

**EFFECT OF STOCKING SIZES
ON THE YIELD AND
SURVIVAL OF NILE TILAPIA
ON-GROWN IN PONDS**

Researchers

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OBJECTIVES

- **To determine the growth and survival rate of producing various stocking sizes of Nile tilapia fingerling during the nursery phase in hapas.**
- **To determine the effect of fingerling size on the growth, survival, yield at harvest of Nile tilapia in grow-out ponds.**

Materials & Methods for the Nursery Phase

Material and Methods

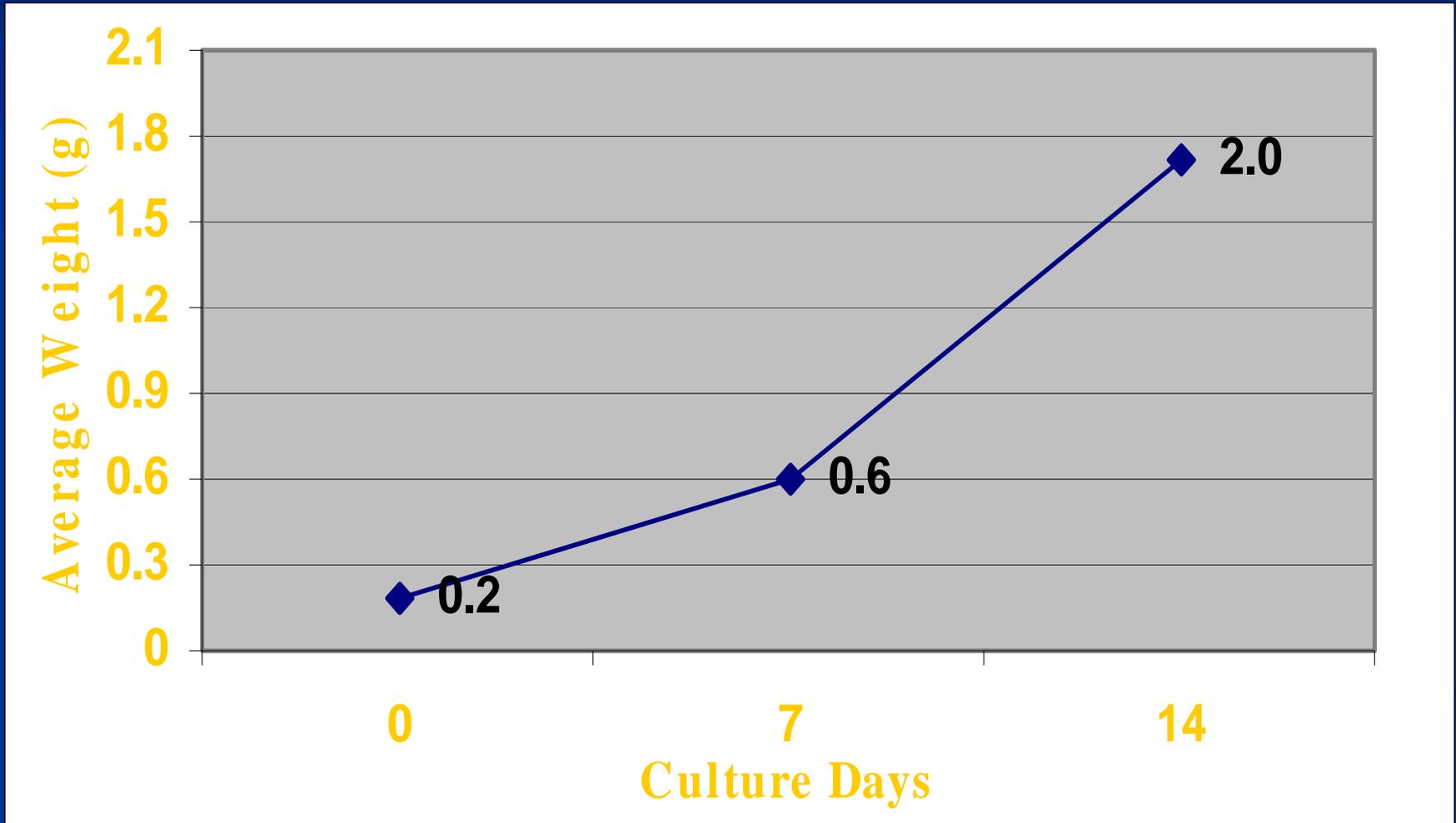
- **Genomar Supreme Tilapia Strain (GST Strain) were used in the study**
- **Tilapia fingerling size #22 required fourteen days (14 days) rearing in 2 x 2 x 1 m hapas to attain size #14**
- **Tilapia fingerling size #22 required twenty eight days (28 days) rearing in 2 x 2 x 1 m hapas to attain size #10**
- **Stocking density of fingerlings per hapa was 200 m^{-3}**

Materials and Methods

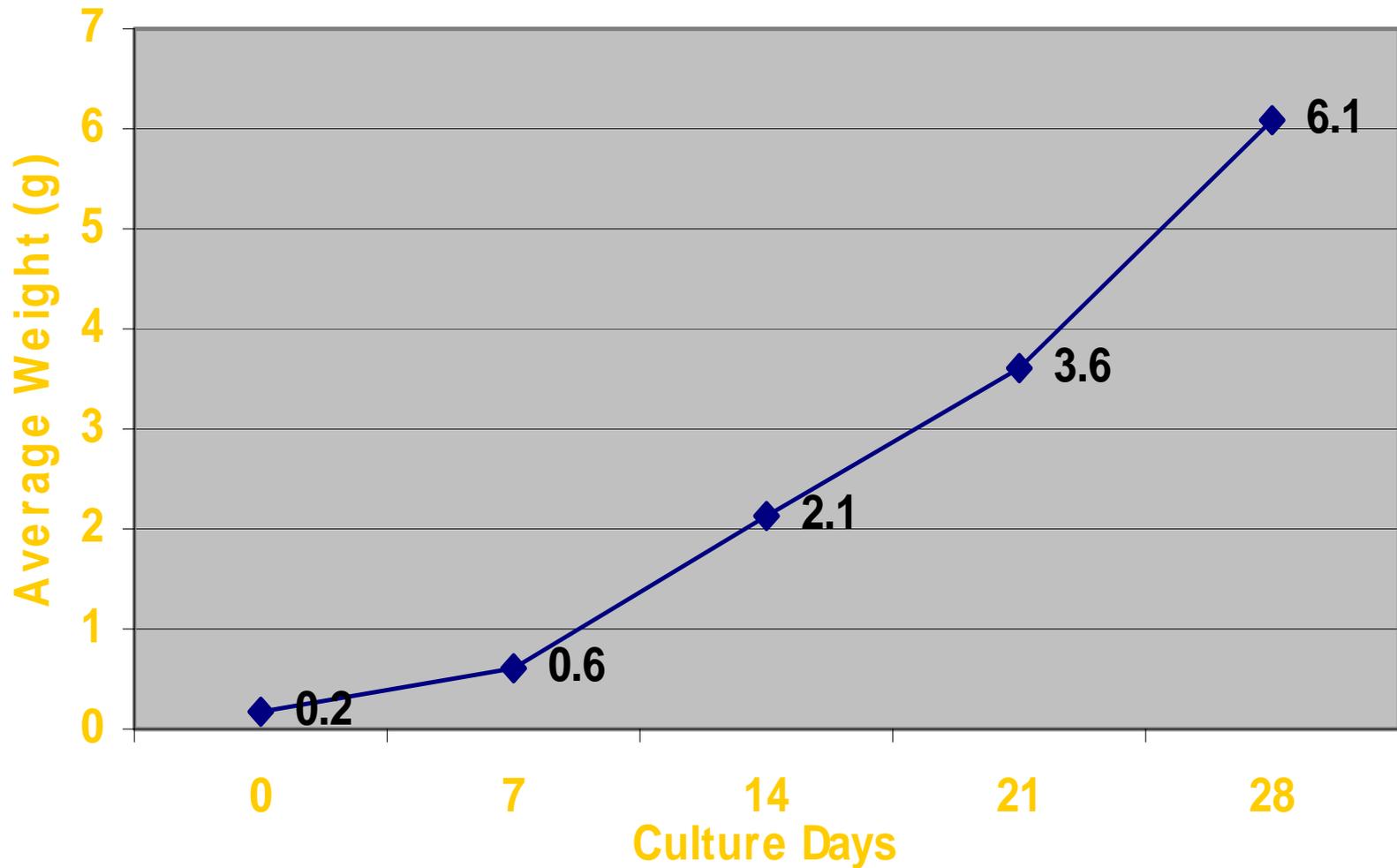
- A commercial type of feed was provided to the fingerlings at the rate of 10-20% of the body weight
- The pond where hapas were installed was fertilized with inorganic fertilizers at the rate of 28 kg N & 5.6 kg P ha⁻¹ week⁻¹
- Production costs in the nursery phase were estimated to determine the cost of producing the desired size of the fingerlings

Results of the Nursery Phase

Growth pattern of Nile tilapia fingerlings from size #22 to size #14 in nursery hapas



Growth pattern of Nile tilapia fingerlings from size #22 to size #10 in nursery hapas



Simple cost and benefit analysis of growing Nile tilapia fingerlings in the nursery hapas from size #22 to size #10 and from size #22 to size #14 (in PhP ha⁻¹)

Item	Size #22 to #14	Size #22 to #10
A. Gross Return*	P 30,000.00	P 38,000.00
B. Cost		
Fingerlings**	19,600.00	19,600.00
Feeds	1,226.40	6,468.00
Fertilizers		
46-0-0	55.12	55.12
16-20-0	25.76	25.76
Total Cost (P)	P 20,907.28	P 26,148.88
C. Net Return	P 9,092.72	P 11,851.12
D. Cost Benefit Ratio	0.69	0.70

* based on GFII pricing, ** based on the required number of fingerlings ha⁻¹ for grow-out culture

Assumptions:

- Price of Feeds = P28.00 kg⁻¹
- Price of Fertilizers:
 - 46-0-0 = P10.60 kg⁻¹
 - 16-20-0 = P9.20 kg⁻¹
- GFII pricing for various sizes of fingerlings are as follows:
 - Size #22 = P0.49 pc⁻¹
 - Size #14 = P0.75 pc⁻¹
 - Size #10 = P0.95 pc⁻¹

Materials & Methods for the Grow-out Phase

Materials and Methods

- Twelve (12) 500 m² ponds were used in the study
- Three (3) stocking sizes were designated as treatments:
 - Treatment I - direct stocking at size #22
 - Treatment II - stocking at size #14
 - Treatment III - stocking at size #10

Materials and Methods

- **Four (4) replicates per treatment**
- **Stocking density: 4 fish m⁻²**
- **Fish were provided with commercial feeds**
- **Alternate day feeding strategy was followed**
- **Adjustment of the amount of feed was done every two weeks**

Materials and Methods

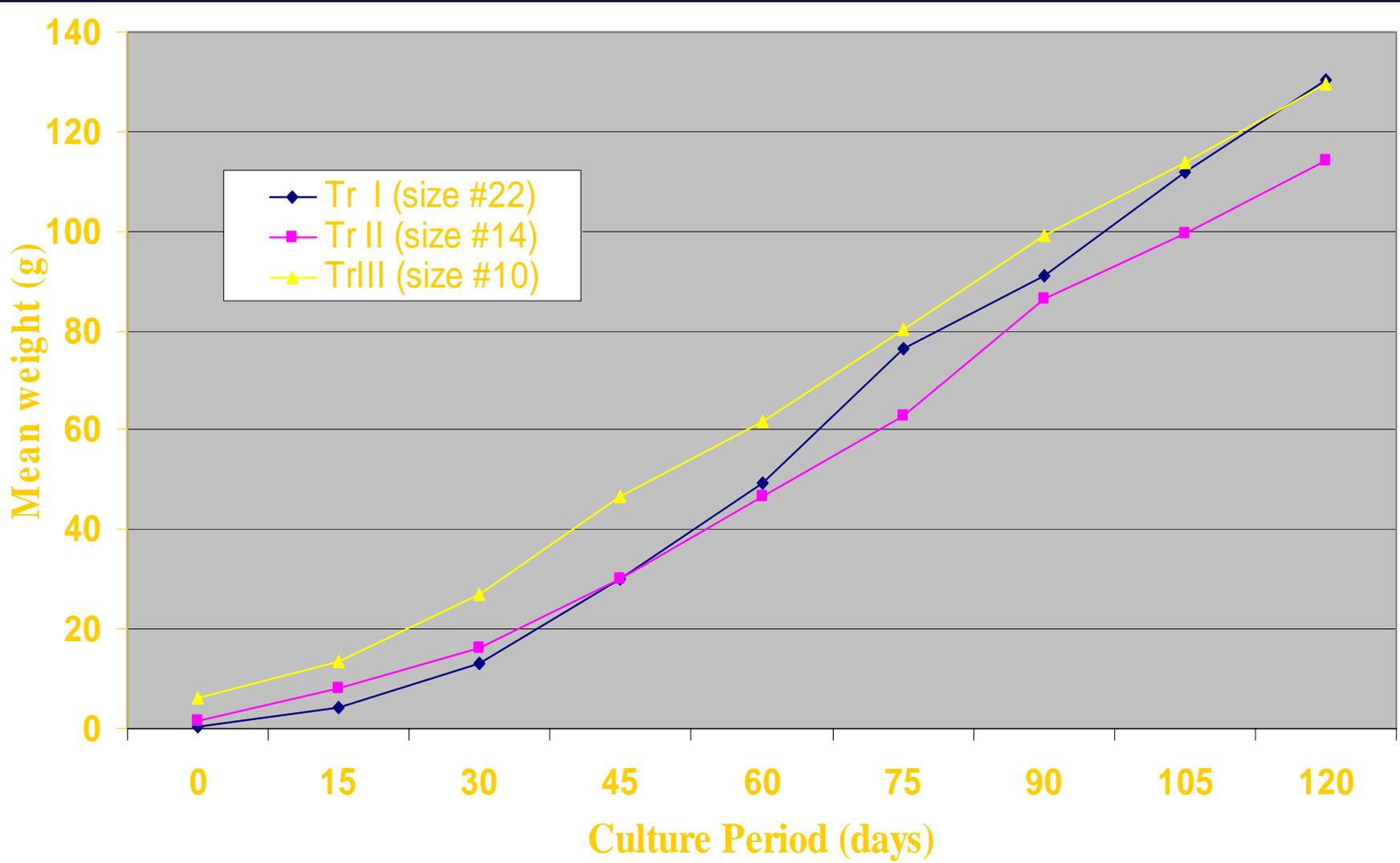
- All ponds were fertilized using inorganic fertilizers at a rate of 28 kg N and 5.6 kg P ha⁻¹ week⁻¹
- D.O., temp., pH, alkalinity, TAN and phosphorus were monitored every two weeks
- Water depth in the ponds was maintained at 1 m
- 100 fish samples were weighed individually every two weeks in each pond to monitor weight gain.

Materials and Methods

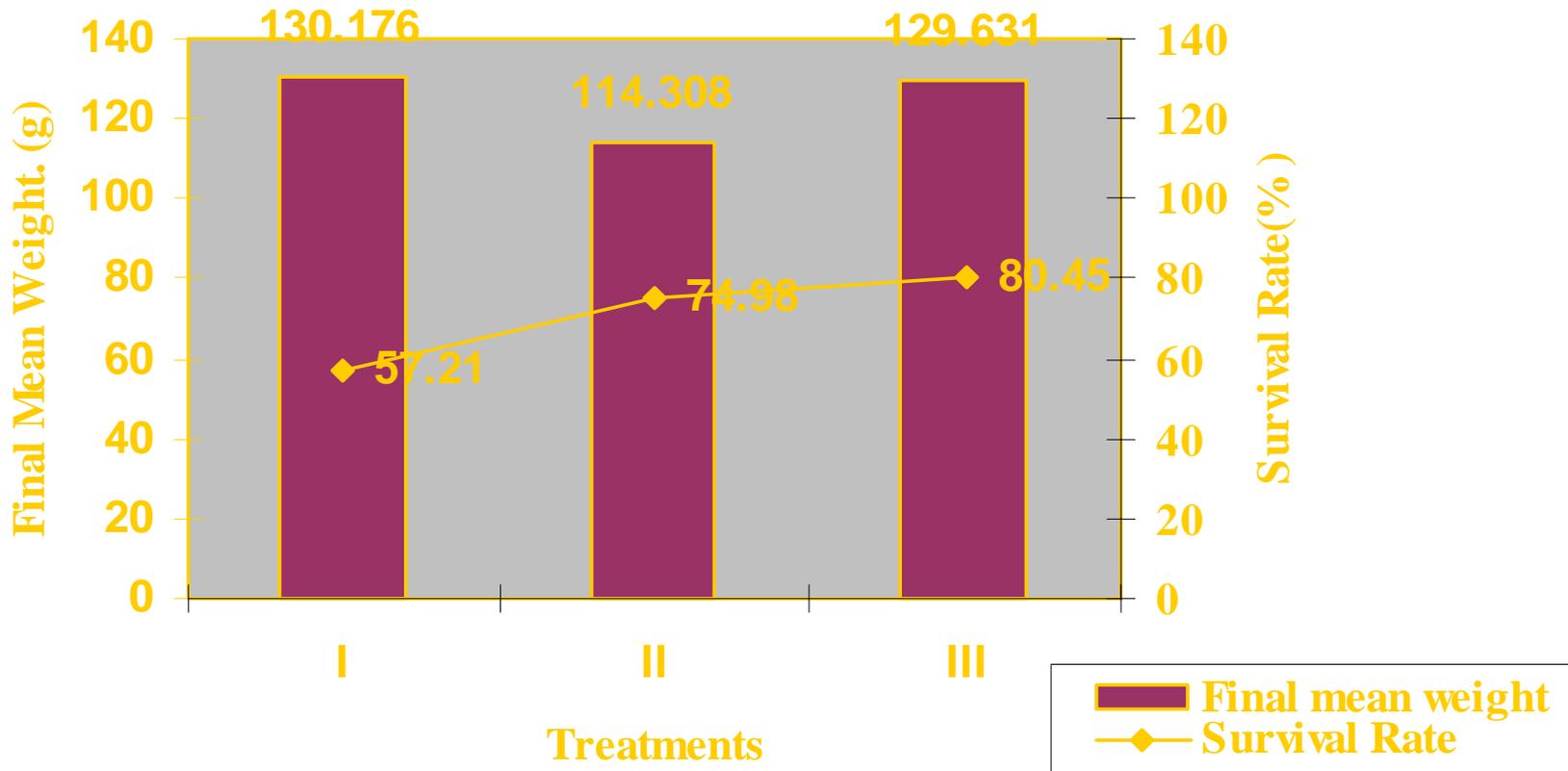
- **Culture period: 120 days**
- **Counting and bulk weighing of the harvested fish were done**
- **Final mean weight, daily weight gain, gross yield, and survival rates were calculated**
- **Simple cost and return analysis was made to compare the cost benefits among the different stocking sizes**

Results of the Grow-out Phase

Growth trend of Nile tilapia on-grown in ponds at different stocking sizes



Final mean weight of Nile tilapia in relation to survival rate



Mean performance of Nile tilapia at different stocking sizes at 120 days of culture in ponds

Parameters	Treatments		
	I	II	III
Initial Mean Weight (g)	0.2 ^a	2.0 ^b	6.1 ^c
Final Mean Weight (g)	130.18 ± 25.3 ^a	114.31 ± 15.7 ^a	129.6 ± 16.8 ^a
Mean Daily Weight Gain (g day ⁻¹)	1.08 ± 0.2 ^a	0.94 ± 0.13 ^a	1.03 ± 0.14 ^a
Specific Growth Rate (%)	5.39 ± 0.16 ^a	3.49 ± 0.11 ^b	2.54 ± 0.11 ^c
Survival Rate (%)	57.21 ± 7.14 ^a	74.98 ± 12.77 ^b	80.45 ± 10.4 ^b
Feed Conversion Ratio	1.6 ± 0.2 ^a	1.8 ± 0.1 ^{ab}	1.9 ± 0.2 ^b
Extrapolated Fish Yield (kg ha ⁻¹)	2738 ± 582.5 ^a	3065 ± 417.6 ^{ab}	3799 ± 377.7 ^b

Values within row with the same superscript letter are not significantly different (P>0.05).

Simple cost and benefit analysis of culturing tilapia in ponds at different stocking sizes (PhP ha⁻¹)

ITEMS	TREATMENTS		
	Size #22	Size #14	Size #10
Gross Return	P 117,734.00	P 131,795.00	P 163,357.00
Cost			
Fingerlings	19,600.00	30,000.00	38,000.00
Fertilizers	5,740.00	5,945.00	5,330.00
Commercial Feeds	73,766.80	72,624.00	85,354.00
Total Cost	P 99,106.80	P 108,569.00	P 128,684.00
Net Return	P 18,672.20	P 23,226.00	P 34,673.00

Assumptions:

- **Price of fingerlings:**
 - Size #22 = P 0.49 pc⁻¹
 - Size #14 = P 0.75 pc⁻¹
 - Size #10 = P 0.95 pc⁻¹
- **Price of inorganic fertilizers:**
 - 16-20-0 = P 9.60 kg⁻¹
 - 46-0-0 = P 10.60 kg⁻¹
- **Price of feeds:**
 - Fry Mash = P 20.00 kg⁻¹
 - Starter = P 19.00 kg⁻¹
 - Grower = P 18.00 kg⁻¹
 - Finisher = P 17.80 kg⁻¹
- **Price of marketable size tilapia = P43.00 kg⁻¹**

Conclusions

- ❖ The two nursery strategies (rearing of Nile tilapia fingerling from size #22 to size #14 and from size #22 to size #10) showed a production cost difference of P5,241.6 or US\$95.31 ha⁻¹. The net return was higher in rearing the fingerlings from size #22 to size #10 (P11,851.12 = US\$ 215.47) than in rearing the fingerlings from size #22 to size #14 (P9,092.72 = US\$165.32).
- ❖ The grow-out study revealed that initial stocking size did not affect mean final weights or daily weight gain, but the smallest stocking size (size #22) exhibited a reduced survival rate as compared with either of the larger initial stocking sizes.

Conclusions

- ❖ Profit margins may be better when stocking larger fingerlings, although the good growth seen in the treatment stocked with size #22 fingerling suggests that the identification and elimination of mortality problems could make this choice of stocking sizes more desirable.

Thank you