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— Short Communication

**NUTRIENT RELEASE CHARACTERISTICS OF DUCK MANURE. II. GROW-OUT  
RESPONSE OF NILE TILAPIA TO MANURE INPUT**

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It is widely known that organic fertilizers or animal manures can be used as pond inputs to promote natural food organisms for fish production (1, 2). The use of organic manure in aquaculture is one of the main inputs in Chinese system of integrated fish farming. Organic fertilizers can increase fish yields, lower the food conversion ratio and also the production costs. The present work describes the effect of manures of different grades on the growth and yield of Nile tilapia under ambient light and temperature conditions.

The experiment was conducted in concrete tanks for 10 weeks. The size of the tanks, and the experimental design were the same as described (3). A loading rate of 500 kg dry matter/ha/week was maintained to get N and P concentrations of 0.35 and 0.07 mg/l respectively. Manure was applied twice a week by mixing with water and spraying over. Manures were kept in a deep freeze and thawed before application.

Sex reversed male Nile tilapia (*Oreochromis niloticus*) fingerlings of about 20 g initial size were stocked at density of 3 fish/m<sup>2</sup>. All tanks were cleaned, sun dried and filled with tap water. Manure was applied 7 days prior to fish stocking. A nylon cage with PVC frame was placed on each tank at the start of the experiment to facilitate fish sampling for monitoring growth under different treatments as shown in Table 1.

All fish from each tank were measured once every two weeks for total length and weight. Fish yield and survival rate were recorded at the end of the experiment. Harvesting was done by taking out the net cages. Fish specific growth rate and daily weight (wt) gain were calculated as follows (4) :

Daily weight gain (g/day) =

$$\frac{\text{Mean final wt.} - \text{Mean initial wt.}}{\text{Time (days)}}$$

$$\text{Specific growth rate (\%/day)} = \frac{(\ln W_2 - \ln W_1)}{T_2 - T_1} \times 100$$

where, W2 = wt. at time T2

W1 = wt. at time T1)

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Fish growth and yield values were subjected to statistical analyses and the results presented in the text are averages of three individual replications within  $\pm 1\%$  S.E.

Growth performances of tilapia are presented in Table 1. The maximum mean final weight was recorded for treatment 4 (M2-RH) i.e., from manure of high grade diet without bedding materials. The daily weight gain of 0.6 g/d and 0.5 g/d were recorded for treatments 4 and 3 (M2+RH) respectively.

Specific growth rates (%/day) were 1.39, 1.37, 1.41 and 1.54 for treatments 1, 2, 3 and 4 respectively (Table 1). In the control treatment, all the experimental fishes lost weight. So no growth data are presented. Survival rate after harvest was 100% in treatments 2, 3 and 4 and 99% in treatment 1. In the control the rate was 75% (Table 1).

**Table 1. Production and growth data for Nile tilapia grown with various types of duck manures ( $\pm 1$  S. E.)**

Parameters	Treatments			
	1(M1+RH)	2(M1+RH)	3(M2+RH)	4(M2+RH)
Fish yield (g/m <sup>2</sup> /day)	2.2 $\pm$ 0.09 <sup>a</sup>	2.3 $\pm$ 0.07 <sup>a</sup>	2.5 $\pm$ 0.06 <sup>b</sup>	2.6 $\pm$ 0.02 <sup>b</sup>
Daily weight gain (g/day)	0.5 $\pm$ 0.02 <sup>a</sup>	0.5 $\pm$ 0.008 <sup>ab</sup>	0.5 $\pm$ 0.02 <sup>bc</sup>	0.6 $\pm$ 0.006 <sup>c</sup>
Specific growth rate (%/day)	1.4 $\pm$ 0.04 <sup>a</sup>	1.4 $\pm$ 0.03 <sup>a</sup>	1.4 $\pm$ 0.03 <sup>a</sup>	1.5 $\pm$ 0.02 <sup>b</sup>

Note : Values having the same alphabet in the superscript are not significantly different at  $p$  (0.05) : M1 M2, RH stand for manure from ducks fed with low grade diet, from ducks fed with high grade diets, and rice husk respectively.

Fish yields were 2.2 g, 2.3 g, 2.5 g and 2.6 g/m<sup>2</sup>/day for treatments 1, 2, 3 and 4 respectively. Fish yields in treatments 3 and 4 were found significantly better than treatments 1 and 2 ( $p < 0.05$ ). Significant difference between other treatments and treatment 4 was due to manure quality.

Specific growth rate (SGR) and daily weight gain (DWG) of the experimental fish were not significantly different among treatments 1, 2 and 3. However, only treatment 4 was found to be significantly better than other, probably due to manure quality.

The results thus show that the growth of tilapia progressively increased with manure input. The mean fish weight also increased progressively with time except for control treatment where the fishes lost weight due to lack of proper food. The specific growth rate, per cent weight gain and daily weight gain thus decreased with advancing time.

## GROWTH OF NILE TILAPIA

Fish yield data from treatments with duck manure revealed that manure alone can give production comparable to that achieved by others who reported yield increases in manure fed fish in ponds (5). On the other hand, fish yield showed no improvement due to use of rice husk as bedding materials. However, manure quality affected the fish yield.

### References

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