1981

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Baliao, D. D.

Aquaculture Department, Southeast Asian Fisheries Development Center

Baliao, D. D., Rodriguez, E. M., & Gerochi, D. D. (1981). Culture of grey mullet, Mugil cephalus, Linnaeus in brackishwater ponds at two stocking densities. SEAFDEC Aquaculture Department Quarterly Research Report, 5(2), 12–17.

http://hdl.handle.net/10862/2388

Culture of grey mullet, *Mugil cephalus,* Linnaeus in brackishwater ponds at two stocking densities

D.D. Baliao, E.M. Rodriguez and D.D. Gerochi

The culture potential of hatchery-produced grey mullet (Mugil cephalus, Linnaeus) stocked with average weight of 3.7 g and at 2,500 (treatment I) and 3,000 (treatment II) fingerlings/ha in six 350m brackishwater ponds following the lab-ab method of culture was studied.

The stock and harvest data of grey mullet reared at two stocking densities for 120 days are presented in Table 1. Grey mullet reared at 2,500 fingerlings/ha (I) and 3,000 fingerlings/ha (II) showed no significant difference (P 0.05) in growth rate. It was expected that the growth of the mullet would be slower at higher stocking density because of intra-specific competition, but the result proved to be the same. The average body weight was found to be identical in all the ponds amounting to 109.50 and 109.30 g for treatment I and II, respectively. Percentage survival however was significantly different with 53.65% (ranging from 19.05 to 82.85%) for the 3,000 fingerlings/ha and 32.65% (ranging from 12.64 to 71.25%) for the 2,500 fingerlings/ha.

The periodical growth rates are plotted to show the growth curves (Fig. 1). In the succeeding period until harvest, growth rates notably continued to incline having an identical overall gain in weight of 0.88 g/day/fish for both treatments. Whether cultured at 2,500 or 3,000 fingerlings/ha the grey mullet exhibited an equal capacity for growth. Unider such condition, however, at least compared to grey mullet grown in Israel, the overall growth rate attained was way below the rate obtained from productive commercial ponds where 2.0 to 2.5 g/day/fish rates are not uncommon (Yashouv, 1966). Under Philippine conditions, where milkfish is a major species being cultured, this present result does not seem to agree with the report of Blanco and Acosta (1953) which stated that growth rate grey mullet is at pace with milkfish. Milkfish grows at an average of 2.5 g/day/fish (IFP Report, 1972) following the conventional lab-lab method of culture. Special system of cultivating grey mullet to include polyculture or artificial feeding have to be developed.

It was also observed that with the presence of relatively abundant amounts of natural food (*lab-lab*), mullets at given stocking densities were less efficient in utilizing its feed until harvest. A theoretical consideration would be to increase the stocking rates or introduce a polyculture system so as to reach the optimum carrying capacity of the pond.

Table 1 summarizes the net production obtained in each of the two treatments. Treatment II had the highest net production at 177.11 kg/ha. On the other hand, Treatment I was lowest with 32.56% which may partly explain the relatively lower yield. The net production in treatment I at 83.23 kg/ha was proportionately one-half of that obtained for treatment II. The difference in production was substantially influenced by the relatively lower rate of survival.

On the basis of two crops a year, the highest net production obtained at treatment I is equivalent to approximately 354 kg of grey mullet net production in a year. Nonetheless, the result is an improvement over 100 to 150 kg/ha and 336 kg/ha of mullet produced annually in Indonesia and the Philippines, respectively (Bardach, *et al.*, 1972).

Physico-chemical parameters obtained during the culture period are shown in Table 2. There was no considerable difference observed in water quality parameters between treatments. On day 45, however, salinity and pH fluctuated abruptly to unfavorable levels in all pond compartments brought about by heavy rain. Mean salinity and pH values dropped from 62 to 22 ppt and 9.35 to 5.50 (treatment I) and 60 to 20 ppt and 9.40 to 5.40 (treatment II), respectively. Sign of stress was evident as some fish became sluggish, swimming slowly near the surface. The following day, dead fish were recovered. There was a reddish discoloration at the base of the fins with gills clogged by silty particles. Pond Nos. 3, 5 and 6 suffered higher mortality rates than the other ponds. It has been observed in brackishwater fishponds that fish kills associated with salinity and pH stress brought about by heavy rain is not uncommon (IFTR, 1972). Likewise, dissolved oxygen and water temperature remained within tolerance limit, values ranged from 1.50 to 9.95 ppm and 24.5 to 31.8 °C (treatment I) and 1.50 to 10.91 ppm and 24.5 to 32.5 °C (treatment II).

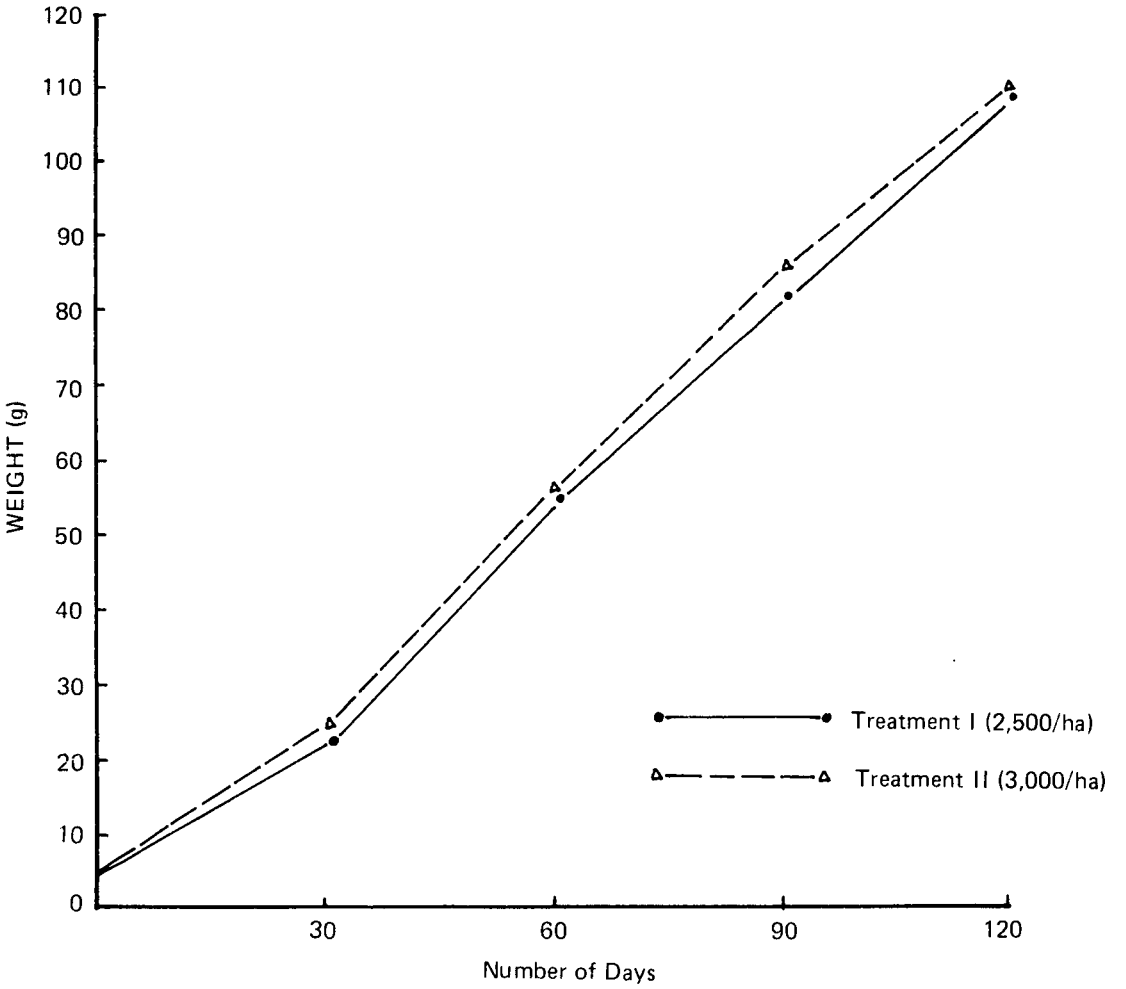

Figure 1. Growth curves of grey mullet (*M. cephalus*, Linnaeus) grown at two (2) stocking densities for 120 days in brackishwater ponds.

Table 1. Stock and harvest data of grey mullet, *Mugil cephalus* (Linn.) grown at two stocking densities in 350 m^2 brackishwater ponds for 120 days.

Treatment	Pond No.	Stock Compartment Initial No.	Final No.	% Survival	Ave. wt. (g) Initial	Final	Relative growth increment (g/day/fish)	Net production (kg/ha/crop)
I	MEP_2	87	62	71.26	3.7	103.24	0.8295	177.28
(2,500 fingerlings per hectare)	MEP_3	87	12	13.79	3.7	126.62	1.0248	42.43
	MEP_5	87	11	12.64	3.7	98.58	0.7907	29.98
Mean			28[a]	32.56[a]	3.7	109.50[a]	0.8817[a]	83.23[a]
II	MEP_1	105	87	82.85	3.7	126.42	1.0226	305.08
(3,000 fingerlings per hectare)	MEP_4	105	62	59.05	3.7	99.89	0.8016	170.35
	MEP_6	105	20	19.05	3.7	101.59	0.8158	55.90
Mean			56[b]	53.65[b]	3.7	109.30[b]	0.8800[b]	177.11[b]

Treatment means with the same superscript are not significantly different ($P > 05$)

Table 2. Physico-chemical parameters observed in grey mullet, *M. cephalus* (Linn.) experimental ponds grown at two stocking densities for 120 days.

Treatment	Pond No.	Salinity (ppt)		Water pH		Dissolved O_2 (ppm)		Water Temp. (^oC)	
		Mean	Range	Mean	Range	Mean	Range	Mean	Range
I	MEP_2	45.0	21-62	7.96	6.00-9.25	5.51	2.38-9.95	28.50	24.5-31.5
	MEP_3	44.7	24-58	7.93	6.01-9.15	5.54	2.12-8.90	28.59	24.5-31.5
	MEP_5	42.0	20-58	7.81	5.50-9.35	5.94	1.50-8.80	28.57	24.5-31.8
Mean		43.9	20-62	7.90	5.50-9.35	5.66	1.50-9.95	28.55	24.5-31.8
II	MEP_1	44.7	20-60	7.92	5.85-9.00	5.69	1.67-9.34	28.47	25.0-31.5
	MEP_4	40.5	21-57	7.82	6.05-9.40	5.39	1.50-8.63	28.41	24.5-31.6
	MEP_6	40.1	20-51	7.78	5.40-8.85	6.09	1.67-10.91	28.70	24.7-32.5
Mean		41.7	20-69	7.84	5.40-9.40	5.82	1.50-10.91	28.52	24.5-32.5

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