



PD/A CRSP EIGHTEENTH ANNUAL TECHNICAL REPORT

TIMING OF THE ONSET OF SUPPLEMENTAL FEEDING OF NILE TILAPIA (*OREOCHROMIS NILOTICUS*) IN PONDS

*Ninth Work Plan, Feeds and Fertilizers Research 4 (9FFR4)
Final Report*

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ABSTRACT

An on-farm trial was conducted on seven farms in Nueva Ecija, Philippines, to investigate the effect of two onsets of feeding on the growth, yield, and survival of Nile tilapia. There were no significant differences in the performance data (final mean weight, daily weight gain, extrapolated gross fish yield, and survival rate) that were recorded in this study. The only statistically significant difference observed was in the total feed used in the trial. The 45-day onset in feeding produced more gross value of the crop (P205,617 ha⁻¹) compared with the 75-day delay (P197,063 ha⁻¹), but by delaying the start of feeding, the costs were reduced such that the net value of the crop was improved (P124,242 ha⁻¹ in 75-day versus P106,026 ha⁻¹ in 45-day delay).

INTRODUCTION

Tilapia farmers in the Philippines commonly provide supplemental feeds in their grow-out operation. However, the timing of the start of supplemental feeding is variable. Earlier studies under the PD/A CRSP showed that initiation of feeding of Nile tilapia after 80 days in the pond produced the same yield as initiation of feeding at 38 days. Later feeding also increased growth rates and yields to the target levels, but with some delay compared with earlier feeding (Diana et al., 1996). This means that fish do not need to be fed immediately after stocking, but can be supported by the natural food in the pond ecosystem.

This study was undertaken to demonstrate efficient supplemental feeding strategies for tilapia production in fertilized ponds. Specifically, the study aimed to evaluate growth, yield, and survival of tilapia with different periods of delay before feeding.

METHODS AND MATERIALS

Seven farmers were enlisted for this trial. The farming practice of farmers ranged from extensive to semi-intensive. Two ponds from each farm were assigned each of the two treatments—supplemental feeding beginning at 45 and 75 days after fish stocking. The pond size ranged from 416 to 3,500 m² with water depth maintained at 1 m. The ponds were stocked with sex-reversed Nile tilapia (*Oreochromis niloticus*) of the Genetically Improved Farmed Tilapia (GIFT) strain. Fingerlings with mean weight of 0.11 g were used at a stocking rate of 4 fish m⁻². All ponds were fertilized weekly with urea and

ammonium phosphate at a rate of 28 kg N ha⁻¹ wk⁻¹ and 5.6 kg P ha⁻¹ wk⁻¹.

The fish were fed with prepared feeds consisting of 67% rice bran and 33% fish meal (crude protein [CP] = 28.6%) at 5% fish body weight per day (BWD) during the first 15 days of feeding and 4% BWD thereafter up to 30 days. For the remaining period prior to harvest, the fish were fed at the rate of 3% BWD. A sample of 50 fish was obtained in each pond every two weeks to measure average weights of the fish.

Water quality parameters were monitored monthly in all ponds. The water was analyzed for dissolved oxygen, pH, total alkalinity, total ammonia, and soluble reactive phosphorus. Analyses were done at the Freshwater Aquaculture Center Water Quality Laboratory according to standard methods (APHA, 1980; PD/A CRSP, 1992).

After 150 days, the ponds were harvested by seining and then complete draining. The total number of fish was counted and bulk-weighed. Final mean weight, daily weight gain, gross yield, and survival rates were calculated. The total amount of feed given in each treatment was also estimated at the end of the study. Data were analyzed statistically by paired T-tests.

RESULTS AND DISCUSSION

Performance data (final mean weight, daily weight gain, extrapolated gross fish yield, and survival rate) were not significantly different between the two treatments (Table 1). The only statistically significant difference observed was in the

Table 1. On-farm growth performance of Nile tilapia at two periods of delay before feeding (45 and 75 days) in a 150-day experiment.

Performance	Treatment (Feeding Onset)	
	45 Days	75 Days
Final Mean Weight (g fish ⁻¹)	164.7	151.7
Mean Daily Weight Gain (g fish ⁻¹ d ⁻¹)	1.09	1.01
Extrapolated Gross Fish Yield (kg ha ⁻¹)	5,140	4,926
Survival (%)	85	87
Total Amount of Feed (kg ha ⁻¹)	8,299	6,068

total feed used in the trial. The extrapolated total feed used was 8,299 and 6,068 kg ha⁻¹ for 45-day and 75-day delays in feeding, respectively. The growth patterns of tilapia in the two feeding schemes are shown in Figure 1.

The simple cost/benefit analysis of this farm trial, taking into consideration the gross sales and the cost of feed, indicated that the 45-day onset in feeding produced more gross value of the crop (P205,617 ha⁻¹) compared with the 75-day delay (P197,063 ha⁻¹), but by delaying the start of feeding, the feed cost was reduced such that the net value of the crop was improved (P124,242 ha⁻¹ in 75-day versus P106,026 ha⁻¹ in 45-day delay; US\$1 = P45).

Table 2 presents the range of values of the water quality parameters measured at monthly intervals. Water quality parameters appeared to be within the acceptable ranges for tilapia culture and there were no treatment-dependent differences that were observed.

Table 2. Range of values for water quality parameters measured monthly over a 150-day culture period in ponds fed 45 days (Pond A) and 75 days (Pond B) after stocking of tilapia.

Farm	Pond (A = 45 d) (B = 75 d)	Secchi Disk Visibility (cm)	DO (mg l ⁻¹)	Temperature (°C)	pH	Alkalinity (mg l ⁻¹)	Ammonia (mg l ⁻¹)	Phosphorus (mg l ⁻¹)
1	A	7–23	4–10	28–31	7.8–8.9	36–95	0.08–0.17	0.18–0.80
	B	8–28	3–9	28–31	7.6–9.9	42–87	0.03–0.33	0.29–0.56
2	A	9–59	9–15	31–35	8.6–9.1	112–156	0.12–0.36	0.06–0.85
	B	14–60	11–16	31–38	8.4–9.6	92–220	0.10–0.30	0.06–0.62
3	A	15–30	11–12	30–31	8.4–10.3	49–81	0.02–0.26	0.08–0.13
	B	15–54	8–13	29–31	8.0–10.3	56–93	0.05–0.32	0.07–0.45
4	A	12–32	9–12	30–32	7.9–9.7	150–162	0.10–0.35	0.27–0.37
	B	10–22	9–11	29–31	8.0–10.4	115–140	0.03–0.37	0.03–0.30
5	A	9–65	6–16	29–32	8.0–9.9	127–175	0.05–0.25	0.14–0.68
	B	11–65	5–14	29–32	8.0–9.5	119–230	0.03–0.35	0.11–0.35
6	A	8–50	14–20	31–32	7.7–9.6	112–210	0.11–0.28	0.18–0.77
	B	12–46	14.6–20	31–34	7.7–9.5	86–207	0.05–0.24	0.09–0.63
7	A	8–40	4–15.4	29–33	8.4–9.7	239–302	0.06–0.22	0.04–0.51
	B	9–28	5–12	29–33	8.4–9.7	271–345	0.09–0.10	0.10–0.57

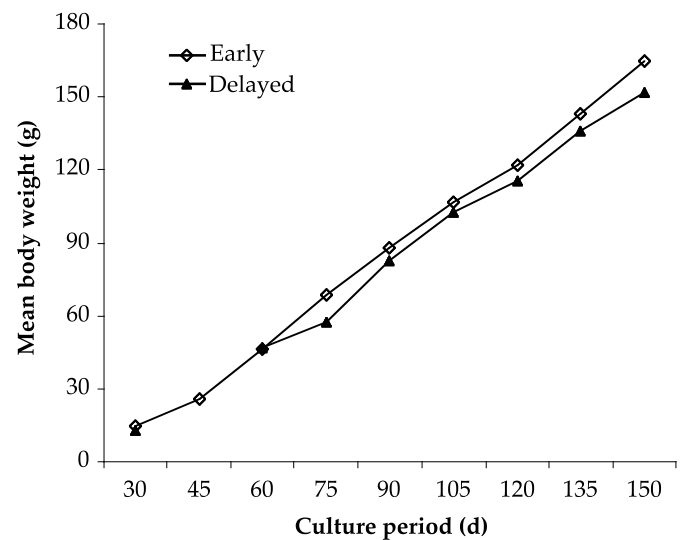


Figure 1. Mean body weight of Nile tilapia in the early (45 days) and delayed (75 days) feeding onset trials.

This study provides technical guidance to farmers on the efficient feeding practices that will optimize tilapia production. The on-farm trial indicated that a delay in the onset of feeding did not significantly reduce the production of tilapia but significantly reduced the cost of feed by about 37%. It is important, however, that proper pond fertilization be maintained to promote the production of natural foods in the pond.

ANTICIPATED BENEFITS

A simple technique has been identified which reduces production costs by the equivalent of about \$400 per hectare

during a tilapia grow-out cycle without significantly reducing yields. That is a meaningful amount of money (P2,200) in the Philippines, especially considering the increased profit is the result of reduced effort on the part of the farmers. Following effective dissemination of these results (see "Workshop on the timing of the onset of supplemental feeding of Nile tilapia (*Oreochromis niloticus*) in ponds," 9ADR6A and "Production of improved extension materials," 9ADR6B), it is expected that the technique of providing commercial feeds to tilapia later in the grow-out period will be broadly adopted, resulting in more cost-effective and profitable farming. It is also possible that the time gained by adding a month of very low-maintenance farming will facilitate other farm activities, such as vegetable gardening or other crop diversification, or educational and training activities.

ACKNOWLEDGMENTS

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LITERATURE CITED

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