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FISH SEED PRODUCTION UNDER CONTROLLED HATCHERY SYSTEM A COTTAGE INDUSTRY

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ABSTRACT

The fish seed production in recent times has emerged as a cottage industry, with the development of controlled hatchery system. Two units of six buckets of vertical hatchery system i.e. Modern Carp Hatchery CIFE D-81 were installed in a private fish farm. 130.25 lakh spawn of Indian Major Carp was produced during the 1988 season, with an average survival rate of 70%. The results support the viability of technology especially for the economically weaker section.

INTRODUCTION

Fish seed production is one of the major limiting factors in enhancing the fish production, not only in the state of Uttar Pradesh but as a whole in the country. In view of this, under extension programme, seed production work was taken up in the Eastern Uttar Pradesh in district Barabanki. Due to the success achieved in the previous year the fish farm owner increased the number of nurseries to 14 from existing four. Therefore, to set up an ideal example for the popularization of fisheries in this area, the work was again initiated in the subsequent year and results are presented in this communication.

MATERIAL AND METHODS

The experiments were conducted during breeding season of 1988. The brood stock & brood ponds were monitored from March to July.

Pond : The work was initiated in the existing Fresh Water Fish Farm, at village Neola Karsanda, district Barabanki during 1987 (Mitra *et al.*, 1989). In view of the success of breeding during 1987, the area of

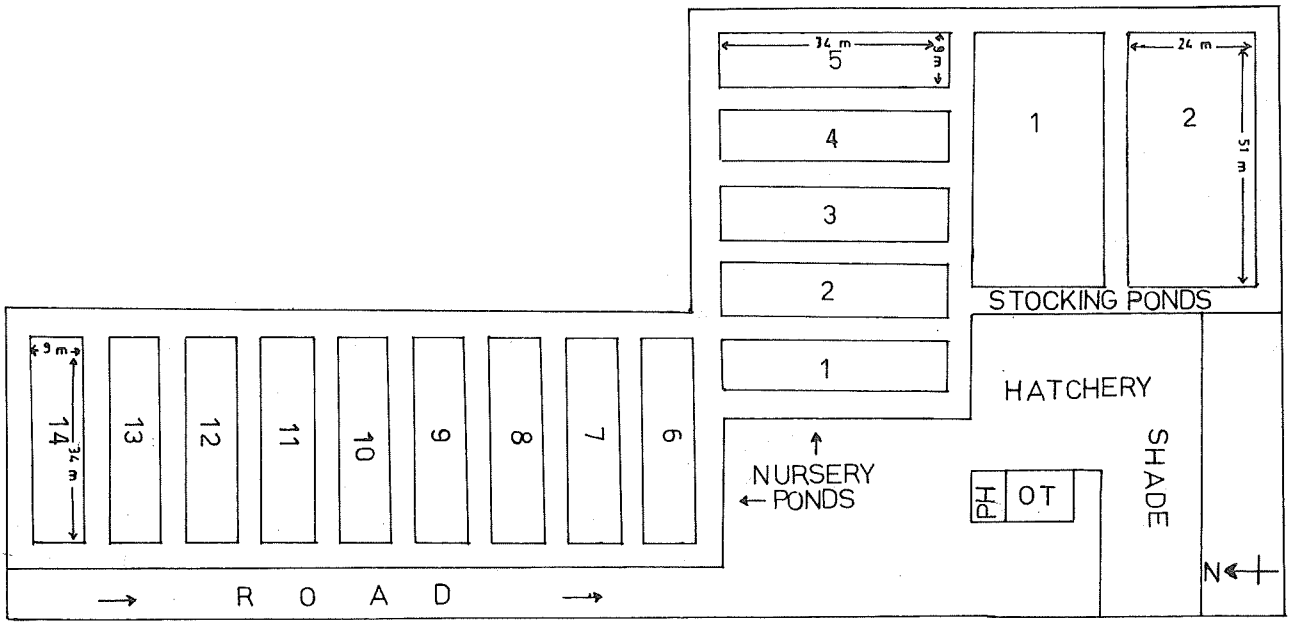

Fig. 1. *Layout of the farm.*

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the farm was increased from one hectare to two hectares and number of nursery ponds (34x9 m) were raised to 14 from 4 (Fig. 1).

Overhead tank : An overhead tank of about 15,000 litre capacity of RCC, was constructed. The farm has the water supply from a tube well.

Hatchery : Two sets of vertical hatchery systems i.e. Modern Carp Hatchery CIFE D-81 of six bucket each were installed. This system provides simulated natural environmental conditions. The temperature, dissolved oxygen and *p*H were controlled and metabolites were removed. Each bucket has egg loading capacity of approximately 0.2 million. (Dwivedi & Ravindranathan, 1982 and Mitra et. al., 1989).

Brooder : Approximately 250 kg brooders of Catla, Rohu and Mrigal were procured and maintained in separate ponds in the vicinity of the farm. The maintenance of brooder was initiated three months prior to the breeding period.

Human Chorionic Gonadotrophin (HCG) was administered intramuscularly every month only to the female brooders at the rate of 2 mg/kg of the body weight to induce maturity. The supplementary feed consisting rice bran and oil cake (1:1) was given for their maintenance for three months prior to the experiment.

Experiment : Induced breeding experiments were conducted by hypophysation of pituitary gland procured from Howrah. Intramuscular injections of pituitary gland were administered in two doses (Chonder, 1980). The doses were determined observing the maturity of the fish.

Each set consists of two male and one female fish. The first dose was given only to the female at the rate of 3-4 mg/kg body weight. The second dose to the female was given at the rate of 6-8 mg/kg and to male fishes at the rate of 2-4 mg/kg of body weight. In some cases the third dose of 8-12 mg/kg to the female and of 2 mg/kg to the male were also administered.

Parameters like air & water temperature, *p*H, dissolved oxygen, carbon dioxide and total alkalinity were monitored in brood ponds, following the standard methods (APHA, 1985).

RESULTS AND DISCUSSION

In the brood ponds water temperature followed the trend of atmospheric temperature. In the present study, water temperature varied from 23 to 31°C while air temperature ranged from 29 to 37°C. Recorded *p*H was between 7.4 and 7.6. The range in dissolved oxygen content and alkalinity were respectively 3.6 to 10 and 154 to 282 ppm. Carbon dioxide content was nil at all the three brood ponds (Fig. 2)

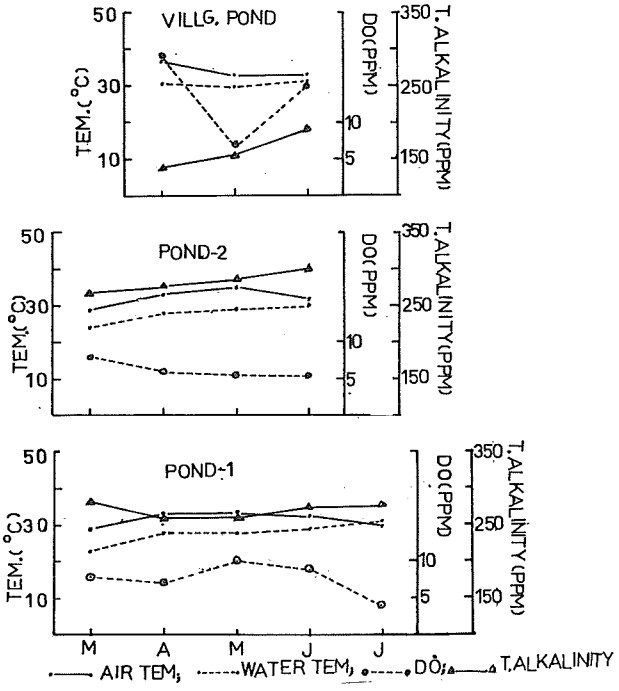

Fig. 2. *Variations in physico-chemical parameters in brood ponds*

The vertical hatchery system (Modern Carp hatchery CIFE D-81) provides the optimum conditions. The observed levels of different parameters of the hatchery are 26.0 to 28.0°C for temperature, 6.0 to 8.0 ppm for dissolved oxygen and around 7.1 for *p*H. Water in the system is silt free. *In situ* natural environmental conditions were simulated in this

Table I : *Breeding and hatching details of Indian Major Carps at village Neola Karsanda during 1988*

Date	Species	Sets (No)	Weight of Female (kg)	Fish Male (kg)	Total Eggs (Lakh)	Survival of Spawn (%)	Total Spawn (Lakh)
13-7-88	*L. rohita*	2	3.500	3.000	10.00	95	9.50
13-7-88	*C. mrigala*	2	6.250	5.000	10.00	98	9.80
15-7-88	*C. catla*	2	6.500	8.000	06.00	90	5.40
17-7-88	*C. catla*	2	2.000	4.200	02.88	70	2.02
17-7-88	*L. rohita*	2	6.250	4.500	18.00	75	13.50
19-7-88	*C. catla*	1	3.000	3.000	02.71	75	2.03
19-7-88	*L. rohita*	2	2.750	3.200	04.00	80	3.20
20-7-88	*L. rohita*	3	3.750	2.500	07.50	60	4.50
21-7-88	*L. rohita*	2	6.000	6.250	03.00	90	11.70
21-7-88	*C. catla*	2	4.250	5.000	Partial breeding-eggs were unfertilized		
23-7-88	*C. catla*	2	4.000	4.500	02.50	70	2.25
24-7-88	*L. rohita*	2	5.500	4.750	15.00	90	13.50
25-7-88	*L. rohita*	2	2.000	2.750	4.50	50	2.25
27-7-88	*L. rohita*	2	4.000	4.250	12.00	80	9.60
27-7-88	*C. mrigala*	2	4.500	3.750	4.00	95	3.80
29-7-88	*C. catla*	2	2.750	5.500	8.00	30	2.40
30-7-88	*L. rohita*	2	5.250	5.000	12.00	50	6.00
02-8-88	*C. catla*	2	5.000	5.750	5.00	All died after twiching movement	
03-8-88	*L. rohita*	2	4.000	3.250	10.00	90	9.00
04-8-88	*L. rohita*	2	5.500	4.750	15.00	90	13.50
04-8-88	*L. rohita*	2	3.000	2.000	07.00	90	06.30
Total		42	94.750	90.900	169.09	--	130.25

hatchery system. (Dwivedi & Ravindranathan, 1982 and Varshney, 1978-79).

The method was highly successful during the study season. As a result 130.25 lakhs spawn of Indian Major Carp (mainly of Catla and Rohu) were produced by induced breeding. In these experiments 13 sets of *C.catla,* 25 sets of *L.rohita* and 4 sets of *C.mrigala* were tried. A total of 90.9 kg of females were injected which gave a yield of 14.1, 102.55 and 13.6 lakhs of spawn of Catla, Rohu and Mrigal respectively. An average survival rate of approximately 70% was achieved. Mitra *et al.* (1989) had also achieved successful results in the same farm and could produce 60 lakhs spawn. Dwivedi & Ravindranathan (1982) used this hatchery system in different agroclimatic conditions.

The rate of survival of spawn was achieved upto 98%, which is higher than that of Mitra *et al.,* (1989) who recorded 90% of survival. The artificial feed used for spawn feeding consisted oil cake and rice bran in the ratio of 1:1.

The trainees of this centre were trained under this extension project. The demonstration of the technology was also extended to the fish farmers from the village. This project was a grand success in a private sector. The seed produced was distributed to the fish farmers and the farm earned a good profit. It has been established that this technology is viable. If vegetables and fruits are grown on embankments, the income can be supplemented further.

The viability of the project is very clear from the interest of the party itself. In the beginning the farm was having 4 nurseries

(Mitra *et al.*, 1989). In the subsequent year total number of nurseries has gone up to 14. With the success of the hatchery system in private sector, in Eastern Uttar Pradesh, people from various walks of the life are coming forward to take up the fisheries as a career.

This indegenous breeding and hatching system has already been successfully tried and adopted by the poor fisherman in the states of Andhra Pradesh, Madhya Pradesh, Haryana, Maharashtra, Rajasthan and Tamil Nadu. It has already been proved that with the development of indegenous Modern Carp Hatchery Model CIFE D-81 fish seed production has become a viable cottage industry, especially for small fish farmers.

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