



Research Article

Effects of Different Commercial Feeds on Growth Performance of Backcrossed *Clarias gariepinus* Hatchlings

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ABSTRACT

Different commercial feeds were fed to the hatchlings from the backcross of albino hybrid and parental *Clarias gariepinus* to improve their growth rate and percentage survival. The fish were fed with D1 Aqualis, D2 vital, D3 Skretting, D4 Coppens, and D5 Prime feeds. The results revealed an increase in weight and length gain of the hatchlings. However, the fish fed with Skrettings and Coppens gave the best growth rate. The weight gain was highest in Skretting D3 ($18.500 \pm 0.042a$), followed by Coppens D4 (18.18 ± 0.52), then the Vital feed (17.767 ± 0.07), Aqualis (17.466 ± 0.13) and Prime had the least (17.200 ± 0.20). In the length gain, Skretting and Vital had the same results (4.734 ± 0.10), followed by Coppens (4.633 ± 0.12), Prime (4.567 ± 0.06) and the least was Aqualis (4.100 ± 0.15). Prime had the highest percentage of survival 86%, this was followed by Coppens at 80%, Vital at 73.33%, Skretting at 66.67% and the least Aqualis at 53.33%. The Coppens had the best feed conversion ratio (0.007), while the rest of the treatments had 0.001. The research showed that both skretting and Coppens gave the best results. However, when considering the cost of the feeds skretting should be used since it is cheaper.

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INTRODUCTION

With the increase in population, the demand for a protein source, especially aquatic animals

risen (Fanzo *et al.*, 2014). Hence there is a need for an increase in aquaculture production.

Fingerlings production and availability of quality fish feed have been the bane of fish farming development in Nigeria. However, Adebayo and Popoola (2008) stressed the need for increased production of fingerlings to meet the ever-rising fish demand. One of the major steps in solving this problem is hybridization which has been recognized as a tool for stock improvement and management purposes (Ochokwu *et al.*, 2016).

Ellis *et al.* (2012), noted that inadequate feed, parasites, and the presence of predators are more likely causes of mortality or poor and erratic fish survival rates curtailing the need to produce enough fingerlings using the quickest way possible. A lot of fish feed with different brand names are always introduced into Nigerian markets. It is necessary to alert fish farmers to know what will give them the result concerning profitability. The fish feed has been projected to account for at least 60% of the total cost of production of the species (Gabriel *et al.*, 2007). To find cheaper, affordable, and available alternative fish feed to imported commercial fish feeds, various local fish feeds have been formulated from a different source. This has led to the emergence and proliferation of many fish feed industries in Nigeria manufacturing and selling all sorts of fish feed with bogus and questionable formulation, nutrient composition, and production. Most fish farmers opt for this cheaper local feed without knowing the proximate composition, formulation, and processing of the feeds.

The growth of fish is influenced by the feed it consumes (Ochokwu *et al.*, 2020). Studies on the growth response of *Clarias gariepinus* to feed have mainly concentrated on the replacement of fish meal with suitable alternatives by using different varieties of plants and animal sources as a substitute, supplement, or total replacement in fish feed and this has led to the development of all sorts

of fish meal with varying or total inclusions of the plants in the feed. Such feed is often called local, home or farm-made fish or Aqua feed. Very few studies have looked at and compared the growth response of fish to these local feeds and the standard commercial feeds. Mollah *et al.* (2010) compared local feeds and commercial feeds on the growth and survival of riverine catfish. Eyo *et al.* (2012) compared the growth performance and food utilization of *Clarias gariepinus* fed on local Unical aqua feed and Coppens.

Fish feeds are used in aquaculture to increase production and maximize profit. Feeds in intensive fish culture consume about 60% of the capital cost (Onyia *et al.*, 2018). For aquaculture to be highly successful there is a need for good quality and affordable feed, which can also encourage small-scale farmers in the field of aquaculture for sustainable production. Presently, in Nigeria, there are different fish feeds with different compositions ranging from Coppens, Euro feeds, eco feeds, vital feeds, blue crown, aqualis and others, but there is competition among them. Therefore, the specific objective of the research is to evaluate the growth and survival of *C. gariepinus* hatchlings fed different commercial feeds.

MATERIALS AND METHODS

Study of Area

The study was conducted in the fish hatchery of Department of Fisheries, Teaching and Research Farm, Modibbo Adama University, Yola, Adamawa State, Nigeria. Adamawa State is in the Northeastern part of Nigeria; it is one of the largest states in Nigeria and occupies land size of about 36,917 square kilometers. It is located on latitude 9.20 – 9.33⁰N, longitude 12.3⁰ – 12.50⁰E and an altitude of 185.9m. It has average annual rain fall of about 759mm with maximum temperature of 39.7⁰C. The rainy season

run from May through October, while the dry season commences November and ends in April. The driest months of the year are January and February when the relative humidity drops to 13% (Ochokwu *et al.*, 2014).

Sources of Broodstock

Normal pigmented male and female Albino hybrid brood fish weighing 2kg, were obtained from Department of Fisheries Teaching and Research farm, Modibbo Adama University Yola, Adamawa State, Nigeria and Ministry of Agriculture and Natural Resource, Dadin-kowa Gombe State, Nigeria.

Induced Breeding

The brood stocks were induced with Ovaprim at 0.5ml/kg. The injected fish were kept in a plastic bowl containing an oxygenated water to undergo latency period (Onyia *et al.*, 2016).

Collection of milt, stripping of eggs and fertilization

The milt was collected by sacrificing the male fish using dissecting kits in order to remove the gonad (testis). Prior to this action physiological solution was prepared by dissolving 9 grams of salt (NaCl) in one liter of water. Incisions were made into the creamy colored lobes of the testis and then squeezed and were held out of the testis sac with the physiological solution. The eggs were stripped and

fertilized with milt from the sacrificed male (Saidu *et al.*, 2021).

Data Analysis

All the experimental data including final mean weight, weight gain, SGR, FCR and survival rate, were compared using histogram and analysis of variance (one way ANOVA) followed by Fisher's LSD tests to determine the significant difference among means. Significance level was declared at ($P < 0.05$) using excel sheet and SPSS (version 20).

RESULTS

Mean Growth Performance in Weight of Hatchlings Fed Different Commercial Feeds

The hatchlings fed with skretting and Coppens had the best growth performance (18.90 ± 0.42 and 18.47 ± 0.64) as shown in figure 1, followed by vital feed (18.20 ± 0.15), aqualis (17.83 ± 0.47) and prime (17.57 ± 0.23). There was a significant difference ($p < 0.05$) in the growth in weight among the treatments.

Mean Growth Performance in Length of Hatchlings Fed Different Commercial Feeds

From the results of growth in length among the treatments, there was a significant difference ($p < 0.05$). The Coppens had the best performance in length (6.400 ± 0.21) followed by vital (6.37 ± 0.17), skretting (6.17 ± 0.12), prime (6.10 ± 0.15) and the least were recorded in aqualis (5.70 ± 0.21).

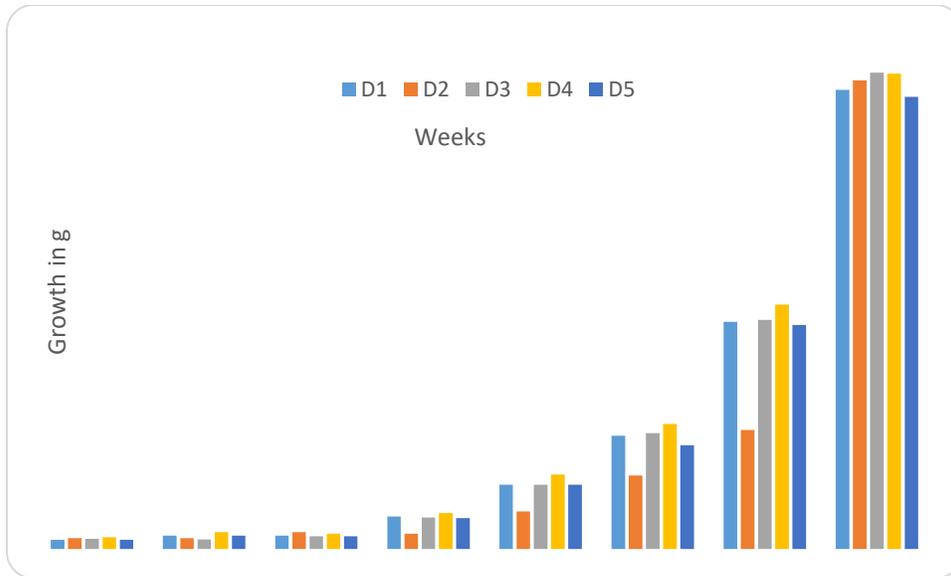


Figure 1: Mean Growth Performance in Weight of Hatchlings Fed Different Commercial Feed
 Keys: D1= Aqualis, D2= Vital, D3= Skretting, D4= Coppens, D5=Prime

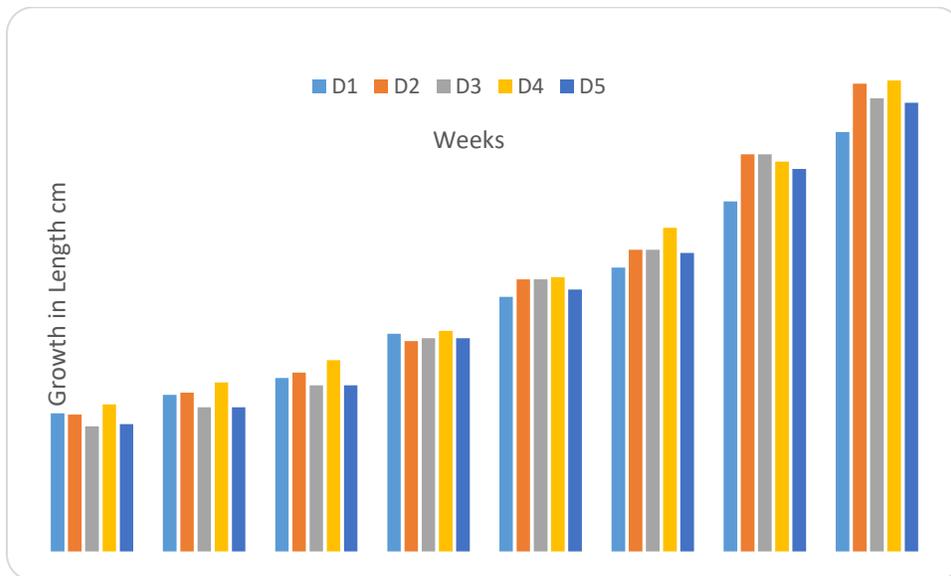


Figure 2: Growth Performance in Length (cm) of Hatchlings Fed Different Commercial Feeds
 Keys: D1= Aqualis, D2= Vital, D3= Skretting, D4= Coppens, D5=Prime

Mean Growth Parameter of Hatchlings fed with different commercial feeds

However, in the aspect of weight gain, skretting and Coppens had the best mean weight gain (18.50 ± 0.42 and 18.18 ± 0.52) as shown in table 1, followed by vital feed (17.77 ± 0.01), aqualis (17.47 ± 0.13) and prime

(17.20 ± 0.20). In the length gain as shown in table 1, skretting and vital feed had the best result (4.73 ± 0.13 , 4.73 ± 0.08), this was closely followed by Coppens (4.63 ± 0.12), prime (4.57 ± 0.07), and the least was in aqualis (6.100 ± 0.153), and the least was in aqualis (4.10 ± 0.15). While in survival rate Prime had

the highest percentage survival at 86%, this was followed by Coppens at 80%, then Vital at 73.33%, Skretting at 66.67% and the least was Aqualis at 53.33%. On the feed conversion ratio, all the commercial feeds had the same value (0.001) except Coppens which had the best FCR of 0.007. While in the Protein efficiency ratio, Prime had the highest

value (16.32), this was closely followed by Skretting (15.19), and then followed by Aqualis (14.64), and then Coppens (14.00) and least was Vital (9.90). For the condition factor, Aqualis had the highest value (0.63), followed by Skretting (0.53), then Prime (0.51), Vital (0.47), and the least was in Coppens feed (0.46).

Table 1: Mean Growth Parameters of Hatchlings Fed With Different Commercial Feeds

Parameters	D1	D2	D3	D4	D5
Initial weight	0.367±0.333	0.433±0.088	0.400±0.000	0.287±0.127	0.367±0.033
Final weight	17.833±0.47 ^d	18.200±0.15 ^c	18.900±0.42 ^a	18.467±0.64 ^b	17.567±0.23 ^e
Weight gain	17.466±0.13 ^d	17.767±0.07 ^c	18.500±0.42 ^a	18.18±0.52 ^b	17.200±0.20 ^e
Daily wt gain	0.312±0.00 ^d	0.317±0.00 ^c	0.330±0.00 ^a	0.325±0.00 ^b	0.307±0.00 ^e
Initial length	1.600±0.06	1.633±0.03	1.433±0.03	1.767±0.09	1.533±0.09
Final length	5.700±0.21 ^e	6.367±0.17 ^b	6.167±0.12 ^c	6.400±0.21 ^a	6.100±0.15 ^d
Length gain	4.100±0.15 ^d	4.734±0.13 ^a	4.734±0.09 ^a	4.633±0.12 ^b	4.567±0.07 ^e
% Survival	53.33 ^e	73.33 ^c	66.67 ^d	80 ^b	86 ^a
FCR	0.1 ^b	0.1 ^b	0.1 ^b	0.7 ^a	0.1 ^b
PER	14.64 ^c	9.90 ^e	15.19 ^b	14.00 ^d	16.32 ^a
K	0.63 ^a	0.47 ^e	0.53 ^{ab}	0.46 ^e	0.51 ^c

Means with different superscripts in the same row are significantly different at P<0.05

Wt = weight

DISCUSSION

Fish feed is of utmost need when the issue of fish culture is involved. There are various feeds available, however, are not all that are effective and give a better growth yield. In this study, there were improvements in the growth parameters of the hatchlings fed with the five commercial feeds, however, the hatchlings fed with Skretting, and Coppens had a better performance in growth than the other feeds. The increase in growth may be attributed to the high nutritive value of the feed, the ability of the hatchlings to convert the feed efficiently for growth (Ochokwu *et al.*, 2020) and another factor is the condition factor of the water used for the culture, it agreed with the study previously reported by Onyia *et al.* (2010), who evaluate the hatchability, survival, growth, and they're reciprocal. Subsequently, Mustapha *et al.* (2014) reported an increase in

the growth of the juveniles fed with Coppens, furthermore, they stated that the imported feed performed far better than the local feed, also Bekcan *et al.* (2006) stated that the body weight of catfish fed diet containing a high level of protein (>40% and above) had the highest final body weight gain. The survival rate obtained in this result was much higher than the 72% recorded by Omeji *et al.* (2013) and different from the mortality rate recorded by Onyia *et al.* (2015). The differences may be because of the use of protein from different sources in the formulation of the diet. From the overall results obtained on the percentage survival of hatchlings fed five different commercial feeds, fish fed with prime had the highest percentage survival, followed by Coppens, Vital feed, and Skretting feed and the least was in Aqualis (Onyia *et al.*, 2017). The fish fed with Coppens had a higher weight

gain which agreed with Onyia *et al.* (2017) who compared Coppens, Multifeed and compounded feeds, this may be because of high crude protein in Coppens, though Skretting had the highest weight gained. The values of feed conversion ratio (FCR) obtained from five different commercial feeds in this work ranges from 0.1 to 0.7 and these showed that the hatchlings could be raised on all five feeds. Feed consumption and growth generally increase with feeding quantity (Bacinar *et al.*, 2007).

CONCLUSION

Based on the experiment, the effects of different commercial feeds on the growth performance of backcrossed *Clarias gariepinus* hatchlings showed that the five commercial feeds used to feed the hatchlings can be used for the rearing of fish. However, when it comes to effectiveness skretting and Coppens are advised to be used reason is that they gave better growth performance over other feeds. Among the commercial feeds used, vital feed is the third best in terms of growth performance and can be compared favourably with Coppens feed. Therefore, the use of Coppens feeds on fingerlings can be substituted with Skretting feed or vital feed to maximize profit since Coppens feed is more expensive than Skretting and Vital. In terms of survival rate, Coppens feed and prime feed had the highest survival rate.

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