Preliminary studies on rearing of Schizothorax esocinus with special reference to growth and fecundity

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Abstract: The Schizothorax esocinus was reared at the Dachigam National Park Kashmir from 2010-2011. Growth and fecundity was assessed. Artificial food was provided of the composition of Fish meal, Soya meal, Mustard cake, Wheat bran, and Rice bran .the feeding was made through square method and was given twice a day. The Standard deviation observed on growth at control was 40.94, at feed first was 59.37at feed second was 58.27 and at feed third was 62.99. The P. value is 0.0002 considered extremely significant. All the cultures passed the normality test. The results observed on fecundity at control was 80.57,at feed first was 127.95 ,at feed second was 128.96 and at feed third was 214.99. The P. Value observed was 0.7012 considered not significant.
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Key words: Schizothorax esocinus, Dachigam National Park Kashmir, artificial feeding, growth, fecundity.

Introduction

Food is considered as an important ecological factor influencing the population dynamics of fishes. One of the essential prerequisites for the successful management of fish culture programmed is a comprehensive understanding of feeding. The increase in cost and demand of feed protein from conventional resources necessitates fish culturists of the developing countries to incorporate cheap and locally available ingredients in fish feeds. Recently the utilization of aquatic plants having high food value are used to supplement fish food has taken a new dimension for producing the much required animal protein at low cost. Fish requires diet relatively higher in protein than those of commercially cultured animals. As protein represents the most expensive component in a formulated diet. It is considerable practical importance to determine the optimum level that will support maximum growth and survival

Nutrients essential to fish are the same as those required by most animals ,these include water proteins,(amino acids) ,lipids (fats, oils, fatty acids),carbohydrates(sugars ,starch),vitamins, and minerals .In addition pigments (carotenoids) are commonly added to the diet of salmonid and ornamental aquarium fishes to enhance their flesh and skin coloration respectively . In their natural environment fish have developed a wide variety of feeding specialization (behavioral, morphological, and physiological) to acquire essential nutrients and utilize varied food sources. Based on their preference to diet fishes are classified as carnivorous (consuming largely as animal material) herbivorous(consuming primarily on both plant and animal material).however, regardless of their feeding classification in captivity fish can be taught to readily accept various prepared foods which contain the necessary nutrients.

Material and Methods

Fingerlings of S.esocinus were collected from government fish seed hatchery Srinagar. They were transferred to operational sites in oxygen bags. During early period the fingerlings were fed on a commercial diet to acclimatize. After acclimatization for 60 days they were transferred to the hapas at the rate of six fishes in each happas.

Diet formulation (Singh et.al. 1987; Siddiqui (1988): Alhafedh (1999) Stickney (2000) Jena (2006) Korkut (1999).

Feed Ingredients

The ingredients were dried and grinded to powder form. The proximate composition of three ingredients is shown in table below. After acclimatization six fingerlings were randomly transferred to each aquarium. The average initial body weight of fingerlings was 60g. The feed was applied at the rate of 4% of body weight of the fingerlings throughout the experiment of two years.

Chemical composition of three ingredients

Group	Fish meal	Soya meal	Mustard cake	Wheat bran	Rice bran
Group 1	50%	23%	11%	9%	7%
Group 2	40%	33%	7%	9%	11%
Group 3	30%	43%	9%	7%	11%
Control	*	*	*	*	*

GROWTH Lecren (1965): Singh et. al., (1987): Huss.et.al. 2007, Alfahedh 1999: Sampath 2003: Aras 2000**:** The growth rate of S.niger and S.esocinus were measured by the formula-

$$\text{Specific growth rate (SGR)} = \frac{\text{in last weight (g)} - \text{in first weight (g)}}{\text{Cultivation period (day)}}$$

Fecundity

The fecundity of *S. esocinus* was determined by gravimetric method (Nikolskie 1965: Rain 1978: Sunder1986: Sunder and Subla 1984). In order to ascertain any differences in the number of mature ova in right and left lobe of the ovaries, the fecundity estimates of ovary were calculated separately for either lobe. Mature ovaries were considered for fecundity studies. After removing the surface moisture by a blotting paper, the number of mature ova visible to the naked eye from the weighed ovary samples was counted. From the number of ova obtained from the portions of ovary of known weight, the fecundity of the species was estimated (Lagler, 1956). To avoid any error, the fecundity was calculated from the counts of mature ova in three random sub samples of the ovary of known weight by using the formula:

$$F = \frac{W * (N1 + N2 + N3)}{(W1 + W2 + W3}$$

Where, F =fecundity, W = total weight of ovaries (g), N1, N2 and N3 and W1, W2 are the ova counts and the weight of each sub sample respectively. The portions of the ovary used for fecundity studies were kept over night in the Gilson's fluid. (Jhingran *et. al,* 1967).

Plate 1.S. esocinus in nature

Plate 2. Showing. S. esocinus

Plate 3 Dachigam rearing Stream

Plate 4. Artificial feeding

Plate 5. Feeding process

Plate 6. Fecundity observation

Plate 7. Collection of eggs.

Plate 8. Artificial feeding and rearing.

Results

	Control		**Feed Ist**		**Feed 2nd**		**Feed 3rd**	
Month	S. esocinus Initial	S esocinus final.	.S. esocinus Initial	S esocinus final	S. esocinus Initial	S esocinus final	S. esocinus Initial	S esocinus final
Mean	155.79	160.6	192.5	206.9	184.2	204.9	192.08	226.54
SR		166		466		733		1100
STANDARD DEV.	42.62	40.94	60.67	59.37	59.54	58.27	57.45	62.99
STD.ERROR OF MEAN	8.700	8.358	12.38	12.12	12.15	12.15	11.72	12.85
NORMALITY TEST(P-VALUE)	>0.10	>0.10	>0.10	>0.10	>0.10	>0.10	>0.10	>0.10
Passed normality test	yes	yes	yes	yes	yes	yes	yes	yes

Table- 1 Variation of mean body weight of S.esocinus fed on three feed ingredients. (Site - Dachigam stream)

Month	S. esocinus	S. esocinus	S. esocinus	S. esocinus
	Control	Feed ist	Feed ist	Feed ist
Oct	1190	1320	1228	1222
Apr	1330	1240	1309	1126
Nov	1140	1125	1411	1425
May.	1230	1428	1526	1608
T0tal	4890	5113	5474	5381
Mean	1222.5	1278.25	1368.5	1345.25
STANDARD DEV.	80.57	127.95	128.96	214.99
STD.ERROR OF MEAN	40.28	63.97	64.48	107.49

Fig 2 -Effect of diet on the absolute fecundity of S.esocinus(Site - Dachigam stream

Fig.1 **Fig 2.**

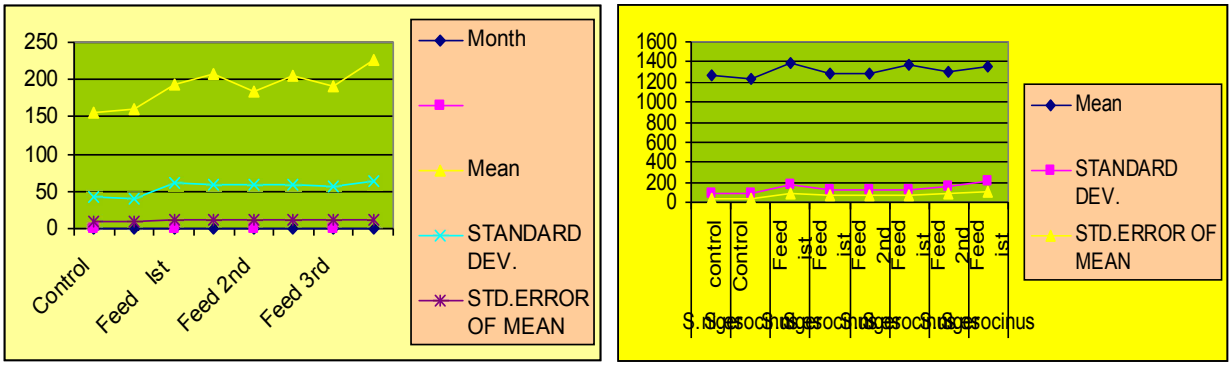

Fig 1. showing variation in body growth (**Fig 2.)** Showing variation in Absolute fecundity. S.esocinus reared at Dachigam National Park Kashmir.

Discussion

The specific growth rate (SGR) and fecundity of S. esocinus observed on three different feed ingredients is shown in table 1 and 2 above. .In controlled condition the specific growth rate observed was 200.Where as the SGR at feed first was - 600, in feed 2nd was 400 and at feed third was 1166.6.Aras (2002) found that feeding groups with higher temperature yield 13.05+-0.21, 7.11+-0.04, and 9.06+-0.51gm average final weights respectively. Shamsiae worked out that the specific growth rate was highest (5.36%) in the live feed group and in the last month of the experiment SGR was highest (3.73%) in the dry feed group. In the study SGR for dry feed higher temperature group was 3.65% and SGR for live feed higher temperature group was found 3.28% temperature difference created significant growth increase and suggested ideal temperature for larval and juvenile trout is 8-13c. Both temperature and feed type affect growth (Abdelbaghian).

The absolute fecundity of S.esocinus observed at site first Beerwa spring fed on three different feed ingredients is shown in table 7th-a (beerwa spring – table-7th-a). In controlled condition the absolute fecundity Observed was 1322, where as the A.F. At feed first was – 1278 in feed 2nd was 1368 and at feed third was again 1345. The relative fecundity of S. esocinus observed at site first Beerwa spring fed on three different feed ingredients is shown in table 7th-b (beerwa spring –table-7th-b).In controlled condition the relative fecundity Observed was 41.7 Where as the R.F. at feed first was – 43 in feed 2nd was 42.5 and at feed third was 48.25.

Overall observations found imply that diet plays an important role in fecundity. Many workers have found similar findings. Nikolskii (1965) stated that fecundity is a specific feature that arises during the evolution of a new species adapted to a certain environment and is directed to the continuance of the species. Nikolskii (1965) stated that there May be marked changes in the fecundity within a population for a given size due to fluctuations feeding conditions. The irregular fluctuations found in the relative fecundity of S.niger could not be attributed to any known environmental factor. The positive relation was found between the fecundity and length and weight of fish. Heidrich (1925) and Kestevan (1942) have showed that the total number of ova (absolute fecundity) holds some experimental relationship with the length of the fish in the same way as it does with the weight.

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