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Email: pntripathiphd@hotmail.com

STUDIES ON LENGTH-WEIGHT RELATIONSHIPS OF THE FRESH WATER CATFISH *MYSTUS VITTATUS* (BLOCH) IN GHAGHRA BELT OF EASTERN U.P. INDIA.

P.N. Tripathi, N.P. Singh and Ved Prakash

Department of Zoology

K.S.Saket P.G.College, Ayodhya. 224123 (U.P.)

Email. fishbiology@rediffmail.com

ABSTRACT

Present study describes the length-weight relationships of a freshwater catfish *Mystus vittatus* (Bloch). Lengths of fishes were varied from 4.9 to 12.2 cm. The correlation coefficient of female ($r^2=0.937$) is found to be higher when compared to that of male. The value of r^2 was found to be 0.728 to 0.921 in male and 0.783 to 0.937 in female. The equation of Linear Regression were $y = 2.664x - 13.50$ $r^2 = 0.835$ for male and $y = 3.269x - 18.48$ $r^2 = 0.843$ for female catfish *Mystus vittatus* (Bloch). The value of correlation coefficient (r^2) was not less than 0.728.

Keywords: catfish, *Mystus vittatus*, Ghaghra river, length-weight relationships.

INTRODUCTION:

Catfish are most abundant group of fish. *Mystus vittatus*, locally known as Tengra is a minor Bagrid catfish that occurs in the East and North - East regions of India. Among the small sized fishes it has high economic importance and market value. Locally it is sold from Rs.120-150/ Kg because of its export to Middle-East countries. In India it is found in all type of freshwaters in warm areas. The *Mystus* species are an important component of riverine and brackish water fisheries in India. The Asian striped catfish *Mystus vittatus* (Bloch, 1794) is a member of the Bagridae (Siluriformes) family that occurs widely throughout the Indian subcontinent including Bangladesh, Pakistan, Sri Lanka, Nepal and Bhutan, but it has been also reported from Myanmar, Malaysia, Laos, Vietnam and Cambodia (Froese and Pauly, 2006). Also found in canals and irrigation channels, this species usually inhabits marginal vegetation in lakes and swamps with muddy substrates and feeds on

plants, shrimps, insects, molluscs and fishes (Bhatt, 1971; Pethiyagoda, 1991). This small, indigenous fish species has a high nutritional value in terms of protein, micronutrients, vitamins and minerals not commonly available in other foods (Ross et al., 2003).

The mathematical relationship between length and weight of fishes is a practical index suitable for understanding their survival, growth, maturity, reproduction and general well being (Le Cren 1951). Length-weight relationships are useful in fishery management for both applied and basic use (Pitcher & Hart 1982). Length-weight relationships are also important in fisheries management for comparative growth studies (Moutopoulos & Stergiou 2002). Present work will provide baseline information for the growth of catfish from Ghaghara belt of Eastern U.P. and it can be supportive in future for the management of catfishes in India.

MATERIALS AND METHODS:

In total 476 fish specimen used for present

study, were collected from river Ghaghra and local fish market Niyawan, Faizabad. Regular monthly samples were obtained from fishermen's catch at fish landing center near Guptarghat, Jamthara, Ayodhya, in Faizabad and Amanipur, Raunahi, Bikapur, Milkipur, Akbarpur, Tanda, Itaura, Tighra, Surharpur and Lakarmandi outside of Faizabad city during April, 2007 to March, 2008.

Specimens were brought to the laboratory of the Department of Zoology K.S.Saket P.G. College Ayodhya, Faizabad for further observation. Total length (TL) and standard length (SL) of fish were measured and body weight was determined with a digital balance. The statistical significance level of correlation coefficient (r^2) was estimated and the parameters m and c were estimated by linear

Table-1: Monthly estimated parameters of length-weight relationship for both sexes of *Mystus vittatus* (Bloch) from April, 2007 to March, 2008.

Month	Sex	N	Standard length of fish (cm.)		Weight of fish (gm)		Regression Parameters		r^2
			Min.	Max.	Min.	Max.	a	b	
April	M	16	5.5	9.8	3	12	2.516	12.45	0.806
	F	26	7.1	10.8	5	19	3.534	21.69	0.792
May	M	13	5.6	11.1	3	16	2.338	11.07	0.788
	F	21	5.5	12.2	3	22	3.419	20.20	0.879
June	M	14	5.5	10.5	3	15	2.703	13.24	0.921
	F	23	7.4	11.3	4	22	4.353	28.60	0.898
July	M	12	5.7	9.6	3	14	2.756	13.81	0.854
	F	14	4.9	10.8	2	18	2.691	12.68	0.856
August	M	18	4.9	10.1	2	15	2.433	11.27	0.840
	F	30	5.5	11.2	3	22	3.095	16.34	0.783
September	M	22	4.9	9.5	2	13	2.282	10.63	0.821
	F	20	5.1	11.2	3	19	2.55	11.08	0.872
October	M	20	4.9	10.8	2	18	2.598	11.69	0.907
	F	28	5.4	10.6	3	18	2.775	13.51	0.801
November	M	17	7.6	10.8	5	18	3.684	22.4	0.896
	F	28	5.5	10.8	2	17	3.112	17.31	0.937
December	M	23	4.9	10.8	2	18	2.729	13.62	0.909
	F	32	7.2	10.7	5	18	3.865	23.87	0.925
January	M	18	4.9	10.3	2	18	2.401	11.56	0.818
	F	29	5.2	11.2	2	18	2.850	14.28	0.907
February	M	22	7.4	10	4	14	3.062	18.68	0.790
	F	29	7.2	10.7	5	18	3.421	19.91	0.883
March	M	15	4.9	8.5	2	8	1.494	5.40	0.728
	F	21	7.4	9.8	4	14	4.044	26.22	0.844
Overall	M	210	4.9	11.1	2	18	2.664	13.50	0.835
	F	266	4.9	12.2	2	22	3.269	18.48	0.843
	B	476	4.9	12.2	2	22	2.992	16.08	0.843

regressions equation $Y = mX + c$, where m is the slope and c is the intercept.

RESULTS AND DISCUSSION:

During the period of observation the total of 476 specimens of *Mystus vittatus* (Bloch) used for the length-weight relationship studies 210 were males, while 266 were females, contributing (44.11%) and (55.88%) respectively. The Length-weight relationship for *Mystus vittatus* (Bloch) observed for one year during April, 2007 to March, 2008 has been presented in Table-1. The correlation coefficient of female ($r^2=0.937$) is found to be higher when compared to that of male. From this trend it may be presumed that the female gained more weight with increases in length than

male.

In the present study the value of r^2 was found to be 0.728 to 0.921 in male and 0.783 to 0.937 in female. In male the lowest r^2 value i.e. 0.728 were obtained in March, 2008 and highest r^2 value is 0.921 obtained in June, 2007. In female the lowest r^2 value i.e. 0.783 were obtained in August, 2007 and highest r^2 value is 0.937 obtained in November, 2007.

The overall length-weight relationship of the male and female catfish *Mystus vittatus* (Bloch) shows that the linear relationship was obtained for both male and female fishes. The equation of Linear Regression were $y = 2.664x - 13.50$ $r^2 = 0.835$ for male and $y = 3.269x - 18.48$ $r^2 = 0.843$

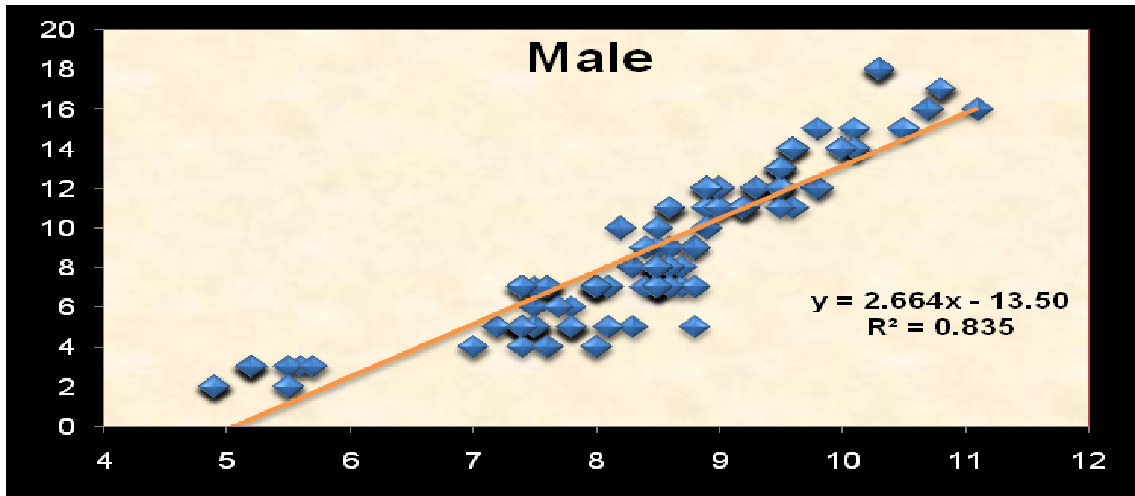


Fig.1: Relationship between standard length (cm) and body weight (gm) of male *Mystus vittatus* (Bloch)

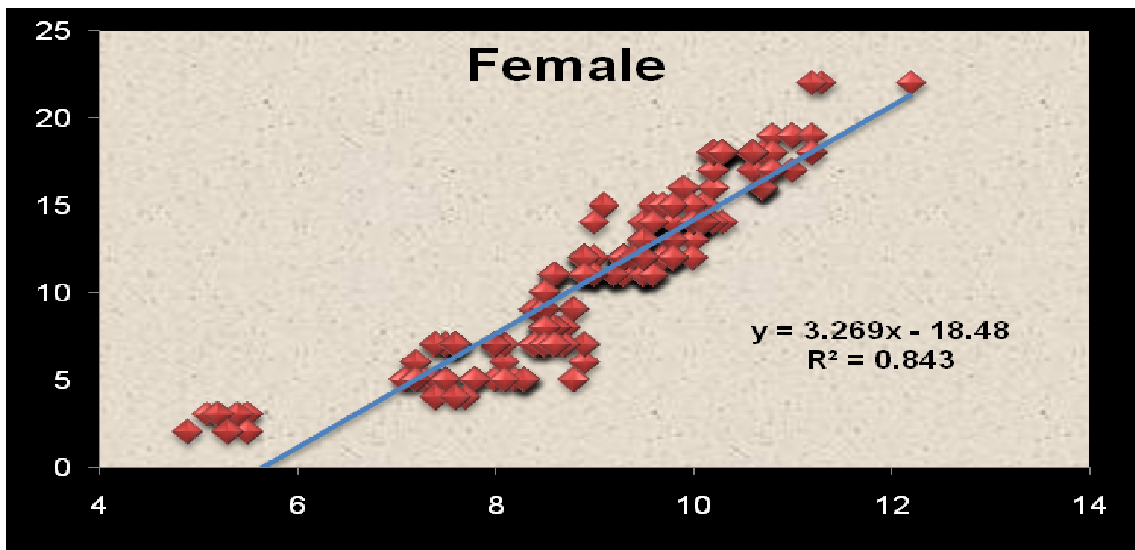


Fig.2: Relationship between standard length (cm) and body weight (gm) of female *Mystus vittatus* (Bloch).

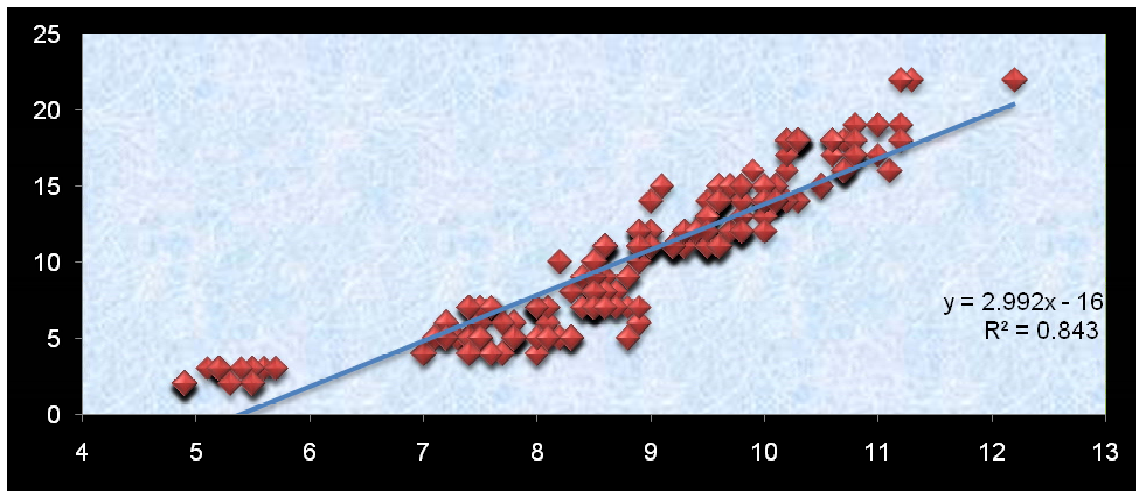


Fig.3: Relationship between standard length (cm) and body weight (gm) for both sexes of *Mystus vittatus* (Bloch).

= 0.843 for female catfish *Mystus vittatus* (Bloch) (Fig. 1 to 3).

In the present study the value of correlation coefficient (r^2) was not less than 0.728 shows that the results of length weight relationship were significant in all months during the period of observation and highly significant in the month of June, October, November, December and January.

Jhingran (1968) observed the length-weight, equation for *G. chapra* revealed that the differences in the exponential indices of length in males and females were statistically not significant. Parameswaran *et.al.* (1970) studied the length-weight relationship of the catfish *Ompak bimaculatus* (Bloch). The length-weight relationship indicates that the increase in weight is an exponential function of length and coefficient of correlation $r = 0.95389$. Vinci (1986) studied the biology of *Mystus seenghala* (Sykes) and observed the length-weight relationship studies indicated that males of *M. seenghala* had superior weights for length above and females for weight below 546 mm. Similar results were also observed by Hossain *et.al.* (2006) studied the annual condition as well the length-weight (LWR) and length-length relationships (LLR) of the Asian striped catfish, *Mystus vittatus* (Bloch), the r^2 value found 0.953 and 0.965 for male and female respectively. Venkateshwarlu *et.al.* (2007) observed the length-weight relationship and condition factor (K) of freshwater catfish, *Mystus cavasius* (Hamilton-

Buchanan) from Bhadra reservoir, Karnataka. The equation for length-weight relationship was $W=0.0309 L^{2.493}$ for male and $W=0.0648L^{2.7402}$ for female.

In conclusion, the present study provides baseline information on length-weight relationship for *Mystus vittatus* (Bloch.) that will be useful for researchers and fishery managers in future.

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