STUDIES ON FECUNDITY OF PUNTIUS SARANA (HAM.) IN RELATION TO TOTAL LENGTH, TOTAL WEIGHT AND OVARY WEIGHT

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ABSTRACT

A total of forty three mature female of Puntius sarana (Ham.) ranging from 204 mm to 320 mm in length and 102 to 482 gin weight were used for present studies. The relationship between fecundity with respect to total length (TL), total weight (TW) and ovary weight (OW) was found to be linear. The coefficient of co-relation 'r' of the above relationships was found to be 0.5947, 0.5761 and 0.9837 respectively. All these values are highly significant (P=0.01) indicating a close relationship between these parameters. However, as indicated by value of 'r' (0.9837), the fecundity is more closely related to ovary weight and hence the ovary weight may be a better index of fecundity than the total length or weight.

Keywords: Puntius sarana, fecundity, total length, total weight and ovary weight

INTRODUCTION

Puntius sarana (Ham.) is a common Indian fresh water teleost widely distributed throughout India except peninsular India, South of Krishna river (Jayaram, 1981). This species is an important candidate species of reservoir fishery in India. Sinha (1972) reported that in experimental catches in Loni reservoir, this species contributes 6.8% of the average catch and ranks fourth in this reservoir fishery. The present study on fecundity and the related body parameters viz. TL, TW & OW of this species may help in management of reservoir fishery as these parameters are important indices of fecundity which in turn indicates the potential of auto - recruitment of this species.

The regression studies are more common for TL-TW relationship and such studies are on a limited scale with respect to fecundity. Some important studies incorporating fecundity are due to Clark (1934), Begenal (1967), Sinha (1975), Chonder (1977) Joshi and Khanna (1980), Varghese (1980), Nautiyal (1985) and Kiran and Puttaiah (2003). Thus, present studies will further add to the knowledge of relationship between fecundity and above stated body parameters.

MATERIAL AND METHODS

For present study a total 62 mature female specimens of P. sarana (ranging 202-322 mm in length) caught in the month of May and June, 1990 from Helali
reservoir (M.P.) were studied. The females dissected and their ovaries were examined to determine the maturity stages following the I.C.G.S. Scale (Wood, 1930). Out of these 43 ripe (stage VI) ovaries were selected for fecundity studies. These ovaries were fixed in 5% formaline. After a week's preservation, ovaries were taken out, washed with tap water, wiped of their moisture with blotting paper and cleared of the extra connective tissues and superficial blood vessels. Then they were weighed on a physical balance to the nearest milligram (mg). For counting, the ova were separated by fine needle and brush keeping the ova mass dipped in Gilson's solution in a watch glass.

Fecundity was calculated from counts of mature ova only. Maturity of ova, was further ascertained by microscopic determination of ova diameter by using ocular micrometer. The ova diameter ranged from 0.865 to 1.017 mm, which falls within the range of mature ova (Sinha, 1975). Mature ova from three random sub samples of the ovary of known weight were counted and the fecundity was determined by using the following formula (Sinha, 1975).

\[
F = \frac{W \times (N_1 + N_2 + N_3)}{W_1 + W_2 + W_3}
\]

Where \(F\) = fecundity, \(W\) = total weight of ovary; \(W_1, W_2, W_3\) and \(N_1, N_2, N_3\) are the weight and ova counts respectively of each sub sample.

The corresponding length and weight of the above stated 43 female specimens were measured as per standard method (Dwivedi and Menezes, 1974) up to the nearest millimeter (mm) and gram (g) respectively. The total length of the specimens ranged from 204-322 mm and total weight ranged from 102-482 g.

The relationship between fecundity and total length, total weight and ovary weight were calculated by using least square regression analysis (Bagenal, 1967).

RESULTS

The results are give below for each relationship separately.

Relationship between total length (TL) and fecundity (F):

The scattered diagram of total length \((x)\) and fecundity \((y)\) was found to be linear (Fig.1a).

The relationship between total length and fecundity was worked out to be

\[
F = -165020.633 + 856.595 \times TL
\]

The value of correlation coefficient 'r' was found to be 0.5947 for the above relationship. The value of 'b' \(856.595(2.93)\) was found to be significant at 1\% (\(P=0.01\)) when tested by 't' test and 'r' \((0.5947)\) was also found to be highly significant \((P=0.01)\) Thus, indicating a close and Positive correlation between TL and F.

Relationship between Total weight (TW) and fecundity (F):

The scattered diagram between total weight and fecundity suggests a linear relationship between these parameters (Fig.1b). The value of regression coefficient
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'\(b\)' and constant 'a' calculated empirically. From the value of 'b' and 'a' the following linear regression equation was worked out.

\[
F = -13416.09 + 276.5837 \times TW
\]

The above value of 'b' 276.5837(2.4418) was found to be highly significant when 't-test' was applied.

The value of 'r' was calculated to be 0.5761 for above relationship. This value of 'r' was also found to be highly significant \((p=0.01)\) indicating positive correlation between \(TW\) and \(F\).

Relationship between Ovary weight (\(OW\)) and fecundity (\(F\)):

A linear relationship was obtained for the ovary weight \((x)\) and the fecundity \((y)\) (Fig. 1c). The values of 'b' & 'a' for the above relationship were determined empirically and the regression equation was worked out as;

\[
F = 854.1417 + 2267.9802 \times OW
\]

The value of 'r' was found to be 0.9837 which is highly significant \((p=0.01)\) indicating a close and positive linear relationship between ovary weight and fecundity.

**DISCUSSION**

Different relationships have been found to exist between fecundity and above body parameters by various workers. Linear relationship between fecundity and total length was observed by Chonder (1977),
Singh et al. (1982), Singh and Shrivastawa (1982), Kiran and Puttaiah (2003). However, Sinha (1975) found a curvilinear relationship between fecundity and TL in P. sarana of Loni reservoir (M.P.)

The relationship between fecundity and body weight was found to be linear by Gupta (1968), Sinha (1975), Hodgkiss and Man (1978), Singh and Shrivastava (1982), Kiran and Puttaiah (2003). It was reported to be curvilinear by Yuen (1955) and Varghese (1980).


The values of co-relation coefficient 'r' in present study indicate that ovary weight is very closely related to fecundity (r=0.9837) than total length (r=0.5947) and total weight (r=0.5761). Hence ovary weight is a better index of fecundity than total weight or total length of the fish. The present results agree with studies of kiran and Puttaiah (2003) on Chela untrachi.

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REFERENCES


Jayaram, K.C., 1981. The fresh water fishes of India, Pakistan, Bangladesh,
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