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Fecundity of Palri, *Gudusia chapra* (Hamilton) from Fishponds of Chilya Hatchery (Distt. Thatta), Sindh, Pakistan

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Abstract.- The estimation of fecundity in *Gudusia chapra* from fishponds of Chilya hatchery (Distt: Thatta) was based on 138 mature fish specimens, collected during April to August 2004. Fecundity of G. *chapra* varied from 1105 to 26532 eggs. The relation between fecundity (F), total length (TL), standard length (SL), body weight (BW), gonadal length (GL) and gonadal weight (GW) were calculated. A positive relationship exists between the fecundity and gonadal weight.

Key words: Fecundity, fishponds, *Gudusia chapra*

INTRODUCTION

Palri, *Gudusia chapra* is one of the important freshwater indigenous small c1upeid fish, which commonly occurs in lakes, and ponds of Pakistan, India and Bangladesh (Narejo *et al.,* 2000). The present investigation on the fecundity of *G. chapra* was carried out in order to contribute some knowledge to the future biologists for more intensive research in the culture and management of this fish. Knowledge on the fecundity of a fish species is important for determining, spawning potential and its success (Qasim, 1973), fluctuations in the egg production potential of individuals of a stock related to age and growth (Nagasaki, 1958; Hodder, 1963; Ludwig and Lance, 1975) and effect of environmental factors (Nikolski, 1963; Wrdoski and Cooper, 1966; Bagenal, 1969; Devalming, 1971; Tyler and Dunn, 1976) and fourthly formulating the commercial management of fishery (Lagler, 1956; Doha and Hye, 1970).

No work on the fecundity of this fish species from any water body of Pakistan been reported in literature. The fecundity of this fish species has however, been studied by Quddus (1993), Kabir *et al.* (1998) and Afroz (2000) from Bangladesh and Mustafa and Ansari (1983) from India. The present study deals extensively with the fecundity of *G. chapra* from fishponds of Chilya Hatchery (District Thatta), Sindh, Pakistan.

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MATERIALS AND METHODS

The fecundity of 138 mature females (total length ranged from 11.4 to 19.0 cm) was collected from fishponds of Chilya Hatchery (Distt: Thatta) during April to August 2004 by cast and seine nets. The collected fish were divided into 10 mm length groups. The body length was determined to the nearest mm and body weight was measured to the nearest 0.1 g. The ovaries from each fish were carefully removed, washed and preserved in 5% formalin. Each pair of ovaries was dried with the help of blotting paper then weighed to the nearest 0.01 g. Gravimetric method was used to determine the fecundity (Bagenal, 1969).

RESULTS

The estimated number of eggs ranged from 1106 to 28532, from the size range of 114 to 190 mm, total length, standard length ranges from 100 to 150 mm, total weight was12.47 to 50. 47 g, gonadal weight was 0.50 to 1.13 g, gonadal length was 30 to 44 mm (Table I). The relationship between the fecundity and five variables i.e., total length (TL), standard length (SL), gonadal length (GL), gonadal weight (GW) and total weight has been analyzed separately (Table II).

Table I.- Estimated number of oocytes in relation to mean total length, standard length, total weight and gonadal weight of *Gudusia chapra* (Hamilton) from fishpond of Chilya Hatchery (Distt: Thatta), Sindh, Pakistan.

Length groups (mm)	Mean total length (mm)±SD	Mean standard length (mm)±SD	Mean total weight (g) ±SD	Mean gonadal weight (g) ±SD	Mean gonadal length (mm) ±SD	Number of oocytes		
						Minimum	Maximum	Mean±SD
110-11 9.9	113.6± 3.85	100±3.00	12.47± 2.46	0.50± 0.44	30 ± 2.11	3766	9190	4589.50± 823.50
120-129.9	122.6± 1.59	104 ± 1.69	15.63± 1.78	0.51± 0.33	32 ± 2.01	1106	11025	6030.0± 3751.50
130-139.9	133.7± 2.87	108 ± 2.87	21.14± 1.73	1.06± 0.87	33±4.21	1953	117613	9036± 6858.40
140-149.9	142.3 ± 2.05	120±2.15	24.81 ± 2.22	0.92 ±,0.66	35 ± 3.20	4653	21720	10843± 7715.63
150-159.9	153.7± 2.97	125±3.17	30.83 ± 3.40	0.90± 0.44	38± 5.11	1889	28532	10854.7± 7563.30
160-169.9	163.5± 3.16	133± 3.05	37.66± 4.79	1.04± 0.59	40 ± 1.57	2472	25099	9130.80± 6376.90
170-179.9	175.3± 1.69	141± 1.50	45.98± 2.50	1.26± 0.38	43 ± 2.27	10940	19530	14403.30± 3698.8
180-189.0	183.5±1.50	150±1.30	50.17±1.33	1.13±0.33	44±3.11	9848	17885	13866.50± 4018.5

Table II.- Regression equations for total length (TL), standard length (SL), gonadal length (GL), total weight (TW) and gonadal weight with fecundity (F) of *Gudusia chapra* (Hamilton) from fishpond of Chilya Hatchery (Distt: Thatta), Sindh, Pakistan.

Variable	Length (mm) / Weight (g)			Value of regression ±SE	Value of intercept ±SD	Correlation coefficient (r)	Significance of `r' at 5% level
	Mini.	Maxi.	Mean±SD				
TL (n=138)	114.0	190.0	142.17±26.70	1.36958±0.5662	2.114529±2.79916	0.34237	Sig. F=0.0199
SL (n=138)	100.0	150.0	113.30±21.81	1.39311±0.56749	2.31248±2.67559	0.34708	Sig. F=0.0181
GL (n=138)	30.0	44.0	40.48±9.65	1.55941±0.41486	3.14099±1.5291	0.49302	Highly sig. F=0.005
TW (n=138)	14.47	50.47	27.05±13.41	0.47454±0.19504	7.38197±0.62439	0.34436	Sig. F=0.0191
GW (n=138)	0.50	2.18	0.86±0.56	0.844139±0.06598	9.24877±0.064122	0.88777	Highly sig. F=0.000

Fecundity and total length

To establish relationship between total length and fecundity, the values of regression (b), correlation coefficient (r.), the intercept (a) and standard error (SE) have been presented in Table II. The equation for the regression of fecundity (F) on total length (TL) was follows: Log F = 2.114529 + 1.36958 TL (r = 0.34237)

The above equation and the estimated regression line (Fig. 1A) showed that the relationship between fecundity and total length was linear. A test of significance (signif. F = 0.0199) showed that the value of the regression coefficient was significant ($p<0.05$) at 5% level.

Fecundity and standard length

The regression of log fecundity (F) on log standard length (SL) has been shown in Figure 1B**.** From the regression of the fecundity (F) on standard length (SL) following equation was obtained: Log F = 2.31248 + 1.39311 SL (r = 0.34708)

The above equation and the estimated regression line (Fig. 1B) showed that the relationship between fecundity and standard length was linear. A test of significance (signif. F = 0.0181), showed that the value of the regression coefficient were significant at 5% level ($p<0.05$).

Fecundity and gonad length

The regression line for fecundity and gonad length clearly suggests a linear relationship (Fig. 1C). The values of the regression (b) and correlation coefficients (r.), the intercept (a) and S.E. have been shown in Table II. When tested statistically (signif. F = 0.0005), the values of the regression coefficient were found significant ($p<0.05$). The equation estimated from the regression analysis was as follows: Log F = 3.14099 + 1.55941 GL (r = 0.49302).

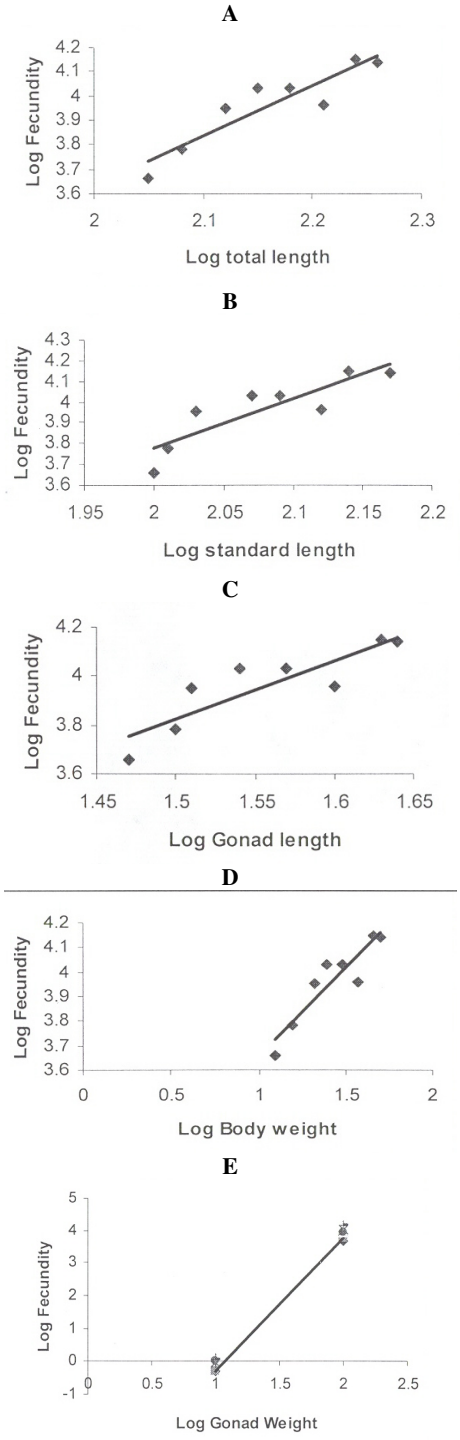

Fig. 1. Relationship between fecundity and five variables in *Gudusia chapra* (Hamilton) collected from fishpond of Chilya hatchery (Distt: Thatta), Sindh, Pakistan.

Fecundity and body weight

The regression of log fecundity (F) on log body weight (BW) has been given in Figure 1D. The values of the regression (b) and correlation coefficients (r.), the intercept (a) and S.E. have been shown in Table II The relationship between fecundity to body weight may be expressed by the following equation:

$$\text{Log } F = 7.38197 + 0.47454 \text{ BW } (r = 0.34436)$$

The above equation and the estimated regression line (Fig. 1D) showed that the relationship between them was linear. A test of significance (signif. F = 0.0191), showed that the value of the regression coefficient were significant ($p<0.05$).

Fecundity and gonad weight

The regression of log fecundity (F) on log gonad weight (GW) has been given in Figure 1E. The values of the regression (b) and correlation coefficients (r), the intercept (a) and S.E. have been shown in Table II. From the regression of the fecundity on gonad weight the following equation was obtained:

$$\text{Log } F = 9.2477 + 0.844139 \text{ GW } (r = 0.88777)$$

The above equation and the estimated regression line (Fig. 1E) showed that the relationship between them was linear. A test of significance (signif. F = 0.000), showed that the value of the regression coefficient were highly significant ($p<0.05$).

A comparison of the correlation coefficients showed that a better relationship existed between the fecundity and gonad weight, which was highly significant ($P>0.01$). The next highest relationship was found between fecundity gonad length ($P>0.01$). The relationship between fecundity with total weight was non-significant ($P>0.01$). It may be assumed from the regression analysis that the size and weight of the fish has little association with the maturity (size of gonad).

DISCUSSION

The present study revealed that the fecundity of *G. chapra* varied from 1106 to 28532 eggs in a fish collected from fishponds of Chilya hatchery

(Distt; Thatta), Sindh. Afroz (2000) estimated fecundity of *G. chapra* varied from 1266 to 29040 eggs in the fish from Jhangimagar University pond, while Kabir *et al.* (1998) calculated fecundity of *G. chapra* ranged from 25220 to 154528 eggs in earthen ponds from Bangladesh. Mustafa and Ansari (1983) reported that the fecundity of *G. chapra* varied from 113 93 to 82719 eggs in the fish of Baigal and 11544 to 56824 eggs in Nanaksagar reservoirs from India. In the present study, the fecundity of *G. chapra* was in accordance or very close with the findings of Afroz (2000) from Bangladesh but was much less than those obtained by Kabir *et al.* (1998) from Bangladesh and Mustafa and Ansari (1983) from India. It was noticed during the present investigation that the same sized fish had different number of eggs in their ovaries. This variation was also reported by Doha and Hye (1970); Karim and Hossain (1972); Davis and West (1993) in other fish species. During the present study it was also noted that in some cases, fecundity of a fish of larger size was less than that of a smaller fish. This phenomenon was also observed by Islam and Talbot (1968) in *Tenualosa ilisha.* In the present study, the relationship between fecundity-gonad weight was highly significant than that between fecundity- fish length, fecundity-body weight and fecundity-standard length. Therefore, it was obvious that in case of *G. chapra* fecundity could be better expressed by gonad weight than fish length and body weight. Similar observation have been reported by Kabir *et al.* (1998) for *G. chapra,* collected from earthen ponds of Bangladesh.

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