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Short Communication

# Effects of Feeding Frequency Variation on the Growth and Survival of *Clarias gariepinus* Fingerlings

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**Abstract**

A 56-day experiment was conducted to consider the effects of feeding frequency variation on the growth and survival of *Clarias gariepinus* fingerlings. The frequencies of feeding were once daily, twice daily, once in two days and once in three designated as G1, G2, G3 and G4 respectively. One hundred and twenty fingerlings were stocked into 30 litre plastic aquaria with each tank stocked with ten fingerlings in three replicates under laboratory conditions. A commercial feed was used for the feeding trials with the fingerlings fed at 5% body weight. The fingerlings fed once in three days had the least value of weight and length but were not significantly different ($p$<0.05). The fingerlings fed once daily had the highest specific growth rate (SGR) of 1.66 and the fingerlings fed once in three days had the least value, which was significantly different from others. Highest survival rate of 73.3% was recorded in fingerlings fed once in two days. The study showed that body composition of *C. gariepinus* fingerlings was influenced by the different feeding frequencies. Based on the growth performance recorded in this research, once in a day feeding frequency was the best to obtain the highest growth while once in 2 days feeding frequency gave the best survival value in the African catfish fingerlings.



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## INTRODUCTION

The desire of fish farmers has been to produce table sized fish within the shortest possible time at a reduced the cost of production and maximum profits. Long term success in meeting the desire of having an all year round supply of fish depends on the ability of the farmer to control the entire life cycle of the fish (Ekelemu and Zelibe, 2006). *Clarias gariepinus* is a commercially important species which according to Idodo-Umeh, (2003), occupies a unique and prominent position in Nigeria because it is tasty, hardy and can tolerate poor water condition.

The cost of fish feed is considered as the highest share of total cost in any intensive aquaculture operation. Therefore, feed quality and feeding strategies are of great importance in fish nutrition science. One problem facing fish culturist is the need to obtain a balance between rapid fish growth and optimum use of the supplied feed (Gokcek *et al*., 2008). There is also the need to establish the effects of number of feeding times or frequency on food management, nutrient utilization and growth rate of fish. Since the feed cost accounts approximately 40-60% of the operating cost in intensive culture system (Agung, 2004). The amount of the daily feed intake, frequency and timing of the feeding and predetermined ration are the key factors of feed management strategies influencing the growth and feed conversion. Feeding also at the optimum frequency can result in tremendous saving in feed cost (Davies *et al*., 2006). According to Hung *et al*. (2002) fish growth at different stages is largely governed by the kind of feed, feeding frequency, feed intake and its ability to absorb the nutrient among which feeding frequency is an important factor for the survival and growth of fish at the early stage. However, over feeding leads not only to reduction in feed conversion ratio and increase in input cost but also results in accumulation of wastes that adversely affect the water quality (Ekelemu and Ogba, 2005). By controlling the optimum feeding frequency, farmers can successfully reduce the feed cost, maximize growth and also able to manage other factors such as individual size-variation and water qualities which are deemed important in rearing of fish in culture conditions (Cavero, 2004). The objective of the study is to determine the most appropriate feeding frequency in *Clarias gariepinus* fingerlings with a view to achieving optimum growth and survival at a reasonable cost of production.

## MATERIALS AND METHODS

### Fish Specimens

Fingerlings of African catfish *Clarias gariepinus* with average weight of 6.6±0.1 g were purchased from a hatchery and transported to the laboratory for analysis and experimentation. Materials used in the experiment included plastic tanks (aquaria), siphon pipe, freshwater, fish feed, meter rule, Weigh balance and net mesh.

### Feeding Trials

The feeding trial was performed at the postgraduate laboratory of Zoology Department, Ekiti State University. The fingerlings were randomly distributed into twelve

plastic tanks of 30 litres volume at stocking rate of 10 fingerlings per tank grouped into four categories in triplicates. The four groups are G1- fed once a day (at 8.00 am), G2- fed twice daily (at 8.00 am and 4.00 pm), G3 fed once in 2 days (at 8.00am) and G4 fed once in 3days (at 8.00am). The period of experiment was 56 days and the fingerlings were fed with compounded fish feed at 42% crude protein. Standard length was measured to the nearest 0.1cm while weight was done to the nearest 0.1g. The fingerlings were fed at 5% body weight and feed consumption was monitored. Mortality in each tank was recorded daily and calculated by taking note of the differences in fish numbers between each count. Water quality parameters like pH, temperature and dissolved oxygen were also monitored throughout the period of experiment.

**Calculations**

The following formulae were applied to the data:

$$\text{Specific Growth Rate (SGR \%/day)} = [(\ln Wf - Wi) / T] \times 100$$

$$\text{Weight gain (\%)} = [(Wf - Wi) / Wi] \times 100$$

Where $W_f$ refers to the mean final weight, $W_i$ is the mean initial weight of fish and T is the feeding trial per period in days.

**Statistical Analysis**

Data analysis was done using ANOVA and Duncan's Multiple Range Test (DMRT) was used for the mean separation.

## RESULTS

Table 1 shows growth and survival of *Clarias gariepinus* fingerlings fed at different feeding frequencies. At the commencement of the feeding regimes, initial mean weights were taken to be 7.15, 6.70, 6.25, and 6.44 g for G1, G2, G3 and G4 respectively. The mean weights of the four groups were not significantly different ($p$>0.05). At the end of the feeding regimes, the mean weights of fingerlings varied from 12.95g in G4 as the lowest to 18.15g in G1 being the highest with apparent significant differences ($p$<0.05) among the four groups. The final mean length which ranged from 12.35cm in G4 to 15.25cm in G1, showed significant differences ($p$<0.05). The mean weight gain ranged from 6.51g in G4 to 11g in G1 with significant differences among the groups at $p$<0.05. The Specific Growth Rate (SGR) recorded in G1 had the highest value of 1.66±0.09 while G4 gave the lowest value of 1.25±0.02. There was no significant difference ($p$>0.05) among the groups. There were significant differences among the four groups with respect to rate of survival. The highest percentage survival rate of 73.3% was recorded in G3 while the G2 gave the poorest rate of 30%.

**Table 1:** Growth and survival of *C. gariepinus* fingerlings fed at different feeding frequency for eight weeks

| Treatments | Initial mean Weight (g) | Final mean Weight (g) | Mean weight Gain (g) | SGR % | Initial mean Length (cm) | Final mean Length(cm) | Survival Rate % |
|---|---|---|---|---|---|---|---|
| G1 | 7.15±0.67$^{a}$ | 18.15±1.06$^{a}$ | 11±1.00$^{a}$ | 1.66±0.09$^{a}$ | 6.24$^{a}$ | 15.25$^{a}$ | 46.7$^{c}$ |
| G2 | 6.7±0.11$^{b}$ | 15.20±0.84$^{b}$ | 8.5±1.47$^{b}$ | 1.46±0.07$^{a}$ | 5.57$^{b}$ | 13.65$^{b}$ | 30.0$^{d}$ |
| G3 | 6.25±0.65$^{b}$ | 13.1±0.66$^{c}$ | 6.87±0.23$^{c}$ | 1.33±0.05$^{a}$ | 5.75$^{b}$ | 12.55$^{c}$ | 73.3$^{a}$ |
| G4 | 6.44±0.08$^{b}$ | 12.95±0.64$^{c}$ | 6.51±1.43$^{c}$ | 1.25±0.02$^{a}$ | 4.98$^{c}$ | 12.35$^{c}$ | 70$^{b}$ |

Means with the same superscript are not significantly different across columns at P>0.05

## DISCUSSION

Bascinar *et al.,* (2007) reported that fish species have shown that fish consumption and growth generally increased with feeding frequency up to a given limit. This is however contrary to the findings of this present study in which the highest specific growth rate of 1.66±0.09 and highest final mean length of 15.25 were recorded in G1. Aderolu *et,al,.* (2010) reported that SGR was at best at a higher feeding frequency of at least three times daily in the fingerlings of *Clarias gariepinus* (Burchell 1822) which is at variance to the outcome of this study. Also, mean weight gain of 11±1.00 in G1 did not agree with the findings of Aderolu *et al.,*(2010) and Ndome *et al.,* (2011) who reported increasing weight gain with increasing feeding frequency. Although G1 had the highest fish length increment in this study, it still did not follow expected pattern with respect to increasing feeding frequencies. Survival rate of 30% in G2 contrasted with the findings of Marimuthu *et al.,* (2010) who reported the poorest survival rate in the group fed once daily in their study on the same fish species. According to Marimuthu *et al.,*(2010), fish species normally exhibit a rapid increase in activity during feeding suggesting that stress may result due to continuous feeding causing the fish to expend energy and consequently reducing growth rate.

## CONCLUSION

The study showed that body composition of *C. gariepinus* fingerlings was influenced by the different feeding frequencies. Based on the growth performance recorded in this research, once in a day feeding frequency was the best to obtain the highest growth while once in 2 days feeding frequency gave the best survival value in the African catfish fingerlings. The outcome of this study calls for further investigation in order to achieve an optimum result that will enhance fish productivity and sustainable profitability.

## Conflict of Interest

Conflict of interest none declared

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