

Analysis on Gonadosomatic Index and Fecundity of Terapon Puta from Nallavadu Coast Pondicherry

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Abstract- In the present study fecundity of Terapon puta was estimated for 47 matured females from the Bay of Bengal, Pondicherry. The fecundity (F) was found to range from 20,002 to 1,23,042 in fishes between 134-219mm Total length(TL) and 30-78 gm weight respectively. The co-efficient of correlation for F/TL ($\log F = 0.790 + 1.731 \log TL$), F/SL ($\log F = 0.799 + 1.773 \log SL$), F/TW ($\log F = 2.590 + 0.450 \log TW$) and F/GW ($\log F = 0.518 + 1.7183 \log GW$) were obtained as 0.277, 0.282, 0.248 and 0.902 respectively. The regression line for the TL, SL, TW and GW of the fishes were found to be linear when they were plotted against their fecundity on logarithmic scales. Significant ($P < 0.05$) linear relationship was obtained for the variables standard length and fecundity. Highly significant ($P < 0.01$) relationship was obtained between gonad weight and fecundity. Gonad weight was found to be the best indicator of the fecundity of Terapon puta.

Index Terms- Fecundity, Terapon puta, GSI, Reproductive biology.

I. INTRODUCTION

Terapon puta belong to the family teraponidae is a medium size food fish which inhabits the sea, backwater and estuaries in Pondicherry coast.

Though they are not commercially important, they together constitute a regular fishery throughout the year. No information available regarding the fecundity studies of Terapon puta with the view of supplementing this, the present study was undertaken along the Pondicherry coast.

The number of eggs contained in ovary of a fish is termed as fecundity. The term fecundity denotes the egg laying capacity of a fish or it refers to the number of ripe eggs produced by a fish in one spawning season. Knowledge about fecundity of a fish is essential for evaluating the commercial potentialities of its stock, life history, practical culture and actual management of the fishery[3] (Laglar,1956). Relative fecundity is the number of eggs per unit of weight is commonly used as an index of fecundity. The fecundity of an individual female also varies according to many factors including age, size, types of species, food availability and season. Many works had been done on the fecundity of different fishes by Khan et al (2002)[4], Mohammed Alam and Pathak(2010)[5], Saifullah et al(2004)[1], Shaheena Shafi et al (2012)[7], Shailja mishra and D.N, Saksena(2012)[8],Arifa Akter et al (2007)[6].

II. MATERIALS AND METHODS

A total of 47 matured females of Terapon puta were collected from Nallavadu sea shore of the Bay of Bengal, Pondicherry from July 2008 to June 2009 for the determination of fecundity and gonadal weight in relationship to other parameters. Enlarged abdomen of the female fish was easily distinguished as gravid one. For detail study of fecundity the collected fishes were carried immediately to the laboratory. After thorough wash with tap water the total length of each fish was measured with a measuring scale to the nearest millimeter and the body weight in gram by an electronic balance. Excess water from the fishes were removed with blotting paper before measuring the weight of the fishes. The gonads were dissected out and weighted

Two lobes of the ovary from each sample fish were removed carefully by dissecting out the abdomen and placed in modified gilson's fluid. It helped to preserve the ovary as well as made it much easier to separate the eggs from the ovarian wall. Gravimetric method was used to determine the fecundity of fish (Murua and Saborido-Rey, 2003)[2].

The two lobes of each ovary were dried off removing of excess moisture with blotting paper. Then 0.01g of each ovary was taken separately from anterior, middle and posterior portions of each lobe. The number of eggs in 0.01g was determined and then multiplied by the total weight of the ovary, which gave the total number of eggs i.e the fecundity of respective fish.

Gonadosomatic index (GSI) of the male and female fishes of the collected samples were determined separately by the following method

$$GSI = \frac{wt.of\ the\ gonad}{wt.of\ the\ fish} \times 100$$

The relationship between fecundity and total length, standard length, body weight and gonad weight were determined with the help of a computer software viz SPSS .

III. RESULTS AND DISCUSSION

The relationship between Total length and Fecundity, Standard length and Fecundity, Total weight of fish and Fecundity, Gonad weight and fecundity were estimated by least square method. The fecundity varied from 20,002 to 1,23,042 based on 47 ovaries of fishes ranging in total length from 134 – 219 mm and weight 30 -78 gm.

A. Relationship between total length(TL) and fecundity(F)

The relationship between Total length and Fecundity of Terapon puta showed a linear relationship, expressed by the equation,

$$F = -47479 + 5855 * TL \quad (\text{or})$$

$$\log F = 0.790 + 1.731 * \log(TL)$$

Based on this formula, the fecundity values were calculated for different lengths showed a linear relationship. Hence the present study suggests that the fecundity increase with the increasing length of the fish.

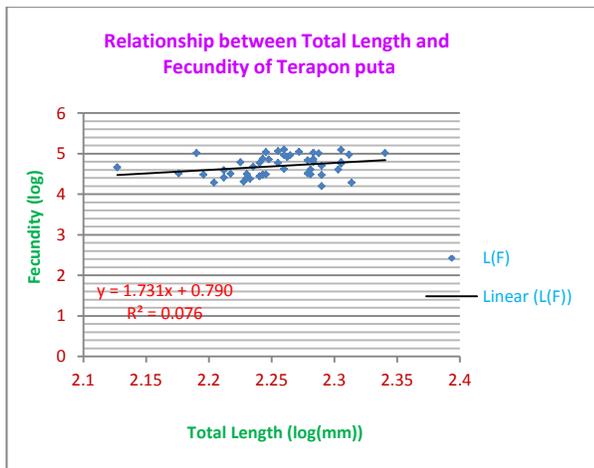


Figure - 1 Relationship between Total Length and Fecundity of Terapon puta

B. Relationship between standard length(SL) and fecundity(F)

The relationship between standard length and fecundity of Terapon puta was found to be linear, expressed by the equation,

$$F = -47550 + 6694 * SL \quad (\text{or})$$

$$\log F = 0.799 + 1.773 * \log(SL)$$

The correlation co-efficient (r = 0.282) between standard length and fecundity was found to be significant at 0.05 level. Hence it was concluded from the present observation that fecundity appeared to increase with the increasing standard length of the fish.

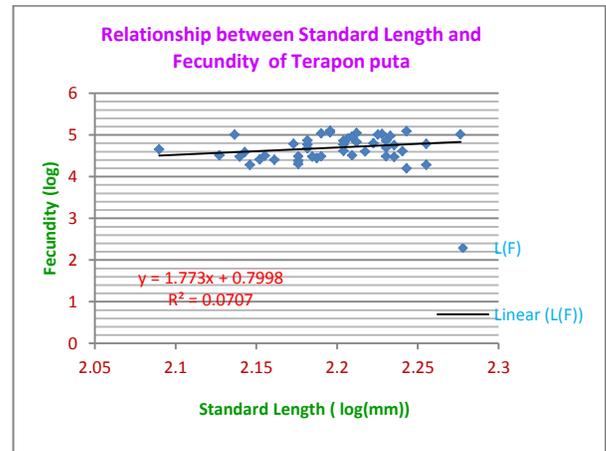


Figure - 2 Relationship between Standard Length and Fecundity of Terapon puta

C. Relationship between total weight of fish (TW) and fecundity(F)

The relationship between total weight of the fish and fecundity showed a linear relationship, expressed by the equation,

$$F = 30811 + 557.0 * TW \quad (\text{or})$$

$$\text{Log } F = 2.590 + 0.450 * \log(TW)$$

The correlation co-efficient (r = 0.248) between total weight and fecundity was found to be significant at 0.09 level. Hence it was concluded that fecundity increase with the increasing with the weight of the fish.

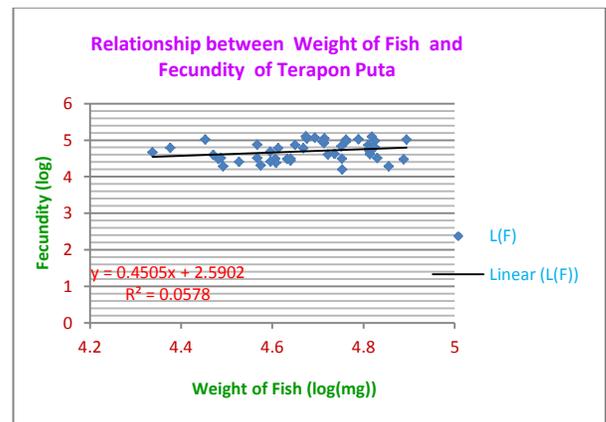


Figure - 3 Relationship between Weight of Fish and fecundity of Terapon Puta

D. Relationship between weight of gonad(GW) and fecundity(F)

The relationship between gonad weight and fecundity showed a linear relationship, expressed by the regression equation,

$$F = -8545 + 17941 * GW \quad (\text{or})$$

$$\log F = 0.518 + 1.183 * \log(GW)$$

The correlation co-efficient ($r = 0.902$) between gonad weight and fecundity was found to be significant at 0.01 level indicating a high degree of relationship between these two variables. Hence Gonad weight was found to be the better index of Fecundity in Terapon puta.

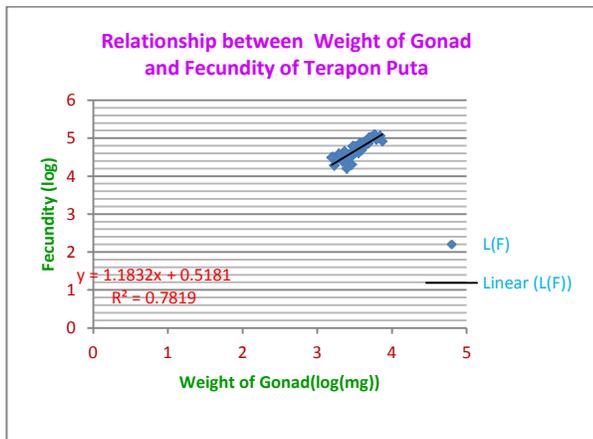


Figure - 4 Relationship between Weight of Gonad and Fecundity of Terapon puta

IV. GONADOSOMATIC INDEX OF TERAPON PUTA

In the present study the GSI increased in March (5.00) indicating maturation of small fraction of their population followed by decline in April (3.81) suggest the onset of spawning.

The GSI showed peak in the month of May (8.40) indicating maturation of large fraction of these species correlating with high water temperature and availability of more food. The decline in June (6.62) indicates the spawning activity. The rise in GSI during July (9.70) further indicates maturation of greater number of fishes followed by spawning in September and October. The gonads were in the resting stage of maturity during November, December, January, February (2.64, 2.63, 3.27, 2.87). The monthly changes in GSI suggest that this species have a protracted spawning period beginning from March to October. The pattern of changes in GSI of males is almost similar to that of females.

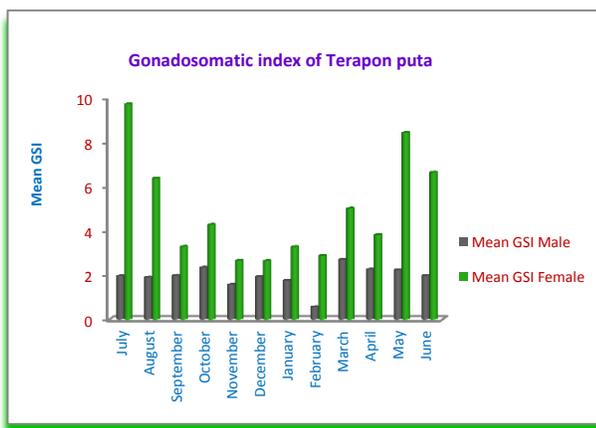


Figure - 5 Gonadosomatic index of Terapon puta

Gonadosomatic index has been considered as reliable estimate for gonad maturity and spawning of any species. The gonadosomatic index increased with the maturation of fish and reaches to its maximum at the peak period of maturity. Its abrupt decrease indicates beginning of spawning. Similar observation was made by Shailja mishra and Saksena (2012)[8] in Labeo Calbasu.

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