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ZOOLOGY

LENGTH-WEIGHT RELATIONSHIP IN *SALMOSTOMA NAVACULA* AND *CHANNA MURALIUS* GODAVARI RIVER AT KAIGAON TOKA, DIST. AURANGABAD (M.S.) INDIA

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Abstract

The length-weight relationship of *Salmostoma navacula* and *Channa muralius* were studied Godavari River at Kaigaon Toka from January 2010 to December 2010. The exponential value of fishes indicates allometric growth pattern in the natural habitat. The logarithmatic regression equation obtained in *Salmostoma navacula* was log W = -0.531+1.70 LogL and in *Channa muralius* was Log W = -0.067+1.45 LogL. The coefficient of correlation in *Salmostoma navacula* was r = 0.711 and in *Channa muralius* was r = 0.967. Which shows the correlation factor revealed positive correlation between length and weight.

Keywords: Length-weight relationship, Kaigaon Toka, Godavari River, *Salmostoma navacula* and *Channa muralius*

Introduction

The success of fishing industry depends mainly on fish catches in terms of weight which, in turn is a function of its length. These two measurements are closely related. As the growth of fish varies species to species and from environment to environment, it is great importance to have the knowledge of length weight relationship of a species occurring in a particular area for its fishery. In tropical and subtropical waters, the growth fluctuation is more frequent in fishes due to variations in seasons, multiple spawning and food composition (Das *et al*., 1997).

Length-weight relationship studies in fishes are being done with a view to establish the relationship between length and weight for enabling the inter-conversions of these variables as required in setting up of yield equations for estimating population strength (Beverton and Holt, 1957). This relationship also provides some additional information related to spawning, growth, feeding, gonadal development and maturity time of the fish (Dawe, 1988; Maceina and Murphy, 1988). A scrutiny of the relative condition factor at different body lengths can give valuable information regarding the maturation and spawning in the life span of the fish whereas a close look at the conditions at different months may give definite clues regarding the breeding seasons. They are also useful for assessing the relative well being of the fish population. (Le Cren, 1951) has stated that the length-weight relationship formula besides providing a means for calculating weight from length and a direct way of converting the logarithmic growth rates calculated on lengths into growth rate for weight. It may also give an indication of taxonomic differences and events in the life history of a species such as metamorphosis and onset of maturity.

Knowledge of L-W relationship of fish has vital role in fishery, as it is not only helps in establishing the yield but in converting variables into others. Length is easier to measure and can be converted into weight in which the catch is invariably expressed. The relationship between length and weight is derived by the equation W = aLb and the relationship follows the laws between cube and tetra indicating three dimensional pattern of growth. In many cases the "b" values are found to be very close to 3, hence it is generally called as "Cube law", which establishes the L-W relationship in the fish.

There are many works available on length-weight relationship of culture fishes from various parts of the world but very few works are available on the length-weight relationship of non culture fishes. Aim of present study to information about length-weight relationships of *Salmostoma navacula* and *Channa muralius* from Godavari River at Kaigaon Toka.

Materials and Methods

During the present investigation fishes collected from (January 2010 to December 2010) Godavari river at Kaigaon Toka (latitude 19° 36' 32.63" N and longitude 75° 03' 02.05" E) 45 km away from Aurangabad (M.S.) India. Fishes brought to the laboratory after washing, the fishes were blotted to remove excess water and then total length of the fish was measured from the snout to the tip of the tail and weighed in single pan electronic balance. The standard length and weight were taken.

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The regression coefficient b in the algometric formula $W = aL^b$ may vary for fish form different localities; different sexed and so this difference may or may not be statistically significant. The length weight relationship between the length and weight was calculated by applying the formula as suggested by Le Cren, (1951) $W = aL^b$ Where,

W =Total weight of fish.

L = Total length of fish

b is the regression coefficient (slope).

The general parabolic equation $W = aL^b$ can be written as $\text{Log}W = \text{Log}\, a + b\, \text{Log}\, L$ i.e. Y = A+BX, Where Y = Log W, B = n (regression coefficient) and X = Log L. This linear equation was fitted separately for the two sexed to the data calculated. After that, graphs were plotted for comparison the log weight of *Salmostoma navacula* and *Channa muralius* against log total length.

Results and Discussion

In the present investigation 170 specimens of *Salmostoma navacula* observed. In which length-weight ranges from 6.3 to 14.4 cm and 3.88 gm to 8.58 gm respectively as well as calculated various hypothesis were Σx = 156.042, Σy =92.280, Σx^2 = 0.412, Σy^2 = 1.415, Σxy = 0.482 and 32 specimens of *Channa muralius* observed. In which length-weight ranges from 22.8 to 37.7cm and 92 gm to 473 gm respectively as well as calculated various hypothesis were Σx = 45.289, Σy =67.805, Σx^2 = 64.139, Σy^2 = 145.198, Σxy = 93.003 (Table No. 1).

Table 1: - Calculation for testing various hypothesis about correlation coefficient of *Salmostoma navacula* and *Channa muralius* Godavari River at Kaigaon Toka (January 2010 – December 2010)

Species	Σx	Σy	Σx^2	Σy^2	Σxy
Salmostoma navacula	156.042	92.280	0.412	1.415	0.482
Channa muralius	45.289	67.805	64.139	145.198	93.003

Table 2: - Regression equation of weight on total length of *Salmostoma navacula* and *Channa muralius* and test of significance Godavari River at Kaigaon Toka (January 2010 – December 2010)

Species	Regression coefficient (b)	Intercept (a)	Correlation (r)	Parabolic equation
Salmostoma navacula	1.70	-0.531	0.711	$W=0.294L^{1.70}$
Channa muralius	1.45	-0.67	0.967	$W=1.167L^{1.45}$

In the present study the coefficient of correlation (r) between length and weight measured and value obtained from statistical analysis of the correlation for *Salmostoma navacula* and *Channa muralius* is r = 0. 711 and r = 0.967 in respectively both species and correlation found to be higher than 0.5, showing the length weight relation ship is positively correlated and vice-versa. The value of n obtained for *Salmostoma navacula* b = 1.70 and for *Channa muralius* b = 1.450. The length weight were calculated as

Log W= -0.531+1.70 LogL r = 0.711 (*Salmostoma navacula*)

Log W= -0.067+1.45 LogL r = 0.967 (*Channa muralius*) (Table no. 2 and Fig. 1& 2).

Fig. 1: - Length weight relationship in *Saloistoma navacula* Godavari River at Kaigaon Toka (January 2010 – December 2010)

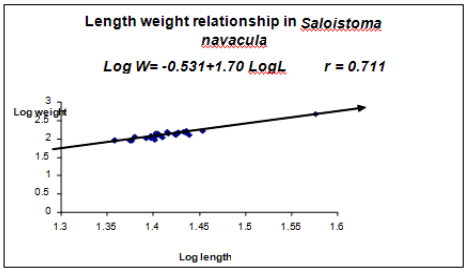
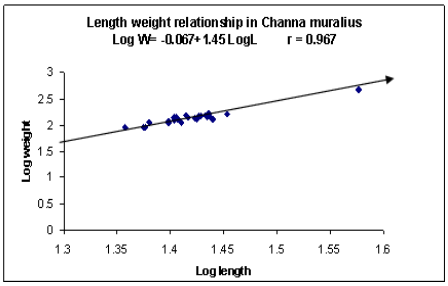


Fig. 2: - Length weight relationship in *Channa muralius* Godavari River at Kaigaon Toka (January 2010 – December 2010)



The length weight relationship with b value typical for most fishes has been recorded by (Royce, 1972); b = 2.5 – 3.5; Lagler *et al*., (1977) b = 2.5 – 4.0 and (King, 1996). According to Frosta *et al*., (2004) the slop value b indicate the rate of weight gain relation to the growth in length and varies among different population of the same species or within in the same species. The values of b in *T. mossmbica* were recorded b = 1.7033 – 2.0280 (Jadhav, 2002), value of b is 1.195 to 1.639 Fuscatus Jamabo *et al*., (2009). Ajayi, (1982)

Observe positive allometry b = 3.177 for Cynoglossus canariensis. Wooton, (1992). However opined that b < 3indicates that fish gets relatively thinner as it grows larger while b > 3 it gets plum pier as it grows larger.

Conclusions

1) The highest correlation in the present study shows that regression values were highly significant.
2) It can be said that the significant correlation exist between body length and weight.
3) Positive correlation between length and weight because length increases weight also increase i.e. allometric growth pattern of fish.
4) The intercept (a) for both was negative which indicate a perfect linear relationship able to change.

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References

Ajayi, T.O., (1982): The age and growth of the *Cynoglossus canariensis* (Steind, 1882). In: Proceedings of the 2 annual conference of the Fisheries Society of Nigeria (FISON) Kainji Lake research institute New Bussa.

Beverton, R.J.H. and S.H. Holt (1957): On the dynamics of exploited fish populations. *Fish. Invest*. London. Ser. Vol. 2(19):1-533.

Das, N.G., A. Majumder and S. M. M. Sarwar (1997): Length-weight relationship and condition factor of catfish, *Arius tenuispinis* Day, 1877. *Indian J. Fish*., 44(1): 81-85.

Dawe, E. G. (1988): Length-weight relationships for short finned squid in Newfoundland and the effect of diet on the condition and growth. *Trans. Am. Fish. Soc.* 117: 591-599.

Frosta, I.O., P.A.S. Costa and A.C. Braga, (2004): Length-weight relationships of marine fishes from the Central Brazilian Coast Naga, World fish centre Quarterly, 27(182): 20-26.

Jadhav U.A. (2002): Length weight relationship in *T. mossmbica*. Ph.D. Thesis, Dept. of zoology Dr. Babasaheb Ambedkar Marathawada University Aurangabad.

Jamabo, N.A., (2007): Ecology of *Tympanotonus fuscatus var fuscatus* (Linnaeus, 1758) in the mangrove swamps of the upper Bonny River, Niger Delta, Nigeria. PhD Thesis in Aquaculture, Rivers State University of Science and Technology Port Harcourt. pp: 231.

King, R.P., (1996): Length-weight relationships of Nigerian freshwater fishes Naga. *The ICLARM Quarterly*, 19(3): 49-52.

Lagler, K.F., J.E. Bardach, R.R. Milter and D.R.M. Passimo, (1977): Ichthyology. *John Wiley and Sons Inc*. pp: 506.

Le Cren, E.D. (1951): The length weight relation-ship and seasonal cycle in gonad weight and condition in Perch (*Perca-fluviatilis*). *J. Anim. Ecol*., 20: 201-219.

Maceina, M. J. and Murphy B. R. (1988): Variation in the weight-to-length relationship among Florida and Northern large mouth bass and their intraspecific F1 hybrid. *Trans. Am. Fish. Soc*. 117: 232-237.

Royce, W.F., (1972): Introduction of Fishery Science. *Academic Press Inc*.; London, pp: 122.

Wooton, R.J., (1992): Fish ecology: Tertiary level biology, Blackie, London, pp: 212.