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TOWARDS DIVERSIFICATION OF AQUACULTURE IN ANDAMAN AND NICOBAR ISLANDS WITH JAYANTI ROHU (CIFA IR 1)

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ABSTRACT

The first genetically improved rohu variety Jayanti Rohu which shown 17% more growth per generation after five generations is compatible to many culture system. With a view to diversify the existing composite culture system in the islands two lakh Jayanti rohu spawn brought from CIFA were reared in nursery system following standard carp culture technique. The preliminary study has shown growth of 0.280±0.0141gm and 0.380±0.0295 gm respectively in farm pond and farmer's pond in 1.5 months period.

Key words: Aquaculture**,** diversification, jayanti rohu, islands

INTRODUCTION

Present aquaculture practices in the Islands are basically IMC polyculture based predominantly carried out in minor irrigation ponds by agricultural farmers. Few exotic species such as Grass carp, Silver carp and Common carp are also reported to culture with IMC in a very limited scale. Present fish production from inland freshwater of the Islands is 90 tonnes per year with a very negligible contribution from aquaculture, in spite of its available estimated area of 91 ha for aquaculture (Dept of Fisheries, A&N Islands, 2013). Amongst Indian major carps, Rohu is one of the most preferred species and command high market price. In multi-species culture system the growth of Rohu is slower compared to other species. It is also highly susceptible to many diseases. With a view to study possibilities of culture and diversification of present aquaculture practices in the Andaman and Nicobar Islands, Jayanti Rohu (CIFA IR 1), a first genetically improved Rohu in India was introduced for the first time in this Islands. It is expected that the inclusion of Jayanti Rohu will boost the productivity of the Islands by virtue of its proven higher growth rate and amicable to any aquaculture practices. Also future brood stock may be accomplished for mass propagation in the Islands. Once the genetically improved strain is developed and tested for its growth, its dissemination will improve productivity and income of carp farms.

SELECTIVE BREEDING AND JAYANTI ROHU

Aquatic animals allow the implementation of several approaches to genetic improvement. These include hybridization and cross breeding, chromosome manipulation, sex control, transgenesis, and selective breeding. Selective breeding is widely recognized as a key factor for the development of resource efficient, sustainable and profitable aquaculture productions (FAO, 1995; Worldbank, 2006). Selective breeding offers the opportunity of continued genetic gain, that the gains made can be permanent, that it is the only approach in which the gain can be transmitted from generation to generation, and that gains in a nucleus can be multiplied and expressed in thousands or millions of individuals in the production sector (Ponzoni *et al*. 2007, 2008). Successful application of combined selection to the improvement of fish (in all cases growth rate was the main focus of selection) are: (i) The GIFT (Genetically Improved Farmed Tilapia) project in Philippines, which reported genetic gains of 12 to 17 per cent per generation in Nile Tilapia, over five generations (Eknath *et al.*, 1998); (ii) The Jayanti Rohu (*Labeo rohita*) selective breeding project in India (iii) The selection project of a Malawian indigenous Tilapia, *Oreochromis shiranus*, where the accumulated gain over two generations was 13 per cent (Maluwa, 2005).

Jayanti Rohu is first genetically improved Rohu in India with higher growth efficiency released by Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar during 1997 on the occasion of 50 years of Indian independence. Morphologically it is similar to Rohu but grows much faster than the normal Rohu. The Jayanti Rohu, is recording 17% more growth per generation after five generations of selection (Reddy, 2003; Das Mahapatra *et al.*, 2007). Jayanti Rohu have been tested extensively on farm and proven to outperform other strains used by farmers. The results show superior performance of improved strains in terms of body weight and survival rate on both average and efficient farms. On an average farm, the improved carp strain gives 15% higher body weight at harvest in India to 36% higher in Bangladesh (Dey *et al*., 2010). The improved strains are more profitable than the existing strains of carp at the grow-out farm level and can afford to pay a higher price of fingerlings to hatchery. This would increase the profitability of a hatchery which can afford to pay a higher price for genetically-improved broodstock (Kumar *et al*., 2008).

FIELD TRIAL AND DISSEMINATION OVERVIEW

The genetic evaluation and economics of carp system in all its stages of production, *viz*. hatchery, seed growing and grow-out carp farming have shown that improved strain could realize higher gain than that envisaged before (Dey, 2000; Ponzoni *et al.*, 2007). Hatchery operators have a crucial role to play in the expansion of improved seed supply and technology dissemination. In field trials in different parts of India the improved Rohu showed significantly greater growth rate in comparison to the control and to the local Rohu. Dissemination has been very effectively implemented in India through a private hatchery located in Andhra Pradesh (Das Mahapatra *et al.*, 2007).

CULTURE TRIAL IN A & N ISLANDS

Two lakhs Jayanti Rohu spawn (Fig 1&2) of 5 days old were transported to this Islands in oxygenated polythene packing by air ways from Fish Genetics and Biotechnology Division of CIFA in the month of August 2013. They were acclimatized to the nursery water for 30 min before releasing. Two nurseries, one (0.03ha) in Blooms dale farm of Central Agricultural Research Institute (CARI), Port Blair and another one (0.02) at farmer's field at Garacharma village were well prepared beforehand following standard nursery management practices for Carp nursery *viz* dewatering, drying and liming (200 kg/ha), water filling, manuring (mixture of ground nut oil cake and cow dung) and soap-oil emulsion application. Each nursery was stocked with 1 lakh spawn of Jayanti Rohu. The initial physico-chemical parameters recorded in CARI-farm nursery pond were: soil silty clay, temperature 28^{o}C , pH 7.5 , Transparency 50 cm and DO 7.0 ppm with moderate zooplankton swarm. The physico-chemical parameters for farmer's nursery pond were- soil sandy clay, temperature 27 ^{o}C, pH 8.0, Transparency 40 cm and DO 7.4 ppm with moderate to heavy zooplankton swarm. Feeding was done next day onwards after stocking in nurseries. They were fed with a mixture of Ground nut oil cake powder and rice bran powder at 1:1 ratio by weight. This mixture were incorporated with mineral mixture formulation at 100 gms/kg of mixture and 5 gms tetracycline animal formulation/kg of mixture. The formulations were thoroughly mixed with feed mixture to get adsorbed in feed particles. Feeding was done twice a day during morning and evening hours @ 4 times of initial body weight (0.6kg/day in two rations) for first 5 days. It was increased to 8 times *i.e* 1.2kg/day in two rations for subsequent days. Monthly sampling was carried out for estimation of growth by Length-weight relationship of spawn. Also vital physico-chemical parameters were recorded for each pond following standard methods *viz.* Temperature with Brannan made centigrade scale, pH with Eco Testr pH2 meter, Transparency with Sacchi disc and DO with Winkler's method.

This preliminary study confirms the feasibility of culture of Jayanti Rohu in Islands condition as well as in tropical climatic condition. After two months of rearing the species were distributed to selected farmers of the South Andaman district to study the performances of species in field condition. The subsequent grow out technology to be carried out with the nursery reared fry/ fingerling of the species may prove a profitable intervention in the diversification of existing carp culture system in Islands condition.

Table 1: Two months growth study of Jayanti Rohu and related physico-chemical parameters

Sl. No.	Parameters	CARI farm pond		Farmer pond	
		1st sampling	2nd sampling	1st sampling	2nd sampling
1.	Length (cm) (mean ± SE)	2.38± 0.0490	2.89± 0.0571	2.88± 0.0947	3.14±0.0836
2.	Weight (gm) (mean ± SE)	0.180 ± 0.0099	0.280±0.0141	0.340 ± 0.0426	0.380±0.0295
3.	Temperature (°C)	30.5	29	29.5	28
4.	pH	7.0	6.8	7.1	7.0
5.	DO (mg/l)	7.3	7.2	8.3	6.7
6.	Transparency (cm)	47	30	33	45

Fig 1: Oxygen packaged spawn

Fig 2: Spawn acclimation and releasing

Fig 3: A month old fry

Fig 4: A sampled one month old fry

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