GROWTH PERFORMANCE OF *Clarias gariepinus* FED COMPOUNDED RATIONS AND MAGGOTS

Kareem, A. O.
Ogunremi, J. B.
Department of Biological Sciences
Ondo State University of Science and Technology
Okitipupa, Ondo State, Nigeria
E-mail: *jogunremi@gmail.com*

ABSTRACT

An investigation into the monoculture of Clarias gariepinus was carried out with a view to determine the most suitable level of supplementing maggots with compounded rations and evaluate the growth performance. Ten juvenile Clarias were stocked each in four different hapas of 1m x 1m x 1m in a pond. Initial mean weights recorded are 105.55g, 110.63g, 108.25g and 112.65g for the four treatments respectively. There were four experimental treatments T_1 - T_4, T_1 100% compounded ration, T_2 50% compounded ration and 50% maggots, T_3 25% compounded ration and 75% maggots, T_4 100% maggots. Experimental fish were fed at 5% body weight for 8 weeks with final weight as 201.56g, 230.28g, 186.35g and 170.80g for the treatments respectively. The highest mean weight of 119.65, specific growth rate of 1.3 and protein efficiency ratio of 0.39 were recorded in treatment II for fish fed 50% compounded ration and 50% maggot Results of this study showed among others that a combination of 50% compounded ration and 50% maggot (Treatment II) yielded the best growth performance of Clarias gariepinus. Hence, equal combination of compounded ration and maggots in fish which is one of the goods sources of human protein is highly recommended.
Keywords: *Growth performance, compounded ration, maggot,Clarias gariepinus*

INTRODUCTION

The importance of aquaculture in improving the diet of the people, generating employment in rural areas and saving foreign exchange through import substitution has generally been considered in most countries of Africa in recent years (Ogunremi and Obasa, 2009). Malnutrition, poor growth and lack of disease tolerance occur as a result of acute protein deficiency in the diet of the people. Hence the need for regular source of animal protein. The adequate supply of fish as a source of protein in correct proportion in man's diet will make him healthy. In fish farming, sufficient composition of feed is essential for increased yield and profitability (Sogbesan and Ugwumba, 2008). Sales and Janssens (2003) opine that increasing cost of high quality fish meal required for aquafeed and as a result of decreasing stocks of fish from capture fishery and competitions for feed in animal husbandry, there is the need to search for alternative sources of animal protein especially in developing countries like Nigeria. *Clarias gariepinus* is a widely cultured mud catfish specie in Nigeria because of its wide range of water tolerance, fast growth and high market price. It feeds on household waste, any available food, including plankton, insect larva, tadpoles and detritus (Olufeagba, 1999). Interests to study the use of housefly maggot meal (Magmeal) as substitute for fish meal in fish diets have increased in recent times (Ogunji, Rahat-Ul-

Ain, Carsten and Werner, 2008). Many Scientists have reported that the possible use of magmeal which is of animal origin has a great potential (Ogunji, Kloas, Wirth, Schulz and Rennert, 2006; Sogbesan, Ajuonu, Ugwumba and Madu, 2005; Ajani, Nwana and Musa, 2004; Fasakin, Bilogun and Ajayi, 2003; Adesalu and Mustapha, 2000; and Fasakin, Falayi and Eyo, 2000). There is high demand for *Clarias gariepinus* in Nigeria but unfortunately, due to high cost of fish feed, fish farmers have not been able to meet up with the growing demand for the product. There is need to boost the production of this highly demanded cultured fish. Hence this study therefore, sets to evaluate the growth performance of *Clarias gariepinus* fed magmeal at different proportions.

MATERIALS AND METHOD

The Experiment was carried out at the department of Wildlife and Fisheries Management Fish Farm, University of Ibadan. An experimental earthen pond which was adequately supplied with water was used. Four hapas were utilized each of 1m x 1m, there are four replicates, one for each treatment in the pond. Source of water supply into the pond was spring; each pond has an inlet pipe and an overhead drainage pipe to let out any excess water which may arise as a result of heavy rainfall. Poultry droppings were collected massively from a poultry farm. The poultry droppings were placed in open containers and constantly wet with water to make it moist which attracted flies to lay their eggs on it. Maggots were generated as from the third to fourth day. Maggots were constantly washed in water and quantity weighed before feeding the fish. A total of 40 juveniles *Clarias gariepinus* were utilized for the experiment and were stocked at the rate of 10 juvenile *Clarias* per *happa* to form treatments I, II, III and IV with initial mean weight of 105.55g, 110.63g, 108.25g and 112.65g respectively.

Feeding was done twice daily in the morning and evening. Sampling was done weekly throughout the eight weeks of experimental period to determine the weight of fish and quantity of feed fed were recorded. Initial and final proximate compositions of fish samples were determined at the beginning and the end of the experiment. The chemical composition of the diets was obtained by using the standard procedure of the Association of Official Analytical Chemist of year 2000. Temperature was taken daily with thermometer, dissolved oxygen and pH were also measured for water quality using Winkler's solution (Boyd, 1990) and pH meter (EIL Richmond Model) respectively. From the experimental data obtained, growth was expressed as weight gain, Specific Growth Rate (SGR), Protein Efficiency Ratio (PER), Feed Conversion Ratio (FCR), Gross Efficiency Feed Conversion (GEFC), Daily Rate of Growth (DRG) and Daily rate of Feeding (DRF) were calculated as follows. Weight gain = (W2) weight at time T2 days - (W1) weight at time T1 days

$$SGR = \frac{\log W2 - \log W1}{T2 - T1} X \ 100$$

$$PER = \frac{Mean\ weight\ gain}{protein\ in-take}$$

$$FCR = \frac{Feed\ in-take}{Net\ weight\ gain}$$

$$DRF = \frac{Mean\ feeding\ per\ week}{Body\ weight\ of\ fish}$$

$$DGR = \frac{Mean\ increase\ in\ weight\ per\ day}{Body\ weight\ of\ fish}$$

$$DRF = \frac{Mean\ feeding\ per\ week}{Body\ weight\ of\ fish}$$

All growth data were subjected to one-way analysis of variance (ANOVA). The significance of difference between means was determined by Duncan's multiple range test ($p<0.05$) using SPSS for Windows.

RESULTS AND DISCUSSION

The crude protein content of maggot meal used in this study was of a higher quality as revealed by the study on table one. The effect of maggot on growth performance was shown on table 5. In the course of the experiment, no mortality was recorded. Highest weight gain and SGR were observed in Treatment II followed by experiments I, III and IV. Feed conversion was the most efficient in experiment IV compared to experiment III. Generally, the body composition of *Clarias* fed various experimental diets resulted in higher crude protein as the percentage of maggots increased in the diet. However, the ash content, fat and crude fiber increased as the percentage of maggots increased but dropped when it was increased in the diet to 100%. The crude protein content was highest in Treatment IV (63.39) which was 100% maggots, followed by Treatment III (54.65) while Treatment I had the least crude protein. It has been reported that magmeal crude protein content ranges from 40 to 61.4 % (Ogunji, Rahat-Ul-Ain, Carsten and Werner 2008), crude fibre 5.8-8.2% and ash 0.93-11% (Adesulu and Mustapha, 2000; Fasakin *et al.*, Ajani Nwanna and Musa, 2004). The differences may be due to processing, drying or storage methods used. Crude fibre content tends to be highest in Treatment III and lowest in Treatment IV. Data obtained from table 5 above reveals mean weight gain was highest in Treatment II (11.65g) and least in Treatment III (58.15g). Specific growth rate was highest in Treatment II (1.30), Treatment I (1.6) and least in Treatment IV (0.42). Fasakin et al (2000) attributed the reduction in growth performance of experimental fish fed full-fat maggot to low protein digestibility of the feed stuff among other reasons. Protein Efficiency Ratio was also high for treatment II (0.38). Table 6 showed that there was no significant difference between the four treatments on mean weight gain.

CONCLUDING REMARK

Results of this study show a combination of 50% compounded ration and 50% maggot (Treatment II) will yield the best growth performance. This treatment is least cost effective dropping feed cost as against treatment I (100% compounded ration). Ability of an organism to convert nutrient especially protein will positively influence its growth performance; this is justified by the best protein efficiency ratio and growth performance shown in treatment II. Hence, equal combination of compounded ration and maggots in fish which is one of the goods sources of human protein is highly recommended.

Table 1: Formulation of crude protein diet

Ingredients	% Composition	% Crude protein
Maize	10.00	1.10
Palm kernel cake	20.00	4.10
Ground nut cake	40.00	19.20
Soya meal	20.00	8.80
Fish meal	2.50	1.80
Oil	4.00	-
Bone meal	2.50	-
Oyster shell	0.05	-
Mineral vitamin	0.25	-
Industrial salt	0.25	-
Total	100%	35%

Source: *Experimentation, 2011*

Table 2: Experimental treatment procedure

Treatment I	Treatment II	Treatment III	Treatment IV
100% cmpd ration and 10 Juvenile *Clarias*	50% cmpd ration and 10 juvenile *Clarias*	25% cmpd ration and 10 juvenile *Clarias*	100% cmpd ration and 10 juvenile *Clarias*

Source: *Experimentation, 2011. cmpd = compounded*

Table 3: Proximate composition of experimental diet and maggots

	Moisture	Ash	Fat	CP	CF	NFE
ED	28.0	15.16	17.06	34.75	4.70	0.13
Maggots	15.65	8.35	6.05	63.39	3.85	2.61

Note: CP - Crude Protein, CFE - Crude Fibre, NFE - Nitrogen Free Extract, ED = Experimental Diet
Source: *Experimentation, 2011.*

Table 4: Proximate composition of experimental diet and maggot at different treatment levels

Treatments	Moisture	Ash	Fat	CP	CF	NFE
I. 100% ED	28.0	15.16	17.06	34.75	4.70	0.13
II. 50%ED and 50%M	8.85	15.26	10.36	48.36	5.13	12.04
III. 25%ED and75%M	9.23	16.58	11.35	54.65	5.55	2.64
IV. 100%M	15.65	8.35	6.05	63.39	3.85	2.61

Source: *Experimentation, 2011*

Table 5: Growth Rate of Fish fed Experimental Diet

		Treatment I	Treatment II	Treatment III	Treatment IV
Initial weight (wt) (g)	Wk	105.55	110.63	108.25	112.65
	Wk 2	124.75	129.01	116.48	122.35
	Wk 3	141.96	148.04	133.56	131.65
	Wk 4	156.38	166.35	141.06	140.87
	Wk 5	171.05	184.63	149.63	148.23
	Wk 6	185.66	201.56	156.87	154.55
	Wk 7	193.58	218.85	170.96	161.36
	Wk 8	201.56	230.28	186.35	170.80
Mean wt. gained (g)		96.01	119.65	78.10	58.15
Total Feed intake (g)		8065.60	7108.40	9417.50	9620.65
Mean feed intake (g)		144.03	126.94	168.17	171.80
SGR		1.1555	1.303	0.971	0.416
PER		0.3400	0.386	0.291	0.289
FCR		8.400	5.941	12.06	16.54
GEFC		0.1500	0.1059	0.2158	0.2955
DRG		0.0156	0.0088	0.0276	0.0508
DRF		14.40	12.69	16.82	17.18

Source: *Experimentation, 2011*
Key: *SGR = Specific Growth Rate, PER = Protein Efficiency Ratio; FCR = Feed Conversion Ratio, GEFFC = Gross Efficiency Feed Conversion; DRG = Daily Rate of Growth DRF = Daily rate of Feeding*

Table 6: Anova table showing the significant differences between the treatments on mean weight gain

Source of variation	df	SoS	MS	F	Sig
Treatments	3	6459.746	2153.249	1.547	.221
	32	44528.377	1391.512		
Total	35	50988.123			

$F(3, 32) = 1.547$, $P > 0.05$. *N/B: df = degree of freedom; SoS = Sum of Squares; MS = Mean Square*

Source: *Experimentation 2011.*

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