

GROWTH OF TWO TILAPIAS IN FLOATING PLASTIC CAGES

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ABSTRACT

A growth trial of *Oreochromis niloticus* and *Sarotherodon galilaeus* fingerlings in floating plastic cages was carried out for 180 days. *O. niloticus* (mean wt., 75 ± 0.50 g) and *S. galilaeus* (mean wt., 36.40 ± 1.80 g) were stocked at 250 fish fingerlings/m³. The study was conducted in four 2x2x1 m plastic cages with two replicate cages for each treatment. A 25% protein balanced diet was used as feed. The mean weight gain ranged from 0.33 to 0.91g/day while the mean final weight ranged from 60.0g to 162.00g for *O. niloticus* and *S. galilaeus*, respectively. Total fish production ranged from 15.90 to 16.00kg/m³. The highest survival (100%) was obtained in *O. niloticus* while the lowest (98.4%) was obtained in *S. galilaeus*. The major constraint in the study was the inadequacy of suitable fingerlings size for stocking the plastic cages.

INTRODUCTION

Cage and enclosure systems are amongst the known modern aquacultural practices and are about the cheapest to operate (Otubusin, 1997). These culture systems maximize the use of feeds in enclosures and they can be stocked at higher density compared to the unit area of the cage. The system also permits low mortality and high production potentials. Cage culture also affords better management and results in higher yields per unit area than pond culture. In Nigeria, tilapias are among the most suitable fishes for cage culture. Cage culture of catfish, *Heterobranchus longifilis* has been attempted on a commercial scale in man-made lake Ayame, Cote d'Ivoire (Coulibaly *et al.* 2007). Rahman *et al.* (2006) in cage culture trials of sutchi catfish, *Pangasius sutchi* (Fowler 1937) suspended in a river – fed channel got a production of 15.2-33.5 kg/cage of 1m³ within 150 days of culture. The cages were stocked with 5.9- 6.7 g fingerlings at 60-150/m³ stocking density. According to Otubusin (2000) there is a definite potential for tilapia Cage culture in Nigeria Lakes and Rivers in Nigeria, both on commercial and subsistence levels. The maximum carrying capacity for a cage depends on the mesh size, cage size, and type of fish and level of dissolved oxygen in water. For 1m³ cages, Otubusin *et al.* (1997) recommended 200 fish/m³ and it is known that as the stocking density increases, the total fish production also increases. Several research works have been documented on the use of cages and enclosures for Tilapia production. The main objective of this study was to grow fingerlings of Tilapias (*O. niloticus* and *S. galilaeus*) to table size in plastic cages using artificial feeds.

MATERIALS AND METHODS

The site used for the studies was the Kigera III Reservoir (about 0.4ha) within the National Institute for Freshwater Fisheries Research Estate at New Bussa, Nigeria and the study was conducted in 2003. Four plastic cages (2 x 2 x 1 m) were used for the study. The study consisted of two treatments below:

- (i) 250 *O. niloticus*/Cage
- (ii) 250 *S. galilaeus*/Cage.

The cages were installed on Kigera III reservoir. The fish were fed with 25% pelleted feed at the rate of 5% body weight twice daily between 9.00a.m. and 5.00 p.m. The fish daily ration was adjusted bi-weekly by sampling 20% of the fish for body weight changes. The experiment lasted for six months at the end of which the total number of fish in each plastic cages and mean survival were estimated. Dissolved oxygen, pH and temperature measurement were determined according to the methods described by APHA (1990) and the result of the water quality parameters measured during the experiments is shown in Table 2). Mean weight gain and specific growth rate were calculated using the equations described in Dada and Wonah (2003).

Table 1: Ingredients and proximate composition of experimental diet fed to fish .

Ingredient	Composition (%)
Groundnut cake	25
Yellow maize	74.50
Vitamin/premix	0.50
Proximate composition	
Crude protein	25.40
Crude fat	12.55
Moisture	9.80
Ash	4.95

Table 2: Summary of water quality during the culture period.

Parameter	Minimum	Maximum	Mean \pm SE
Temperature (OC)	25.40	29.30	27.352 \pm 1.95
Dissolved oxygen (mg/l)	2.80	4.80	3.802 \pm 1.00
pH	6.90	7.10	7.0 \pm 0.1

RESULTS AND DISCUSSION

The summary of results of the study is shown in Table 3. *Oreochromis niloticus* grew from an average weight of 75g to an average final weight of 162g while *Sarotherodon galilaeus* grew from an average weight of 36.50g to an average final weight of 60.0g. The growth rate was highest in *Oreochromis niloticus* when compared with the growth rate obtained in *Sarotherodon galilaeus*. This may be attributed to the size of the fish at stocking. At 75gm, Tilapia is almost table size and the growth rate would be slower than the fingerlings of *Sarotherodon galilaeus* (36.50g). Also, it is on record that *O. niloticus* grow better than *S. galilaeus* in earthen ponds as documented by several authors. The growth rates of fish in this study appeared low compared with the rate of 2.59 – 5.72g per day obtained by Otubusin and Ifili (2000) but better than the values of 0.20-0.49 g/day reported by Otubusin (2000). Total fish production was 16.0kg and 5.90kg respectively. The high survival rate could be attributed to proper management of the stock and the physico-chemical conditions of the water in the reservoir during the culture period (Tale 2). The dissolved oxygen, pH and temperature estimated during the culture period were within the acceptable range recommended for fish production (de Graaf and Janssen,1996).

Table 3: Yield of *O. niloticus* and *S. galilaeus* in floating plastic cages for 180 days.

Items	<i>O. niloticus</i>	<i>S. galilaeus</i>
Mean no. Stocked	250	250
Mean stocking wt (g)	75.00 \pm 0.50	36.40 \pm 1.80
Mean harvest wt (g)	162 \pm 1.20	60.0 \pm 0.80
Mean wt gain (g/day)	0.91	0.33
Survival (%)	100	98.4
Average production kg/m ³	16.20	5.90

The cage fish culture experiment embarked upon is aimed at maximally exploiting the water bodies of Nigeria through production oriented research on the culture system. Experience in countries where cage fish culture has been adopted showed several advantages over pond culture. Based on the results, it could be concluded that, there is a definite potential for Tilapia cage culture in lakes and Rivers in Nigeria, both on commercial and subsistence levels. Fish production could be enhanced through this culture system in Nigeria.

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