

**STOCKING DENSITY OF MALE TILAPIA *Oreochromis niloticus*  
IN RICE FIELD**

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**Abstract :**

The fish in a rice field play an important role in rural communities as a protein source and for income. The study conducted during September 9 - November 12 , 1994 was divided into 4 treatments (Control 1, 2, 3 and 4 stock with 0, 2, 3 and 4 fish per m<sup>2</sup>) in 75 m<sup>2</sup> per 3 replicates. The weight gain of fish (38.2, 33.6 and 25.8 g) and average gain in weight per day (0.6, 0.5 and 0.4 g) were obtained from treatments 2, 3 and 4, respectively. The statistic analysis of weight gain showed significant difference (P<0.01). The average treatment means by Duncan's Multiple Range Test were different from treatments 2, 3 with 4. The average rice yields (4.53, 4.5 and 3 kgs from treatments 4, 3 and 2, respectively were 15-74% higher than the control 2.5 kgs)

**Introduction and literature:**

Tilapia is an important fish species in many countries. Male tilapia has become popular in ponds since 2-3 years ago due to fast growrate and a controled population. All male sex reversal of 3-10 days tilapia were done by using 172-methytestorone 20-40 mg/kg diet for a period of 30 days (Tayamen and Shelton, 1978). Sex identification of Selected 20 g tilapia was proved by urogenital popilla (Ponthana, et al. 1995).



Figure 1. Diagram of Urogenital papilla of male and female.

Male tilapia production was provided at about 30% higher than female. Rice yield with fish was obtained at about 7-15 % higher than rice which was only due to good water supply, good fertilizer and reduced pest (Ponsuwana, 1963). Tilapia growth rate in rice field without feeding gave 0.3 g/day (Meng-umpan and Arce, 1988). The suitable location of fish in a rice field must be in an irrigated area with normal practices land preparation as normal. However, narrow canals around dike is necessary but should not be more than 20% of total area.

**Objectives :**

1. Affectation of weight gain in male tilapia by stocking density
2. Aquaculturally sustainable
3. Extension and promotion

**Methodology :**

1. The study conducted during Sep 9 - Nov 12, 1994 ( 64 days) involved the use of Randomized Complete Block Design (CRBD) using 4 treatments with 3 replicates (25 m<sup>2</sup> per replicate) per treatment as below:  

T <sub>1</sub>	-	rice only (control)
T <sub>2</sub>	-	2 fish per m <sup>2</sup> with rice
T <sub>3</sub>	-	3 - do -
T <sub>4</sub>	-	4 - do -
2. All male tilapia at an average size of 22.5 g was identified by urogenital papilla and stocked 10 days after rice planting.
3. Feeding was provided by 15% protein diet with 2% of fish biomass per day. Fertilization was given 3 times at first, before rice planting, second 1 month after and third, 2 month after planting with cow manure application at 5 kg per replicate.
4. Bi-weekly fish sampling conducted to measure growth fish gain and water qualities.
5. Analysis of variance and Duncan's multiple range test (DMRT).

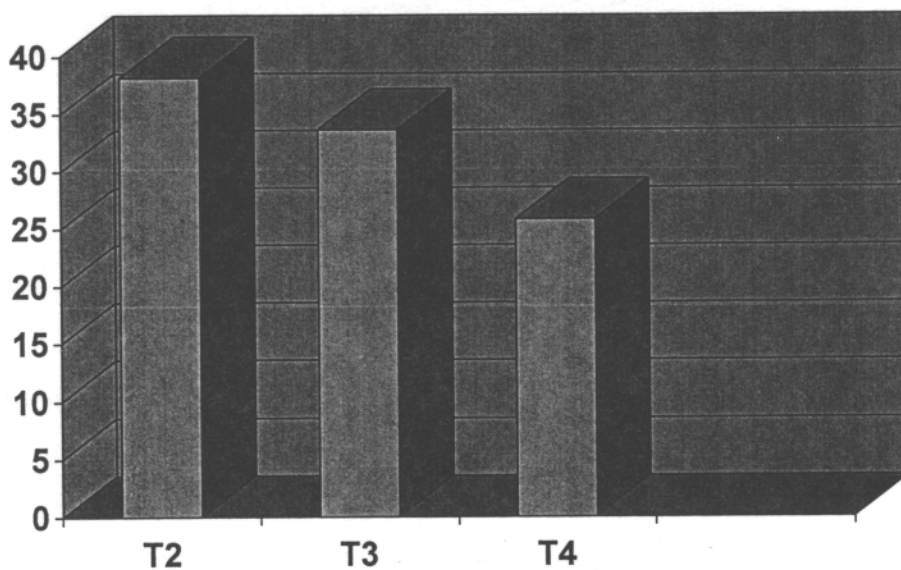
**Results and discussion :**

1. Fish growth rate, gain in weight and recovery rate.  
The weight gain of fish at 38.2, 33.6 and 25.8 g, and average gain in weight per day at 0.6, 0.5 and 0.4 g, were obtained from treatments 2, 3 and 4, respectively. The statistic analysis of weight gain showed a significant difference (p<0.01). The average treatment means by DMRT of weight gain were significant different among treatments 2, 3 and 4. Potipitak and Mallepai, 1987, cited that fish stocking in rice field without feeding should not

be more than  $1/2 \text{ m}^2$ . The growth rate of mix-sex tilapia in rice field stock  $1/2 \text{ m}^2$  without feeding was obtained 0.37 g/day (Meng-umpan and Arce, 1988). The recovery rate of fish at 46, 42 and 35 were obtained from treatments 2, 3, and 4, respectively. Recovery rate lower than 50% was due to water shortage and predators during culture period.

**Table 1.** Fish growth rate , gain in weight and recovery rate by treatment form Sep 9 - Nov 12 , 1994 (64 days)

Replicates	$T_2(2/M^2)$			$T_3(2/M^2)$			$T_4(2/M^2)$		
	Initial (g)	Final (g)	Gain (g)	Initial (g)	Final (g)	Gain (g)	Initial (g)	Final (g)	Gain (g)
R <sub>1</sub>	23.2	57.5	34.3	22.9	50.9	28	22.9	40.3	17.9
R <sub>2</sub>	21.2	64.7	43.5	23.3	61.6	38.3	23.1	53.6	30.5
R <sub>3</sub>	22.6	59.3	36.7	23.4	58	34.6	23.3	52.3	29
Average	22.3	63	38.2	23.2	56.8	33.6	23.1	48.9	25.8
Gain rate (g)			878			883			108.
Growth rate (g/day)			0.6			0.53			0.4
Recovery rate (g/day)			46			35			42



**Graph 1** Average wieght gain of fish from treatment 2,3 and 4

## 2. Rice yield

The average rice yields at 4.53, 4.5, 3 and 2.6 kgs per replicate, were obtained from treatments 4, 3, 2 and 1 ranging 15-75 % higher than control . Pongsuwana, (1963) cited that fish in a rice field had provided soil fertility and gave better rice yield at about 15%. However, Statistic were not significantly different.

**Table 2** Average dry weight of rice grain by treatment

Replicates	T <sub>1</sub> (No fish)	T <sub>2</sub> (2/M <sup>2</sup> )	T <sub>3</sub> (3/M <sup>2</sup> )	T <sub>4</sub> (4/M <sup>2</sup> )
R <sub>1</sub>	2.7	3	2.8	4.1
R <sub>2</sub>	2.7	4.1	3.9	4.3
R <sub>3</sub>	2.6	1.9	6.8	5.2
Total (Kgs)	8.0	9	13.5	13.5
Average (Kgs)	2.67	3	4.5	4.53

## 3. Water qualities

The water qualities at temperature 27-29 c<sup>o</sup>, 5-7-6, dissolved oxygen 5.7-6, acid-alkaline 6-7-6-9 hardness 75-82 mg/l and alkalinity 97-109 mg/l were obtained from all treatments. Alkalinity contributed to the small number due to water turbidity, new land and low fertility.

### Conclusion and comments :

1. Treatment 2 provided best fish gain in weight and growth rate.
2. Male tilapia grew well in rice field.
3. Fish in rice field was complemented with rice yield.
4. Male tilapia sex reversal by hormone must be tested.
5. Prevention of water shortage and fish predator.
6. Culture period should be extended.

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Figure 2. The experimental site