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PRELIMINARY YIELD TRIAL WITH CARP POLYCULTURE IN FERTILIZED AND UNFERTILIZED PONDS

JOHN H. GROVER
and
GREGORIO T. BANACIA
Freshwater Aquaculture Center*
Central Luzon State University
Muñoz, Nueva Ecija, 2320

INTRODUCTION

The culture of different fish species with different food habits in a pond at the same time thus making most efficient use of the culture environment is one way to increase fish production. Different species of carp, for example, show particular promise for use in such polyculture system. This experiment in the newly constructed ponds at the Freshwater Aquaculture Center was designed to find out what production could be expected from combined carp culture in ponds with and without the use of fertilizer. Such information should be useful in predicting yields and guiding management practices like stocking rate, length of culture and effectiveness of fertilizers. This experiment combined the plankton-feeding silver carp, *Hypophtalmichthys molitrix;* the omnivorous and benthos-feeding common carp, Cyprinus carpio; and the herbivorous rohu carp, *Labeo rohita.*

MATERIALS AND METHODS

The eight rectangular ponds used in this experiment were built from heavy clay soil found in the previous existing ricefield. This was the first experiment to be conducted in these ponds. Exact pond

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areas were not measured until after the experiment was underway so inputs were based on the estimated 0.1 and 0.05 ha sizes of the different ponds. Mean water depth in each of the ponds was approximately 75 cm.

Four of the ponds were fertilized 14 days prior to stocking. The other four ponds served as unfertilized control ponds. However, even after a few days it was apparent that the fish in the control ponds were not growing well. Two of these control ponds received fertilization starting on culture day 70 to determine what recovery was possible in fish growth. Fertilizer inputs into the various ponds are summarized in Table 1. Chicken manure was applied first in a single application at approximately 1100 kg/ha to provide an organic base to support productivity in the new ponds. Subsequently, inorganic fertilizers high in phosphate were applied on platforms to sustain plankton growth. The inorganic fertilizer, mostly 16-20-0 NPK formulation with each application approximately 50 kg/ha, was given when water visibility as measured with a Secchi disk exceeded 45 cm.

Fish were stocked on November 14, 1973, at the sizes and numbers given in Table 2. Fish were contributed by the Bureau of Fisheries and Aquatic Resources from its Tanay Farm and had been treated with formalin (15 ppm for 36 hr) as prophylaxis against ectoparasites when received. The numbers of silver and rohu carps stocked were determined by what was available. Fish were distributed from pond 21 without draining the pond so only an estimate of the number of fish remaining in that pond was possible. A sample of fish was seined from each pond monthly to estimate the growth rate of the fish. After weighing, the sampled fish were returned to their ponds. Ponds were drained and fish harvested from Aug. 26 to Aug. 28, 1974. Length of the experiment was 285 to 287 days.

RESULTS AND DISCUSSION

Growth curves for fish in each pond based on the sampling are presented in Figure 1. Fish grew best in the fertilized ponds, poorest in the unfertilized ponds. The addition of fertilizer to the two previously unfertilized ponds resulted in greatly accelerated fish growth. Common carp in the fertilized ponds appeared to have reached carrying capacity when fish reached a mean of 500 to 800 g. Silver

carp and rohu carp grew throughout the culture period in the fertilized ponds. However, rohu grew at a much slower rate.

Harvest result are given in Table 3. Mean net productions were 1080 kg/ha in ponds fertilized continuously, 841 kg/ha in ponds receiving delayed fertilizer and 222 kg/ha in ponds without fertilization. The mean net production in both the continuously and delayed fertilized ponds was significantly higher ($P<.05$) than from the unfertilized ponds. The amount of fertilizer used to produce one kilogram more fish than in the unfertilized ponds was 1.3 kg chicken manure and 1.1 kg inorganic fertilizer in the continuously fertilized ponds and 1.8 kg chicken manure and 1.0 kg inorganic fertilizer in the ponds receiving delayed fertilization.

Table 3. Harvest information for carps taken from ponds at Freshwater Aquaculture Center August 26 to 28, 1974.

Treatment	Pond No.	Pond Area (m^2)	Kind	No.	Mean Wt.	No/Ha	Kg/Ha	Net* Kg/Ha	Survival %
Fertilized	2H	950	Silver	24	1931.1	253	487.86	484.04	96
			Rohu	70	818.5	737	603.11	598.22	88
			Common	40	604.4	421	254.48	252.55	100
	3I	934	Silver	25	1670.5	268	447.14	443.25	100
			Rohu	72	608.8	771	469.31	464.34	90
			Common	38	672.8	407	273.73	271.76	95
	4J	445	Silver	6	1900.9	139	256.30	253.04	60
			Rohu	42	463.3	944	437.27	431.41	93
			Common	17	504.6	382	192.77	190.70	85
	5K	434	Silver	10	1895.3	230	437.71	433.36	100
			Rohu	22	518.4	507	262.78	256.77	49
			Common	17	617.1	392	241.77	239.60	85
	3H	921	Silver	25	1547.8	271	420.14	416.21	100
			Rohu	79	432.4	858	370.90	365.86	99
			Common	34	404.8	369	149.44	147.44	85
	4K	431	Silver	7	1265.1	162	205.47	202.10	70
			Rohu	42	371.9	974	362.41	356.35	93
			Common	19	445.8	441	196.52	194.39	95
	2I	962	Silver	37	241.4	385	92.85	86.52	-
			Rohu	110	65.7	1143	72.12	67.52	-
			Common	232	16.4	2412	39.55	26.78	-
	5J	442	Silver	8	523.0	181	94.66	91.38	80
			Rohu	41	142.3	928	131.99	126.09	91
			Common	14	150.3	317	47.61	45.53	70

* Net production is harvest weight minus stocking weight.