

EFFECT OF *LATES CALCARIFER* SEED STOCKING ON THE SURVIVAL AND PRODUCTION OF INDIAN MAJOR CARPS REARED IN A FRESHWATER COASTAL POND IN KONKAN REGION

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ABSTRACT

The experiment indicated feasibility of culturing Indian major carps seed with *Lates calcarifer*, if the size of Indian Major Carps is larger. In the present investigation the average growths of *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* are recorded as 1193, 1120 and 821 g, respectively, during the year 1997-98, 1998-99 and 1999-2000 in 7.5 months. Complete haresting of *L. calcarifer* is essential before stocking of new seed. The average growth of *L. calcarifer* was recorded as about 670 g during the above period. About 5000 numbers of Indian Major Carps fry per hectare can be stocked under the present culture system.

Keywords : Lates, survival, stocking

INTRODUCTION

The knowledge of different culture systems on the production of *Lates calcarifer* is essential, as it is a high-value product with particular reference to taste, quality, preservation and transport of the live fish to the market.

Locally known as *jitada* in coastal Konkan zone, it constitutes an important fishery of the region (Singh, 2001). The fish being euryhaline, has advantage of culturing in freshwater or brackishwater ponds. Since brackishwater fish culture has not yet come up in a big way in Maharashtra state due to various reasons, the aquaculturists and fishermen undertake rearing of high priced *jitada*

seed with the seeds of Indian major carps in freshwater ponds.

A study was undertaken to investigate this unique culture system in the North Konkan region for its commercial feasibility. The seed of *L. calcarifer* is widely available from the last fortnight of May till September. The fry stages of the fish were observed to be available between June and August (Singh and Mehta, 1997). This coincides with the availability of the seed of Indian major carps. Hence, stocking of both types of seed together is prevalent in the region.

The information on the various aspects of *L. calcarifer* is mainly available from south and southeast coasts of India, while

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such literature from Konkan region is very limited except that of Belsare *et al.* (1987), Singh *et al.* (1990 a), Singh *et al.* (1990 b), Singh and Shirgur (1994), Singh and Mehta (1997) and Singh (2001). The above references pertain to traditional culture systems available, status of traditional culture systems in Maharashtra, comparative growth of fry stages of *L. calcarifer* and pond culture in seasonal rain-fed ponds.

The culture of this fish in the southern states of India is highly restricted primarily due to very less wild stock collection and the lack of controlled seed production on large scale.

Comprehensive studies on *L. calcarifer* were reported in various Southeast Asian countries.

The objective of present study was to investigate the feasibility of commercial culture of different fish species having divergent feeding habits and behaviour. *L. calcarifer* is highly predatory and even resort to cannibalism, while the Indian major carps are vegetarian and non-aggressive.

MATERIAL AND METHODS

The experiment was conducted in a rainfed pond of 0.2 ha area, located at Khar Land Research Station, of Konkan Agricultural University at Panvel in Raigad district, successively for three years from 1997 to 2000. Since the pond is in coastal region, it had slight influence of salinity before the onset of monsoon. The pond entirely depends on rain for water as khar

land or saline soils lack irrigational facilities. The pond was dewatered and prepared for stocking the seed of *L. calcarifer*, Indian major carps, and tilapia (*Oreochromis mossambicus*) in the beginning of June every year.

The seed of *L. calcarifer* was procured from wild collection, while the seed of Indian major carps was procured from the Department of Fisheries, Maharashtra. Under the present polyculture system, tilapia was introduced as forage to *L. calcarifer* as the same was observed to be available in all the ponds in Konkan region where local fishermen practice this culture system. Tilapia was collected from farm fields where it is abundant. Demand feeding with oil cake and rice bran coupled with natural production was maintained for Indian major carp seed.

The details of stocking, harvesting and hydrobiological parameters were recorded fortnightly and are presented in Tables 1, 2 and 3, respectively.

RESULTS AND DISCUSSION

L. calcarifer is not only a carnivorous fish and if there is variation in size or lack of forage feed it also tends to be cannibalistic. (Singh, 2001). The present study was therefore, undertaken to evaluate the impact of its presence on the growth and survival of Indian major carp seed, which was larger than the *L. calcarifer* seed and tilapia stocked.

The seed stocking rates of Indian major carps were 400, 200 and 150 per ha in respect of *Catla catla*, *L. rohita* and

Table 1 : Particulars of fish seed stocking in fishpond at Panvel.

Sr. No.	Year	Name of Fish Species									
		<i>Lates calcarifer</i>		<i>Catla catla</i>		<i>Labeo rohita</i>		<i>Cirrhinus mrigala</i>		<i>Oreochromis mossambicus</i>	
		Nos./ha.	Average size (cm)	Nos/ha.	Average size (cm)	Nos/ha.	Average size (cm)	Nos/ha.	Average size (cm)	Nos/ha.	Average size (cm)
1	1997-98	1200	8.50 (0.424)*	400	7.0 (0.374)*	200	5.75 (0.362)*	150	6.50 (0.471)*	13500	10.50 (0.893)
2.	1998-99	3325	2.80 (0.328)*	500	7.5 (0.513)*	400	9.0 (0.374)*	-	-	7750	9.50 (0.517)
3.	1999-00	3410	3.30 (0.387)*	1000	8.82 (0.330)*	750	8.10 (0.471)*	-	-	8000	10.00 (0.453)

(Standard deviation)*

Table 2 : Particulars of harvesting details of fishpond at Panvel.

Sr. No.	Year	Name of Fish Species												Culture Period (months)	Fish production/ year/ ha	Tilapla	Sea bass + IMC
		<i>L. calcarifer</i>			<i>C. catla</i>			<i>L. rohita</i>			<i>C. mrigala</i>						
		Nos	Survival (%)	Avg. wt(g)	Nos	Survival (%)	Avg. wt(g)	Nos	Survival (%)	Avg wt(g)	Nos	Survival (%)	Avg wt(g)				
1	1997-98	198	82.3	402	23	28.8	1587	11	27.5	1500	21	70	821	7.5	1628	1478.15	149.85
2	1998-99	135	20.3	370	87	87	1003	6	7.5	666	-	-	-	7.5	1518	1376.75	141.25
3	1999-2000	17	2.5	971	170	85	799	76	50.7	741	-	-	-	7.5	1803	1594.5	208.5
														Total	4949	4449.4	499.6
														%	-	89.9	10.1

Table 3 : Hydrobiological parameters of Jitada culture pond at K.L.R.S. Panvel.

Parameters	Year		
	1997-98	1998-99	1999-2000
Water Temperature (°C)	31.6 (2.669)*	27.0 (3.7484)*	25.8 (2.397)*
pH	8.84 (0.133)*	7.94 (0.156)*	8.35 (0.09)*
Water transparency (cm)	33.6 (8.3095)*	18.5 (7.148)*	20.0 (6.308)*
Salinity	Nil	1.56 (0.317)*	1.75 (0.167)*

(Standard deviation)*

C. mrigala during the year 1997-98, while in 1998-99, 500 seeds of *C. catla* and 400 of *L. rohita* were stocked. In 1999-2000, 1000 seeds of *C. catla* and 750 of *L. rohita* fingerlings were stocked. the number of *Cirrhinus* was 1200, 3325 and 3410 numbers per hectare during 1997-98, 1998-99 and 1999-2000, respectively. Tilapia stocking rates were 13,500, 7750 and 8000 numbers per hectare during 1997-98, 1998-99 and 1999-2000, respectively.

C. catla seed ranged from 7.00 ± 0.374 to 8.82 ± 0.330 cm, *L. rohita* from 5.75 ± 0.362 to 8.10 ± 0.471 cm and *C. mrigala* 6.5 ± 0.471 cm during the above three years (Table 1). Similarly, the seed of *L. calcarifer* was in the size range of 2.80 ± 0.328 to 8.50 ± 0.424 cm. However, in respect of tilapia, the specimens were mature so as to breed and have fry available for *L. calcarifer* to forage. The survival of *C. catla* was 85.0 and 87.0% in 1999-2000 and 1998-99, while in 1997-98, it has on 28.8% (Table 2). In case of *L. rohita*, the survival was 50.7% in 1999-2000 and 7.5% in 1998-99. *C. mrigala* was stocked only in 1997-98 and the survival

rate was 70.0%. However, in the case of *L. calcarifer*, the highest survival percentage was observed in 1997-98 (82.5%) and the lowest (2.5%) in 1999-2000.

Available data revealed that the low survival of *L. calcarifer* was due to the presence of grown up *L. calcarifer* of previous year, which could not be harvested completely before stocking of the new seed. Since, the seeds of *L. rohita* and *C. catla* which showed higher survival (50.7 and 82.5%) was much bigger in size (8.10 cm and 8.82 cm of *L. rohita* and *C. catla*, respectively) than that of *L. calcarifer* (3.30 cm), the latter seed was cannibalized. However, in the year 1998-99, the survival of *L. rohita* was very low (7.5%), which is attributed to low water level (around 1m) for a long period. The average weight of all carp species stocked can be rated as very good. In the case of *C. catla*, it was 1193 g; *L. rohita*, 1120 g, and *C. mrigala*, 821 g. The good growth of carps is mainly attributed to bigger seed size and available planktonic food for consumption besides supplementary feed of rice bran and

groundnut oil cake. The culture period was considered on the average depth of over one meter water level and it was 7.5 months for three years. The total production per hectare per year was calculated roughly between 1518 kg to 1803 kg which may be taken as an average in view of the fact that experiment was a low cost technology for saline soils or coastal soils where water management is not available.

The experiment was conducted to understand the compatibility of culturing IMC and *L. calcarifer*, as it is a good quality table fish and fetches high price. Kasim and James (1986) have also suggested to undertake research on prospects of its culture, biology in fresh and salt water as it is reported to grow faster in freshwater (Alikunhi, 1957, Ghosh, 1971). *L. calcarifer* cultured along with milkfish showed fast growth (Danakusumah *et al.* 1986). Polyculture of seabass (*L. calcarifer*) with finishes like grouper (*Epinephelus tauvina*) and snapper (*Lutjanus johni*, *L. argentimaculatus*) have also been reported in Malaysia. (Ali, 1986). The low seed stocking rate of IMC, *Lates calcarifer* and high tilapia was recorded as against 10% of *Lates calcarifer* and IMC combine (Table 2). Therefore, seed rate of about 5000 number per ha. of IMC may be stocked under present polyculture system.

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