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Scientific Note

Length-Weight Relationship and Growth Condition of *Mystus gulio* (Ham.) in Different Months and Sexes

M. Begum, H.K. Pal, M.A. Islam and M.J. Alam
Bangladesh Fisheries Research Institute, Brackishwater Station, Paikgacaha, Khulna, Bangladesh

***Key words*:** Length-weight relationship, growth condition**,** *Mystus gulio*

Nuna Tengra, *Macrones gulio* renamed *Mystus gulio* (Ham.) is a native catfish of family Bagridae, distributed around India to Malay Archipelago especially estuarine and tidal waters (Jhingran, 1997). It is having high market demand and delicious in taste and it has an emerging trend as an aquaculture species in the South-west region of Bangladesh. Despite a paucity of information available about its biology, hence quests have been made to assess length-weight relationship (LWR). It is often believed that the regression co-efficient of weight to length for fishes ranges from 2~4 (LeCren, 1951 and Rounsefell and Everhart, 1953) and for perch like fish it is often 3 (Mia, 1984). In fisheries research, length-weight relationships are important for the estimation of weight where only length data are available, and as an index of the condition of the fish (Pauly, 1993; Petrakis Stergiou, 1996). The present work was undertaken as a part of a study of the catfish, especially to observe seasonal effect on both male and female.

Live specimens of *M. gulio* for this study were collected from the fish market in Paikgacha upazilla where it comes from the adjacent rivers, swamps and shrimp farms. The study is based on the monthly examination of 100 specimens of each sex in the size range of 10.0-29.2 cm collected during the period of December, 2005 to November, 2006. The specimens were brought alive to laboratory. In the laboratory fishes were sexed and sorted according to their stage of maturity following the methods established by Qayyum & Quasim (1964). The total lengths of fish were recorded to the nearest millimeter from the tip of the snout to the tip of the tail. Weights of the fish were recorded to the nearest gram using digital weighing device (Tanita, KD-160) sensitive to 1g. After the measurement of specimens, the fishes were preserved in 10% formalin as quickly as possible. The length-weight relationship was determined by following the methods mentioned by Barua *et al.* (1988) and condition factor (K) was calculated following Le Cren (1951). The relationship of length and weight was used to calculate the regression coefficient n (slope of regression line of weight on length):

$W = aL^n$ or Log W = Log a+n Log L ---------- (1)

Where W=Weight, L=Total length and a= intercept

The equation (1) may be written in short notation i.e. $W' = a'+nL'$

Where W' = Log W, L' = Log L and a' = Log a

Table 1. Regression equation of length-weight relationship of *M. gulio* from December, 2005 to November, 2006.

Month	Regression			
	Male		Female	
December, 05	log W = -0.684+1.599 log L	r = 0.9124	log W = -0.935+1.014 log L	r = 0.9505
January, 06	log W = -0.916+1.076 log L	r = 0.9505	log W = -0.932+1.021 log L	r = 0.9567
February, 06	log W = -0.876+1.011 log L	r = 0.9472	log W = -0.837+0.961 log L	r = 0.9419
March, 06	log W = -0.789+0.977 log L	r = 0.9545	log W = -0.859+0.986 log L	r = 0.9662
April, 06	log W = -0.850+0.998 log L	r = 0.8812	log W = -0.818+0.969 log L	r = 0.8290
May, 06	log W = -0.703+1.638 log L	r = 0.8728	log W = -0.885+1.869 log L	r = 0.9264
June, 06	log W = -0.809+1.792 log L	r = 0.9608	log W = -1.083+2.149 log L	r = 0.9589
July, 06	log W = -0.813+1.804 log L	r = 0.9486	log W = -0.982+2.006 log L	r = 0.9541
August, 06	log W = -0.541+1.369 log L	r = 0.9462	log W = -0.679+1.562 log L	r = 0.9486
September, 06	log W = -0.679+1.598 log L	r = 0.8957	log W = -0.769+1.711 log L	r = 0.9170
October, 06	log W = -0.562+1.385 log L	r = 0.9098	log W = -0.822+1.778 log L	r = 0.9656
November, 06	log W = -0.552+1.425 log L	r = 0.9218	log W = -0.872+1.588 log L	r = 0.9586
Pooled	log W = -0.731+1.388 log L	--	log W = -0.873+1.468 log L	--

The length weight relationship was calculated separately for males and females during different seasons to observe if there are differences in the relationship due to sex and season. In all the cases, the relationship was found to be linear in the logarithmic form conforming to the general formula expressing the relationship between the length and weight of fishes (Table 1).

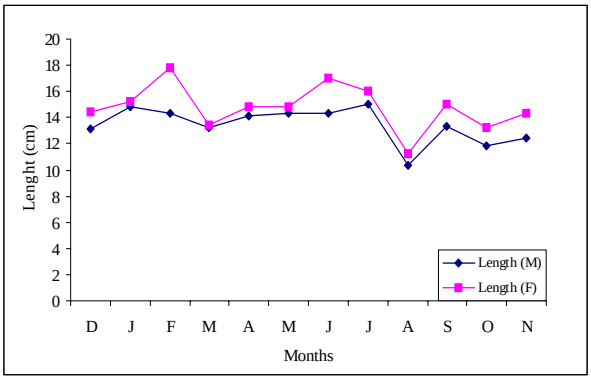

Fig 1. Month-wise distribution of length of both sexes of *M. gulio*

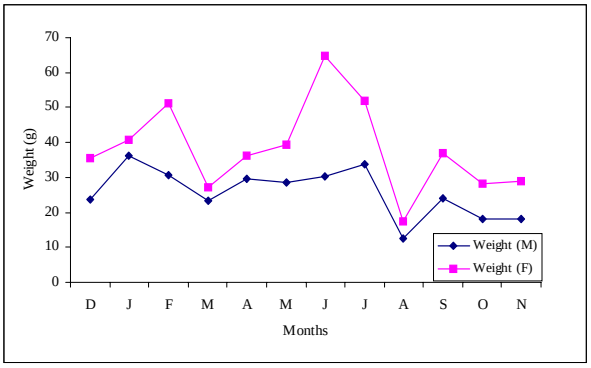

Fig 2. Month wise distribution of weight of both sexes of *M. gulio*

Correlation coefficient (r) between length and weight of *M. gulio* from December, 2005 to November, 2006 lies between 0.8290~0.9662, regardless the sex and season, representing strong relationship between length and weight i.e. the increase in weight is significant with per unit increase in length.

The month-wise distribution of total length of *M. gulio* shows the highest in February for female and July for male fishes but lowest in August for both sexes (Fig.1). The month-wise distribution of weight shows the highest in July for female and January for male fishes but lowest in August for both sexes (Fig. 2). The length and weight for both the sexes being lowest in August proves that the fish became spent in that period and it supports the findings of Alam *et al.* (2006).

On plotting the average weight against the average length, a parabolic curve was obtained (Fig.3 & 4). The parabolic relationship, for both the sexes, revealed that the increasing in length and weight is conspicuous when fish attain a size beyond 11 cm a similar condition was also reported by Nautiyal (1985) in another species from Garhwal Himalayas. A logarithmic graph showed, for both the sexes, straight line relationship (Fig. 5 & 6).

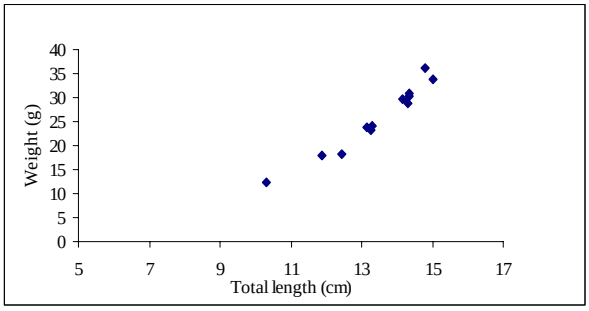

Fig.3. Length weight relationship of *M. gulio* (Male)

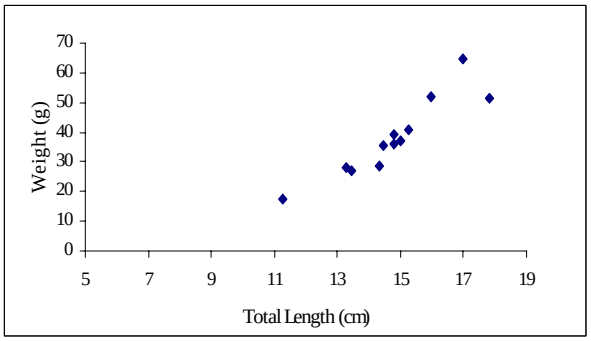

Fig.4. Length-weight relationship of *M. gulio* (Female)

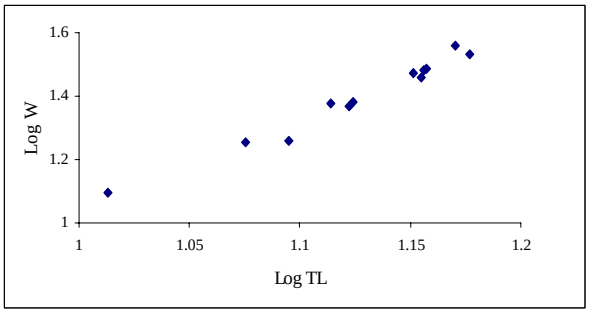

Fig.5. Logarithmic graph of length-weight relationship of *M. gulio* (Male)

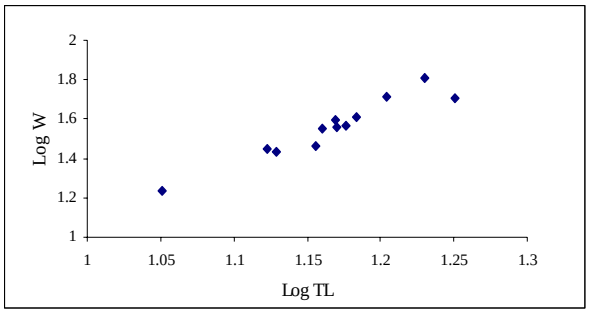

Fig.6. Logarithmic graph of length-weight relationship of *M. gulio* (Female)

The condition factor (K) calculated for different size groups gave an indication about the variations in the condition of the fish during its growth. The values of 'K' are depicted in Fig. 6. Condition (K) value increased proportionately with the length of the fish. The first peak in condition factor (K) and relative condition factor (Kn) was recorded at the size interval of 18~20 cm followed by the second prominent peak at the size group 22~24 cm. The first peak indicated the condition of sexual maturing stage, which generally showed the fast growth rate, whereas the second peak coincided with the size at its breeding maturity (Fig.7).

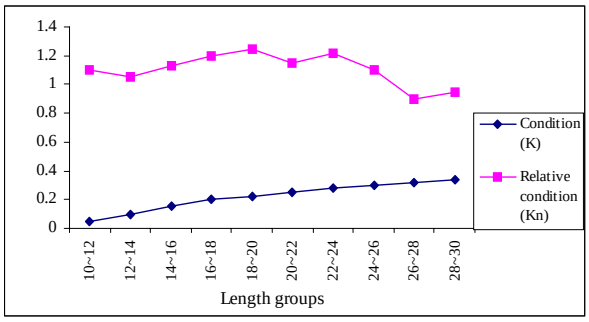

Fig.7. Condition (K) and relative condition (Kn) in relation to different length of *M. gulio*

Further, the increase and decrease in 'K' and 'Kn' values with the increasing length may be due to metabolic strain during maturation or spawning as well as changes in feeding activity. Similar condition was observed in several species of fish by earlier workers (Dhanze *et al.*, 2005; Barua *et al*., 1988; Gupta, 1988; Jhingran, 1972).

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