RESEARCH ARTICLE

Observations on Growth and Productions of Indian Major Carps through composite Fish Culture under different Management practices

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ABSTRACT

Three fish culture ponds (P_1, P_2 and P_3) in Nanded district of M.S. under different management practices were selected for study over a period of two years. In the pond P_1, culture of Indian major carps was carried without any fertilization or supplementary feeding while in pond P_2 fertilization was done without any supplementary feeding. In pond P_3, culture was carried out both with fertilization and supplementary feeding. The physic-chemical parameters of water, primary production, growth and fish production varied significantly among the three ponds which could be attributed to the different levels of inputs used in the fish culture. The results of present study indicate that high stocking density, supplementary feeding, regular liming, intermittent fertilization and manuring contributed to considerably high fish production. The average production of fish was significantly higher ($P \leq 0.01$) in the pond P_3 in comparison to ponds P_2 and P_1 The length-weight relationship of the cultures species in the experimental ponds was calculated by linear regression equation and exponential equation.

Keywords : Fish production, management, composite fish culture practices

INTRODUCTION

Freshwater aquaculture started in India from a low subsistent level of domestic activities in the eastern Indian states like West Bengal, Orissa and Assam. During the last decaders, it has reached the status of a progressive industry in the states like Andhra Pradesh, Punjab,Haryana, Madhya Pradesh, Maharashtra and Gujarat. There has been an increasing trend in fish production from freshwater aquaculture due to technological developments like pond preparation, stocking with adequate number of quality seeds of proper size and ratio, fertilization and manuring supplementary feeding, disease control and water quality management.

Nanded is one of the most potential and resourceful districts in M.S. so far as fish production is concerned. Although the fish production per unit area

from freshwater culture ponds is quite high in Nanded in comparison to the other districts of the state, yet there is scope for further increasing productivity to the national level. The aquaculture practices in Nanded district area based mainly on three species of Indian major carps (Catla, Rohu and Mrigal) occasionally with exotic carps species. However, exotic carps could not get popularity due to ecological and economical reasons. Further, lack of availability of quality seeds accompanies by poor consumer preference has caused substantially less culture of the exotic carps.

Information on limnology of fish culture ponds, growth rate, fish production under different management practices in the Nanded district is rather meager and present study attempts to evaluate growth and production of Indian major caps under different management practices.

MATERIALS AND METHODS

Present study was conducted over a period of two years (August 2012 to July 2014) in three selected ponds namely P1, P2 and P3 located at Chatrpur sub-division of Nanded district, M.S. The perennial ponds has an area of 3150 m^2, 3400 m^2 and 3250 m^2 and average water depth of 2.5, 2.3 and 2.4 m respectively. Three different types of management practices were adapted in the three ponds, IN P1 only raw cow dung was applied in an irregular manner. The management practices in P_2 involved application of lime, organic manure and inorganic fertilizers at regular intervals while the management practices in P2 involved eradication of aquatic weeds and unwanted fishes, regular application of lime and fertilizers and use of locally made supplementary feed. Ponds were stocked with fingerlings of the three species of Indian major carps viz. catla catla, Labeo rohita and cirrhinus mrigala procured from Government hatchery. Ponds were stocked at combined density of 5000-7500/ha. Mixture of rice bran and groundnut oil cake in a ration of 1:1 (w/w) was provided as supplementary feed. Details on seed stocking and input doses in different experimental ponds are computed in Table 1.

Water quality parameters were analysed at regular intervals following standard methods (APHA, 1985), Sampling of fishes was carried out randomly at monthly intervals by operating cast net to assess the growth. Length and weight of each species of fish were recorded and length-weight relationship was calculated by estimating the values of the constants 'a' and 'n' in the formula $W= a L^a$ (LeCreen, 1951). Analysis of variance (ANOVA) technique was used for statistical analysis of data on growth rate and water quality.

RESULTS AND DISCUSSION

The water qualityparameters like temperature, dissolved oxygen, pH, total alkalinity and net primary production ranged between 21.6-33.8^{0}C, 3.07-9.44 mg/I, 6.55-9.42, 78.92-196.24 mg $CaCO_3$/1 and 4.21-282.47 mgC/m^3/h respectively. Significant variations ($p \leq 0.05$) in dissolved oxygen, pH, total alkalinity and primary production were observed among the experimental ponds which can be attributed to different levels of inputs and allochthnous surface runoff added to these ponds.

The details of stocking density, inputs, survival rate and total fish production are presented in Table 1. The stocking density varied from 5000-7500 fingerlings/ ha in the selected ponds. Significant difference in growth rates of the carps was recorded in the three ponds with different treatments (Fig. 1) The fish production was maximum in pond P_3 followed by in P_2 and P_1 (Table 1). The variation in fish production in the experimental ponds was significantly high ($P \leq 0.01$) which could be due to significant variation ($P \leq 0.05$) in the level of inputs including the quantity of seed stocked, regular liming, supplementary feeding, intermittent use of fertilizer, which contributed to the high fish production in the pond P3. The lowest fish production in the pond P1 was obviously due to the lowest stocking density and lack of other inputs. The results of present study are in agreement with the reports of present study are in agreement with the reports of earlier workers (Chaudhuri et al, 1975; Tripathy, 1984; Verina et al, 1993).

In all the three ponds, significant positive correlation ($P \leq 0.01$) was observed between primary productivity and average growth of cultured species (Fig.1). Present results are in agreement with earlier works by Rout and Tripathy (1988) and Yussoff and McNabb, (1989). Such higher primary productivity in the pond P_3 might have contributed to the faster growth rate and relatively high fish production in this pond.

Table 1, Stocking density, inputs, survival and fish production in three selected ponds.

Year	Fish	Pond P_1				Pond P_2				Pond P_3			
		Stocking density (no./ha)	Inputs (Kg/ha)	Survival (%)	Production (Kg/ha)	Stocking density (no./ha)	Inputs (Kg/ha)	Survival (%)	Production (Kg/ha)	Stocking density (no./ha)	Inputs (Kg/ha)	Survival (%)	Production (Kg/ha)
2012-13	Catla Rohu Mrigal	1000 1000 1000	RCD-10,000	62 65 52	502.5 537.5 307.5	2500 2000 2000	Lime-800 RCD-14000 Urea-230 SSP-120	51 61 65	899 1012 735	2500 3000 2000	Lime-1150 RCD-18000 Urea-230 SSP-125 Feed-4265	61 67 60	1160 1880 617.5
	Total	3000		59	1347.5	6500		58	2646	7500		63	3657.5
2013-14	Catla Rohu Mrigal	1000 1000 1000	RCD-7,500	52 60 50	500 507.5 305	2250 2250 1500	Lime-800 RCD-15750 Urea-205 SSP-107.50	65 61 62	940 1260 782.5	3000 2500 2000	Lime-800 RCD-18750 Urea-220 SSP-125 Feed-4445	58 65 55	1060 1657.5 665
	Total	3000		54	1312.5	6000		63	2982.5	7500		60	3382.5

RCD= Raw cow dung, SSP = Single Super phosphate

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