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GROWTH PERFORMANCE OF *Clarias gariepinus* FED WITH DIFFERENT COMMERCIAL FEEDS

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Abstract

The growth performance of African Catfish (*Clarias gariepinus*) fingerlings fed with four commercial feed (Top, Vital, Lynx and Coppens) feeds was studied investigated with the aim of establishing the best quality feed in terms of growth rate, total weight and percentage survival rate, for a period of eight weeks. One hundred and eighty (180) fingerlings of *Clarias gariepinus* and four commercial feeds with varying proximate compositions was used for the experiment. Water quality parameters analyzed indicated temperature varied between 26.38^{0}C and 27.05^{0}C while pH ranged between 6.51 to 7.2and dissolved oxygen value was between4.70mg/l and 6.49mg/l respectively. The treatment shows significant difference in terms of mean weight gain, specific growth rates and survival rates ($P<0.05$). In terms of weight gain vital feed gave the best growth of 40.91g, top feed (29.41g), lynx feed had 26.92 and coppens feed had the lowest value of 24.74g. The best size in length (23.80) was observes for coppens. Survival rate showed Top feed having 100% followed Coppens feed (93.3%) while the lowest was recorded in Vital feed(46.67%).

1. Introduction

Fish is a reliable source of thiamine, riboflavin, vitamins A and D, phosphorus, calcium and iron (Eyo and Ekanem, 2011). In Nigeria, consumption and demand for fish protein is increasing due to its affordability. The African catfish *C. gariepinus* is a very popular fresh water fish in Nigeria (Eyo *et al*., 2012). It is regarded as one of the most important aquaculture candidates because of its ability to tolerate a wide range of environmental conditions, high stocking densities under culture conditions, fast growth rate, high yield potential, high fecundity, air breathing characteristics and high market value (Hetch,2007; Babalola and Apata, 2006).Aquaculture is gaining attention all over the world as means of improving world fish production which is currently on decline due to dwindling output from capture fishery (FAO, 2010).

Feed, being part of the general input of production in extensive and semi-intensive sustainable aquaculture system, has been reported to account for 40-60% of the total recurrent cost of production (Falaye, 1992). The culture of fish is receiving a lot of attention in Nigeria with the result that new cultivation techniques are being introduced and adopted. Over the last decade, spectacular growth has taken place in the aquaculture sector in Nigeria. Fish farming activity in Nigeria started about 50 years ago (Olagunju *et al*., 2007) and as at now aquaculture in the country is in the developing stage, because it has not been able to meet the demand of the ever increasing population (Ojutiku, 2008). Fish feeds are used in aquaculture to increase production and maximize profit. Feeds in intensive fish culture consume about 60% of the capital cost (Eyo, 2001).

For aquaculture to be highly successful there is need for good quality and affordable feed, which can also encourage small scale farmers in the field of aquaculture for sustainable production and also meet the demand for fish. Presently, in Nigeria, there are different fish feeds with different compositions ranging from Coppens, Euro feeds and others but there is competition among them more so they are imported. The amount of feed consumed, age, body size and temperature are the most important factors that limit maximum growth of fish (Machiels and Henken, 1985). The present work assesses the growth response of *Clarias gariepinus* fed on four commercial feeds, to test and compare which could equally give best yield in response to the increasing demand.

2. Materials And Methods

2.1. Study Area

The study was conducted in the demonstration farm of the fisheries unit, University of Port Harcourt, Choba, Rivers State, Nigeria.

2.2. Experimental Fish

One hundred and eighty fingerlings of *Clarias gariepinus* were obtained from the departmental fish farm in the demonstration farm of the University of Port Harcourt. The fish were acclimatized for one week and during the period of acclimatization the fish were fed ad libitum (Anibeze and Eze, 2000) at 5% body weight twice daily (Okoye *et al*., 2001) with Coppens at 42% crude protein. Feed not consumed and faecal matters were siphoned out every two days interval. At the end of the acclimatization period, the fish were randomly selected and stocked into 12 plastic tanks of 26x27x40 cm3containing 30L of aerated water with each plastic tank holding 15 fish. Feeding was suspended 24 hours before the feeding trial to increase appetite and reception for new diet (Madu and Akilo, 2001).

2.3. Experimental Diet

One imported feed (Coppens,) and three commercial feeds (Vital, Top and Lynx) were obtained. Each test diet was fed to duplicate groups for eight weeks. The feed/experimental diets were analyzed for proximate composition according to A.O.A.C (1999).

2.4. Experimental Procedure

The temperature, pH and dissolved oxygen of the aquaria were monitored on weekly basis. The initial weight and length of the fish at the commencement of the experiment and final weight and length was determined using weighing balance (model P168) and a calibrated meter rule. Weekly weight and length measurements were taken to monitor weight and length gain.

2.5. Data Analysis

Mean values of the water quality parameters measured was calculated. Mean values of length and weight measurements were subjected to analysis of variance (ANOVA) and tested for significance difference at P = 0.05(5% probability level). Duncan Multiple Range Test (DMRT) was used to rank the means.

3. Results

The proximate composition of the experimental diets is presented on table 1.The percentage crude protein value for top, lynx and coppens was 42% while, the lowest crude protein value of 38% was recorded for vital feed. Crude fibre ranged between 1.8 to 4.0%, While crude fat was between 9.5 and 13.0%. Ash content varied from 7.4 and 10.0%; phosphorus 0.9 and 1.4%. The data on growth response, of *Clarias gariepinus* fingerlings to the diet is shown in Table 2. In terms of total weight gain, treatment 2 gave the best growth (40.91g) followed closely by treatment 1 (29.41g) and treatment 3(26.92g), while treatment 4 had the lowest weight gain (24.74g).In terms of total length gained, treatment 4 recorded the highest length gained (23.80cm) followed by treatment 1(17.87cm) and treatment 2(16.33cm) while the lowest length gained was recorded in treatment 3(15.96cm). Food conversion ratio (FCR) values ranged from 0.41 in treatment I to 0.73 in treatment 2.The highest value of survival was recorded in treatment 1(100%) while the lowest was recorded in treatment 2(46.67%)

The results of this study indicate that the mean pH value ranged from 6.51 to 7.29 while temperature of water is within the range of 26.38^{0}C to 27.05^{0}C (Table 2). Mean dissolved oxygen varied from 3.91 to 6.49mg/l and alkalinity range from 129.25 to 189.75mg/l.

Table 1: Proximate composition of the experimental diets

Feed	Protein (%)	Fibre (%)	Fat (%)	Ash (%)	Phosphorus (%)
Top	42.0	3.5	12.0	7.0	1.4
Vital	38.0	3.5	9.5	-	0.9
Lynx	42.0	4.0	10.0	10.0	1.0
Coppens	42.0	1.8	13.0	7.4	1.0

Table 2: Growth, survival and food conversion ratio of *C. gariepinus* fed with different commercial feeds

Parameters	**Treatments**				
	T1(Top)	**T2(Vital)**	**T3 (Lynx)**	**T4 (Coppens)**	**SEM**
Final Length (cm)	19.85b	18.14c	17.73c	26.44a	7.368
Final weight (g)	32.68b	45.46a	29.91bc	27.49c	31.254
FCR	0.58d	0.41a	0.61c	0.73b	0.448
Survival rate (%)	100	46.67	53.33	93.33	

Table 3: Mean values of the Physico-chemical parameter of the treatment

Treatment	**pH**	**Temperature (^oC)**	**Dissolved Oxygen (mg/l)**	**Alkalinity (mg/l)**
1(Top)	6.99^b	26.76^b	5.73^a	189.75^a
2 (Vital)	6.51^d	26.38^c	3.91^b	129.25^a
3 (Lynx)	6.80^c	27.05^a	4.70^c	131.25^a
4 (Coppen)	7.20^a	26.94^a	6.49^d	167.58^a
SEM	0.044	0.617	0.304	3667.3

*Superscripts of the same alphabet are not significantly different (P<0.05)

**Superscripts of different alphabets are significantly different (P<0.05)

4. Discussion

The water quality parameters showed little variation. The range of temperature (26.38°C-27.05°C), pH (6.5-7.2) and dissolved oxygen (2.9mg/l-5.5mg/l) obtained is favorable for fish culture, they are within the range described as optimal by Boyd (1979) and this agrees with similar work by Jamabo *et al* (2015). Balogun *et al*., 2004 and Agokei *et al*. (2011) reported a higher specific growth rate (SGR) value of 3.19%d-1 using Coppens, Multi feed, Eurogold, Vital and Ajanla feed, which may be due to feeding frequency and the type of feed. The high growth rate recorded in fingerlings fed treatment 2(Vital feed) and treatment 1(Top) may be attributed to the high nutritive value of the feeds and tolerable physico-chemical parameters against the lesser values in treatment 3(Lynx) and treatment 4 (Coppens) which could be due to the anti-nutritive elements present in the feeds, this is also in line with Dada and Gnanados, (1983) who obtained high values for Chi and Coppens feeds. The problem associated with the low survival rate in treatment 2(Vital) and treatment 3(Lynx) arose due to the change in the physico-chemical parameters of the water. The ability of anorganism to utilize nutrients especially protein will positively influence its growth rate Sogbesan and Ugwumba, (2008).The growth of fish depends upon the ingredients and its percentage in the formulated feed Glencross *et a*l., (2007). The results also compare well with comparative feed trials of Rahman *et al*. (1997) and Henken *et al*. (1986) who recorded best growth results for feed containing 40% and 58% CP respectively in Clarias species. The highest value for protein intake is recorded in fingerlings fed 42% crude protein (Top, Lynx and Coppens feeds) while the least value was recorded in fingerlings fed 38% CP. The result obtained for average mean weight gain and weekly average length gain followed the same pattern also.

5. Conclusion

Based on the results of the study, vital and top feed are the best feeds that supported the growth of *Clarias gariepinus* cultured in 12 plastic tanks in terms of weight gain while coppens and top feeds gave the best in terms of length and survival rate. Economically top feed and vital feeds also performed well and are the cheapest in terms of price. Therefore, they are recommended for use in feeding of fingerlings of *Clarias gariepinus* in Nigeria. However it is necessary to consider the prevailing physico-chemical characteristics that affects fish feeding behavior and utilization are at optimal levels in the culture aquaria. The success of *Clarias gariepinus* fingerlings depends on quality feed and water for better growth

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