition factors between length and weight.

Discussion

During this study period, specimens of *M. cavasius* of the Bagridae family were collected from the Tanguar haor, Bangladesh. Descriptive statistics on the LWRs measurements and results of other regression analyses are shown in (Table 1).

Throughout the predefined timeframe (November 2022 to June 2023), the fish samples were diligently combined at irregular intervals, forming a captivating mosaic of data for this study. Above experimental findings cover the modified info on the LWRs of Gulsha tengra (*M. cavasius*). This analysis of LWRs are the first data from the Tanguar haor, Sylhet area on *M. cavasius*. *a* and *b* parameters for this species have been updated against ongoing environmental and ecological changes of this popular waterbody. The allometric coefficient *a* (intercept) was close to the allometric growth value ($b = 1.4463$; May 2023) in *M. cavasius*, respectively, although it suggested negative allometric growth in *M. vittatus* ($b < 3.00$), whilst the lowest allometric growth observed in *M. cavasius* ($b = 0.6155$; December 2022). Similar results of different species on *b* value showed the enigmatic '*b*' parameter of the red mullet revealed its humble nature, bowing lower than its counterparts from the illustrious Sea of Marmara (Bok et al., 2011) and the captivating Aegean Sea (Cicek et al., 2006). Yet, with a gentle rise, it surpassed the echoes from the Mediterranean Sea (Sangun et al., 2007), marking a modest elevation in its measured prowess. In the realm of this comprehensive study, the values of parameters '*a*' and '*b*' for the illustrious quartet of species resided comfortably within the boundaries delineated by Froese (2006).

Nevertheless, these enigmatic parameters exhibited substantial variations among the species, unveiling the unique signatures of each. Notably, the esteemed *S. bacaila* boasted a higher estimated '*b*' value when compared to the captivating exploration conducted by Ahamed et al. (2018) along the enchanting Payra River.

Within the tapestry of the present study, the calculated '*b*' value of the length-weight relationships (LWRs) unfurled a captivating tale. *M. vittatus* gracefully embarked upon a journey of negative allometric growth ($b < 3.00$), while *L. guntea*, adorned with isometric growth ($b = 3.00$), showcased a harmonious equilibrium. Interestingly, Hossain et al. (2009b) reported isometric growth for both *M. vittatus* and *L. guntea*, as witnessed in the enchanting Ganges of Bangladesh. As the narrative continued, the tale of *M. pancalus* unfolded with an isometric flourish ($b = 3.00$) within the LWRs. However, the chronicles scribed by Narejo et al. (2003) spoke of negative allometric growth ($b < 3.00$) resonating from the captivating realm of Mymensingh, Bangladesh. Previous studies have shown that the '*b*' value in functional regression is connected to how fish body proportions change as they grow (Froese, 2006; Froese et al., 2014). For teleost species, it is generally expected that the '*b*' value falls between 2.5 and 3.5 (Froese, 2006). In a typical study, the length-weight relationships of four fish species were observed and recorded through field sampling, marking the first empirical records of their kind. Interestingly, the '*b*' values obtained in this study differ from the estimates derived from Bayesian Models in FishBase (Froese et al., 2014; Froese & Pauly, 2021). These variations could be attributed to different factors, either a single factor or a combination of factors. Some possible factors include the number of specimens examined, how full their stomachs were, their overall health status, and the general condition of the fish (Froese, 2006; Sani et al., 2010; Wootton, 2012). To gain a deeper understanding of these differences, further studies are needed to explore the relative contributions of these factors to the variations observed in the '*b*' parameter. This ongoing research will shed more light on the intricate interplay between these factors and their impact on the '*b*' value. In the realm of fisheries, areas abundant in productivity often exhibit '*b*' values surpassing 3, while regions with lower productivity tend to showcase '*b*' values below 3. This correlation between productivity and '*b*' values unveils a compelling

pattern, where higher-productivity areas foster fish populations with a propensity for exponential growth, while lower productivity areas nurture species exhibiting more restrained growth dynamics (Wang et al., 2020). The insightful works of Ezenwaji (2004) have shed light on the reproductive patterns of *Clarias spp.* dwelling within the captivating of Anambra River basin. They have revealed that these species undergo significant gonadal development during this period, preparing themselves for the forthcoming spawning season. Consequently, the condition factor, denoted as ' k ,' assumes a vital role as an invaluable indicator for monitoring various aspects of their lives. It serves as a compass, guiding us in gauging food availability, identifying breeding seasons, assessing growth patterns, unraveling physiological states, evaluating relative robustness, and gaining insight into the overall well-being of populations. Multiple factors contribute to the observed variations in the LWRs. These factors encompass both environmental aspects, such as seasonal changes, habitat types, and geographic regions, as well as biological components, including population dynamics, gonadal maturity, sex, growth stages, dietary habits, level of stomach fullness, overall health, and general condition of the fish (Xia et al., 2016; Zhang et al., 2017; Zhu et al., 2015). However, it is important to note that the present study did not incorporate these factors into its analysis. While recognizing their potential influence on LWR, they were not specifically considered within the scope of this research endeavor.

The Fulton's condition factors (k) varied monthly showing different pattern for *M. cavasius* (table 1). Monthly condition factor (k) ranged from 0.840 (Mar-2023) to 1.022 (May-2023) respectively from November 2022 to June 2023. The observed indicators indicate a positive state of wellbeing for the species under examination. Various elements influence the growth and overall condition of fish, encompassing factors such as reproductive cycles, food availability, habitat quality, and environmental conditions (Morato et al., 2001). Elevated k values during warmer periods could be attributed to an increase in the feeding intensity of the fish species under investigation. This rise in k may be associated with greater availability of food or heightened feeding activity when temperatures are optimal (De Giosa et al., 2014).

Additionally, it is well established that fish typically reduce their feeding activity and rely on their lipid reserves during spawning, leading to a decline in their condition (Lizama & Ambrósio, 2002). Since the spawning of *M. cavasius* commonly occurs at the onset of the cold period, the decrease in feeding activity during this time could also explain the lower k values observed. It is important to note that the analysis did not consider gut fullness, as previous studies have indicated that it is unlikely to be directly linked to the condition factor (Hanjavanit et al., 2013).

The report on *O. niloticus* indicates that the recorded b values were lower compared to the findings of Haruna (2006), Nyaku et al. (2008), and Bala et al. (2009). The k factor of *O. niloticus* exhibited its highest value during the wet season (2.44) and the lowest during the dry season (2.1). Although it was higher than the results obtained in the studies of Olurin & Aderigbe (2006), it fell below the ideal range of 2.9-4.8 suggested for normal growth and nutrient utilization in freshwater fish. In terms of growth performance, *T. zilli* showed relatively improved results. The maximum b values of 2.5 and 1.53 were recorded for the wet and dry seasons, respectively, with an annual maximum of 2.5. However, these values were comparatively lower than those obtained in the studies by Haruna (2006) and Bala et al. (2009). The k factor for *T. zilli* was 2.63 during the dry season and 3.4 during the wet season, indicating a higher value during the wet season that fell comfortably within the ideal range. However, the result of the dry season was outside the range recommended for ideal growth in freshwater fish. Generally, the K factor of *T. zilli* was higher than that recorded in the study by Bala et al. (2009), but lower than that of Anene (2005).

For *H. bimaculatus*, the b values were 1.52 and 2.0 during the dry and wet seasons, respectively, indicating a relatively increased value from the former to the latter. These b values were below 3, suggesting a negative allometric growth of the sampled fish. Although the b value during the wet season barely fell within the range obtained in the study by Haruna (2006).

Conclusion

In conclusion, the study focused on the length-weight relationships and condition factor of *Mystus cavasius* from the Tanguar Haor in Sylhet. The length-weight relationship analysis revealed a significant positive correlation between the total length and weight of *M. cavasius* individuals. This study concluded that Eight monthly variation of length-weight relationships and condition factors of *M. cavasius* were determined. The lowest value of condition factor was found during the month of March 2023 and highest value was found during the month of May 2023. Furthermore, the condition factor analysis provided insights into the health and well-being of *M. cavasius* individuals in Tanguar Haor. Overall, this study contributes to the understanding of the biology of *M. cavasius* in Tanguar Haor, Sylhet. The length-weight relationship and condition factor analysis provide valuable information for fisheries management and conservation efforts. Future research can build upon these findings to investigate other aspects of *M. cavasius* biology, such as reproductive behavior, diet composition, and habitat preferences, to further enhance our understanding of this species and promote its sustainable management.

References

- Ahamed F, Saha N, Nishat MA, Biswas MK, Sultana M, Khatun MS and Ohtomi J. 2018. Length-weight and length-length relationships of three indigenous fishes from the Payra River, southern Bangladesh. *Journal of Applied Ichthyology* 34(3):777–779.
- Ahmed M. 2013. Review status of existing sanctuaries and design and demonstration of a site of an advanced fish sanctuary in Tanguar Haor. TARA. Report submitted to IUCN Bangladesh under CBSMTH Project. p. 19.
- Anene A. 2005. Condition factor of four cichlid species of a man-made lake in Imo State, south-eastern Nigeria. *Turkish Journal of Fisheries and Aquatic Sciences* 5:43–47.
- Ashashree HM, Venkateshwarlu M and Sayeswara HA. 2013. Seasonal changes of protein in the tissues of male catfish *Mystus cavasius* (Ham.) in Bhadra Reservoir, Karnataka, India.
- Bala U, Lawal I, Bolorunduro PI, Oniye SJ, Abdullahi SA and Bichi AH. 2009. Study of ichthyofauna of Daberam Reservoir in Katsina State. *BAJOPAS* 2(2):172–174.
- Bhuiyan MAH, Kowser A, Islam SS, Islam MR, Mohid M, Kakoly SA and Khondker M. 2020. Phytoplankton in relation to water quality of Tanguar Haor ecosystem, Bangladesh: II. Watch Tower Station. *Dhaka University Journal of Biological Sciences* 29(1):9–18.
- Bok TD, Gokturk D, Kahraman AE, Alicli TZ, Acun T and Ates C. 2011. Length-weight relationships of 34 fish species from the Sea of Marmara, Turkey. *Journal of Animal and Veterinary Advances* 10(23):3037–3042.
- Chandran R, Singh RK, Singh A, Ganesan K, Thangappan AKT, Lal KK and Mohindra V. 2023. Evaluating the influence of environmental variables on the length-weight relationship and prediction modelling in flathead grey mullet, *Mugil cephalus* Linnaeus, 1758. *Peer J* 11:e14884.
- Chaturvedi J and Saksena DN. 2013. Diet composition, feeding intensity, gastro-somatic index and hepato-somatic index of a catfish, *Mystus cavasius* from Chambal River, Morena, Madhya Pradesh. *International Journal of Recent Scientific Research* 4:1350–1356.
- Cicek E, Avsar D, Yeldan H and Ozutok M. 2006. Length-weight relationships for 31 teleost fishes caught by bottom trawl net in the Babadillimani Bight (northeastern Mediterranean). *Journal of Applied Ichthyology* 22(4):290–292.

Ahmed et al. (2025)

- Conway KW, Mayden RL and Tang KL. 2009. *Devario anomalus*, a new species of freshwater fish from Bangladesh (Ostariophysii: Cyprinidae). *Zootaxa* 2136:49–58.
- De Giosa M, Czerniejewski P and Rybczyk A. 2014. Seasonal changes in condition factor and weight-length relationship of invasive *Carassius gibelio* (Bloch, 1782) from Leszczyńskie Lakeland, Poland. *Advanced Zoology* 2(7):7–8.
- Ezenwaji HMG. 2004. Length-weight relationships of fishes from Anambra River, south-western Nigeria. *Animal Research International* 1(1):1–6.
- Froese R. 2006. Cube law, condition factor and weight-length relationships: history, meta-analysis and recommendations. *Journal of Applied Ichthyology* 22(4):241–253.
- Froese R and Pauly D. 2021. FishBase. World wide web electronic publication, version 06/2021.
- Froese R, Thorson JT and Reyes RB. 2014. A Bayesian approach for estimating length-weight relationships in fishes. *Journal of Applied Ichthyology* 30(1):78–85.
- Gupta S. 2014. A review on *Mystus cavasius*, a popular food fish of the Indian subcontinent. *International Journal of Fauna and Biological Studies* 1(6):27–31.
- Hanjavanit C, Buromra S and Sangpradu N. 2013. Length-weight relationships, condition factors and gut contents of *Syncrossus helodes* (Sauvage, 1876) and *Yasuhikotakia modesta* (Bleeker, 1864) from the Mekong River, Muang District, Nong Khai Province, northeastern Thailand. *African Journal of Agricultural Research* 8:5508–5517.
- Haruna MA. 2006. Length-weight relationship of four fish species (Cichlidae) from Magaga Lake, Kano, Nigeria. *BEST Journal* 3(3):109–111.
- He J, Wu Z, Huang L, Li Y, Sun Y, Wang D and He A. 2023. Length-weight relationships of twenty-nine native fish species from Hongshui River, southern China. *Journal of Applied Ichthyology* 34(4):997–998.
- Hossain MY. 2010b. Morphometric relationships of length-weight and length-length of four cyprinid small indigenous fish species from the Padma River (NW Bangladesh). *Turkish Journal of Fisheries and Aquatic Sciences* 10(1):131–134.
- Hossain MY. 2010a. Length-weight, length-length relationships and condition factor of three Schilbid catfishes from the Padma River, northwestern Bangladesh. *Asian Fisheries Science* 23:329–339.
- Hossain MY, Jasmine S, Ibrahim AHM, Ahmed ZF, Rahman MM and Ohtomi J. 2009. Length-weight and length-length relationships of 10 small fish species from the Ganges, Bangladesh. *Journal of Applied Ichthyology* 25(1):117–119.
- Hossain MY, Ohtomi J and Ahmed ZF. 2009b. Morphometric and meristic characteristics and conservation of the threatened fish *Puntius sarana* (Hamilton, 1822) in the Ganges River, northwestern Bangladesh. *Turkish Journal of Fisheries and Aquatic Sciences* 9(2).
- Hossen MS, Reza AHMM, Rakhi SF, Takahashi K and Hossain Z. 2014. Effect of phospholipids in broodstock diets on serum calcium level, gamete quality and spawning of threatened bagrid catfish gulsha *Mystus cavasius*. *International Journal of Research in Fisheries and Aquaculture* 4(2):70–76.
- Hussain MG. 2021. Biological diversity status of fish genetic resources at Tanguar Haor wetland in Bangladesh. *Bangladesh Marine Journal* 5(1):193–206.
- Imam TS, Bala U, Balarabe ML and Oyeyi TI. 2021. Length-weight relationship and condition factor of four fish species from Wasai Reservoir in Kano, Nigeria. *African Journal of General Agriculture* 6(3).

- Irigoyen-Arredondo MS, Moreno-Sánchez XG, Marín-Enríquez E, Ayala-Galaz JM, Ortiz-Oyola DS, Valenzuela-Quiñonez F and Olivier D. 2023. Length-weight relationship of 20 cryptobenthic fish in coral and rocky reefs in the Gulf of California, Mexico. *Journal of Applied Ichthyology* 2023.
- Islam MS, Hossain MS, Hoque ME, Tusher TR and Kabir MH. 2014. Study on natural resource management in relation with socio-economic status at Tanguar Haor in Sunamganj District of Bangladesh. *Bangladesh Journal of Environmental Science* 26:59–66.
- Jena JK, Das PC, Kar S and Singh TK. 2008. Olive barb *Puntius sarana* (Hamilton) is a potential candidate species for introduction into the grow-out carp polyculture system. *Aquaculture* 280:154–157.
- Ji S, Ding L and Tao J. 2022. Length-weight relationships of four indigenous fish species from the Nujiang River, China. *Journal of Applied Ichthyology* 38(6):567–569.
- Karim MA, Rohani MF, Hasan AM, Farhad FB, Alam MM, Khalil SMI and Islam SM. 2022. Health status monitoring of *Mystus cavasius* through histological aberrations of liver and kidney due to deterioration of water physico-chemical parameters in the Surma River. *Environmental Chemistry and Ecotoxicology* 4:148–154.
- Krishna Rao DS. 2007. Biology of the catfish *Mystus cavasius* (Ham.) in the Hemavathi Reservoir (Cauvery River system, Karnataka). *Journal of Inland Fisheries Society of India* 39(1):35–39.
- Lizama MLLAP and Ambrosio AM. 2002. Condition factor in nine species of fish of the Characidae family in the upper Paraná River floodplain, Brazil. *Brazilian Journal of Biology* 62:113–124.
- Malmqvist B and Rundle S. 2002. Threats to the running water ecosystems of the world. *Environmental Conservation* 29(2):134–153.
- Mamun SA, Roy S, Rahaman MS, Jahan M and Islam MS. 2013. Status of fisheries resources and water quality of Tanguar Haor. *Journal of Environmental Science and Natural Resources* 6(1):103–106.
- Morato T, Afonso P, Lourinho P, Barreiros JP, Santos RS and Nash RDM. 2001. Length-weight relationships for 21 coastal fish species of the Azores, north-eastern Atlantic. *Fisheries Research* 50(3):297–302.
- Mustafi SK, Kunda M, Khan AF, Mazumder SK and Pandit D. 2022. Conserving nutrient-rich small indigenous species of fish in the wetlands of north-eastern Bangladesh. *Aquaculture, Aquarium, Conservation and Legislation* 15(4):2238–2252.
- Narejo NT, Rahmatullah SM and Rashid MM. 2003. Length-weight relationship and relative condition factor of freshwater spiny eel *Mastacembelus armatus* (Lacepede) from Mymensingh, Bangladesh. *Indian Journal of Fisheries* 50(1):81–87.
- Nyaku RE, Okayi RG, Yem IY and Abdulrahman M. 2008. Length-weight relationship and condition factors of three fish species in the Benue River, Nigeria. *BEST Journal* 5(3):204–206.
- Olurin KB and Aderibigbe OA. 2006. Length-weight relationship and condition factor of pond-reared juvenile *Oreochromis niloticus*. *World Journal of Zoology* 1(2):82–85.
- Özvarol Y. 2014. Length-weight relationships of 14 fish species from the Gulf of Antalya (northeastern Mediterranean Sea, Turkey). *Turkish Journal of Zoology* 38(3):342–346.
- Pan L, Peng Z, Shao D, Yang T, Wang Z, Zeng Z and Shi X. 2018. Length-weight relationships of four fish species from the Yellow River, China. *Journal of Applied Ichthyology* 34(4):1094–1096.
- Pandit D, Shefat SHT and Kunda M. 2023. Fish diversity decline threatens small-scale fisheries in the Haor Basin of Bangladesh. *Small in Scale Big in Contributions*. p. 268.

- Rahman MR, Rahman MA, Khan MN and Hussain MG. 2004. Observation on the embryonic and larval development of silurid catfish gulsha (*Mystus cavasius*). Pakistan Journal of Biological Sciences 7(6):1070–1075.
- Roos N, Islam MM and Thilsted SH. 2003. Small indigenous fish species in Bangladesh: contribution to vitamin A, calcium and iron intakes. Journal of Nutrition 133(11):4021S–4026S.
- Sanaye SV, Rivonker CU, Sreepada RA, Ansari ZA, Murugan A and Ramkumar B. 2017. Weight-length relationship and Fulton's condition factor of the alligator pipefish *Syngnathoides biaculeatus* (Bloch, 1785) from the southeast coast of India. Current Science 112:1605–1609.
- Sangun L, Akamca E and Akar M. 2007. Weight-length relationships for 39 fish species from the north-eastern Mediterranean coast of Turkey. Turkish Journal of Fisheries and Aquatic Sciences 7(1).
- Sani R, Gupta BK, Sarkar UK, Pandey A, Dubey VK and Singh Lakra W. 2010. Length-weight relationships of 14 Indian freshwater fish species from the Betwa and Gomti rivers. Journal of Applied Ichthyology 26(3):456–459.
- Santoshsing J and Gupta SR. 2007. Studies on maturation and spawning of tropical freshwater catfish *Mystus cavasius* from the Marathwada region. Aquaculture 8:101–107.
- Siddiqui KU, Islam MA, Kabir SMH, Ahmad M, Ahmed ATA, Rahman AKA, Haque EU, Ahmed ZU, Begum ZNT, Hassan MA, Khondker M and Rahman MM (eds.). 2007. Encyclopedia of Flora and Fauna of Bangladesh, Vol. 23: Freshwater Fishes. Asiatic Society of Bangladesh, Dhaka. 300 p.
- Sultana MA, Pandit D, Barman SK, Tikadar KK, Tasnim N, Fagun IA and Kunda M. 2022. A review of fish diversity, decline drivers and management of the Tanguar Haor ecosystem: a globally recognized Ramsar site in Bangladesh. Heliyon e11875.
- Wang O, Song D and Zhang Y. 2020. Resource composition, length-weight relationship and condition factor of fishes in Bosten Lake. Biotic Resources 42:181–187.
- Wootton RJ. 2012. Ecology of Teleost Fishes. Springer Science and Business Media.
- Xia C, Wang X, Song J, Dai F, Zhang Y, Yang J and Liu D. 2022. Length-weight relationships of six freshwater fish species from the main channel of the Yangtze River, China. Egyptian Journal of Aquatic Research.
- Xia CX, Chen L and Xiong W. 2016. Length-weight relationships of three fish species from the Jinsha River, southwestern China. Journal of Applied Ichthyology 32:513–514.
- Zhang DF, Wang W and Liu FQ. 2017. Length-weight relationships of four fish species from the Niulan River, China. Journal of Applied Ichthyology 33(3):592–593.
- Zhu TB, Yang DG, Liu Y and Li F. 2015. Length-weight relationships of six fish species from the Zengqu and Ouqu rivers, southwest China. Journal of Applied Ichthyology 31:1153–1154.