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LENGTH – WEIGHT RELATIONSHIP OF FISH NOTOPTERUS NOTOPTERUS

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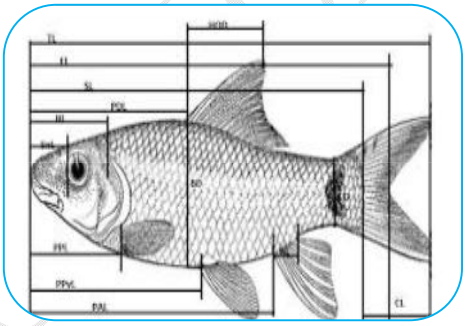
ABSTRACT:

The present study was carried out for the period of one year from July 2003 to June 2004 to determine the length – weight relationship separately in males and females of Notopterus notopterus. Length and weight of 226 seximens of Notopterus notopterus were measured. Out of the total 226 specimens 190 were males and 36 were females.



KEYWORDS: *Length weight relationship, Notopterus notopterus.*

LENGTH WEIGHT RELATIONSHIP

Studies on the Length-weight relationships of fishes have been recognized as important aspect in fishery biology study. Data on the lengths and weights of the fish commonly been analysed to yield biological information one or other form of such analysis has, infact; become one of the standard methods employed in fishery biology.

The analysis of length-weight data has usually been directed to wards two rather different objects. First 'towards describing mathematically the relation between length and weight primarily so that one may be converted into the other. Secondly to measure the variation from the expected weight for length of a individual fish or relevant group of individualsw as indications of fatness, general well being, gonad development, etc.

The length of a fish is often more rapidly and accurately measured than the weight. Moreover back-calculations of past growth from scales etc. usually yield data on length alone. Thus it is very convenient to be able to determine a weight where length only is known and occasionally it may be useful to reverse this process. It has been found that the length-weight relationship of most fish can adequately be described by a formula of the type.

$$W = AL^n$$

Where , W = weight and L = length A is constant and B an exponent usually lying between 2.5 and 4 (Mile, 1936, Martin, 1949). For an ideal fish which maintains the same shape B = 3 and this has occasionally been observed (Allen, 1938), Le Cren (1951), states, "the length-weight relationship formula, besides providing a means for calculating weight from length, and a direct way of convering logarithmic growth rates calculated length length in to growth-rates for weight, may also give indication of taxonomic differences and events in the life history such as metamorphosis and the onset of maturity'. He further clearly pointed ot the superiority of the equation of the general parabola, $W = AL^B$ over that of the cubic parabola.

Considerable work on length-weight relationship has been carried out abroad as well as in India by many workers.

Houstor (1952), Rabanal et al. (1952) Badsa and Tang (1967), Ling (1969), Juliano et al..(1970), Swingle and Shell (1971), Chonder (1978), Burrough and Kennedy (1979), Hussein Md. EI-Ghobary and John H. Grover (1986), Samuel Olu, Otubusin (1990) etc. are work in this field.

In India Khan (1945), Chacko and Ganapati (1951), Jhingran (1952), Prabhu (1954), Seshappa and Bhimachar (1955), Bal and Joshi (1956), Gupta (1968), Kamal (1969, 71), Mujumdar (1971), Hanumant Rao (1974), Hussain and Abdulla (1977), Rita Kurnari and Baiakrishntm Nair (1978), S.S. Dan and P. Mojumder (1978), Victor (1978), Agrawal and Saksena (1979), Soni and Kumari Maya Kathal (1979), Shrivastava and Pandy (1981), Se.shappa and Chakrapani (1981), Sareen *et al.* (1983-84)., Prakash Nautiyal (1985), M.V. Mohan and I.M. Sankaran (1988), Santosh Kumar and Som Dutt (1994,1997), Samirkumar Sarkar, *et al,* (1998), and many other workers have contributed to length-weight relationship studies in fishes.

MATERIAL AND METHODS

The present study was carried out for the period of one year from July 2003 to June 2004 to determine the length – weight relationship separately in males and females of Notopterus notopterus. Length and weight of 226 seximens of Notopterus notopterus were measured. Out of the total 226 specimens 190 were males and 36 were females.

The males ranged from 13 cm. to 28 cm in total length and from 15 gm to 150 gm in weight, whereas the females ranged between 16.3 cm to 28 cm in total length and from 32 gm to 152 gm in weight. The total length of the fish to the nearest centimeter and weight of the fish to the nearest gram: were carefully noted down for this study. Fishes were weighted individually after removing surface moisture with a blotting paper. The males and females were studied separeately by arranging them in 3 cm. class intervals. Freshly collected samples of fishes were examined.

The average length (L) and the average weight (W) in each size group were calculated and the relationship.

Was determined ; on the size group averages with the help of the formula.

$$W = AL^B$$

Where W = Average weight of the fisher and
L = Average length of fishes,
A and B are constants to be determined.

OBSERVATIONS

Table No. 1

W = Average weight of fish in gm
L = Average length of fish in cm
The formula may also be expressed as follow :

$$Y = a + Bx$$

Where y = Log W, x = Log L and
A and B constants.

The Length-weight relationships in males and females have been found to be

Male $W = 0.01008\ L^{2.8362}$
female $W = 0.00313\ L^{3.2059}$

Notopterus notopterus Male (Table 1)

$\sum x$	=	7.9317
$\bar{x}$	=	1.32195
$\bar{x}^2$	=	1.7475
$\sum y$	=	10.4738
$\bar{y}$	=	1.74563
$\sum x^2$	=	10.543

$\sum xy$ = 14.0103
N = 6
N $\bar{xy}$ = 13.8458
Nx^2 = 10.485

Now the general equation $W = AL^n$ has to be fitted in for above data converting this into logarithms and after substituting y for Log W, x for Log L and a for Long A the equation will be

$Y = a + Bx$

Where the constants a and B to be determined

$$B = \sum \frac{xy - Nxy}{\sum x^2 - Nx^{-2}} = \frac{14.0103 - 13.8458 - 0.1645}{10.543 - 10.485 - 0.058}$$

$B = 2.8362$

$$= \frac{\sum y - b \sum x}{N} = \frac{10.4738 - 2.8362\,(7.9317) - 12.0220}{4} = \frac{a}{6}$$

$a = -2.0036$ $A =$ Antilog a = 0.01008

$y = -2.0036 + 2.8362(x)$

Expressing this in teerms of W and L the equation will be

$W = aL^B$

$W = 0.01008\ L^{2.8362}$

Procedure of calculations for lengh-weight relationship in

Notopterus notopterus Female (Table - 2)

$\sum x$ = 6.7855
$\bar{x}$ = 1.1309
$\bar{x}^2$ = 1.2789
$\sum y$ = 906265
$\bar{y}$ = 1.60441
$\sum x^2$ = 9.2373
$\sum xy$ = 13.1399
N = 6
N $\bar{\bar{xy}}$ = 10.8864
Nx^2 = 7.6734

Now the general equation $W=AL^B$ has to be fitted in for above data converting this into logarithms and after substituting y for Log W, x for Log L and a for Log A the equation will be

$$Y = a + Bx$$

Where the constants a and B to be determined

$$B = \frac{\sum xy - N\bar{x}\bar{y}}{\sum x^2 - Nx^2} = \frac{13.1399 - 10.8864 - 2.2335}{9.2373 - 7.6734 - 1.5636}$$

$$B = 1.4409$$

$$a = \frac{\sum y - b\sum x}{N} = \frac{9.6265 - 1.4409(6.7855) - 0.1507}{6}$$

$$a = -0.0251 \quad A = \text{Antilog } a = 1.059$$

$$Y = a + Bx$$

$$y = -0.0251 + 1.4409\ (x)$$

Expressing this in terms of W and L this equation will be

$$W = aL^B$$

$$W = 1.059L^{1.4409}$$

RESULTS

The equation of curve $W = AL^B$ by converting the above equation of curve in the linear form as

$$Y = a + Bx$$

Where y = Log W
A = Antilog a
x = Log L.

Substituting these values of A and B in the above equation plot a graph for males and females **Notopterus notopterus,** taking average length on x – axix and estimated values of average weight along the y –axis. The nature of graph is curvature, also mark the point, average length verses observed weight. The points are slight away from the curve which indicates that there is nearest agreement between observed and estimated values of the weight.

The average length of male and female of average, estimated weight obyes the law of exponential distribution.

REFERENCES

1) Dan, S. and P. Mojumdar, (1978); Length-wight relationship in cat fish Tachysurus tenui spinis (Day)., Indian J. Fish., 25 (1-2); 23-28.
2) Hussen, Md. Ej- Ghobashy and John H. Grover (1986): Length-weight relation ships of newly hatched Cultured warmwater fishes. J. Aqua. Trop., 1 (1986): 67-74.
3) Jhingran, V.G. (1952): General length-weight relationship of the major Carps of India. Proc. Nat. Inst. Sci. India., 18(5): 449-460.

4) Le Cren, E.D.(1951): The length-weight relationship and seasonal Cycle in gonad weight and condition in perch (percha fluviatilis). J. Anim. Ecol., 20: 201-209.
5) Mazumdar, P. (1971): Length-weight relationship in thecalifishk, Tachysurus thalassinus (Ruppell). Indian J. Fish., 18: 179-182.
6) Pathak, S.C. (1975): Length weight relationship, Condition factor and food study of Labeo Calbasu (Ham) from Loni reser voir (M.P.) J. Indland Fish. Soc. India, 7: 58-64.
7) Rangarajan, K. (1973) : Length-weight relationship in the snapper Lutianus Kasmira (Forskal). Indian J. Fish., 20 (1): 205-208.

Table – 1
Length Weight relationship in MALE *Notopterus notopterus*

Size group in cm	Average length in cm 'L'	Average weight in gm 'W'	Log L 'X'	Log W 'Y'	X^2	XY	Y	W
13-15	14.6	24.0	1.1644	1.3802	1.3558	1.6068	1.5472	35
16-18	17.25	41.18	1.2367	1.6146	1.5294	1.9967	1.6436	43
19-21	20.39	2.26	1.3094	1.3067	1.7145	1.7109	1.7405	54
22-24	22.89	83.53	1.3596	1.9219	1.8485	2.6130	1.8075	64
25-27	25.96	120.0	1.4144	2.0792	2.0005	2.9408	1.8806	75
28-30	28.0	148.33	1.4472	2.1712	2.0943	3.1421	1.9243	83
Total			S X = 7.9317	S Y = 10.4738	S X^2 10.543	S XY 14.0103		

$\bar{X}$ = 1.32195 $\bar{Y}$ = 1.74563

Table – 2
Length Weight relationship in FEMALE *Notopterus notopterus*

Size group in cm	Average length in cm 'L'	Average weight in gm 'W'	Log L 'X'	Log W 'Y'	X^2	XY	Y	W
13-15	--	--	--	--	--	--	--	--
16-18	17	40	1.2304	1.6021	1.5138	1.9712	1.7449	55
19-21	21	63.33	1.3222	1.8016	1.7482	1.3820	1.8753	74
22-24	23.48	94.16	1.3707	1.9739	1.8788	1.7056	1.9447	87
25-27	26	127.66	1.4150	2.1059	2.0022	1.9798	1.0077	101
28-30	28	139	1.4472	2.1430	2.0943	3.1013	1.0536	112
Total			S X = 6.7855	S Y = 9.6265	S X^2 9.2373	S XY 14.0103		

$\bar{X}$ = 1.1309 $\bar{Y}$ = 1.60441