

EFFECTS OF FEED FORMS AND FEEDING FREQUENCY AND GROWTH PERFORMANCE OF *Clarias gariepinus* FED COMMERCIAL FEED

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ABSTRACT

This review investigated the effect of feed form and feeding frequency of *Clarias gariepinus* fed floating and sinking pellet feeds, growth performance of *Clarias gariepinus* fed fish feeds, similarly to evaluate growth of *C. gariepinus* fed 5 difference commercial feeds. Fish fed with floating pellet had highest Final Weight Gain with the value of 9.50g than those fed with sinking pellet feed with the value of 8.98g. Final Weight Gain and Daily Feed Intake of *C. gariepinus* fed floating or sinking pellet feed fed twice a day and thrice a day were significantly higher than those fed once a day ($p < 0.05$). There were significant difference ($p < 0.05$) in Specific Growth Rate (SGR) with value of 2.79 and Protein Efficiency Ratio (PER) with value of 1.97 in *C. gariepinus* fed Aqua and Rana feeds. Furthermore, there were significant difference ($p < 0.05$) in the survival rate of the fish species fed Coppens (93.33%) while lowest (46.67%) in *C. gariepinus* fed with Aqua feed. *C. gariepinus* juvenile fed with Coppens, Multifeed and Eurogold with Final Mean Weight value of 181.54, 179.92, 0.95 and 139.92 respectively, while Final Mean Weight for Vital and Ajanla were 110.1 and 119.03 respectively. Fish fed with Coppens had the highest SGR (3.19%) and lowest (2.71%) in those fed with Eurogold feed. *C. gariepinus* can be fed floating and sinking pellet feeds twice or thrice per day for optimum growth. *C. gariepinus* should be fed with feed that have macronutrient composition 7 of 45% crude proteins, 12% crude fat, 1.5 crude fiber and 9.5% Ash in order to promote better growth.

INTRODUCTION

Catfish (*C. gariepinus*) are the major commercial culture species in Nigeria for good market reasons. Since 2000 there had been a rapid expansion in urban aquaculture and a significant increase in catfish culture (Anetekhai *et al.*, 2004).

Optimal feeding for fish species especially African catfish was yet to be clearly defined and this had led to uncertainty in the feeding routines used by many farmers. Under feeding can be detrimental to the health of the fish and may cause reduction of weight and poor feed utilization. This will increased susceptibility to infection (Priestley *et al.*, 2006). Specific growth rate (SGR) and the efficiency of feed conversion as have been observed to be directly related to feed ration and frequency of feeding (Dwyer *et al.*, 2002). This study aimed to find the appropriate feeding frequency for optimum culture of *C. gariepinus* and to assess the impact of feed type/forms on the growth quality of fish seed production and assessment of *C. gariepinus*.

MATERIALS AND METHODS

EXPERIMENTAL FISH, REARING CONDITIONS AND FEEDING TRIAL

Two hundred and twenty five fish *Clarias gariepinus* were obtained from a local hatchery in Ibadan, with average weight of 3.12 ± 0.04 g. They were stocked into 15 (60-liter) aquaria each holding 15 fish. Five feeds: Coppens (T1), Aqua (T2), Ranna (T3), Pira (T4) and Durante (T5) were used for this study.

Experimental trial was conducted at the laboratory of Bowen University, Iwo, Nigeria. A total of 360 *C. gariepinus* fingerlings were used. Three feeding frequencies were adopted; two different feed forms (floating and sinking pellets) were used, thus giving a total of 6 treatments.

Research on feeding trials were also carried out at the family testing unit of ARAC Nigerian limited. Some 500 nine week old *C. gariepinus* juveniles were purchased from Belem fish farm, Port Harcourt. A completely randomized design was used with 5 treatments (commercial catfish feed): Coppens, Multifeed, Eurogold, vital and Ajanla feeds and 3 replicates per treatment.

GROWTH PARAMETERS

Growth performance of the fish was determined following the methods adapted by Ajani *et al.* (2011).

Measurement of weight and the survival of *C. gariepinus* Fingerlings/Juveniles

Weights of fingerlings were determined at the beginning of each treatment and subsequently at weekly intervals basis. Electronic digital weighing scale: ACCULAB model meter balance 2000 was used for measuring the weight of the fish species (Ajani *et al.* (2011)).

STATISTICAL ANALYSIS

Data collected were subjected to analysis of variance (ANOVA). Significant difference means ($P < 0.05$) were separated using Duncan's New Multiple Range Test (Duncan). The statistical analysis was done using SPSS (Windows version 15.0).

RESULTS AND DISCUSSION

Table 1: Growth Performance and survival of *C. gariepinus* fish fed floating and sinking pellet once, twice and thrice/day

	Floating Pellet			Sinking Pellet		
	1x	2x	3x	1x	2x	3x
Mean Initial Wt(g)	3.03±0.05	3.10 ± 0.02	2.97±0.57	3.15 ±0.06	3.05±0.41	3.00 ±0.18
Mean final wt(g)	12.44 ±2.01	12.27 ± 3.04	12.47 ±2.31	12.04 ±4.42	12.02 ±0.36	11.96 ± 4.05
Mean wt gain (g)	9.41 ± 3.20 ^a	9.17 ±2.32 ^a	9.50 ± 1.08 ^a	8.89 ±2.40 ^a	8.97 ±4.24 ^a	8.96±2.09 ^a
Sd SGR (%)	0.062 ±0.01 ^c	0.64 ±0.04 ^c	0.68 ±0.21 ^c	10.58 ±0.07 ^c	0.60 ±0.71 ^c	0.52 ±0.01 ^b
FCR	2.88 ±0.02 ^a	2.68 ±0.50 ^b	2.50 ±0.06 ^b	2.92 ±0.01 ^a	2.85 ±0.12 ^a	2.82 ±0.08 ^a
Survival (%)	95.00 ±3.41 ^b	98.0 ±1.81 ^b	95.5 ±181 ^b	85.0 ±3.22 ^a	98.0 ±1.24 ^b	98.0 ±1.41 ^b

Mean values with different superscript along each row are significantly different from each other ($P < 0.05$).

Source: Ajani *et al.* (2011).

Table 1 revealed that the floating pellet feed fed thrice a day had the highest mean weight gain with the value of 12.44 ± 2.31 while sinking pellet feed fed thrice per day had the lowest mean weight gain with value of 11.96 ± 4.05 . The highest final weight gain recorded in the fish species fed floating pellet feed fed to *Clarias gariepinus* had the highest with the value of 12.44 ± 2.31 while The lowest final weight gain in fish species fed with sinking pellet feed fed thrice per day may be attributed to nature of feed types. Ajani *et al.* (2011) noted that floating pellets float on the water and doesn't disintegrate easily like sinking pellet feeds.

Table 2: Growth performance and survival rates of *C. gariepinus* fed different feed brand

	Treatments				
	Aqua	Coppens	Durate	Pira	Rana
Initial Weight	3.12 ± 0.2	3.12 ± 0.1	3.1 ± 0.1	3.11 ± 0.2	3.10 ± 0.2
Final Weight	57.18 ± 4.05	33.38 ± 33.2	39.28 ± 3.64	42.93 ± 3.72	24.82 ± 2.57
Weight Gain	54.07 ± 4.37	30.26 ± 2.46	36.17 ± 3.54	39.83 ± 3.86	21.73 ± 2.30
Percentage Weight Gain	1734.87 ± 142.28	$969.77^{bc} \pm 100.32$	$1165.88^b \pm 106.87$	1282.07 ± 110.09	$704.01 \pm 80a$
Specific Growth rate	$2.79^a \pm 0.76$	$2.25^b \pm 0.32$	$2.41^b \pm 0.43$	$2.51^b \pm 0.46$	$1.97^a \pm 0.21$
Feed Conversion Ratio	$1.59^a \pm 0.06$	$1.95^b \pm 0.08$	$1.88^{ab} \pm 0.06$	$1.79^{ab} \pm 0.05$	$2.13^b \pm 0.09$
Protein Efficiency Ratio	$1.49^a \pm 0.02$	$1.22^b \pm 0.02$	$1.30^{ab} \pm 0.04$	$1.33^{ab} \pm 0.03$	$1.12^b \pm 0.04$
Survival Rate	$46.67^c \pm 2.46$	$93.33^a \pm 3.24$	$57.78^c \pm 3.76$	$91.11^{ab} \pm 2.55$	$62.22^b \pm 3.65$

Source: Ajayi *et al.* (2016).

The initial weight gain of *C. gariepinus* fed Aqua feed had the highest final weight gain with value of 57.18g while the fish species fed Rana feed had the lowest final weight gain with the value of 24.82 ± 2.57 . No significant difference existed among Coppens, Dorante and Pira. The best feed was Aqua with feed conversion ratio and protein efficiency ratio values of 1.69 and 1.49 respectively.

There was no significant difference in FCR among Aqua, Durante and Pira. Feed fed with Coppens (table 2). Booth *et al.*, (2008) observed that different feeding regime doesn't not have a significant effect on weight gain.

Proximate composition *C. gariepinus* fed with Coppens, Multifeed, Eurogold, Vital and Ajanla and Multifeed had the highest percentage C.P with the value of 45% while vital had the lowest percentage C.P value of 38%. The crude lipid content of Coppens and Multifeeds had the highest with the percentage value of 12% while Ajanla had the lowest with the percentage value of 8%. A significant difference was observed in the percentage fat and ash content recorded from carcass of the fish fed different feed types feed brands. It may be due to losses due to volatilisation between constituents (Micheal *et al.*, 1995).

Another feeding trial carried out indicated that Aqua had the highest final weight gain with the value 1734.87g while the Rana had the lowest final weight gain. There were no significant difference existed among Coppens, Dorantea and Pira. There were significant differences in the FCR among feed type with Rana feed brand. According to Haulihan *et al.* (2001) FCRs should never go above 2. According to the author opined that FRC vary with fish species, activity levels of fish and culture system.

Proximate composition in Coppens, Multifeed, Eurogold, Vital and Ajanla indicated that vital feed lowest C.P The crude lipid content of Coppens and Multifeeds had the highest value of 12% while Ajanta had the lowest value. According to Agokei (2011) significant highest growth performance of *C. gariepinus* was found in the diet that contained < 2% fibre content. This could be due to inability of the fish species to digest and utilized high content in the feed. Alam *et al.*, (2012) reported that ash content in the feed of *C. gariepinus* should not be less than 8%.

Growth performance of similar feeding trial indicated that Coppens feed fed to *C. gariepinus* had the highest final weight gain while the vital had the lowest final weight gain. Earlier worked of Fagbenro *et al.* (1992) ascertained that African cat fish tend to require at least 40% crude protein. Specific growth rate (SGR) was highest for fish fed Coppens but was not significantly different from SGR for fish fed Multifeed.

CONCLUSIONS

There was no significant difference in final weight gain in *C. gariepinus* fed floating and sinking pellet feeds although fish fed floating pellet feed exhibited higher final weight gain. It was also revealed that floating pellet feed can be fed to *C. gariepinus* three times a day for optimum growth while the best feeding frequency for sinking pellet feed in order to obtain optimum growth for *C. gariepinus* were twice and thrice per day. Macronutrient combinations with 45% CP, crude fat, 12%, crude fibre 1.5% and Ash 9.5% will promote higher growth rates of *C. gariepinus* than other feed ingredients combination in the diets of the juvenile fish species.

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