GROWTH PERFORMANCE OF HETEROCLARIAS FED MAGGOT MEAL AT VARYING INCLUSION LEVELS.

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ABSTRACT.

70-day growth trial was conducted with *Heteroclarias: Heterobranchus bidorsalis x Clarias gariepinus* (mean weight 0.64±0.006g) fed diets based on various inclusion levels of Maggot Meal. The fishmeal in the control diet was replaced with maggot meals at 25%, 50%, 75% and 100% levels to supply 40% crude protein in the final diets. The trials were conducted in glass tanks (60cm x 30cm x 30cm). Evaluation of growth parameters and nutrient utilization of the fish was based on weight gains, protein intake, protein efficiency ratio, net protein utilization, feed conversion efficiency and carcass analysis. Best growth and feed conversion efficiency were obtained with the 75% dietary inclusion of maggot meal. There was no significant differences ($P>0.055$) between the group of fish on 50% and 75% dietary inclusion maggot meal in growth performance and protein efficiency ratio but, there was a significant ($P<0.05$) difference in the NPU (Net Protein Utilization) and protein gain between the control diet and those fed on maggot meals. There was no marked variation in the survival rate of fish on all diets.

INTRODUCTION

Feed represents a large part of production costs during intensive culture (Chen and Tsai, 1994). Protein represents the most expensive component in fish feed and the protein sources (especially fish meal) are often the major factor in the high feed cost, it is important to search for alternative feedstuffs from unconventional sources so as to reduce cost.

In Nigeria most fish farmers feed the cultured fish with agricultural wastes and in recent times, novel protein supplement like housefly maggot has been commonly substituted successfully for fishmeal at varying levels in fish feeds. (Ugwumba and Abumoye; 1998; Faturoti *et. al.* 1998). Maggots could be removed from these agricultural wastes and served to fish live or processed, dried and incorporated into fish feed as meal. There is Paucity of data on the effects of maggot meal protein as fish feed in tropical fish feed. The maggot meal is being evaluated in this study as a source of protein in the diet of the African catfish hybrid: - *Heteroclarias*, which is popularly, culture fish in Nigeria because of its remarkable fast growth rate (Aluko, 1998).

MATERIALS AND METHODS.

A total of 200 fingerlings of *Heteroclarias* (mean weight. 0.68±0.006g) obtained from the hatchery of the National Institute for Freshwater fisheries research, New Bussa, Niger State Nigeria. The fish were acclimatised for two weeks, and starved for 24 hours before they were placed on the experimental diets. Fish were held in glass tanks (60cm x 30cm x 30cm) at a rate of twenty fingerlings per tank with adequate aeration. Each glass tank was filled with 40 litres of filtered water.

Five diets were formulated and prepared at a desired 40% crude protein level as

recommended for *Heterobranchus bidorsalis* fingerlings (Fagbenro *et. al.* 1992). Fishmeal in the control diet was replaced with maggot meal at 25%, 50%, 75% and 100% levels (Tale 1).

Poultry droppings were obtained from a poultry farm in New Bussa, Niger State. The container was moisture with water to prevent drying and exposed for two day to allow flies to lay eggs on it. The container was covered and left for between 3 days and a week to allow maggot to be fully grown before harvesting. The harvested maggots were sundried and ground into powder, which was then used as test diets. Proximate analysis of experimental diet is presented in Table 2. Each treatment was in duplicate. The fish were fed twice daily at 5% body weight for 10 weeks

Batch weighing of fish in each tank was carried out every 14 days. Feeding allowance was adjusted in accordance wit the body weight. Water was partially replaced once or twice daily after each cleaning and completely changed during 14-days sampling.

Composite samples of ten whole fish were analysed for proximate composition at the start of the feeding trial and at the end of the experiment, five fish were taken from each treatment for carcass composition, using AOAC (1990) methods. Dissolved oxygen, pH and temperature followed the method described by Boyd (1981).

Results of weight gain, specific growth rate, feed conversion ratio, Net protein utilization and percentage survival were pooled for each treatment computed and analysed using one-way analysis of variance (ANOVA) followed by the least significant difference (LSD) test for comparisons among means.

Table 1. Ingredient/gross composition of experimental diets ((%) dry weight).

	DIETARY INCLUSION OF MAGGOT MEAL.				
Ingredients	0 % control	25%	50%	75%	100%
Fish meal	14.70	11.03	7.35	3.68	-
Maggot meal	-	3.68	7.35	11.03	14.70
Yellow maize	25.00	25.00	25.00	25.00	25.00
Soybean meal	54.10	54.10	54.10	54.10	54.10
Blood meal	4.70	4.70	4.70	4.70	4.70
Vitamin premix	0.50	0.50	0.50	0.50	0.50
Vegetable oil	1.00	1.00	1.00	1.00	1.00

Table 2. Proximate analysis of experimental diets (% dry weight basis).

	DIETARY INCLUSION OF MAGGOT.				
% Composition	0 % Control	25%	50%	75%	100%
Crude protein	41.93	41.22	40.51	39.80	39.08
Crude fat	11.44	11.23	12.65	12.48	15.63
Crude fibre	9.44	9.12	9.64	10.84	10.32
Ash	12.29	11.46	12.42	11.35	11.05
Moisture	12.10	12.04	11.85	11.05	11.34

RESULTS AND DISCUSSION

The growth performance of the *Heteroclarias* is shown in table 3. All fish fed actively and appeared healthy. The best growth response was achieved at 75% maggot meal inclusion level as shown by the results of weight gained and final weight (Table 3).

Survival was generally high but could not be attributed to the inclusion levels. Similarly no significant differences (P>0.05) were found between the percentage survivals. The FCEs were significantly different among the treatments (P<0.05). Fish fed at 75% inclusion level had the best FCE (35.71) followed with 50% inclusion level (33.33) with no significant differences between the two treatments (P>0.05) (Table 2). The water quality parameters measured were within the desired range, temperature, 26.00-28.50oC, dissolved oxygen, 4.10-6.05 mg/l, pH, 7 20-7.60 recommended for catfishes (Viveen *et al.* 1986).

Carcass composition at the start and end of the experiment is shown in table 4. The best protein efficiency ratio was obtained in the control with no significant differences (P0.05) found between the treatments.

Based on the results and the foregoing, it could be concluded that replacement of fishmeal with maggot meal at 50% - 75% inclusion level is suitable for optimal growth performance in *Heteroclarias* fingerlings.

Table 3: Performance of *Heteroclairas* fingerlings fed maggot meal at various levels of inclusion for 70 days.

Parameters	DIETARY INCLUSION OF MAGGOT MEAL.					Significant
	%	25%	50%	75%	100%	
Initial wt(g)	0.84	0.75	0.92	0.88	0.96	Ns
Final wt (g)	2.04	2.39	3.86	4.10	2.90	S
Wt gain (g/d)	1.20	1.64	2.94	3.22	1.94	S
% wt gain	142.9	218.77	319.6	365.9	202.1	S
Total feed intake (g)	5.69	6.37	8.43	9.44	7.60	S
Daily feed intake	0.08	0.09	0.12	0.14	0.11	Ns
SGR (%/day)	1.27	1.66	2.05	2.20	1.58	S
FCE	25.00	22.22	33.33	35.71	27.27	S
Protein intake	2.28	2.55	3.37	3.78	3.04	S
Protein gain	2.04	1.79	2.08	2.11	1.92	Ns
PER	0.53	0.64	0.87	1.08	0.64	Ns
NPU (%)	89.50	70.20	61.72	55.82	63.16	S
Survival rate (%)	90	87.5	92.5	90.0	85.0	Ns

N = 80 Fish per treatment
Ns = Not significant at 5% level
S = Significant at 5% level

CONCLUSION

The performance of *Heteroclarias* when fed on maggot meal substituted diets gave significant difference (P<0.05) in growth performance when compared with the control diet. This is indicative of the suitability of maggot as a protein source in the diet of this species. The cost of producing the maggot meal based diets would be lesser than that of the control, because the maggot spare much of the quantity of the fish meal require, thereby reducing the cost of production. It could be concluded from this study that maggot meal may be used in fish diets to reduce the fish feed cost and to promote the growth performance, food conversion and survival of fish.

Table 4: Proximate composition of the fish carcass before and after feeding on the diets with maggot meal at various levels of inclusion (% dry weight basis).

% Composition	DIETARY INCLUSION OF MAGGOT MEAL.					
	Initial	0 %	25%	50%	75%	100%
Crude protein	70.21	72.25	72.00	72.29	72.32	72.13
Crude fat	4.24	4.67	5.46	5.00	5.00	5.08
Ash	0.06	9.37	9.26	9.18	9.14	9.32
Moisture	10.10	9.70	9.00	8.95	9.21	9.18
Crude fibre	2 34	2.35	2.10	2.14	2.22	2.18

*** Mean of duplicate values.**

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