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FECUNDITY AND GONADOSOMATIC INDEX (GSI) OF *Osteobrama vigoressi (sykes)* FROM NIRA RIVER, BHOR DISTRICT PUNE, (MAHARASHTRA) INDIA.

***Nirbhay S. Pimple[1] and Sanjay S. Kharat[2]**

[1]Zoology Department, Abasaheb Garware College of Arts and Science (University of Pune), Karve road, Pune-4, India.

[2]Zoology Department, Modern College of Arts, Science and Commerce (University of Pune), Ganeshkhind, Pune-1, India.

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***Correspondence for Author**
Nirbhay S. Pimple
Zoology Department, AbasahebGarware College of Arts and Science (University of Pune), Karve road, Pune-4, India.

ABSTRACT

The study about Fecundity and Gonadosomatic index (GSI) of *Osteobrama vigoressi (skyes)* was undertaken to investigate the reproductive potential of this fish. The fecundity was in range of 6241 to 25262 with a mean value of 14517.4 ±42.54. The mean Gonadosomatic index (%) was 211.81 ±9.134 with a range of 4.349-10.051. The correlation coefficient for Fecundity (Y) and total body weight (X) was 0.9629. The correlation coefficient for Fecundity (Y) and total gonads weight (X) was 0.8937, the correlation coefficient for Fecundity (Y) and total body length(X) was 0.9629, and the correlation coefficient for Gonad weight (y) and total body weight (X) was 0.9202. The regression was linear when graph was plotted against the fecundity for TL, BW, GW, and GSI. The variable observed were significant at $P<0.01$.Knowledge about fecundity of a fish is essential for evaluating the commercial potentialities of its stock, life history, practical culture and actual management of fishery [10,12]. Thus the study would help in knowing the commercial potentialities of the stock and would benefit the fishery economics.

KEY WORDS: stock, life history, practical culture.

INTRODUCTION

Osteobrama vigoressi (skyes) an endemic species from Western Ghats of Maharashtra is been widely consumed by the local population in fresh form as well as dried form. To understand

the gonadal capacity of any fish, gonadosomatic index is the most reliable and scientifically approved indicator. Since it gives a correct time span regarding season of spawning. On the other hand fecundity is defined as the number of eggs that are likely to be laid during the spawning season [1]. Fecundity of any fish is related to egg size, gonad size, and length weight of the female fish. Fecundity is an important parameter to estimate the potentials of egg output by comparing its relation to female size [3]. The reproductive potential is an important biological parameter that plays an important role to estimate and evaluate the commercial potentialities of the fish stocks [5].The main purpose of carrying out this study on *Osteobrama vigoressi (skyes)* is to understand and calculate the reproductive potentials, since this fish is widely consumed in fresh as well as dry forms. Hence the study would benefit the commercial aspect and would contribute to the economic aspect of fishery science.

MATERIALS AND METHODS

Freshly collected *Osteobrama vigoressi (skyes)* from Nira River (Bhor) District, Maharashtra), from fish market were stored in prewashed polyethylene bags in ice and brought to laboratory on the same day of capture. Approximately 50-60 specimens were collected each month for a period of 27 months .They were fixed in 5% buffer formalin solution upon arrival in the laboratory. Since there is no sexual dimorphisms both the sexes, the separation of the female fishes were done based on the bulginess of abdomen, the selected fishes were washed, the excess water from fish was removed with the help of blotting paper. The gonads were kept in 10% formaldehyde for 24 hours, so as to bring about the hardness of eggs which would help to make accurate and easy calculation. They were weight to the nearest 0.01g. The total length (TL) was measured with the electronic measuring scale to the nearest millimeter. The total body weight and the gonad weight were done on the electronic balance. For calculating gonadosomatic index and fecundity the following formula was used:

$$\text{Gonadosomatic index} = \frac{\text{Weight of ovary}}{\text{Weight of fish}} \times 100.$$

Fecundity was calculated by gravimetric method.[9] from anterior, middle, and posterior region of the two lobes three cross section were taken. The eggs from each of the three section were manually counted and the mean number of eggs was calculated. From each

individual fish the total number of eggs was calculated from the sample mean the total weight of ovaries. [4][14]

$$\text{Fecundity} = \frac{\text{Number of ova in the subsample of ovary}}{\text{Weight of the subsample of ovary}} \times \text{weight of ovary in gm.}$$

Result: In *Osteobrama vigoressi (skyes)* the ovary is situated in the body cavity present dorsal to the digestive tract on the either side or air bladder. The ovary is bi-lobed which short oviduct, the shape of the ovary depends on the maturity stage and the amount of ova. The fully extended ovaries reach up to the end of the kidney. The eggs were spherical in shape. To calculate the mathematical relationship between fecundity and other parameters, the values of correlation coefficient (r) was established using the formula: y= bx +a. Mean (± SEM) of fecundity and other parameters of *Osteobrama vigoressi* from Nira River are shown in Table 1. The mean total length of *Osteobrama vigoressi (skyes)* was 4713±1.86 cm. The mean total body weight was 1636.28±245.08 gm, the gonadal weight was 94.586±3.20 gm

Table 1: mean (± SEM) of various parameters of *Osteobrama vigoressi (skyes)* from Nira River, District Bhor. Maharashtra India.

Parameters	Mean ± SEM	Range
Total length (mm)	4713±1.86	124.2-199.4
Body weight (gm)	1636.28±245.08	17.232-67.285
Gonad weight (gm)	94.586±3.20	0.782-4.992
Fecundity	14517.4 ±42.54	6241-25262
GSI	211.81 ±9.134	4.349-10.051

(Table 2) shows the correlation coefficient (r) regression equation that was calculated between fecundity and total body weight, total gonads weight, total body length. In all the cases an positive correlatioship were obtained. The regression equation was found to be linear and the coefficient of correlation shows a highly positive relationship.

Table 2: Correlation coefficient (r) regression equation and significance of correlation of fecundity with parameters like total length, body weight and gonad weight.

Relationship	Correlation coefficient (r)	Regression equation	Significance at 1% level
Fecundity (Y) and total body weight (X)	0.9629	y = 275.79x + 1984.7	significant
Fecundity (Y) and total gonads weight (X)	0.8937	y=3986.8x + 1947.6	significant
Fecundity (Y) and total body length (X)	0.877	y = 2726.7x – 28364	significant
Gonad weight (y) and total body weight (X)	0.9202	y = 14.394x + 0.0611	significant

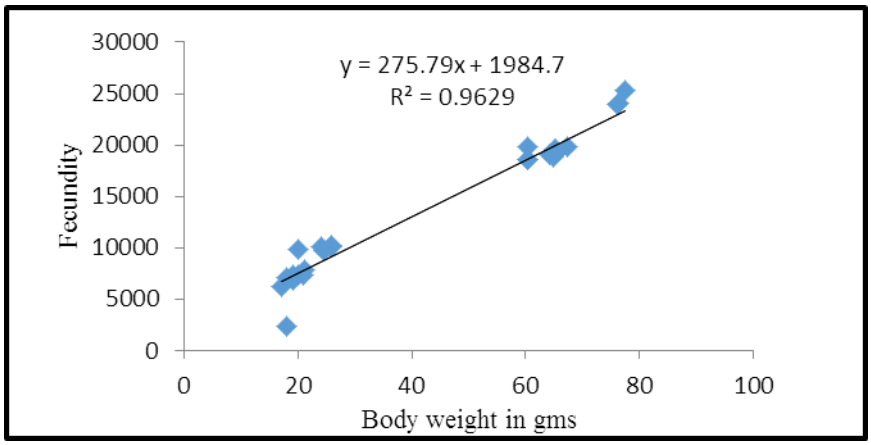

Fig1: Relationship between fecundity and total body weight of *Osteobrama vigoressi (skyes)* from Nira River, District Bhor.

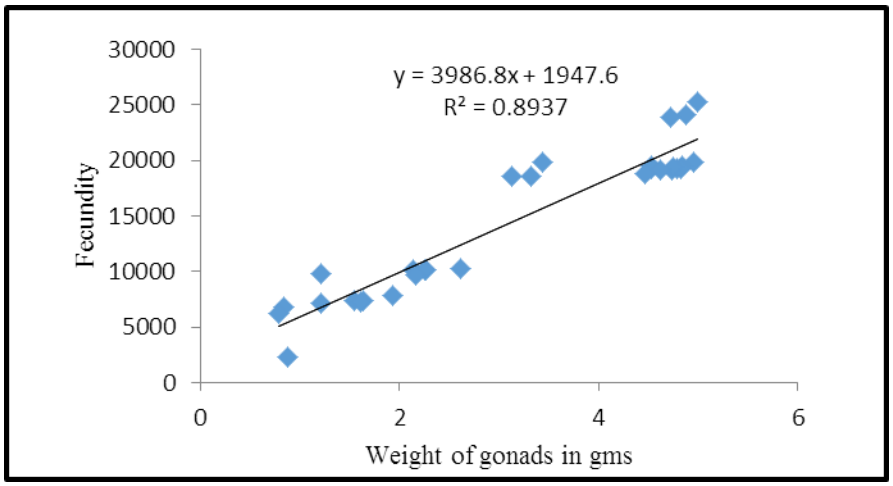

Fig2: Relationship between fecundity and weight of gonads of *Osteobrama vigoressi (skyes)* from Nira River, District Bhor.

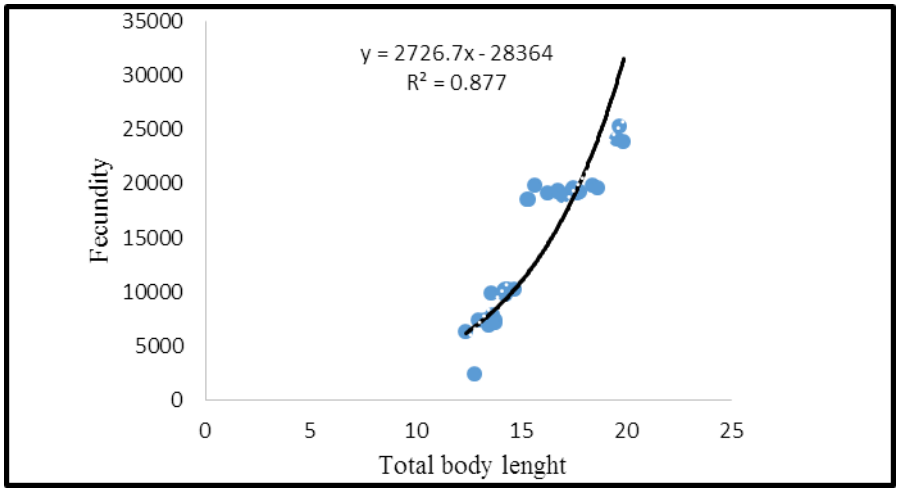

Fig3: Relationship between fecundity and total body length of *Osteobrama vigoressi (skyes)* from Nira River, District Bhor

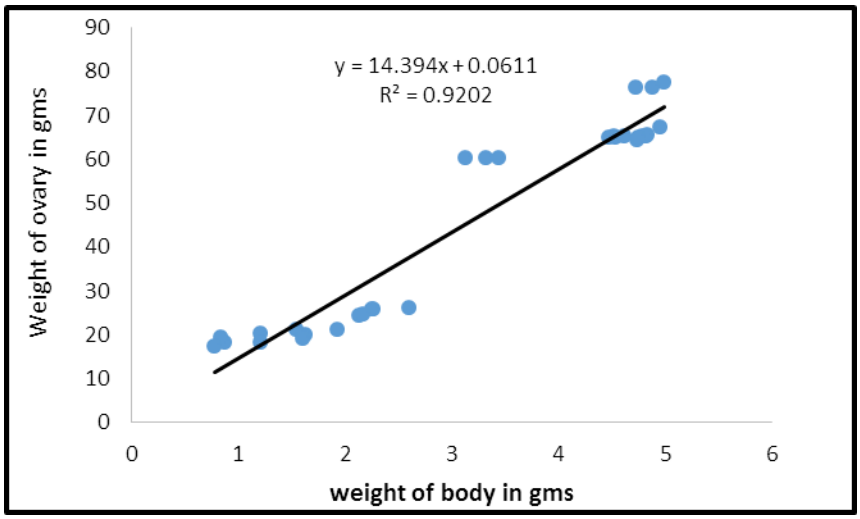

Fig4: Relationship between weight of ovary and weight of body of *Osteobrama vigoressi* from Nira River, District Bhor

The relationship between fecundity and total body weight showed a significant positive correlation which is liner r=0.9629. The relationship between fecundity and total gonad weight showed a significant positive correlation which is liner r=0.8937. The relationship between fecundity and total body length showed a significant positive correlation which is liner r=0.877. The relationship between Gonad weight and total body weight showed a significant positive correlation which is linear r=0.9202.

DISCUSSION

In *Osteobrama vigoressi (skyes)* the Gonadosomatic Index was higher during the month of February-March as well as in the month of September-October. This clearly states that the fish spawns twice a year one is the pre monsoon and the second is the post monsoon spawning. It is familiar that the Gonadosomatic Index (GSI) increases with the maturation of fish and decline abruptly thereafter [16].To estimate the fecundity of fishes, one need to consider a variety of attributes including size at first sexual maturity [6] duration of spawning season, daily spawning behavior, and spawning fraction [17]. Fecundity in *Osteobrama vigoressi (skyes)* varied from (mean ±SEM) =14517.4 ±42.54 for range 6241-25262. The study shows that the fish is low fecund. There would be various reason for it including the environmental factor as well as availability of food supply.[13] Reported that fish fecundity varies with body length or weight, as it was found for *Osteobrama vigoressi (skyes)*. The variation of fecundity is a common factor and has been reported by many researchers. [4][2] [12] Nutritional status of the fish is also related to the fecundity [7].Time of sampling and maturation stages can affect the fecundity within the species and between fish population [2].

The relationship between Fecundity (Y) and total gonads weight (X) was found to be linear, significant (r=0.8937) and the equation was Y=3986.8x + 1947.6. Fecundity increases with increase in gonadal weight, which is also studied and explained by [18]. Positive correlation between fecundity and body weight has been reported [7], which supports the present findings. In addition, positive relationships between fecundity and total length have been reported in a number of fishes in accordance with the present findings [11]. In *Ostobramavigoressi* the relationship between fecundity and body weight was significant (r = 0.9629) and found to be linear (y = 275.79x + 1984.7). Gonad weight (y) and total body weight (X) relationship was highly positive with (r= 0.9202) and the equation was y = 14.394x + 0.0611.

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