印度贝拉巴吉普伦淡水养殖场鲢鱼繁殖力的研究

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FECUNDITY OF THE CHINESE SILVER CARP, *HYPOPHTHALMICHTHYS MOLITRIX* (VAL.) FROM FRESHWATER FISH FARM, BALABHADRAPURAM, A. P., INDIA.

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提要 作者检验了五十尾性成熟鲢鱼的卵巢。从统计学的角度，对鲢鱼的繁殖力同其总体长、体重和卵巢重量之间的关系进行了估计，发现三者关系均呈线形关系。同时还发现鲢鱼的繁殖力同体重的关系比同其总体长和卵巢重量的关系更为密切。

主题词 鲢鱼，繁殖力

Introduction

A knowledge of fecundity and its relationship with the body measurements make possible the estimation of the number of eggs that are likely to be spawned by a fish. In fish culture this information is useful in making proper arrangements for successful hatching of fertilised eggs. In India, *H. molitrix* was bred successfully by hypophysation in 1962 and presently this species forms an important component of the fishes used for composite fish culture. The present study is location specific and would help the authorities concerned in making adequate preparations for rearing the spawn.

Materials and Methods

Fifty mature specimens of *H. molitrix* raised in freshwater fish farm, Balabhadrapuram, A. P. were examined for the present study. The total length and weight of each individual fish were recorded in fresh condition. The fecundity of the fish was estimated by the gravimetric method (Simpson, 1959). For this purpose, three

random samples of 100 mg each were taken from the anterior, middle and posterior regions of each ovary of every specimen. The number of ova in each sample were counted under a binocular microscope and the total number of eggs in each fish were estimated by the following formula:

$$F=\frac{\bar{S}\,OW}{100}$$

where F = fecundity, $\bar{S}$ = average number of eggs in 100 mg of ovary, OW = total weight of ovary. The relationship between fecundity and total length/body weight/ovary weight were calculated by employing the method of least square. The formula used for this purpose was $Y=a+bX$ where Y = Fecundity, X = dependent variable (fish length, fish weight or ovary weight) and a and b are the constants. The correlation coefficient 'r' was calculated for each relationship. The analysis of variance was used for testing the linearity of the regressions.

Observations

Fecundity and fish length: The relationship between fecundity and fish length is shown in table 1. The number of ova varied from 1.14 lakh for a fish of 43.6 cm to 2.55 lakhs in one measuring 49.5 cm. The largest specimen of 50.4 cm had a fecundity of 2.0 lakh. The relationship between fecundity and the total length was observed to be

$$F=-8.1946+0.21339L$$
$$r=0.7040707$$

where F = fecundity, L = total length of fish and r = coefficient of correlation. The analysis of various proved the linearity of the regression (observed $F=8.9532$ significant at 5% level).

Egg production ranged from 1.14 lakhs in a fish of 0.760 kg to 2.55 lakhs in one of 1.350 kg. The mean values of the fecundity calculated per kg body weight ranged from 1.483 to 1.78 lakh. The fecundity-body weight relationship could be expressed as: $F=-0.6529+2.1884WF$

$$r=0.843904$$

where WF = total weight of the fish in kg. The analysis of variance proved the linearity of regression (observed $F=15.377$ significant at 1% level).

Fecundity and ovary weight: The relationship is expressed in table 1. Egg production ranged from 1.14 lakh in an ovary of 120 g to 2.55 lakhs in an ovary of 270 g. The fecundity-ovary weight relationship might be expressed as:

$$F=0.19352+8.3839W_0$$

$r = 0.679453$

where W_0 = weight of ovary. The analysis of variance proved the linearity of regression (observed $F = 8.3839$ significant at 5% level).

Discussion

Fecundity of different fish species has been studied by Clark (1934), Khan (1945), Alikunhi (1956), Varghese (1973), Joshi and Khanna (1980) and Singh *et al* (1982). In *H. molitrix*, the fecundity ranged from 1.14 lakh in a fish measuring 436 mm in total length, 760 g body weight and 120 g ovary weight to 2.55 lakhs in a fish measuring 495 mm in total length, 1350 g body weight and 270 g ovary weight. The number of eggs per kg weight of fish ranged from 1.48 to 1.78 lakh. Alikunhi *et al* (1963) reported that the fecundity of silver carp weighing from 3.18 kg to 8.51 kg varied from 1.45 to 20.44 lakhs. The number of eggs per g body weight were 171 and per g ovary weight 292. Wu and Chung (1964) stated that the fecundity of pond reared silver carp in Kwangtung Province, China is usually about 1 lakh/kg body weight.

In *H. molitrix*, the fecundity increases with an increase in body size. A straight line relationship has been observed between the fecundity and fish length, fish weight, and ovary weight. Clark (1934) suggested that the fecundity of a fish increased in proportion to square of its length. However, Simpson (1951) concluded that the fecundity of Plaice was related to the cube of its length. A straight line relationship between fish weight and fecundity has been reported by several workers including Bagenal (1957), Sarijini (1957) and Varghese (1973). However, a curvilinear relationship has been reported by Varghese (1976) in the case of *Coilia ramcarati*.

The results of the present study show that the fecundity was more closely related to body weight ($r = 0.843904$, $F = 15.377$ at 1% level of significance) than to fish length ($r = 0.7040707$, $F = 8.9532$ at 5% level of significance and ovary weight ($r = 0.679453$, $F = 8.3839$ at 5% level of significance). However, fecundity of specimens having a wider range in size has to be studied to confirm the findings of the present investigation.

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ABSTRACT Ovaries from fifty mature speciment of *H. molitrix* were examined. The relationship between fecundity and total length/body weight/ovary weight were statistcally estimated and found to be linear in all the three cases. The fecundity was found to be more closely related to body weight than to total length and ovary weight.

KEY WORDS Chinese silver carp, *Hypophthalmichthys molitrix* (Val.), Fecundity