

FECUNDITY OF DOLPHIN FISH, *CORYPHAENA HIPPURUS* L.

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ABSTRACT

Fecundity of *Coryphaena hippurus* L. ranged from 139636 to 549540 with an average of 300878. The number of ova per mm total length, per g body weight and per g ovary weight were 407, 175 and 5851 respectively. A linear relationship was noticed between fecundity, body weight and ovary weight of the fish while fecundity and total length showed a parabolic relationship.

Coryphaena hippurus is an oceanic fish with a world wide distribution. It grows to a size of about 6 feet. Despite its importance as a game-fish, no information is available on the reproductive biology of the fish. The present paper deals with the fecundity of the species.

Fish samples for the present investigation were captured from the Central West Coast (Lat. 12°N to 19°N, Long. 70°E to 70°30'E) in the depth range 200-1000 m during the 89th cruise of R. V. *Gaveshani* in the month of March 1981 by long line. After recording total length and weight of the fish in fresh condition, gonads were taken out, weighed and preserved in 5% formalin.

Fecundity of all the specimen was estimated by gravimetric method ($Eg = Es / Wg \times Wg$, where Eg, Es, Ws and Wg are number of eggs in ovary, numbers of eggs in small sample and weight of ovary respectively). Simple regression analysis of the relationship of fecundity of total length, body weight and ovary weight were carried out.

Table I. Fecundity counts at various length range of *Coryphaena hippurus*.

No.	Total length (mm)	Body weight (g)	Ovary weight (g)	Fecundity	Gonado-somatic index	Ova/mm total length	Ova/g body weight	Ova/g ovary weight
1	549	980	36.300	139636	3.70	254	142	3846
2	588	1050	39.810	173780	3.79	295	165	4365
3	620	1160	43.650	199526	3.76	321	172	4571
4	630	1250	44.660	208929	3.57	331	165	4678
5	635	1300	47.860	263026	3.68	414	202	5495
6	640	1600	50.110	275422	3.13	430	172	5496
7	691	1650	52.800	295120	3.20	427	178	5589
8	707	2005	54.950	338844	2.74	479	168	6166
9	741	2380	60.250	398107	2.53	537	167	6607
10	758	2550	66.060	467735	2.59	617	183	7080
11	800	3000	69.180	549540	2.30	686	183	7943

Fecundity of fishes (549-800 mm in total length) varied considerably from 139636 to 549540 with an average of 300878. Average number of ova per mm total length, per g body weight and per g ovary weight were 407, 175 and 5851 respectively. There was a gradual decrease in gonado-somatic index of the fish associated with increase in fecundity and weight of the fish (Table I). The measurements of oocytes showed wide range of sizes (0.25 to 1.58 mm) for all the mature fishes. The maximum number of eggs were found in the size range of 0.96 to 1.03 mm. This indicates a long spawning season in this species. A correlation between the size frequency distribution of oocytes and the duration of the spawning season was first pointed out by Hickling and Retenberg (1936). They showed that pilchard and hake, which have long spawning season, have maturing oocytes of a wide range of sizes. Qasim (1956) has also reported similar condition in some marine teleosts.

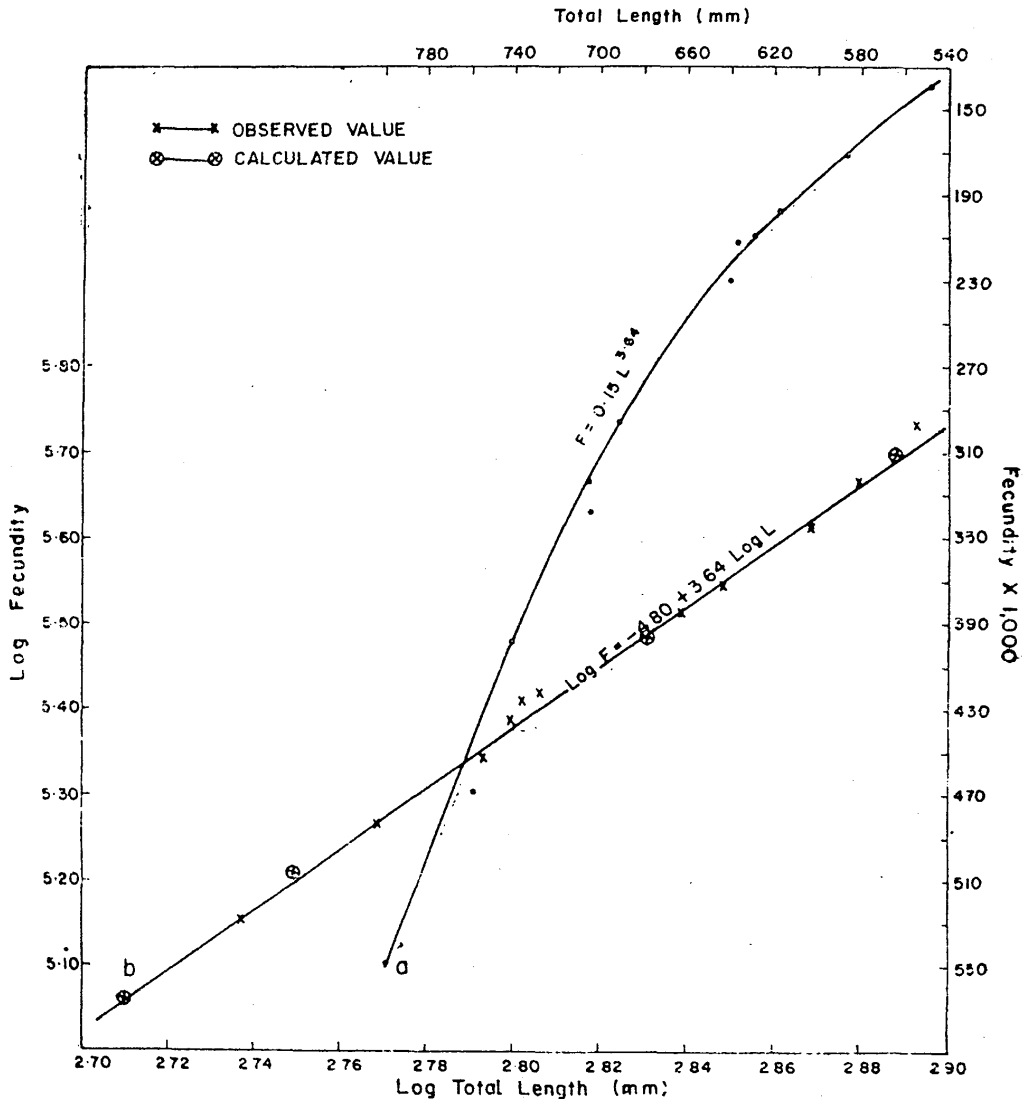


Fig. 1. a - Scatter diagram showing the relationship between fecundity and length of *Coryphaena hippurus*. Straight line b showing the observed and calculated regression lines of log fecundity on log length.

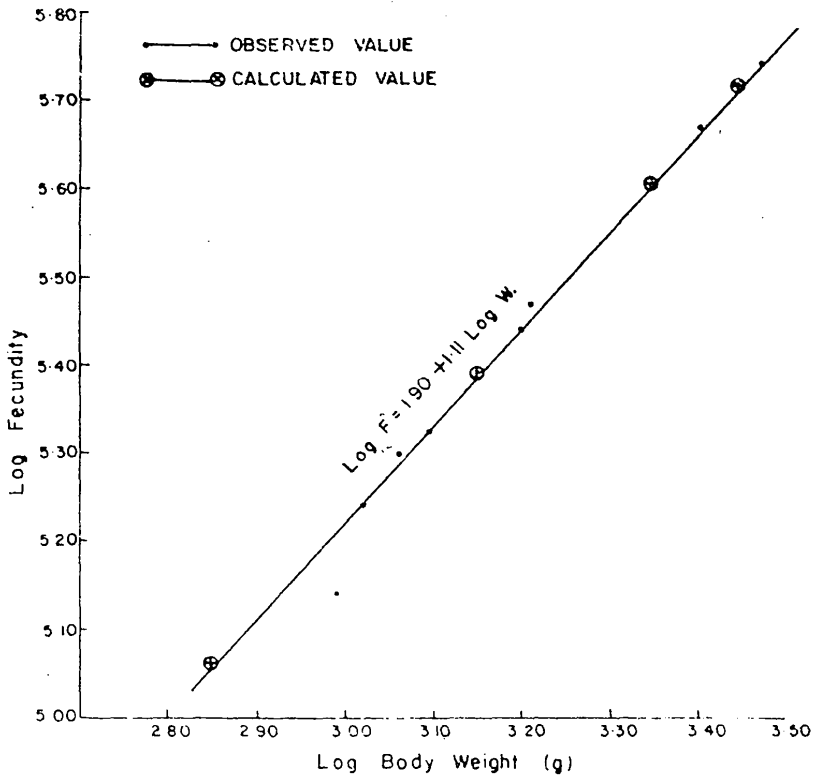


Fig. 2. Scatter diagram showing the relationship between fecundity and body weight of *Coryphaena hippurus*.

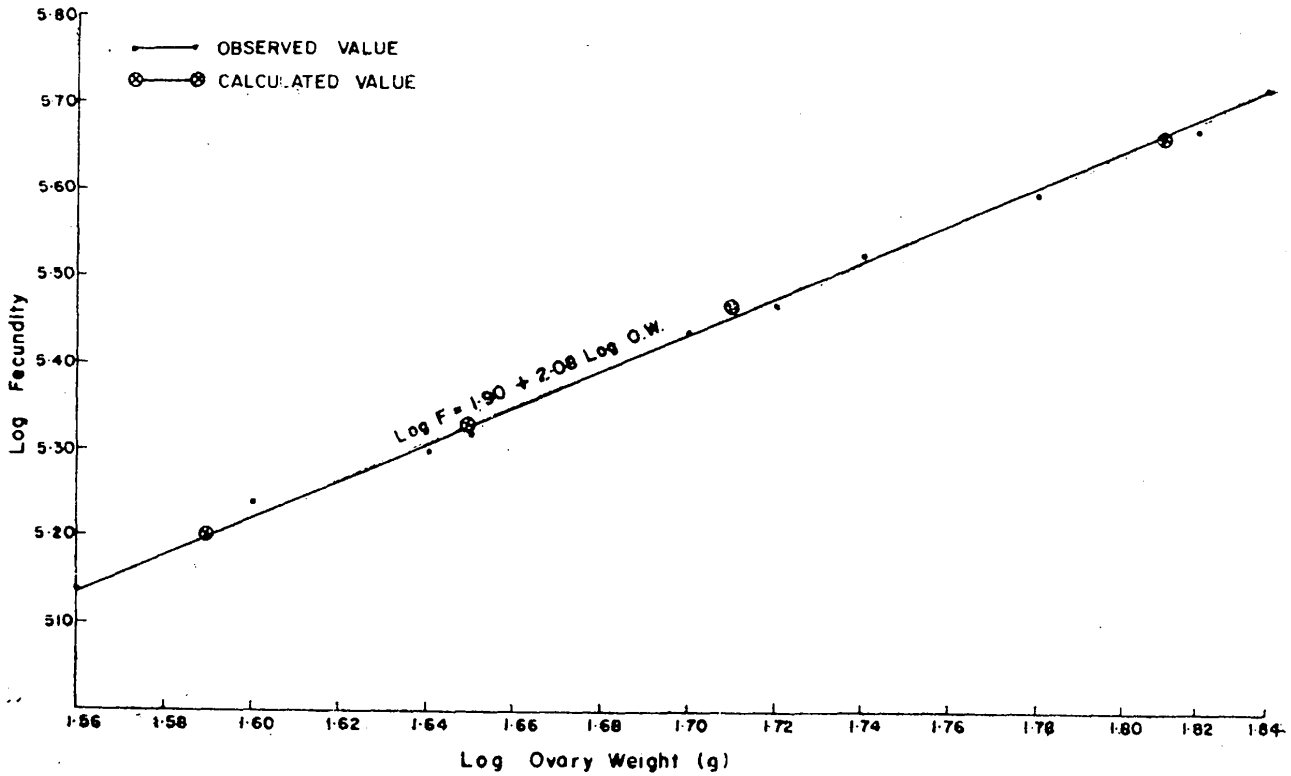


Fig. 3. Scatter diagram showing the relationship between fecundity and ovary weight of *Coryphaena hippurus*.

Relationship between fecundity and total length is presented in Fig. 1a. The smooth curve represents the calculated fecundity at each size interval while the straight line represents the calculated regression line (Fig. 1b) for which the following regression equation was derived:

$$\log F = -4.80 + 3.64 \log L \quad (r = 0.99)$$

The regression equation shows higher rate of increase in fecundity in relation to length. Similarly, higher rates of increase in fecundity in relation to length have also been reported in Irish herring (Farran, 1938); North Sea herring (Hickling, 1940) and some freshwater fishes (Qasim and Qayyum, 1963). A non-linear relationship was also reported between fecundity and total length in number of fish species (Hickling, 1940; Simpson, 1951; Bagenal, 1957). In some species, fecundity was found to be related either to the square of the length (Franz, 1910) or to the cube of the length (Simpson, 1951; Pillay, 1958). A straight line relationship was obtained between fecundity and body weight (Fig. 2) and the regression equation showing the relationship was

$$\log F = 1.90 + 1.11 \log W \quad (r = 0.98)$$

A linear relationship was derived when the logarithmic values of fecundity and ovary weight were plotted (Fig. 3) and it could be expressed by the following equation

$$\log F = 1.90 + 2.08 \log O. W. \quad (r = 0.97)$$

Linear relationship between fecundity to body weight and ovary weight indicated that in *Coryphaena hippurus* the number of eggs in the ovaries increased in proportion to those two variables (Hickling, 1940; Prabhu, 1963 and Qasim and Qayyum, 1963). The fecundity was estimated from the equations arrived at against total length, body weight and ovary weight of the fish and some differences in observed and calculated fecundity were noted. The percent average difference between observed and calculated fecundity against length, weight and ovary weight were of the order of 30.61, 10.04 and 1.62. It can therefore, be inferred that body weight and ovary weight of the fish are better indicators of fecundity in *C. hippurus* than the total length.

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