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EFFECT OF LIVE MAGGOT ON GROWTH OF THE NILE PERCH, *Oreochromis niloticus* (CICHLIDAE) IN SOUTH EASTERN NIGERIA

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ABSTRACT

Analysis of the housefly (Musca domestica) larvae (maggot), showed high content of protein, when combined in diet with farm by-product. Wheat offal and the maggot, at a ratio of 4:1 recorded higher growth rate or body weight gain of 3.62% per day and better feed conversion rate of 4.15 than when the wheat offal was fed singly. The maggot can be cheap source of protein for fish farmers.

KEYWORDS: Live maggots, Nile perch, Nigeria, fish growth, protein source.

INTRODUCTION

Tilapias are grouped into two genera: *Tilapia*, which are macrophagous and substrate spawners, and *Oreochromis*, which are microphagous and mouth breeders (Trewavas, 1982). About seventy species have been identified under these two groups. However, only two, *Tilapinne cichlids* (*T. rendalli* and *T. zillii)* and those *Oreochromis* species (*O. mossambicus*, *O. niloticus*, and *O. aureus)* have been widely used in practical culture (Lovell, 1989).

Under culture conditions, growth is a function of the stocking rate, feed given and environmental conditions (Chang *et al.*, 1983). According to Jhingran and Pullin (1988), information on larval fry and fingerling nutrition is very limited, most reports deal with larger fish; it is well known that nutritional requirements and feeding behaviour of fish usually differ markedly between early life history and adult stage.

Nile tilapia, *Oreochromis niloticus* are principally omnivorous but for enhanced growth of both fry and fingerlings, supplementary feeding became important. "Novel" animal protein sources are typical mini-livestock: earthworm, snails, locusts, crickets, termites and other insects as adults, larvae or pupae (Ravindran and Blair, 1993). Inexpensive raw materials like maggot (Testia and Miller, 1994), maggot meal (Atteh and Olegbenla, 1993) molasses (Aletor, 1986) and wheat-offal (Otubusin, 2001) serve a good alternative to fish meal, which is expensive. Fly larvae (maggots) and termites could lead to decrease in fish meal imports (Hardouin, 1995). Maggots are waste processors and protein provider.

With high stocking rates, the natural food becomes less significant and better-quality supplemental feeds are needed. To overcome this problem of high stocking rates and intensive fish cropping, it is necessary to use fast-growing and cheap protein sources that can be easily procured such as larvae of housefly usually called maggot.

MATERIALS AND METHODS

Specimens of fry of the Nile tilapia, *O. niloticus* (average weight = 0.05gms) for the experiment were obtained from a hatchery at Institute of Oceanography, University of Calabar, Nigeria. The treatments comprised of two fresh water plastic tanks (100 x 100 x 60cm). Ten fry were assigned at random into each tank and aerated by use of air pumps. Each treatment was carried out in duplicate of two tanks per diet for 42 days.

To obtain development of live larvae of the housefly (*M. domestica)*, liquid contents of a chicken egg and powdered wheat offal were used. The liquid egg contents and hatchery wastes (broken, shell-less and discarded eggs) were homogenized. The homogenized materials were poured into a container holding 250ml of water. A 50g chicken egg is expected contain about 12g dry matter. The emulsion from the sclution is thereafter poured over 1kg of powdered wheat-offal on a cemented floor (under open shade). The treatment is kept at 22 to 25°C (mean 24.8°C) with humidity of 70% for the housefly to infest. A single housefly can produce about 10g of live maggot in 7 days. Dissolved oxygen content was 6.32mg/L and pH was 7.1. Proximate analysis of the two diets using methods provided by A. O A. C. (1990), revealed that:

Diet 1 comprising of only wheat-offal (powder), contains 14.2% crude protein, 51.4% NFE and 10.8% fat.

Diet 2 consisting of Diet 1 supplemented with live maggots in the ratio of 4:1, containing 54% crude protein in maggot. The specific growth was measured according the methods of Viola *et al.*, (1988).

To feed the fry, each diet was mixed with water to form dough. The dough was broadcast into each of the tanks containing the fry. The feeding was carried out thrice daily between 08.00 and 17.00 at the rate of 20% of fish body weight with adjustment to compliment for change in body weights. Measurement of fish weight was done weekly. Data obtained from the experiment were subjected to statistical analysis, according to methods of Steel and Torrie, (1980).

RESULTS

There was no mortality of the fry specimens during the study. No abnormal sign was apparent in the behaviour of the specimens. The mean body weight during the study is presented in Table 1. There were significant increases in Diet 2of final weight (1.56g), specific growth rate (3.62%/day) and survival rate (92.3%) over Diet 1, while efficiency of feed conversion was significantly higher in diet 1 (4.48) than Diet2. However, there was no significant difference between diet 1

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and II in the initial weight of 9.054 and 0.053g respectively.

TABLE 1: MEANS OF GROWTH PARAMETERS OF TILAPIA FRY *O. niloticus* FED EXPERIMENTAL DIETS.

	*Mean ± SEM	
	Diet 1	Diet 2
Parameter	(Wheat-offal only)	(Wheat-offal + maggot)
Initial weight(g)	0.054 ± 0.032	0053 ± 0.028
Final weight(g)	1.43 ± 0.016 A	1.56 ± 0.041 B
Daily weight gain (g/day)	0.024 ± 0.005	0.028 ± 0.009
Feed conversion ratio	4.48 ± 0.044A	4.15 ± 0.032 B
Specific growth rate (%/day)	3.23 ± 0.067 A	3.62 ± 0.131 B
Survival rate (%)	88.2 ± 0.131 A	92.3 ± 0.162 B

SEM= Standard error of mean

* Means in a row with different alphabets are significant (P < 0.05)

DISCUSSION

From this study, fish fed diet 2 grew faster than those fed wheat-offal only (diet I). This resulted from better conversion and subsequent increased specific growth rate. Fish fed diet 2 also had a higher survival rate than those fed diet 1.

The growth rate of 3.62% per day by fish fed diet 2 is considered higher when compared with reports of Otubusin (2001) with 3.18% for corn bran fed singly and 3.32% from a combination of corn bran, rice bran and brewer's waste respectively. The daily feeding of fry and its feeding adjustment consequent upon weight change could probably have necessitated the good growth performance by fish fed diet 2. Tilapias, like many other cultured species benefit from multiply daily feeding. Kubaryk , (1980) found out that *O. niloticus* grew faster when fed four times daily than twice daily, however slower growth were recorded for fish fed eight times daily by the author. Lovell , (1989) reported that feeding rates for tilapia are affected by species, size, energy level in diet, water quality, feeding frequency and the availability of natural foods.

A combination of wheat-offal with maggots (diet 2) with 4.15 feed conversion ratio was better utilized than diet 1 with 4.48. The value of 4.15 recorded for diet 2 is superior when compared with reports of 6.53 to 9.12 for tilapia fed ingredients singly (Otubusin, 1999), 5.67 for corn bran only (Otubusin, 2001), 5.0 and 8.0 for cereals and rice husk respectively (FAO, 1976), 4.38 for a combination of corn bran and rice brain, 4.44 for a combination of corn bran, rice bran and brewer's waste (Otubusin 2001). The better efficiency of diet 2 is supported by reports of Falaye (1992). Winfree and Stickney (1981) both demonstrated that tilapia of 2.5g will grow best when fed a fish meal-based diet containing more than 50% crude protein.

In summary, the larvae (maggots) of the housefly, *M. domestica* are cheap protein source for the tilapinne cichlids and other fishes in Nigeria and elsewhere. Its collection from decaying animal products and by-products make it less expensive for an average fish farmer to procure. When the maggots are combined with farm waste, the fish farmer is assured of quick returns on investment, through faster fish growth. The present study will translate into improved food security and a better model of integrated agriculture.

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