

Study on Gonado-Somatic and Fecundity Relationship in Air Breathing Fish *Channa gachua* (Ham. 1822) from Godavari near Aurangabad

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Abstract: Studies have been carried out on maturity of oocyte (egg) in *Channa gachua*. Development of oocytes was measured with the help of Oculometer and maturity stage of gonad found varies according to different breeding phases. More number (30.7%) of oocytes (eggs), observed in pre-spawning and spawning period, where as less number (0.99%) oocytes (eggs), observed post-spawning period. Gono-Somatic Index (GSI- 55.68%) and Fecundity noticed (30.6 %) as maximum to the respective weight.

Key word: Oocyte • *Channa gachua* • Spawning

INTRODUCTION

Fish body weight and weight of gonad gives the gonado-somatic Index (G.S.I.). Mean while the development and growth of gonad simultaneously take place in the fish. Fish grows; the G.S.I. is high.

The term "fecundity" can be expressed as the number of eggs laid in a single in one season by the species. In order to assess the population stock of any species the accurate estimation of the fecundity is essential. This will to understand that whether fish has attain the maturity and able to produce number of eggs in the spawning period. The relation between G.S.I and fecundity also studied by [1,2]. Present study insured that the growth of fish body weight and gonadal development along with egg laying capacity (fecundity) and when the fish attains its first maturity.

MATERIALS AND METHODS

Collection of Samples: For the estimation of fecundity gravimetric method was applied. Fresh gonads were removed from the fish within a few hours of capture and their sex and stage of reproductive maturity determined using a macroscopic staging system. Gonads obtained from recreational fishers could usually be weighed in fish (gm). Two or three transverse cuts were then made through each gonad to ensure proper fixation.

Fresh Samples: Length (cm) and weight (gm) are measured in each fish. Total length (TL) is measured to the tip of the mouth to the end of the tail.

Development of matured oocytes were measured with the help of Oculometer and found vary according to breeding phase. Gonado-Somatic Index and fecundity have been calculated during the study.

$$\text{Fecundity (F)} = \frac{\text{Total wt. of ovary}}{\text{Wt. of sub-sample}} \times \text{No. of mature eggs (ova) in sub-sample}$$

Gonado-somatic Index (GSI) Is Measured by Using Following Formula:

$$\text{GSI (\%)} = \frac{\text{Weight of gonad}}{\text{Weight of fish}} \times 100$$

RESULT AND DISCUSSION

The specimen (total length 17 cm and body weight 51gm) found caring 420,000 eggs and the smallest sized fish (total length 12.5cm and body weight 23.0g) caring eggs 199, 980. But variation was found in the fecundity in fish of equal length of fish group. Increased diameter of oocyte (ovum) tends to the maturity of ovary. *C. gachua* follows the normal gonad development and possesses normal reproductive behavior even in adverse water medium. Gonado-Somatic Index was observed high in the same month June (55.68) (Table 1) and low in January

Table 1: Showing Gonado Somatic Index in *C. gachua*

Months	Avg. fish body weight (gm)	Avg. weight of ovary (gm)	G.S.I. (%)
January	12.0	2.0	6.0
February	13.5	3.0	6.2
March	13.6	3.9	7.1
April	15.2	2.5	7.3
May	15.2	3.1	7.23
June	18.5	7.0	25.2
July	26.6	8.5	55.68
August	23.5	5.97	34.48
September	16.4	2.0	7.54
October	15.2	3.2	8.0
November	16.0	5.8	12.0
December	16.4	2.0	7.54

Table 2: Regression co-efficient (b-slope), intercepts (a), and correlation co-efficient (r) in the F/TL, F/TW, F/GL and F/GW relationships in *C. gachua*

Relationship between		Values of	Values of	Values of regression	Values of	Values of correlation	Significant at
Fecundity (X)	Total length (Y)	SD of X	SD of Y	coefficient (b)	Intercept (a)	coefficient (r)	5%
F	TL	30.7	15.0	2.9	9.2	0.8	**
F	TW	30.06	33.7	3.64	26.42	0.7	**
F	GL	3.0	6.1	3.1	0.1	0.87	**
F	GW	11.8	14.9	3.1	8.7	0.8	**

** Moderate

Table 3: Showing Fecundity in *C. gachua* during spawning

Month	Avg. Length of fish (cm)	Avg. Weight of fish (gm)	Avg. Weight of ovary (gm)	Avg. Length of ovary (cm)	Fecundity (%)
January	17.0	40.1	2.0	3.9	0.99
February	14.5	33.2	3.8	4.1	4.96
March	14.2	32.2	4.0	1.9	3.46
April	13.0	26.3	5.8	3.0	4.05
May	12.5	23.4	7.9	2.0	30.7
June	14.0	34.0	8.8	1.9	30.06
July	14.9	30.0	8.18	0.07	25.8
August	12.0	31.0	3.2	2.0	3.7
September	13.0	33.0	3.42	3.4	3.71
October	14.7	33.7	5.35	1.9	12.96
November	15.0	45.0	3.3	2.8	3.6
December	17.0	50.1	4.0	3.9	3.2

(6.0) (Table 1). High fecundity was observed in June (30.06) and low in January (0.99) (Table 2) on the graph peak value was observed while discussing the present result, total specimen, 100 fishes were studied in each month. The minimum average length 12.5 cm and average body weight 23 g. where as the maximum average length 17 cm and average body weight 51 g. was found. 4, 20,000 and 199,980 eggs were observed in the respective fish

group in the peak month. Similar result was observed in *Hilsa ilisha* from the river Padma. The regression equation $Y = a + b x$, or $Y = 3.4234 + 14.089x$ The variation of fecundity is common in fish [3] and the number of eggs produced by an individual is size, age, condition dependent [4]. Workers have suggested that the reproductive capacity of any species varies according to availability of space and food [5].

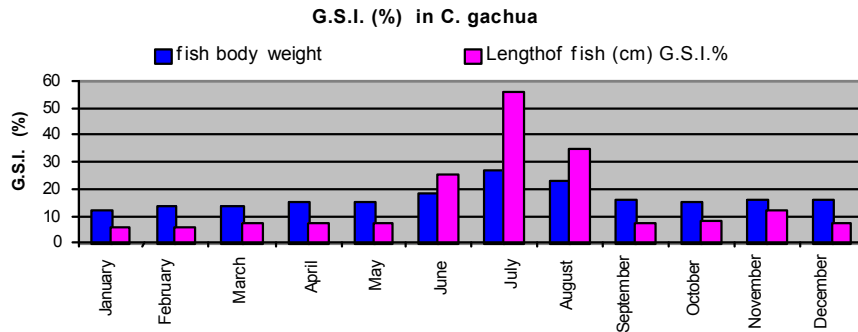


Fig. 1: Showing G.S.I. (%) in *C. gachua*

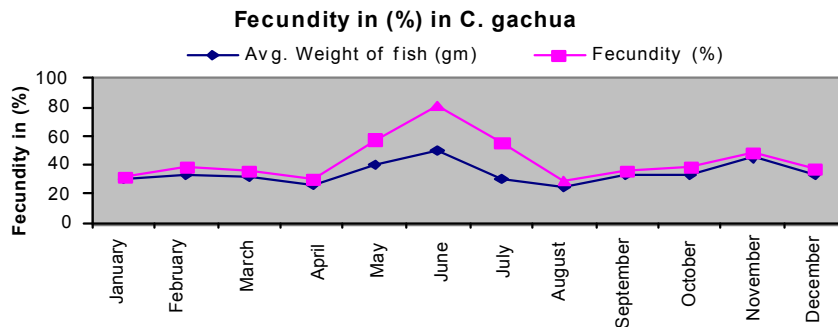


Fig. 2: Showing Fecundity (%) in *C. gachua*

CONCLUSION

The ratio between the body weight and the weight of the gonad showing the status of the ovary in terms of maturity and denotes the phase of reproductive cycle. G.S.I. of fish found increased (55.68) with the maturation of the fish and gonad. Where the GSI was found lowest (6.0) during post spawning phase and was highest at the peak of maturity during spawning phase. In the present investigation and the graphical representation shows there is the intimate relationship between the length of ovary and its relative weight. On the graphical representation, in the month of August the high values of gonad weight and fecundity were concluded.

Fecundity was studied for capture management and potential of stock regarding the number of eggs laid by the female during spawning season. Studies were carried on the development of oocyte (eggs) in *C. gachua*. More number of oocytes observed in pre-spawning and spawning period where as less number were observed post-spawning period shown in the form of fecundity. Gonado- Somatic Index signifies the varied number of oocytes observed during study. The peak of breeding phage was observed during June-July where as the rest of months deserved for low egg production.

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