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STUDIES ON THE CULTURE PRACTICES AND GROWTH PERFORMANCES OF THE GANGETIC KOI FISH, *ANABAS COBOJIUS (HAMILTON, 1822*) AT TAMLUK, PURBA MEDINIPUR, WEST BENGAL, INDIA

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Abstract :

High growth of the population of the world creates the severe crisis of the protein for the consumption of the human being. It is very difficult problem of the day. To solve this, a study was conducted on the culture of the palatable Gangetic Koi fish (*Anabas cobojius*). The growth of the well feeded Gangetic Koi fish of the treated tank is enhanced in length, breadth and weight. The yield of the Koi fish is also increased (26%) in the production. The other study showed that the growth of the Koifish stands stagnant after 120th day of the age. So, the harvesting of the fish is economically profitable between 110 - 120th day considering the economics of the cost of the culture.

Keywords :

Gangetic Koi fish, Tank preparation, Feeds, Pellet, Fish growth rate.

I. INTRODUCTION

The Gangetic Koi fish *Anabas cobojius* (Hamilton,1822), popularly known as Koi, is a species of climbing gourami native to India and Bangladesh. These mud loving fish is cultured in low quality water, endure extremely unfavorable aquatic environmental conditions including low levels of dissolved Oxygen and polluted muddy water (Pethiyagoda,1991). This fish has an air breathing mechanism and high tolerance level to overcome the harsh environmental conditions. The neglected swampy water bodies and derelict ponds can be utilised for the mass scale production of this fish. So that, this fish is considered as a promising fish species for culture in the water bodies where common fishes cannot be cultured properly.

The Koi fish is rich in iron and copper which are the vital components for the haemoglobin synthesis (Sarma et al; 2010). It also contains an easily digestible poly unsaturated fatty acids(PUFAs) and essential amino acids(EAAs) (Kohinoor et al;1991). So, this fish is an important item of the diet for the sick and convalescent patients (Saha et al;2009).

This Koi fish has great market value due to its optimum size, palatable and delicious taste in Southeast Asia (Herre, 1924; Vidthayanam, 2002). Now- a- days, the demand of this fish is increasing among the fish growers in West Bengal, India. It is an important source of income to the small and large scale

fishermen due to its high demand for its commercial trade value and has great potential to develop a prominent fishery sector due to its hardy life. These fishes are threatened day by day by siltation from deforestation, habitat destruction by the hydropower and the dam development, housing, indiscriminate uses of pesticides, ecological degradation and fissing pressure.

So, the present rate of fish production is lesser in comparison with the growing human population. Keeping this in mind, it is now an urgent issue that all kind of efforts need to be employed to increase this fish production in all the inland water bodies to fulfill the demand of the protein for the human growth. According to Chakraborty et al (1979b), aquaculture plays a key role in promoting the health of the people and also an important tool to increase the fish production. Along with that, fish culture practice generates the employment of the youths and good economic growth of the country. The aim of the present research work is to find the Optimum Growth Rate, Effects of the Feed Treatment, Use of Manures and Marketing age of the Gangetic Koi fish.

II. MATERIALS AND METHODS

Materials required:

1. 2 Ponds
2. Water
3. 4 Pumps
4. Fingerlings
5. Nets - small and big
6. Drums - small and big
7. Vehicle for transportation
8. Lime , Potassium permanganate
9. Light trap - 2 Lamps
10. Organic and Inorganic Manures.

Methods :

Selection of the tank:

In the year 2020 to 2022, two tanks about 6 feet in depth were selected for the experiment purpose at Tamluk (Latitude : 22.2858°N, Latitude : 87.9189°E), Purba Medinipur, West Bengal, India. Here, the sunlight presents for the 12 hours. There was no tree or bushes on the bank of the pond. So that shadow of the tree, snakes, frogs otters, birds, civet-cats etc cannot harm the fishes of the tank.

The nylon sheet of 1 meter height is surrounded the edge of the tank in all sides, so that the Koi fishes cannot run away on the land by walking because these Koi fishes are Climbing Perch who can walk on the land in rainy days by the help of the thorny gill and tail.

Preparation of the tank :

In the month of March - April of 2020,2021 and 2022 the tanks were dried up. In accordance with Decimal of land, organic and inorganic manures were applied such as Lime 6 kg, Cow dung 7 kg, Mustard Cake 5 kg, Triple Super Phosphate 5kg, Urea 1 kg, Micronutrients 500 gram and White Sand 22 kg at the bottom of the tank. Then plowing twice. Now the water is allowed to stagnant in the tank.

After 15 days algae, fungi, bacteria, protozoa, phytoplankton, zooplankton will grow profusely in the water of the tank. These are the feeds of the fishes. The colour of the water is changed from colourless to the light green. Now the tank is ready for the culture of Koi fish (*Anabas cobojius*).

Selection of the offsprings :

The offsprings of the Koi fish must be healthy, disease free, vigorous, always jumping up and down and brightened in colour. The fish offsprings were purchased from a reputed fish seed farm of Tamluk, Purba Medinipur, West Bengal, India.

Feeding :

Now, the fingerlings of the Koi fishes are freed in the tank. Some amount of dust of Rice bran powder with protein feed powder are to be spread on the water surface of the tank as a feed of the fingerlings for 7 days. After that, feeds should be supplied to the spawns through the pellets in the water of the tank by the help of the trays. The pellets were prepared by our own formulation.

Composition of pellets :

Dust of Dried fish	20 gm
Dust of Mustard Cake	20 gm
Dust of Rice Bran	15 gm
Dust of Gram	20 gm
Molasses	10 gm
Wheat Flour	4 gm
Gram Powder	4 gm
Salt / NaCl	1 gm
Boiled Rice	4 gm
Micronutrients	2 gm
Total	100 gm

The total amount of feed required per day splitted in two doses which is twice a day, means morning and afternoon.

Use of Pump:

Two pumps per tank are set up on the bank of the pond. The pump will suck water from the tank and will discharge the same water vigorously in the same tank. As a result, Oxygen with water will be injected or pushed in the water of the same tank profusely. As a result, the growth of the fishes will be higher due to more consumption of the Oxygen and the mortality rate will be remarkably diminished. The pumps should be used in shifting alternatively for the better service.

Exercise of the fishes:

The netting of the fishes was done once in a week. After catching the fishes in the net, they should be rubbed on the body and released them again in the same water. The saliva on the body of the fishes will be removed partially with the friction of the net. As a result, the growth of the fishes will be enhanced quickly.

Health Protection:

If foul smell is discharged from the tank, the water of the tank is highly acidic in nature. So , immediately lime water solution must be sprayed through out the tank. In winter season, Potassium Permanganate solution ($KMnO_4$) must be sprayed in the tank. So that, the fishes will be free from the attack of the insects and diseases.

Use of Light Trap:

One burning Kerosene lamp will be floated in the night at the centre of the tank. As a result, many insects will be attracted. They will try to reach to the fire. Ultimately, they will fall on the water of the tank. The Koi fishes are carnivorous. So, they will consume all the insects and will be healthy day by day.

Figure I : Culture of the Gangetic Koi fish (*Anabas cobojius*) in Tamluk, Purba Medinipur, West Bengal, India.

III. RESULTS AND DISCUSSION

In this experiment, a study was conducted on the morphology of the Gangetic Koi fish (*Anabas cobojius*) by the feed treatment in comparision with the fishes of the control tank where no extra feed was supplied. The cultured and growth of the Gangetic Koi fishes are shown in Figure I. The fishes in the control tank were grown by the natural foods of the environment . The growth of the fishes studied in the aspects of length, breadth and weight . The results are taken at the age of 120th days on maturity (Table I). With the above three aspects, the fishes grown in the treated tank showed better growth performances i.e., length is 17%, breadth is 14% and weight is 26% are enhanced with comparision to the control fishes. The increased growth of the Gangetic Koi fish is also demonstrated in the pie chart also (Figure II). Considering the growth of the fish in the total amount of the tank, the yield of the Koi fish is very large in amount which is approximately of 1 ton/per acre.

The other study was conducted on the effects of the use of the organic and inorganic manure in the treated fish tank in comparison with the untreated fish tank i.e, the control tank. The results revealed that average body weight of the Gangetic Koi fish is 68 gram per fish where as the untreated fish is 54 gram(Table II) . So, 14 gram weight per fish is increased in the treated tank.

There is remarkable effects on the total body weight of the fishes of the treated tank. The yield or growth of the Koi fish in the treated tank is increased remarkably(26 %) in comparision with the control tank(Table II).

A separate study was also conducted on the marketable age of the Gangetic Koi fish (*Anabas cobojius*), so that the feed cost and establishment cost can be minimised. The experiment was conducted in the successive three years i.e., 2020,2021 and 2022 at Tamluk, West Bengal, India. The data of length,breadth and weight were taken on the 110th, 120th, and 130th day . The average growth of the Koi fishes in 120th day is 16.1 cm in length, 6.1 cm in breadth and 65.6 gram in weight (Table III). But after 120th day, the growth of the Koi fishes remains stagnant more or less.The observation on the basis of the data of the successive three years revealed that 120th day is the peak day for the harvesting of the Koi fish. In 120th and 130th day, the growth is more or less same.

Considering the feed cost and the establishment cost, it is observed that the age of the Koi fish is 120th day is the optimum which is the right peak time for the harvesting of the Koi fish. So the harvesting of the Koi fish is preferred between 110 to 120 days of the age considering the economic point of view(Table III). The artificial feedings of the Koi fishes enhances the fish production. Similar results have been observed by Chakraborty et al(1975b) and Sinha (1979).

The technique of the culture of Koi fish in the treated tank is an environmental friendly aquaculture technique(Chakraborty et al(1979b). The organic and inorganic manures used in the tank produces the in-situ microorganisms which help the Koi fishes for their growth (Swingle,1938; Hora, 1962; Hepher, 1962; Chaudhuri, 1971; Chakraborty et al,1973; Chakraborty et al,1975b; Chakraborty et al, 1979a; Sinha, 1979) . It is the suspended growth in the tank which is the aggregate of the living and non living particulates of the organic matter, phytoplankton, zooplankton, fungi, bacteria,algae,etc. This process acts as a water treatment remedy of the tank which means it is the active suspension pond for this fish culture.

Table I : Study on the morphology of the Gangetic Koi Fish (*Anabas cobojius*) by the feed treatment.

Year	Age (Days)	Length (cm)			Breadth (cm)			Weight (gram)			Others
		Control	Treated	%	Control	Treated	%	Control	Treated	%	
2020	120	13.6	15.9	17.0	5.1	5.8	14.0	52.2	66.1	26.0	
2021	120	13.8	16.1	17.0	5.2	6.0	15.0	53.1	66.2	24.0	
2022	120	13.9	16.2	16.0	5.4	6.1	13.0	51.9	66.4	28.0	
Growth rate	120	17.0 %			14.0 %			26.0 %			43.0 %

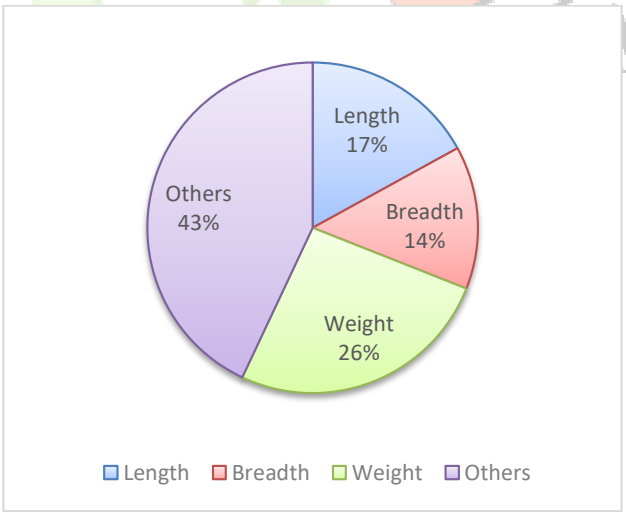

Figure II : Pie chart of the growth of Gangetic Koi fish (*Anabas cobojius*).

Table II : Study on the use of organic and inorganic manure for the preparation of tank for culture of the Gangetic Koi fish (*Anabas cobojius*).

Sl No	Manures used	Cultivated Tank (kg)	Control Tank(Amount)	Growth Difference(gm)	% of Growth
1.	Cowdung	7	NIL		
2.	Mustard cake	5	NIL		
3.	White sand	22	NIL		
4.	Lime	6	NIL		
5.	Triple super phosphate	5	NIL		
6.	Urea	1	NIL		
7.	Micronutrients	0.5	NIL		
Remarks	Average body weight/fish (gm)	68	54	14	26

Table III : Study on the marketable age of the Gangetic Koi fish (*Anabas cobojius*) for the profitable marketing.

Year	2020			2021			2022			Average growth
Days	110	120	130	110	120	130	110	120	130	
Length (cm)	15.8	16.1	16.1	15.9	16.2	16.2	15.7	16.4	16.4	16.1
Breadth (cm)	5.9	6.2	6.2	5.8	6.3	6.3	5.9	6.4	6.4	6.1
Weight (gm)	62.2	65.6	65.6	63.1	66.2	66.2	65.4	68.1	68.1	65.6
Remarks	Growth is stagnant after 120 days									

IV. CONCLUSION

The growth of the Koi fish in the treated tank is enhanced in length, breadth and weight. As a result, the yield of the Koi fishes increased (26 %) remarkably. The other study reveales that growth of these fishes become stagnant after 120th days of the age. The harvesting of the Koi fishes are recommendable between 110 to 120 days of the age to minimise the cost of the food and the establishment. This fish is cultured densely in a small pond where the land requirement is less. This fish is tasty, nutritious and palatable. They destroy the mosquitoes by eating their eggs, larvae etc. So, people will be able to be relieved from the attack of the mosquitoes as well as from the Dengue fever. The demand of Koi fish is high but the supply is scanty. So, the fishermen should be encouraged to take up the Koi fish farming so that they can become self reliant and as well as to achieve the monetary gain may be increased to a considerable extent. Great scope prevails for the unemployed youth of the country.

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