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Baliao, D. D.

Aquaculture Department, Southeast Asian Fisheries Development Center

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Growth and survival rates of hatchery-produced and wild milkfish fry grown to fingerling size in earthen nursery ponds

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

Growth and survival rates of hatchery-produced and wild milkfish fry grown to fingerling size were compared. Growth and survival rates are presented in Table 1. Data shows no significant difference ($P > 0.05$) between hatchery-produced and wild milkfish fry. Final mean weight and percentage survival for the hatchery-produced fry was 2.11 g and 61.5%, while for the wild fry it was 1.88 g and 62.9%, respectively. Mean total length was 58.95 mm for the hatchery-produced and 56.46 mm for the wild. The relative weight and length increment from both treatments gave an average of 0.032 g/day/fish and 0.710 mm/day/fish, respectively. Similar results were obtained from the studies conducted by Rabanal (1975) IFP TR7 (1975) and Baliao (1978), adopting a stocking density of 30 to 50 milkfish fry/m^2, reared to fingerling size from 45 to 60 days in earthen nursery ponds. In terms of percentage survival the above result is an improvement over 50% which is normally expected in milkfish nursery ponds in the Philippines (May, 1976).

Physico-chemical parameters obtained during the culture period are shown in Table 2. No marked difference was observed between treatments. However, there was a sudden drop in salinity (48 to 6 ppt) and pH (8.15 to 5.20) from the 28th to 33rd day of rearing due to heavy rains. Sign of stress during the above period was evident as some fish were seen swimming lethargically in all compartments. Fish kills due to salinity and pH stress following rains in milkfish ponds are not uncommon (IFP TR 1972; Ranoenichadjo and Padlan, 1976). High mortalities in pond No. 4 (43.9%) and pond No. 5 (21.7%) may had occurred during this period of adverse conditions. This cannot be confirmed, however, because there is no reliable method of estimating the dead fish in each experimental ponds. Dissolved oxygen and water temperature were within tolerance limits; values ranged from 3.29 to 10.7 ppm and 24.1 to 32.2°C (Treatment I) and 2.84 to 10.51 ppm and 23.9 to 32.3°C (Treatment II), respectively.

Based on subjective observation, growth of *lab-lab* in all compartments during the culture ranged from moderate to abundant – a criterion resorted to in the absence of qualitative and quantitative analysis. The fingerlings appeared healthy as indicated by their relatively normal body shape.

Table 1. Growth and survival rates of hatchery-produced and wild milkfish from 2 June – 2 August 1980.

Treatment	Pond No.	Stock/50 m^2			Harvest/50 m^2			Relative Growth Increment		Percentage Survival
		No.	Ave. length (mm)	Ave. weight (gm)	No.	Ave. length (mm)	Ave. weight (gm)	Length (mm/day/fish)	Weight (g/day/fish)	
I (Hatchery-produced) (30 fry/m^2)	MHP-1	1500	13.79	.0066	1287	51.60	1.32	0.630	0.021	85.8
	MHP-2	1500	13.79	.0066	1157	54.57	1.38	0.679	0.022	77.1
	MHP-5	1500	13.79	.0066	526	70.70	3.63	0.948	0.060	21.7
Mean[1/]		1500	13.79	.0066	923	58.95	2.11	0.752	0.034	61.5
II (Wild) (30 fry/m^2)	MHP-3	1500	13.80	.0065	1167	54.93	1.58	0.685	0.026	77.8
	MHP-4	1500	13.80	.0065	659	63.90	2.86	0.835	0.047	43.9
	MHP-6	1500	13.80	.0065	1008	50.55	1.22	0.612	0.020	67.2
Mean[1/]		1500	13.80	.0065	944	56.46	1.88	0.710	0.031	62.9

[1/] Treatment means not significantly different ($P > 0.05$).

Table 2. Physico-chemical parameters observed in hatchery-produced and wild milkfish fry nursery ponds from 2 June – 2 August 1980.

Treatment	Salinity (ppt) Mean	Range	Water pH Mean	Range	Water Temp (°C) Mean	Range	Dissolved O_2 (ppm) Mean	Range
I								
MHP-1	25.88	10 – 43.0	6.71	5.85 – 7.90	28.17	24.2 – 32.2	2.34	4.09 – 10.71
MHP-2	28.17	14 – 48.0	7.04	5.20 – 7.95	28.42	24.3 – 32.1	7.05	4.11 – 10.01
MHP-5	28.14	14.7 – 47.0	6.94	5.90 – 8.10	28.31	24.1 – 31.8	6.88	3.29 – 10.55
Mean	27.39	10 – 48	6.89	5.20 – 8.10	28.30	24.1 – 32.2	7.09	3.29 – 10.71
II								
MHP-3	27.58	12 – 14	7.33	5.99 – 8.10	28.71	24.2 – 32.3	6.45	2.95 – 10.39
MHP-4	28.41	14 – 46	7.38	5.80 – 8.15	28.61	23.9 – 32.1	7.76	2.84 – 10.51
MHP-6	25.41	8.– 40	6.95	5.70 – 8.10	28.25	24.3 – 32.1	7.45	3.38 – 13.88
Mean	27.13	8 – 46	7.22	5.70 – 8.15	28.52	23.9 – 32.3	6.88	2.84 – 10.51

Closer observation of hatchery-produced fingerlings revealed 5 to 10 pieces per compartment having deformed mouths and exposed gills. In Japan, Suemitsu (personal communication) observed that hatchery-produced yellow tail *Seriola quinquiradiata* have similar deformities, e.g., deformed mouth, exposed gills and twisted body. These deformities may be due to abnormal environmental conditions, e.g., salinity and water temperature (May 1975) and nutritional deficiencies (Halver, 1972) during incubation and larval stages. The above abnormalities could not have been the primary cause of mortality among hatchery-bred fish since length and weight gain and survival were not considerably different from that of normal ones and wild fish.

Based on the results of this study, the following recommendations are made:

(1) At recommended stocking density of 30 fry/m^2, hatchery-produced milkfish fry could attain fingerling size of almost 2 g with a percentage survival of 68%.

(2) This study indicates that hatchery-produced fry/fingerlings can equal the culture performance of the wild fry, however, further replications are needed to make the result conclusive.

(3) Comparative performance of hatchery-bred and wild fry should encourage intensified research on milkfish broodstock development and refinement of induced spawning methods.

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