

STUDIES ON FECUNDITY OF *RITA PAVIMENTATA* (GUNTHER)  
IN RELATION TO TOTAL LENGTH, TOTAL WEIGHT  
AND OVARY WEIGHT

V. K. Tiwari and T. A. Qureshi\*

Central Institute of Fisheries Education, Deemed University (ICAR),  
Seven Bungalows, Mumbai – 61.

ABSTRACT

A total of thirty eight ripe ovaries from the specimens of *Rita pavementata*, measuring 230 to 355 mm in total length (TL) and 250 to 750 g in total weight (TW), were selected to study the fecundity. The relationship between fecundity and total length (TL), total weight (TW) and ovary weight (OW) was found to be linear. The coefficient of co-relation 'r' of the above relationship was found to be 0.92, 0.94 and 0.96 respectively. All these values are highly significant (P= 0.01) indicating a close relationship between compared parameters. However, as indicated by value of 'r' (0.96), the fecundity is more closely related to ovary weight and hence the ovary weight may be a better index of fecundity than the total body length or weight.

Keywords: *Rita pavementata*, fecundity, total length

INTRODUCTION

*Rita pavementata* (Gunther), a common freshwater teleost is distributed in many parts of the India. This fish was a candidate species of the river Narbada during the year 1958 and had contributed about 37.60 % of the total fish catch which had come down up to 13.98 % in the year 1966 (Karamchandani *et al.*, 1967). The present studies on relationship of fecundity with related body parameters viz. TL (total length), TW (total weight), OW (ovary weight) of this species may help in management of riverine fishery as these parameters are important indices

of fecundity which in turn indicates the potential of auto – recruitment.

Some important studies incorporating fecundity are due to Clark (1934), Bagenal (1967), Sinha (1975), Chonder (1977), Joshi and Khanna (1980), Varghese (1980), Nautiyal (1985), Kiran *et al.* (2003) and Somdutt *et al.* (2004). However the study on fecundity of this species is scanty, thus, present studies will further add to the knowledge of relationship between fecundity and above stated body parameters which in turn would serve as tool for better management of this resource.

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\* Applied Aquaculture Department, Barkatullah University, Bhopal (M.P.)

## MATERIAL AND METHODS

A total 38 mature female specimen of *R. pavementata* caught in the month of July and August 2001 from Narbada river Hoshangabad (M.P.) was taken for the present study. The corresponding length and weight were measured as per the standard method up to the nearest mm and g respectively. Ovaries were examined to determine the maturity stages following the I.C.E.S. Scale (Wood, 1930) and fixed in 5% formalin for further studies. The relationship between fecundity and total length, total weight and ovary weight were calculated by using least square regression analysis (Bagenal, 1967).

Maturity of ova ascertained by microscopic determination of ova diameter by using ocular micrometer. The ova size, under present study ranged from 0.238 to 1.824 mm in diameter. The ova diameter study indicates that ova in

the range of 1.634 mm to 1.824 mm diameter with a mode 1.69 mm are in fully mature stage during the months from June to August. Mature ova from three random sub sample of the ovary of known weight were counted and the fecundity was determined by using the formula

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

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

## RESULTS

During the present investigation, TL, TW and OW were found in the range of 230 mm to 355 mm, 250 g to 750 g and 11.2 to 42.6 g respectively (Table1). The results are given below for each relationship separately.

**Table 1: Length and weight of the fish, ovary weight and fecundity of *R. pavementata***

S.No.	Length of Fish (mm)	Wt. of Fish (g)	Wt. of Ovary (g)	Fecundity (No. of egg)	No. of eggs/g Ovary wt.
1	230	250	11.2	4850	433.0
2	230	280	10.9	5100	467.9
3	235	280	16.3	9200	564.4
4	240	285	15.6	8600	551.3
5	250	280	14.3	8100	566.4
6	256	300	18.4	13000	706.5
7	260	330	24.6	11300	459.3
8	260	290	17.3	12600	728.3
9	265	225	19.6	13400	683.7
10	270	260	11.2	4850	433.0

Contd....

S.No.	Length of Fish (mm)	Wt. of Fish (g)	Wt. of Ovary (g)	Fecundity (No. of egg)	No. of eggs/g Ovary wt.
11	275	345	29.3	18400	628.0
12	275	340	21.9	13100	598.2
13	275	290	16.6	11800	710.8
14	280	310	21.6	13600	629.6
15	285	360	24.8	16600	669.4
16	290	385	27.3	17380	636.6
17	290	380	28.5	14700	515.8
18	293	390	26.3	17300	657.8
19	295	400	33.8	24700	730.8
20	295	370	25.7	16900	657.6
21	295	380	26.1	17000	651.3
22	295	430	32.8	24300	740.9
23	300	410	33.9	25400	749.3
24	300	408	31.1	23700	762.1
25	310	450	32.9	24600	747.7
26	312	520	35.8	27100	757.0
27	315	480	31.8	23600	742.1
28	315	470	31.5	23400	742.9
29	315	475	33.2	24300	731.9
30	315	530	34.9	25300	724.9
31	320	620	35.7	33800	946.8
32	330	635	38.3	35200	919.1
33	335	580	37.4	27800	743.3
34	335	690	41.2	38300	929.6
35	336	690	40.2	37000	920.4
36	345	660	34.2	26700	780.7
37	345	680	39.4	28300	718.3
38	355	750	42.6	42000	985.9

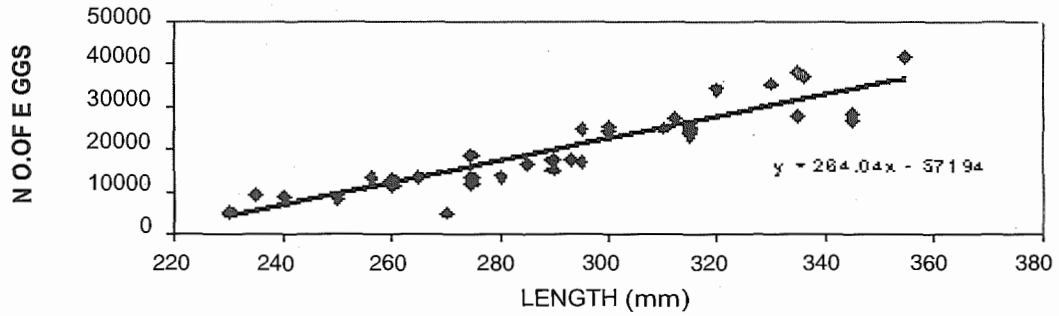
The scattered diagram of total length against fecundity was found to be linear (Fig. 1a). The value of correlation coefficient 'r' is derived as 0.92. The value of 'b' (264.04) and 'r' (0.92) are found highly significant ( $p=0.01$ ) and indicate a linear, close and positive correlation.

The scattered diagram between total

fish weight and fecundity suggests a linear relationship between these parameters (Fig.1b) the value of regression coefficient 'b' and constant 'a' calculated empirically.

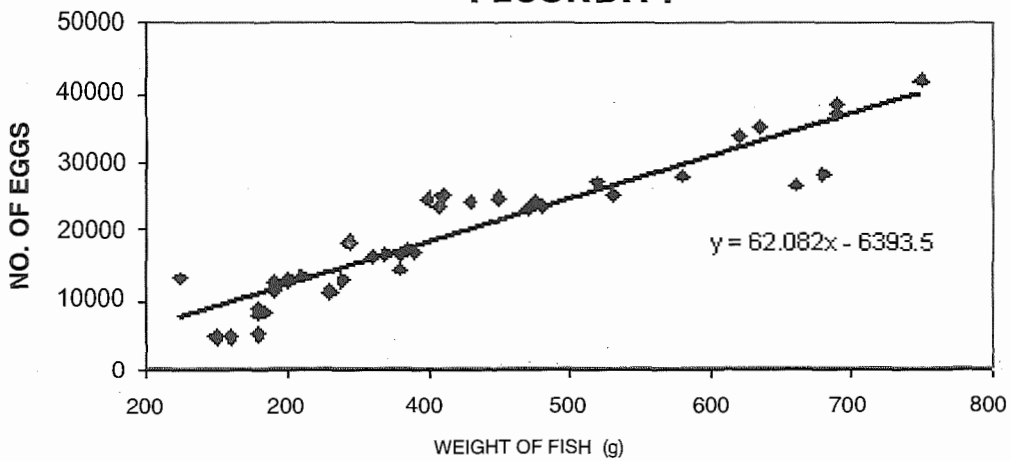
The above value of 'b' (62.062) was found to be highly significant ( $p = 0.01$ ) with 't' test ( $t = 8.21$ ). The value of 'r' was calculated to be 0.94 for above

**SCATTERED DIAGRAM OF TOTAL FISH LENGTH AND FECUNDITY**



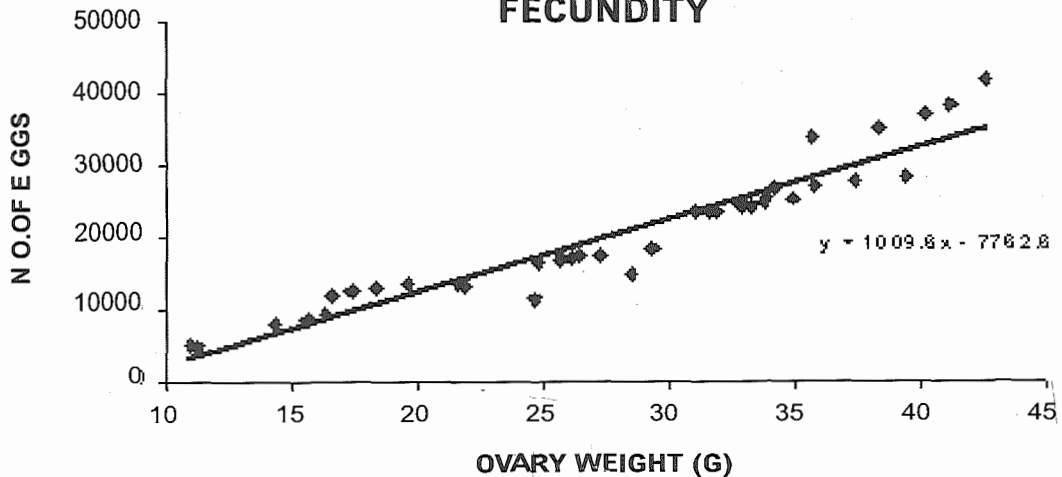
*Fig.1a*

**SCATTERED DIAGRAM OF FISH WEIGHT AND FECUNDITY**



*Fig.1b*

**SCATTERED DIAGRAM OF OVARY WEIGHT AND FECUNDITY**



*Fig.1c*

relationship and was found highly significant ( $p = 0.01$ ) justifying a close, positive and linear relationship between TW and F.

A linear relationship was found for the ovary weight and the fecundity (Fig.1c). The value of regression coefficient 'b' and constant 'a' were calculated empirically. The above 'b' value (1.4201) was found highly significant ( $p = 0.01$ ) when tested with 't' test ( $t = 7.40$ ). The value of correlation coefficient 'r' was found to be 0.96, which is also highly significant ( $p = 0.01$ ) indicating a positive linear relationship between OW and F.

## DISCUSSION

Different relations have been found to exist between fecundity and above body parameters by various workers. Chonder (1977), Singh *et al.*, (1982), Singh and Shrivastava (1982), Kiran and Puttaiah (2003), Somdutt *et al.* (2004), have observed linear relationship between fecundity and total length whereas Sinha (1975) found the relationship curvilinear in *P. sarana* from Loni reservoir.

The linear relationship between body weight and fecundity was observed by Gupta (1968), Sinha (1975), Hodgkiss and Man (1978), Singh *et al.*, (1982), Kiran and Puttaiah (2003), Somdutt *et al.*, (2004). Yuen (1955) and Varghese (1980) have reported curvilinear relationship.

The linear relationship between ovary weight and fecundity was observed by

Bhatanagar (1964) in *L. dero* and *L. bata*, Sinha (1972), Kiran and Puttaiah (2003) and Somdutt *et al.* (2004) in *Puntius sarana*, in *Chela utrachi*.

Among the above three parameters, based on values of coefficient correlation (r), closest correlation was observed with the OW ( $r = 0.96$ ) followed by TW ( $r = 0.94$ ) and TL ( $r = 0.92$ ). Hence, it is concluded that the ovary weight is a better index of fecundity than the total length and total weight. The result is matching with the results observed by Kiran *et al.*, (2003) and Somdutt *et al.*, (2004).

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