



FACUNDITY OF WHIPFIN SILVER BIDDY *GERRES FILAMENTOSUS* (CUVIER) FROM SHARAVATI ESTUARY, CENTRAL WEST COAST OF INDIA

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Abstract

Fecundity of *Gerres filamentosus* varied from 48,300 to 1,16,760 in fishes ranging in size from 154 to 240 mm. Fecundity increases at the rate of cube of the total length. The number of ova per gram of body weight varied from 485 to 955, while the number of ova per gram ovary weight ranged from 11761 to 24250. The relationship between weight of ovary and fecundity is linear and number of ova increases at a rate less than that in relation to total length and body weight.

Keywords: Fecundity, *Gerres filamentosus*, Sharavati estuary

Introduction

Fecundity is one of the best known indicators of the reproductive potential of a species. It is widely known fact that fishes which afford protection to their eggs produce fewer number of eggs, whereas on the other hand, as a precautionary measure, fishes which leave their eggs to the mercy of the current ridden aquatic environment produce very large number of eggs. The ability of egg production also varies within the individual limits such as length, somatic weight, gonadal weight, volume of fish etc. The production of eggs is the dominant function of ovary and a close correlation should be expected between weight of the ovary and the number of eggs produced. Fecundity of fish is determined from the number of ova of the mature group in the ovary. *Gerres filamentosus* (Cuvier) is a well-known fish of the order Perciformes and family Gerreidae wide spread in Indo-West Pacific. It inhabits coastal waters and estuaries.

Materials and Methods

The material for the present study was procured fortnightly from Sharavati estuary from Jan. 2008 to Dec. 2009. The collected specimens were brought to the laboratory, their weight and body length were recorded to the nearest milligrams (mg) and millimeters (mm) respectively. The mature ovaries after removed from the fish were preserved in 4% formalin. The weight of ovary was recorded with the help of a chemical balance. The relationship between fecundity and different variables like length and weight of the fish and weight of the ovary were statistically derived by using the formula $Y = a + bX$. In logarithmic formula it can be written as $\log Y = \log a + b \log X$. Y is fecundity X is variable (length L or body weight W or gonad weight G) Where a and b are constant.

Result and Discussion

The data regarding the length and weight of the fish, weight of the ovary and number of mature ova are shown in table 5. The total number of mature eggs ranged between 48,300 to 1,16,760 in fishes ranging in size from 154mm to 240mm. The average being 67,791 eggs per female.

The relationship between total length of the fish and fecundity (Table 1) can be expressed as

$$\log Y = -6.5733 + 3.6891 \log X$$

In *G. filamentosus* the fecundity increases at the rate of 3.6891 times the total length supporting Simpson's view that the fecundity of a fish increases at the rate of about the cube of the total length.

The exponential value 3.6891 was found to be higher than that value from length – weight relationship 3.0017 in *G. filamentosus*. This suggests that in this species, the fecundity increased at a higher rate than the rate of increase of body weight in relation to length.

The relationship between fish weight and fecundity is linear (Table 2). The rate of increase of fecundity is 1.1018 times the weight of the fish. The equation relating weight of fish and fecundity can be written as

$$\log Y = -0.3737 + 1.1018 \log X$$

In *G. filamentosus* the rate of egg production (1.1018) in relation to weight of fish is much lower than that of length of fish.

The fecundity and ovary weight relationship can be expressed in the form of

$$\log Y = 1.2877 + 0.8953 \log X$$

The relationship between weight of ovary and fecundity is linear and the number of ova increases at

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the rate of 0.8953 times the ovary weight (Table 3). The exponential value (0.8953) indicates that fecundity increases at a rate less than that in relation to total length and body weight.

The ability to produce eggs is known to vary not only among the different species but also within the same species depending upon the weight, length, volume of the fish, weight of the gonad etc. Even geographical distribution is known to have some influence on fecundity.

Table 1. Length of fish and calculated numbers of eggs

Length in (mm)	Fecundity in thousand	Log L X	Log F Y	Estimated		Difference
				Y	F	
154	48.300	2.1875	1.6839	1.4966	31.37	-16.93
160	32.920	2.2041	1.5175	1.5578	36.13	
167	32.227	2.2227	1.5083	1.6264	42.31	3.21
171	35.608	2.2330	1.5469	1.6644	46.17	10.562
172	35.225	2.2355	1.5514	1.6736	47.17	11.945
180	78.451	2.2533	1.8887	1.7467	55.81	-22.641
183	68.880	2.2625	1.8253	1.7732	59.32	-9.56
185	77.400	2.2672	1.8947	1.7906	61.74	-15.66
186	75.126	2.2695	1.8757	1.8334	62.96	-12.166
190	78.213	2.2788	1.8933	1.7991	68.14	-10.073
195	59.076	2.2900	1.7715	1.8747	74.94	15.864
200	97.000	2.3010	1.9868	1.9153	82.28	-14.72
210	110.209	2.3222	2.0012	1.9953	98.53	-11.679
220	121.462	2.3424	2.0845	2.068	116.9	-4.562
230	114.706	2.3617	2.067	2.1392	137.7	22.994
240	116.760	2.3802	2.0599	2.2074	161.2	44.44

Table 2. Weight of fish and observed and estimated number of eggs

Weight of fish (gm)	Fecundity in thousand F	Log W X	Log F Y	Estimated		Difference
				Y	F	
50.530	48.300	1.7036	1.6839	1.5033	31.86	-16.44
52.050	32.920	1.7164	1.5175	1.6660	32.93	0.010
57.220	32.227	1.7576	1.5083	1.6759	36.55	4.323
71.000	35.608	1.8513	1.5514	1.5628	46.34	10.732
72.500	35.225	1.8603	1.5469	1.5174	47.42	12.195
84.026	78.451	1.9594	1.8947	1.7467	55.81	22.641
91.085	66.880	1.9245	1.8253	1.7851	60.96	-5.920
92.200	77.400	1.9647	1.8887	1.7910	61.80	15.600
92.265	75.126	1.9651	1.8757	1.7914	61.86	13.266
98.500	78.213	1.9934	1.8933	1.8226	66.46	11.753
113.500	59.076	2.0550	1.7715	1.9009	77.69	18.614
116.000	97.000	2.0645	2.0012	1.8904	79.50	-17.500
150.000	110.209	2.1761	1.9868	2.0239	105.6	-4.609
179.600	121.462	2.2544	2.0845	2.1101	128.8	7.338
196.700	114.706	2.2923	2.0599	2.1519	141.9	27.194
206.000	116.760	2.3139	2.0675	2.1757	149.8	33.040

Table 3. Weight of ovary and observed and estimated number of eggs

Weight of ovary (gm)	Fecundity in thousand F	Log W X	Log F Y	Estimated		Difference
				Y	F	
3.100	48.300	0.4914	1.6839	1.7276	53.39	5.090
2.025	32.920	0.3065	1.5175	1.5621	36.49	3.750
2.035	35.608	0.4800	1.5083	1.5639	36.64	16.562
3.020	32.227	0.3086	1.5514	1.7174	52.17	4.413
2.066	35.225	0.3142	1.5469	1.5690	37.07	1.845
4.540	68.880	0.6571	1.8947	1.8760	75.16	-16.400
4.040	78.451	0.7482	1.8253	1.7200	52.48	-3.291
5.600	77.400	0.4829	1.8887	1.9575	90.67	13.270
6.190	75.126	0.7917	1.8757	1.9965	99.19	24.064
6.650	78.213	0.4051	1.8933	2.0243	105.72	27.507
3.200	59.076	0.8228	1.7715	1.6502	44.69	-14.386
4.000	97.000	0.6021	1.9868	1.8261	67.08	-29.920
4.700	110.209	0.6721	2.0012	1.8894	77.52	-32.689
6.540	121.462	0.8156	2.0845	2.0179	104.2	-17.262
6.500	114.706	0.8129	2.0599	2.0154	103.6	-11.106
7.000	116.760	0.8451	2.0675	2.0443	110.8	-5.960

Indices of fecundity in the spawners of *G. filamentosus*

In order to find the trends of increase or decrease in fecundity with the increase in length and weight of the spawners various fecundity indices were estimated (Table 4). The different indices calculated were the number of ova produced per gram body weight called

relative fecundity; number of ova produced per gram ovary weight called competitive fecundity; ovary weight in percentage of total fish weight called coefficient of maturity and ovary weight in relation to the fish weight without ovary called gono-somatic index.

Table 4. Range of indices of fecundity in the spawners of *Gerres filamentosus*

Fecundity indices			
	Minimum	Maximum	Average
Number of ova per gram fish weight	485	955	699
Number of ova per gram ovary weight	11761	24250	16743
Co-efficient of Maturity	2.81	6.76	4.35
Gono-somatic Index	2.90	7.24	4.57

Table 5. Fecundity and other particulars of 16 mature specimens of *Gerres filamentosus*

Total length of fish	(gm) Fish wt. of	(gm) Ovary wt. of	Ova of mature total no.	Wt. of fish per gm. of no. of eggs	Wt. of ovary per gm. of no. of eggs
154	50.530	3.100	48300	955	15880
160	52.050	2.025	32920	632	16256
167	57.220	2.035	32227	563	15836
171	71.00	3.025	35607	501	11770
172	72.500	2.066	78451	485	17049
180	84.026	4.540	35225	755	17279
183	91.085	4.040	68880	933	17049
185	92.200	5.600	77400	839	13821
186	92.265	6.190	75126	814	12136
190	98.500	6.650	78213	794	11761
195	113.500	3.200	59076	520	18461
200	116.000	4.000	97000	836	24250
210	150.000	4.700	110209	734	23448
220	179.600	6.540	121462	676	18572
230	196.700	6.500	114706	583	17647
240	206.000	7.000	116760	566	16680

It was observed from the Table 2 that the number of ova per gram body weight varied from 485 to 955, while the number of ova per gram ovary weight ranged between 11761 to 24250. The coefficient of maturity values were found to vary from 2.81 to 6.76 and the gonosomatic index from 2.90 to 7.24.

From the above study, the average values of the fecundity indices for *G. filamentosus* can be given as:

1) Relative fecundity	699
2) Number of ova per gram ovary weight	16,743
3) Coefficient of maturity	4.35
4) Gonosomatic index	4.57

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