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Experiments were conducted in twelve 144 sq m brackishwater ponds at Leganes Research Station, SEAFDEC, to determine the effects of increased stocking density and supplemental feeding on survival and growth of milkfish fry to fingerling stage and to evaluate the profitability of supplemental feeding in the milkfish nursery system. The experiments consisted of four treatments at two stocking densities with and without supplemental feeding as follows: Treatment I – 50 fry/sq m without supplemental feeding, Treatment II – 75 fry/sq m without supplemental feeding, Treatment III – 75 fry/sq m fed with practical diet, and Treatment IV – 75 fry/sq m fed with rice bran. Each treatment was randomly assigned to each experimental pond in a completely randomized design with three replicates. Feeding started 15 days after stocking at the rate of 5% body weight six days a week. Feeding rate was adjusted every two weeks after each sampling.

Mean percent survival of milkfish fry to fingerlings at two stocking densities with and without supplemental feeding are shown in Table 1. Highest mean survival of 71.50% was obtained in Treatment IV followed by Treatment II with a mean survival of 60.19%. Lowest survival was obtained in Treatment I (51.70%).

Growth, measured in terms of weight and length increases, are shown in Table 2. Highest weight increase was obtained in Treatment III while highest length increase was obtained in Treatment I. Growth was higher in Treatment I and III than Treatments II and IV probably due to the low survival rate obtained.

Table 1. Mean percent survival of milkfish fry to fingerling at two stocking densities with and without supplemental feeding for 40-45 day culture period

Treatment	Trial I	Trial II	Mean
I. (50 fry/sq m without supplemental feeding)	35.63	67.77	51.70 c 1/
II. (75 fry/sq m without supplemental feeding)	45.86	74.52	60.19 ab
III. (75 fry/sq m fed with practical diet)	38.15	73.61	55.88 bc
IV. (75 fry/sq m fed with rice bran)	60.34	82.67	71.50 a

1/ Treatments with the same superscript are not significantly different at the 5% level of significance.

Table 2. Mean growth, measured in terms of weight and length increase, of milkfish fry to fingerlings for 40-45 days culture period

Treatment	Trial I		Trial II		Mean	
	Weight (g)	Length (mm)	Weight (g)	Length (mm)	Weight (g)	Length (mm)
I	1.02	50.10	1.40	51.15	1.21	50.62
II	0.69	47.25	0.88	46.49	0.78	46.87
III	1.13	50.82	1.54	48.47	1.33	49.64
IV	0.96	50.08	1.45	47.00	1.20	48.54

Table 3. Ranges in physico-chemical parameters monitored during the rainy and dry season of culture

Treatment	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (ppm)	pH
Trial I (October 15 – November 30)				
I	26.6–33.1	14–35	1.3–5.3*	6.0–7.9*
II	26.5–33.0	15–35	0.9–4.8	5.9–8.8
III	26.7–32.0	13–35	0.8–5.2	6.0–8.6
IV	26.5–32.9	15–35	1.6–4.8	6.1–8.8
Trial II (May 15 – July 1)				
I	28.5–32.0	18–40	1.4–6.0	4.3–9.1
II	29.2–32.0	19–40	3.0–8.7	4.6–8.1
III	28.9–32.0	18–41	1.6–7.9	4.2–8.0
IV	28.5–31.0	17–40	0.9–6.8	4.9–8.0

*Monitored between 0600 and 0630 hours.

Table 3 shows the range in physico-chemical parameters monitored during the culture period. There was little variation in the ranges of physico-chemical parameters monitored among treatments. A decrease in pH value occurred after a continuous heavy rainfall in all treatments and reddish scums were observed at the pond bottom. At this time high mortalities were observed with dead fish floating on the surface of the water.

Table 4 summarizes the results of the economic comparisons between treatments. Input costs were calculated according to the prevailing prices at the beginning of the experiment while output costs were based on prices at the end of the experiment. Cost of production in both trials were higher in Treatments III and IV compared to Treatments I and II. Increased production cost at stocking density of 75 fry/sq m was mainly due to the cost of supplemental feeds. Eco-

Table 4. Economic analyses of the effect of various treatments on milkfish fingerling production.

Treatment	Feed used	Total amount of feed used (kg)	Total cost of feed (P)	Total cost of fry (P)	Cost of Production (P)	Gross Income (P)	Net Income (P)
Trial I							
	none	none	none	864.00	864.00	1,026.00	162.00
II	none	none	none	1,296.00	1,296.00	1,980.80	684.80
III	Formulated diet	25.67	128.35	1,296.00	1,424.35	1,648.00	223.65
IV	Rice bran	17.85	17.85	1,296.00	1,313.85	2,606.40	1,292.55
Trial II							
I	none	none	none	561.60	561.60	1,951.60	1,390.00
II	none	none	none	842.40	842.40	3,219.20	2,376.80
III	Formulated diet	15.29	85.62	842.40	928.02	3,179.60	2,251.58
IV	Rice bran	31.20	31.20	842.40	873.60	3,571.20	2,697.50

Note: Price of practical diet per kilo — P 5.00 (Trial I), P5.60 (Trial II)
Price of rice bran per kilo — P 1.00
Price of bangus fingerling per piece — P 0.40
Price of bangus fry per thousand — P120.00 (Trial I), P78.00 (Trial II)

nomic analysis between treatments, however, showed highest return in Treatment IV with net income of P1,292.55 and P2,697.50 obtained in Trials I and II, respectively. The low net income obtained in Treatment I was due to low stocking density and therefore less fingerlings harvested although it had the lowest production cost. On the other hand, the low net income obtained in Treatment III was due to the high cost of formulated diet which was not compensated by the percent survival obtained at harvest.

Rabanal et al (1953) found that a stocking density of 95 fry/sq m was too high resulting in overstunting and mortality if the ponds are not closely supervised. Results obtained in this study showed that increased stocking density from 50 to 75 fry/sq m increased net income and is profitable. Survival was further increased through supplemental feeding with rice bran which has the advantage of being cheap and easily obtainable. Low growth at stocking density of 75 fry/sq m without supplemental feeding was probably due to limited amount of natural food organisms.

Literature cited:

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