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FECUNDITY OF TWO TYPES OF PALLA (A+B), *TENUALOSA ILISHA* (HAMILTON) FROM RIVER INDUS SINDH, PAKISTAN

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Abstract

The present investigation was carried out on the fecundity of two types Palla (A+B), *Tenualosa ilisha* from River Indus. The study was based on 22 (11 each types A and B) mature females of Palla, *T. ilisha* sampled during (October 2004 to September 2005). These individuals ranged in size from 201 to 408 mm in length, and 82.0-1331.0 gm in weight. The highest fecundity was observed (1156380 eggs) from a fish measuring 480 mm in (TL) and 1331 gm in weight (in type A). While the maximum fecundity (288340 eggs) was from a fish measuring 288 mm in (TL) and 260 gm in weight (in type B). The type A was found to be more fecund than that of type B. The number of ova per gram body weight was 964 and 900 eggs, and number of ova per gram of ovary weight was 6230 and 5932 eggs in types A and B respectively.

Keywords: Fecundity, two types (A and B), River Indus, Palla, *Tenualosa ilisha*.

1. Introduction

In our previous communication Narejo *et al.*, (2008) the occurrence of two types of *T. ilisha* from River Indus was evidenced through the analysis of morphometric and meristic characters. They differ also in the spawning season (Quddus *et al.*, (1984C). In this paper the results of comparative estimation of fecundity of the two types (A and B) of palla, *T. ilisha* from River Indus, Sindh, Pakistan is given. Presently no published information on the fecundity of two types of Palla, *Tenualosa ilisha* from Pakistani water is available. Hence it was necessary to publish information on the fecundity of two types of palla (A+B), breeds in different season.

2. Materials and methods

For the estimation of fecundity of two types of palla, (*T. ilisha*) 22 specimens (11 each type A and B) mature females were sampled. These individuals ranged in size from 201 to 408 mm in length, and 82.0-1331.0 gm in weight. The specimens were collected from River Indus during summer and winter from Kharo chan, Jhangisar Distt Thatta, deltaic region during October 2004 to September 2005. The ovaries from each fish were carefully removed, washed and preserved in 10% formalin. Ovaries of both the types were weighed on an electronic balance to the nearest gram. Gravimetric method was used to determine the fecundity (Begenal, 1967; Shafi *et al.*, 1978; Dewan and Doha 1979). Three sub samples of about one gram from both the ovaries were weighed and the number of egg found in each sub samples were counted, the fecundity was calculated by total weight of ovaries. The fecundity of the fish estimated through following formula:

F= N × Gonad weight/sample weight, where F= fecundity and N= the number of ova in sub sample. The relationship between fecundity and different body parameters like (total length, body weight and gonad weight) of two types of *T. ilisha* were determined using least square estimation (LeCren 1951).

3. Results

The estimated number of eggs in the present investigation ranged from 1156383 to 288339, sizes ranging from 480 to 1331 mm in length and 82.0 to 1331.0 gm in weight showed in (**Table - 1**) (for type A). While the highest number of ova was recorded from fish of size 288 mm and 260 gm in length and weight

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respectively as showed in **(Table - 2)** (for type B). It was observed that the eggs present in one gram body weight were 963.7 and 900 eggs, while, the eggs found in one gram of gonad weight were 5932.4 and 6230.1 eggs in types A and B respectively.

Table. 1. Fecundity of type "A" palla, *Tenualosa ilisha* (Hamilton) from River Indus during summer.

S. No	Length of fish (mm)	Weight of fish (g)	Gonad weight(g)	Fecundity in thousands
1	331	459	53.0	2,51,602
2	210	117	14.8	94,406
3	201	82	11.4	64,680
4	411	850	97.0	5,98,674
5	400	775	134.4	8,15,970
6	480	1331	198.5	11,56,383
7	370	625	109.7	6,25,940
8	415	784	153.2	8,91,368
9	400	754	112.5	6,82,477
10	380	680	93.4	6,43,961
11	298	282	57.7	3,18,141

Table. 2. Fecundity of type "B" palla, *Tenualosa ilisha* (Hamilton) from Kharo chan and Jhangisar near Thatta, Sindh River Indus during winter.

S. No	Length of fish (mm)	Weight of fish (g)	Gonad weight (g)	Fecundity in thousands
1	202	78	10.2	60530
2	288	260	45.5	288339
3	120	50	5.5	33780
4	220	140	16.3	110211
5	190	80	9.6	58980
6	212	120	15.0	98050
7	260	230	40.0	217839
8	275	250	42.2	248111
9	230	150	15.3	99101
10	245	170	16.7	122740
11	285	250	41.9	270945

Fecundity- Total length relationship

The relationship between total length and fecundity of *T. ilisha* of Indus river were recorded during summer and winter for Type A and B respectively. The values of regression (b), correlation coefficient (r), the intercept (a) and standard error (SE) were calculated. The equation for the regression of fecundity (f) on total (TL) was as follows:

Log F=-5.254×3.106LogL Fecundity-total length relationship of Type A

Log F=16.41×8.86LogL Fecundity-total length relationship of Type B

The above equation and the estimated regression line are shown in **(Fig. 1)**. The relationship between fecundity and total length of *T. ilisha* of Indus river was found to be linear and more dependable in both the types. A test of significance showed that the value of the regression coefficient was highly significant ($p<0.05$ at 5% level).

Fecundity-Body weight relationship

The regression of log fecundity (f) on log body weight (BW) of *T. ilisha* of both the types have been given in **(Fig. 2)**. The values of the regression (b) and correlation coefficients (r) the intercept (a) and S.E. The relationship between fecundity to body weight may be expressed by the following equation.

Log F=-0.33×1.09× Log W Fecundity-body weight relationship of type A

Log F=2.18×3.37 Log W Fecundity-body weight relationship of type B

The above equation and the estimated regression line showed that the relationship between them was found to be linear and more dependable. A test of significance showed that the values of the regression coefficient were significant ($p<0.05$ at 95% confidence limit).

Fecundity-Gonad weight relationship

The regression of log fecundity (f) on log gonad weight (GW) has been given in **(Fig. 3)**. The values of the regression (b) and correlation coefficients (r.), the intercept (a) and S.E. From the regression of the fecundity on gonad weight the following equation was obtained.

Log F=- 9.73×2.25× Log GW Fecundity-Gonad weight relationship of type A

Log F=3.84×7.00 Log GW Fecundity-Gonad weight relationship of type B

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The above equation and the estimated regression line showed that the relationship between them was found to be curvy linear. A test of significance showed that the values of the regression coefficient were highly significant ($p>0.05$ at 95% confidence limit).

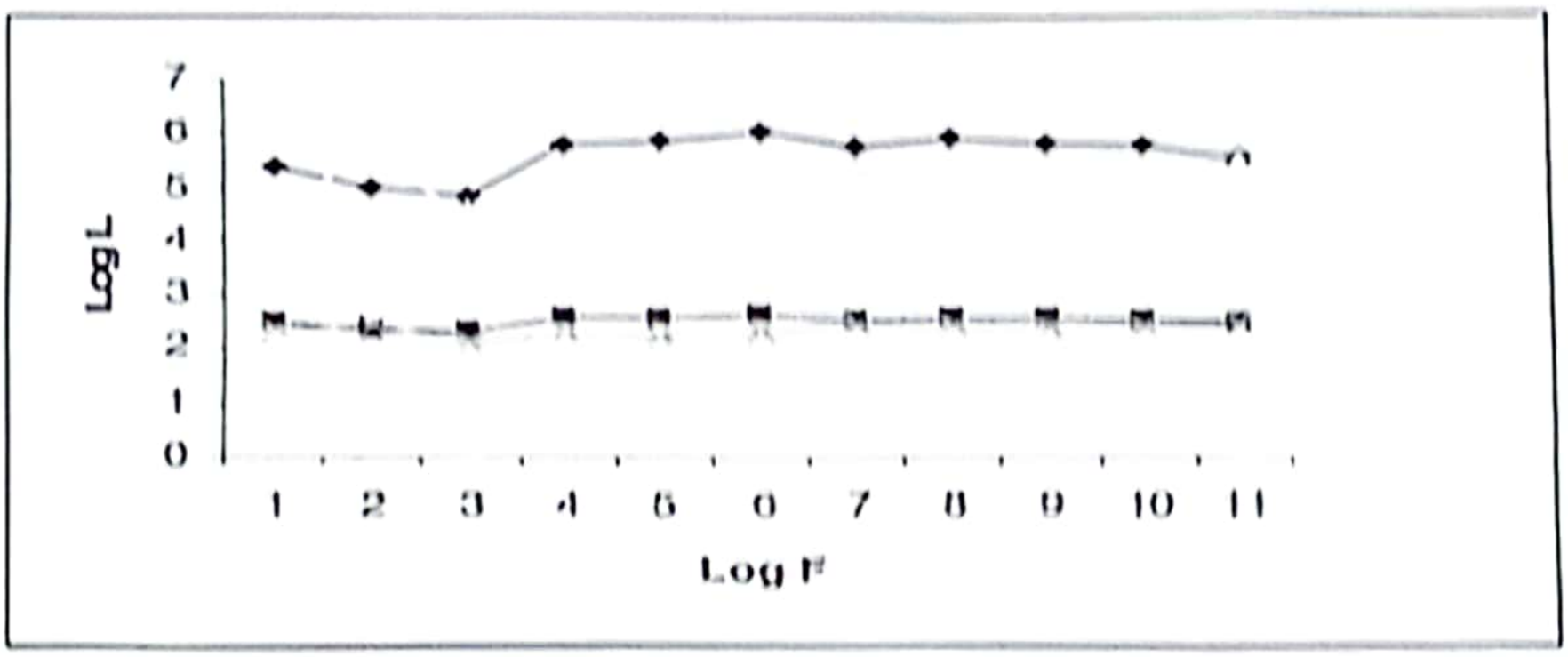


Fig. 1. Log –log relationship fecundity- total length of female both types (A and B) palla, *Tenualosa ilisha* (Hamilton) from River Indus.

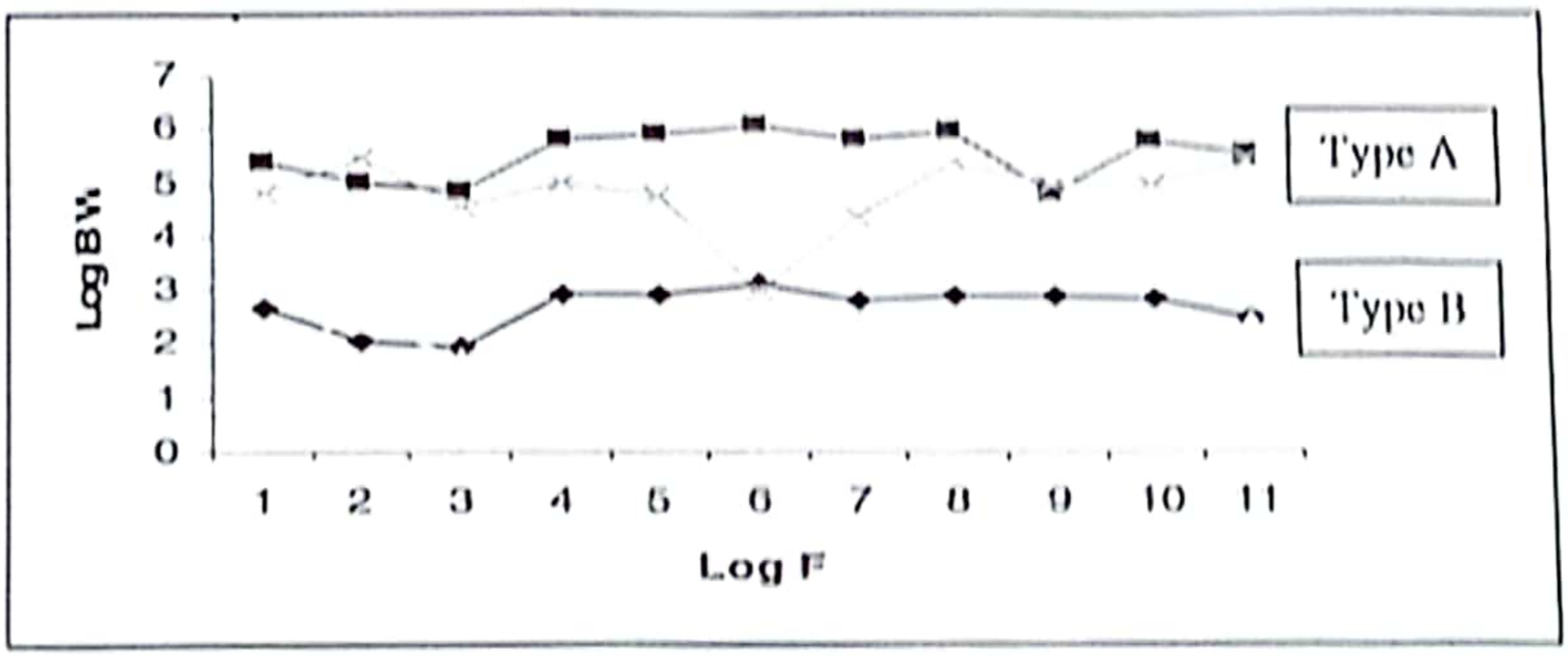


Fig. 2. Log- log relationship of fecundity- body weight of female both types (A and B) Palla *Tenualosa ilisha* (Hamilton) from River Indus.

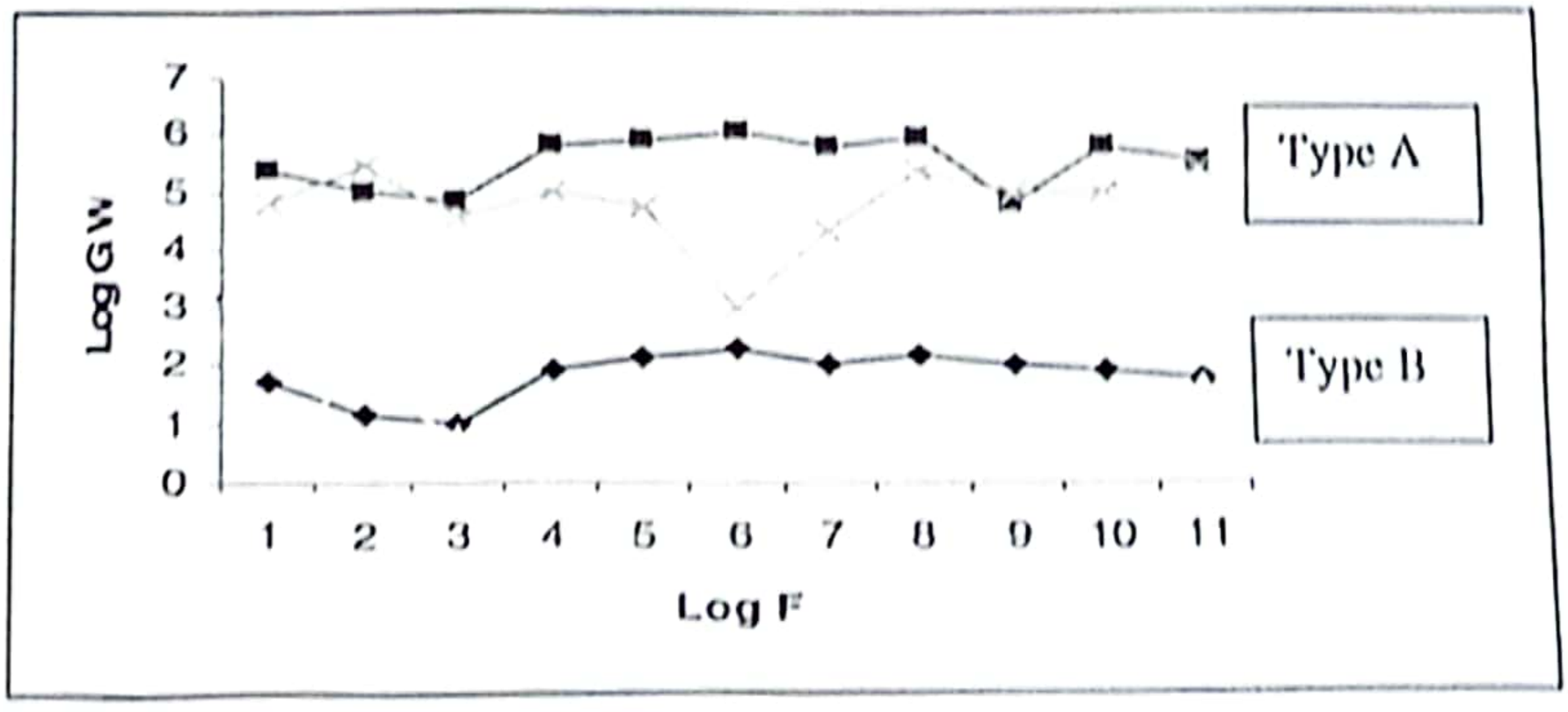


Fig. 3. Log-log relationship of fecundity-gonad weight of female both types (A and B) Palla, *Tenualosa ilisha* (Hamilton) from River Indus

4. Discussion

Observations on the fecundity of fish have shown that for fish of any species, the fecundity increases with the size of fish (Simpson, 1951). Normally, an exponential relationship exists between fecundity and fish length (Begenal, 1967), Pillay (1954) and Pillay and Rao (1962) established a curvilinear relationship of exponential type between the fork-length and fecundity of Hilsa from River Hoogly and Godawari rivers respectively. On the other hand, Islam and Talbot (1968) and Doha and Hye (1970) found a linear relationship for Hilsa from the river Indus and Padma respectively. In the present study it was observed that the fecundity of *T.ilisha* of Indus river showed linear and better relationship with body weight than that of gonad weight and total length of the fish in both the cases (Type A and B). Quddus *et al.*, (1984b) reported similar linear relationship of fecundity with two different body parameters (length and weight) in *H. ilisha*, Narejo *et al.*, (2002) also published similar information in spiny eel, *M. armatus*, from Bangladesh waters, which agreed with the present findings on *T. ilisha* of Indus river. Quddus *et al.*, (1984b) reported that the fecundity bears linear relationship between length and weight in *H. ilisha* from Bangladesh, which support the findings of the present study. Quddus *et al* (1984c) studied on the spawning, fecundity of two types *T. ilisha* from Bangladesh. It was also noticed during the present investigations that the type A found to be more fecund than type B. Similar observations have also been reported by Quddus *et al.*, (1984c) from Bangladesh. It is therefore concluded, on the basis of morphometric, meristic characters and fecundity study there seems to be a possibility of that a different race or type of *T. ilisha* exists in Indus river, Sindh, Pakistan.

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