

RECYCLING OF POULTRY WASTE IN INTEGRATED FISH FARMING

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ABSTRACT

An integrated fish culture experiment with poultry was carried out at fresh Water Biological Research Station, Bhavanisagar during 1986-87. Poultry droppings were added in the experimental pond at the rate of 8 t/ha/year instead of supplementary feeding and manuring. The fish species Viz., Catla, Rohu, Mrigal and Common carp in the ratio of 3:2:2:3 were stocked at the rate of ten thousand numbers per hectare. A total production of 4125 kg of fish/ha/year was recorded in the experimental pond against 3500 kg in control pond. The increase in yield being 18 per cent over control. The production cost per kg of fish was reduced from Rs. 5.75 in the control to 2.00 in experimental pond. In addition, the fertility status of the experimental pond was also improved.

Key words: Recycling, poultry waste, integrated fish farming.

Utilisation of animal waste in crop fields and fish ponds is an age old practice in China and other Asian countries. By recycling poultry waste in fish ponds, the mineral rich organic matter is incorporated in the form of manure and eventually recovered as table fish. The poultry waste applied to the fish ponds not only serves as fertilizer but also consumed directly by the fish. The addition of waste increases the fertility status of the pond and enhances the fish yield. In addition to this, the left over or spilled feed by the birds is also used as nutrient input. Thus integration of fish culture with poultry rearing offers greater efficiency in resource utilisation and provides additional income to the farmers.

Several experiments conducted in India proved the scientific feasibility and economic viability of fish-cum-pig farming and fish-cum-duck farming (Sharma *et al.*, 1979; Jhingran and Sharma, 1980; Bulbule, 1981; Sharma and Das, 1981). Preliminary studies in India indicated that use of poultry manure as a complete fertilizer can be well availed for integrated fish farming. According to XII Livestock census Report (1977), Tamil Nadu is having 144 Lakhs poultry population. About 2000, 1700 and 1900 tonnes of N, P₂O₅ and K₂O respectively are being produced

per annum (Udayasoorian *et al.*, 1983). Keeping this in view, an experiment was carried out at fresh water Biological Research Station, Bhavanisagar to find out the feasibility and economic viability of fish-cum-poultry farming in Tamil Nadu.

MATERIALS AND METHODS

Eighteen weeks old Babcock hybrid layers were raised intensively in cages at the rate of 300 birds/ha to supply 8 t/ha/year poultry excrete throughout the culture period. The droppings were collected and applied to the experimental pond once in five days. The chicks were fed with layer mash at the rate of 110 g/bird/day. Lighting hours provided to the birds per day ranged from 12-18 hours.

Two ponds each with 0.02 ha water spread area were used for the experiment. In control pond the conventional composite fish culture technique was adopted (Jhingran, 1977). In the experimental pond no manure and feed other than the poultry excreta was added. Fingerlings of Catla, Rohu, Mrigal and Common carp were stocked in both ponds at the rate of 10,000 numbers/ha in 3:2:2:3 ratio (Table I). The pond being

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essentially stagnant, water was added just to compensate the loss due to seepage and evaporation. The pond was harvested after 12 months of rearing period. The fertility status of the ponds was assessed by quantitative and qualitative analysis of plankton once in a fortnight.

The hydrographical features of the ponds viz., water temperature, dissolved oxygen and pH ranged from 24.5-32.5C, 2.8-6.4 ppm and 7.2-8.4 respectively. The total NPK content of the poultry excreta ranged from 1.5-3.5, 0.3-0.5 and 0.4-0.6 per cent respectively.

RESULTS AND DISCUSSION

In the present study a total fish yield of 4125 kg/ha/year was recorded in the experimental pond as against 3500 kg/ha/year in control pond (Table 1). It is in close agreement to the production of 3940 kg/ha/year in fish-cum-poultry farming conducted at Krishnagar (Das, 1981 a) and the average production rate of 3543 kg/ha/year from intensively fed fertilized composite fish culture ponds in eastern region of India (Anon., 1977). The increase in yield in the poultry droppings recycled pond being 18 per cent over the intensively fed and fertilized control pond. This increase in production in experimental pond

Table 1. Production details of Integrated fish farming

Sl. No.	Species	Initial average length (cm)		Initial average weight (g)		Recovery per cent		Initial average length (cm)		Final average weight/fish (kg)		Total yield (kg/ha)	
		Contr.	Expt.	Contr.	Expt.	Contr.	Expt.	Contr.	Expt.	Contr.	Expt.	Contr.	Expt.
1.	<i>C. catla</i>	11.0	11.0	25	25	93.3	96.6	33.0	34.5	0.40	0.42	1120	1225
2.	<i>L. rohita</i>	10.0	10.0	20	20	87.5	92.5	33.0	35.3	0.37	0.51	645	950
3.	<i>C. carpio</i>	10.0	10.0	20	20	90.0	91.6	24.4	25.8	0.27	0.28	725	770
4.	<i>C. mrigala</i>	9.0	9.0	15	15	67.5	75.0	53.7	54.5	0.75	0.79	1010	1180
											Total	3500	4125

Table 2. Mean Planktonic Sediment Volume (ml/50 lit.)

Month	Experimental pond	Control pond
January	1.6	0.9
February	2.2	1.1
March	2.4	1.5
April	3.5	1.3
May	2.0	1.2
June	2.1	1.2
July	1.9	0.8
August	1.8	0.5
September	1.4	0.8
October	0.8	0.3
November	1.8	0.8
December	1.9	0.8

could be attributed to the high manurial value of the poultry droppings which resulted in higher production of micro fauna and flora ultimately in terms of fish yield.

The volume of planktonic sediments ranged from 0.8 to 3.5 ml/50 lit. of water in the experimental pond and 0.3 to 1.5 ml/50 lit. of water in the control pond (table 2). It was observed that the production of zoo-plankton especially cladocerans and rotifers were rich and steady in the poultry excreta added pond than control pond. The plankton production was higher during the initial period of the experiment when the fishes were in smaller size. But as the size of the fish population grew, the planktonic

volume decreased gradually due to the higher growth rate of fish in both experimental and control ponds. During the last four months of the rearing period the planktonic volume was found to be reduced due to higher intake by the fishes and also due to the low volume of plankton produced during the winter months (Sep-Nov). The above findings also corroborated with the earlier reports of Das (1981 b). Schroeder (1973) stated that maintenance of plankton concentration at 1-2 ml/50 lit. reduces the supplementary feed requirement by 30 per cent.

By recycling the poultry waste the production cost of fish was greatly reduced to 2.00 from

5.75 rupees per kg. (Table 3). The low production cost of fish in the integrated farming was due to the savings on the cost of fertilizer and supplementary feed. The input cost in the experimental pond was reduced to the tune of 65 per cent of the total input. Banarjee *et al.* (1979) and Das (1981 a) were also of the opinion that the integrated fish farming greatly reduced the input cost to the tune of 50-58 per cent. It was evident that a net profit to the tune of Rs. 32,000/- per ha was recorded in the experimental pond against Rs. 15,000/- per ha in control pond. The additional income of Rs. 17,000/- per ha obtained in the experimental pond was due to the recycling of poultry waste in fish farming.

Table 3. Cost and return of integrated fish farming with poultry (Rs./ha/year).

I.	EXPENDITURE	Experiment Rs.	Control Rs.
A.	Cost of fish farming:		
	1. Rent of water body	1500-00	1500-00
	2. Pond preparation	2000-00	2000-00
	3. Stocking materials	2500-00	2500-00
	4. Feed and fertilizers	...	12000-00
B.	Cost of poultry farming:		
	1. Annual depreciation on cost of poultry house	840-00	...
	2. Cost of 300 Nos. of 18 weeks old layer	9000-00	...
	3. Feed cost for layers	19400-00	...
	4. Medicines	500-00	...
	5. Wages for labour	3000-00	500-00
	6. Interest on working capital	3878-00	1600-00
	Total	42618-00	20100-00
I.	I. RETURNS		
	1. Disposal of 4125 kg in experimental pond and 3500 kg in control pond @ Rs.10/kg	41250-00	35000-00
	2. Sale of 60,000 eggs @ Rs.10/kg	30000-00	..
	3. Sale of 300 culled birds @ Rs.12/bird	3600-00	..
	III. PROFIT		
	1. Gross return	74850-00	35000-00
	2. Net return	32232-00	14700-00
	3. Production cost/kg of fish	2-00	5-75

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