



ORIGINAL ARTICLE

The Growth Rate of Gonads in *Hemipimelodus jatius* (Ham.) from Kheetam Lake in Agra, U.P.

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ABSTRACT

The behavior of maturation, spawning, reproductive behavior and gonadosomatic index, the fishes ranging from 20.6 to 78.7 mm. *Hemipimelodus jatius* (HAM.) were obtained from the local sources, their dissections were done in fresh conditions. The size and position of the gonads were noted and the fishes were separated in five stages according to maturity (Qayyum and Qasim, 1964). Over 140 specimens (of the two species), covering all the above stages have been selected. After dissection, the ovaries were hardened in 10% formalin. The random samples of 500 ova were measured from each ovary of all the fishes under microscope with an eye piece micrometer (Clark, 1925). Further the cycle of maturation and depletion of gonads, spawning and its frequency have been done by a separate ovum diameter frequency polygons and the growth rate of the gonads in males and females have been also studied.

Key words: Gonads, *Hemipimelodus jatius*, Agra

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INTRODUCTION

A ratio has been derived between the size of gonads and the fish length (TL) (Table- 1). The regression of the same has been noted to be $y = 0.8438 + 0.4058 x$ for males and $y = 1.2883 + 0.4289$ for females. The linearity of the regression has been tested where the 'F' was very high than the tabulated values showing the highly significant nature for the length of gonads. The correlation coefficient is found to be 0.9616 for the testes and ovaries respectively showing the high degree of correlation ship. The straight line of the graph further confirms this, showing the growth of ovary being higher than the ovaries.

A ratio has been derived between the size of gonads and the fish length (TL). The regression of the same has been noted by $y = a+bx$ where a & b are constant and x is TL and y being the length of gonads. This comes out to be $y = 0.3175 + 0.2719 x$ for males and $y = 0.7375 + 0.2200x$ for females. The linearity of the regression has been tested by the analysis of variance where the 'F' is very high than the tabulated values, showing the highly significant nature of the length of gonads. The correlation coefficient is found to be 0.9893 and 0.9795 for the testes and ovaries respectively. This again shows a high degree of co-relationship. Individually the description runs as under.

The sexual game starts in the mid-August and continues till the end of September. The game takes place in the early morning after sunrise and is completed in the following sub-stages-

1. The male and female start moving in a circle, one after the other, in a clockwise direction.

2. Sometime, the movement of the male is so swift that it hits the middle region of the female by its head region, probably initiating for a clasp.
3. Generally three to four males run with a female.
4. After the sexual selection one or two males come close to the female laterally and runs shoulder to shoulder, with normal rubbing of the bodies.
5. This position is most suitable for 'enfolding'.
6. The ring of the male is never formed.
7. The female rotates a little and comes in the bend of the male by tilting its ventral side in the lateral position.
8. After 3 to 4 circles, the male and female move embracing each other by making an each over the female, and press each other.
9. The paired fins of both do not move, i.e. they become non-motile.
10. The female also become 's' shaped. This is called "mating posture".
11. After half to one minute the cloaca of the female pours the eggs and the male, its milt.
12. Such condition is repeated 2 to 3 times.
13. The game is completed in a short span of time ranging from 8 to 12 minutes.

DISCUSSION

Growth of gonads have been tackled by Prabhu (1955) while working on *Tricxhiruus haumela*, showing a straight line relationship in length and the gonads which have also been reported in both the fishes in present study. The weights of the testes have higher rate of increase than in the ovaries as has been shown by Hickling (1940) Whole working on Herring. This is same in our fishes, but Unlike to Radhakrishnan (1957), who has shown the higher rate of the ovaries of *Sillago sihama*.

Though, the sexual behavior in the natural environments is different from that in the captivity, however, some resemblances like chasing and slight-splashing are alike as has been shown by Chaudhary (1969) on breeding of major carps. Further the holding of females by males, bending round the females, rubbing, knowcking, nudhing, locking and embracing have been in full agreement to the observations of Khan, 1924 and Dubey & Tuli, 1961.

Table 1: Growth Rates of Gonads: Relationship between Total Length of Ovary and Testis of the Fish *Hemipimelodus jatius* (Ham.)

S.No.	Length group of male and female in mms.	Mean Length	Average length of ovary	Average Length of testis of testis
1	20-22.9	21.4	-	5.6
2	23-25.9	24.4	7.0	6.9
3	26-28.9	27.4	9.0	8.5
4	29-31.9	30.4	10.4	10.4
5	32-34.9	33.4	12.1	11.6
6	35-37.9	36.4	14.4	13.1
7	38-40.9	39.4	15.5	14.9
8	41-43.9	42.4	17.3	16.3
9	44-46.9	45.4	19.2	-
10	47-49.9	48.4	20.7	19.2
11	50-52.9	51.4	22.2	21.0
12	53-55.9	54.4	24.0	22.5
13	56-58.9	57.4	25.9	24.2
14	59-61.9	60.4	-	25.6
15	62-64.9	63.4	29.2	-
16	65-67.9	66.4	31.0	29.2
17	68-70.9	-	-	-
18	71-73.9	72.4	-	32.4
19	74-76.9	75.4	63.1	-
20	77-79.9	78.4	38.4	-

In the present study, the gonado-somatic index is high during the period of spawning and becomes low on the onset of it and a gradual increase upto the peak and rapidly fall after it as has also been shown by Clark (1925), Qayyum and Qasirn, 1964, Capoor (1983) and Mathew (1987).

SUMMARY

1. The ovaries are elongated, flat, reddish brown structure with broad and round anterior and tapering gradually towards the posterior side.
2. The maturity stages show the same five stages- immature virgin, maturing virgin, ripening, ripe and spent. But the first stage is subdivided in 'Immature' and 'Intermediate' stages while the second in the 'early maturing' and 'advance maturing' stages.
3. 'Protandrous' condition in which male in maturing at 35.4 cms. Length and females at 38.2 cms.
4. The spawning of the fish starts in August and continues upto September with peaks in August.
5. The spawning periodicity and breeding season show that the fish spawns only once in a season with no specific periodicities.
6. The growth rate of gonads show that the growth of the testes in higher than the ovaries which has been confirmed statistically.
7. The reproductive behavior show that the 'ring' of male is never formed, the male arches over female at least 3 to 4 times after taking circles and the complete game finishes in 8 to 12 minutes.
8. The gonads-somatic index shows the onset of spawning in August Continuing upto September.

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