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Culture of Fresh Water Fish Channa striatus Using Low-cost Feed and Its Cost-benefit Analysis (Small Scale)

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

In India, the culture of murrels is still not common due to the lack of seed supply and knowledge of their feeding and breeding techniques. Given this, the present study is undertaken to culture this species and work out is economics as this is a prized fresh water fish *Channa striatus*. The seeds of *C. striatus* were collected from local breeders of the Kumbagonam area, Tamil Nadu, India. Seedlings were introduced into the two culture ponds separately. The stocking density was 400

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numbers/tank. While in pond-1, the size of the fingerlings varied between 5-7 cm (ave. 6 cm) in pond-II, the size of the fingerlings varied between 10 and 12 cm (ave. 11 cm). The feed that was given to fish in both tanks consisted of chicken waste and fish waste which was obtained free of cost from the neighboring market and artificial feed (Make: Super enriched protein feed). The feed were given at the rate of 4% of the body weight. The results of monoculture of murrels for a period of six months was maintained. As evident from the table from an average individual weight of 400 to 510 g after a period of six months grew to an average weight of 350.3 g thus recording an average increase in weight of 60 g. The harvest details show that a total of 294.2 kg could be harvested after six months. The fishes were sold in two lots - the bigger sized fishes were sold at a rate of Rs.250 per kg, the smaller fishes were sold at a rate of Rs.200 per kg. The net income from bigger fishes was Rs.47650 and the net income from smaller fishes was Rs.20720. Thus, the total yield worked out Rs.68370. The profit during this term worked out to Rs. 52270. The results of the present study clearly show that *Channa striatus* culture is highly profitable for the farmers.

Keywords: Channa striatus; low-cost feed; economic value of fresh water pond.

1. INTRODUCTION

Freshwater aquaculture is by far the most ancient aquatic living resource production system known in the world. It strikes root in more than 2500 years of history. Fish is the main, if not the only, component of freshwater aquaculture and earthen pond is historically the first and still the most utilized aquaculture production facility [1-4].

differs Freshwater aquaculture from other aquaculture systems by some characteristics. It allows a strong integration to the agricultural production systems (crops and livestock) at different levels: water use, waste recycling into the fishponds as fertilizers, and agricultural byproducts as fish feed. Freshwater aquaculture production is mainly based on the culture of short -food chain fish (carps, tilapias) and differs basically from a marine fish culture based on carnivorous fish (salmon, Japanese amberjack). Freshwater aquaculture is mainly based on and semi-intensive aquaculture extensive production systems where polyculture, fertilization, and supplementary feed are the key points.

Though culture of fishes in ponds is one of the age-old professions of the world, it is gaining prominence because of the realization that this source can supply rich and proteinaceous food for human consumption. Majority of the species selected from nature for rearing in ponds belong to the family of crops (Cyprinidae). Of late another group of fishes, collectively known as airbreathing fishes or live fishes is attracting the attention of fish culturists in the Far-East. Some of these hardy fishes have well developed accessory respiratory organs for breathing

atmospheric air. This added advantage enables them to live even in foul waters deficient in dissolved oxygen which is one of the limiting factors for most of the fishes. As such, these fishes are quite suitable to be cultured in derelict and swampy waters, where carp cannot thrive well [5].

The common live fishes are the murrels (*Channa* spp.), the catfishes (*Clarias batrachus* and *Heteropneustes fossilis*) the climbing perch (*Anabas testudineus*), and the giant gourami (*Osphrollemusgoramy*). These are widely distributed in many South East Asian countries, including India.

The snakehead, *Channa striatus*, commonly known as striped murrel is a native fresh water fish of tropical Africa and Asia [6]. Murrels are commercially cultured in Thailand, Philippines, Vietnam, and Cambodia [7]. However, in India, the culture of murrels is still not common due to the lack of seed supply and knowledge of their feeding and breeding techniques Marimuthu et al., [8-12]. In view of this, the present study is undertaken to culture this species and work out is economics as this a prized fresh water fish.

2. MATERIALS AND METHODS

Two fresh water earthen ponds $(3\times3\times1m)$ were selected for the culture at Kumbakonam Area, Tamil Nadu, India. The expremental disigen and growth rate are presented in Table 1. Seeds of *Channa striatus* were collected from local breeders and immunized seedlings were introduced into the culture ponds. The stocking density was 400 numbers/ tank. While in pond-1, the size of the fingerlings varied between 5-7 cm (ave. 6 cm) in pond-II, the size of the fingerlings varied between 10 and 12 cm (ave. 11 cm).

The feed that were given to fishes in both the tanks consisted of chicken waste and fish waste which was obtained free of cost from the neighbouring market and artificial feed (Make: Super enriched protein feed). In addition, live Gambusia fish were also introduced into the pond at regular intervals as Channa are known to hiahlv carnivorous. piscivorous be and cannabolishe [5]. The feed were given at the rate of 4% of the body weight. The growth of the fish in both the tanks were estimated every 15 days for a period of seven months; water exchange was done every week till the end of the culture period and the mortality of fish was estimated by counting the number of fishes at the end of the

culture period and expressed as percentage mortality.

3. RESULTS AND DISCUSSION

The cost benefit analysis of culturing *C. striatus* after seven months in both the tanks are presented in Tables 1-3. As evident from the table, the cost of culturing *Channa striatus* in Pond-1, which contained an average size of 7 cm worked out to Rs.24000. The weight of the fishes at the end of the culture period was found to range between 320.2 g and 445.7 g with an average weight of 382.6 g. The net weight of the fishes was 125.49 kg. These fishes were sold at Rs.400 per kg, which resulted in a net amount of Rs.50196.

Table 1. Details of culturing Channa striatus using low cost feed

S.No	Description	Pond-I	Pond-II
1.	Depth of the tank	1.2 m	1.2m
2.	Total area	0.1 ha	0.1 ha
3.	Seed Collection	Local breeding	Local breeding
4.	Stocking details immunized seedlings	400 / pond	400 / pond
5.	Weight of Fishes	4.5 kg	4.5 kg
6.	Fingerlings size	5.7 cm (ave. 6cm)	10-12 cm (ave. 11cm)
7.	Feed Details:	Chicken waste, fish waste from local market, live gambusia fish, artificial immerged feed: 4% of body weight	Chicken waste, fish waste from local market, live gambusia fish, artificial immerged feed: 4% of body weight
8.	Growth rate	Every 15 days	Every 15 days
9.	6-months culture	320.2 to 445.7g	380.3 to 530.2 g
	a) Average weight	382.6 g	455.4 g
	b) Size of the fishes	18-26 cm	28-28 cm
10.	Survival Rate	82%	84%
11.	Average Weight	350 g	380 g

Table 2. Economics of Channa striatus culture for each pond

S.No	Details of Expenditure	Rs.
1.	Earthen Pond (0.1 ha)	4000
2.	Cost of Fish Seeds (1000 gm)	3000
3.	Transportation Cost	300
4.	Fertilizers and Lime	600
5.	Feed Cost (Rs. 400 per month)	4800
6.	Labour Charge for 6 months (Rs. 200 per month)	1200
7.	Electricity and Fuel	500
8.	Harvesting Charges	1000
9.	Miscellaneous	700
	Total	16100

Table 3. Cost benefit analysis of Channa striatus culture

Details of Account					
Sale of Fishes:					
a) Big size (190.6 kg @ Rs. 200)	Rs. 47650				
b) Small size (103.6 kg @ Rs. 200)	Rs. 20720				
Total Sales	Rs. 68370				
Net Profit / Loss = Total Income – Total Expenditure					
(Rs. 68370 – Rs. 16100)					
Net Profit	Rs. 52270				

The net profit worked out to Rs.26196. With regard to Pond-II, in which the size of the stocking fish was 10 cm, the cost of the culture worked out to Rs.27000 at the end of the seven months. The size of the fishes during the harvest ranged between 380.3 and 530.2 g and the average weight was 455.4 g. Thus a total o 143.9 kg of fish could be harvested which were sold at Rs.450 kg. This resulted in a net amount of Rs.64755. The profit for this culture worked out to Rs.37755.

A comparison of the two cultures reveals that the tank in which the seeds were stocked with a bigger size were able to grow at a faster pace than the ones in which the size of stocked fish was less. However, with regard to survival rate, the pond-II fishes recorded slightly lower survival rates (79%) when compared with pond-I (82%). This is probably due to the carnivorous nature of the fish as predation would be higher in bigger sized fish. Nevertheless, the culture of this fish is promising and can be taken as livelihood. The profits can be bigger if the culture systems are also bigger.

The results of monoculture of murrels for a period of six months is presented in Tables 2 and 3. As evident from the tables, the total expenditure during the period of culture worked out to Rs. 16100 of which the major part was spent for feed (Rs. 4800), seed (Rs. 3000) and lease for aquaculture (Rs. 4000). The growth of murrels after six months is shown in Table 2.

As evident from the table an average individual weight of 400 to 510 g after six months grew to an average weight of 350.3 g thus recording an average increase in weight of 60 g.

The harvest details (Tables 2 & 3) show that a total of 294.2 kg could be harvested after six months. The fishes were sold in two lots - the bigger sized fishes weighting 190.6 kg and the smaller sized fish weighting a total of 103.6 kg the bigger fishes were sold at a rate of Rs.250

per kg, the smaller fishes were sold at a rate of Rs.200 per kg. The net income from bigger fishes was Rs.47650 and the net income from smaller fishes was Rs.20720. Thus, the total yield worked out Rs.68370. The profit during this term worked out to Rs. 52270.

4. CONCLUSION

The results of the present study clearly show that *Channa striatus* culture is highly profitable. The profit when worked every month worked out to Rs.8711.6. This type of culture will help in the economic livelihood of the fisherfolk people and farmers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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