Comparative Growth of *Clarias gariepinus* Fed On Maggots And Other Artificial Feeds: A Strategy For Waste Recycling in Fish Production

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ABSTRACT

A 58 days study was carried out to assess the performance of maggot (house fly larvea) in the first feeding of the frys of *Clarias gariepinus* in College of Agriculture Yandev. Live maggots were collected from the poultry farm of the college, it was well treated by boiling, drying and was grounded to powder. One set of *Clarias garipinus* (male and female) that weighed 1.2kg each were used as brood stock for the experiment. Water parameters observed showed as follows; pH 8.4, DO 11mg/l, NH$_3$ 1.06, NH$_2$ 0.1, -NH$_2$ 0.1 and Temperature, both air and water 27$^\circ$c and 23$^\circ$c. Total quantity of feed used was; artificially formulated feed (Atermia and coppens ) 2612gm, maggot 3500gm. Total fish produced showed that those fed on artificial feed were more in number, they grew faster and had higher weight (2920no, 7.89cm and 4.50gm). The fish fed on maggots also survived and did well but were less in number and had relatively less weight and length (2400no, 6.97cm and 3.94gm). The differential performance was 520 fish, 0.92cm and 0.60gm. It was observed that due to the extremely light powdered nature of the maggot feed it was difficult for the fish to swallow and it kept forming balls too large for the small fish, its application was associated with high turbidity. It is recommended that maggot is a cheap source of good starter feed for fish but much needs to be done for its treatment to form crumbles and improve it preservation for longer shelve life. Its nutritional value also needs to be further assessed.

Keywords: *Clarias garipinus*, Maggot feed, Growth Observation.

INTRODUCTION

The fish *Clarias gariepinus* belong to the family Clariidae, it is commonly grouped among the catfishes and they are characterized by enlongated body and have four barbells, long dorsal and anal fins, and especially by the presence of a suprabranchia organ, formed by tree- like structure from the second and fourth gill arches. This suprabranchia organ, or labyrinth organs allows some species the capability of travelling short distances on land (Walking catfish by Reed et al; (1967). According to their food and mode of feeding, the fishes can be broadly classified as plankton or (plankton feeder) herbivores, predators, omnivores and detritivores.

Growth is the progressive increase in size and weight of any living thing, right from the time of fertilization each entity starts to increase both in size and weight due to the incorporation of new cells that result from the various metabolic processes. Growth in fishes is usually measured in length or expressed in weight and indexed from time of existence. Growth in fishes as compared to other organisms varies as it could be allomatrict or isometric (the increase in the body size could be uneven or even) and weight can be increasing steadily. Growth could be observed directly from the fish raised in captivity where the known date for age is recorded and length and weight progression could be monitored throughout the period. Growth in captivity is not however compared to growth under natural conditions due to the
variations in water parameters and other conditions of living. Both fishes in the wild and captivity have peculiar factors that determine their growth and these could be measured as Physical, chemical, biological and intrinsic.

Maggot: is the larvae stage of the domestic fly (muscadomestica) it has ability to grow on large range of substrates and this can make them useful to turn wastes into a valuable biomass rich in protein and fat Ebere (2009). The crude protein content of maggot is around 40% to 64% John (2015) Fidelis (2014) stated that maggot consist of 65% protein and 25% fat and 10% water

The larvae stage of different insects produce different types of maggots which include; common white maggot, also called spikes, and are the largest maggots reaching three quarters of an inch in size. They are the larvae of the blue battle fly, dyed maggots: white maggots are often dyed to enhance their attraction to the fish as bait in capture fisheries, Pikle; these are naturally pikle in color, they are the larvae of the green battle fly and generally about half the size of their white counter parts. Squats maggot are also white in colour they are the larvae of common house fly and are the smallest in size and not common to obtain in large quantities. The crude protein content of maggot is around 40% to 64% John (2015). Fidelis (2014) stated that maggot consist of 65% protein and 25% fat and 10% water. Starter feed for the newly hatched fish is presently being imported into Nigeria with attendant high cost and freight capital exit. There is therefore serious need for inward research for alternative starter food for young fishes. This work seeks to provide an alternative starter feed for newly hatched fish to reduce cost of fish production, findings from this study depending on the result obtained is hoped to enhance the reduction of cost of fish fingerling production.

MATERIALS AND METHODS

The study was carried in Avese Fish Farm situated at the bottom of Mkar hills along kilometer 2 Yandev Mkar Road, on the outskirt of Gboko metropolis. The farm is comprised of 14 earthen ponds with a multispecies hatchery that is supported with an industrial borehole. Spring water is the main source of water supply to the farm especially the production ponds and many species of fish are grown on the farm, it is properly secured with all other necessary factors for fish production maintained at the optimum.

Following the method carried out by Bondari et al (1987), live maggots (the larval form of housefly Muscadomestica) were collected from the poultry farm of Akperan Orshi College of Agriculture yandev and treated for small fish food.

One set of Clarias garipinus (male and female) that weighed 1.2kg each were caught from an earthen pond and used as brood stock for the experiment. Going by the estimation, the female was estimated hold about 5000 to 6000 eggs. New fish were hatched (frys) and spread into holding facilities (tanks), the 56 day comparative growth study which commenced at day three of the hatched fish used the maggots feed and coppens (artificially formulated feed common in the market) for observation after which the number of survived fish (now fingerlings) were counted, their lengths and weights were also measured. The water parameters were managed according observations earlier raised by others authors like Abowei (2010), Boyd et al (1998), Barman et al (2005) and Ajah (2007).

RESULTS AND DISCUSSIONS

Water Parameters Observed

Seven water parameters were observed at the commencement of the experiment as shown in table 1.0 but subsequently, were not monitored due to the frequent changes by the flow - through system operated. The parameter ranges were therefore baseline information to support the study.
Table 1.0 Mean Water parameters observed (+ - range)

<table>
<thead>
<tr>
<th>Water parameters</th>
<th>Borehole water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (T°) Atmospheric</td>
<td>27°c</td>
</tr>
<tr>
<td>Water</td>
<td>23°c</td>
</tr>
<tr>
<td>Power of hydrogen (pH)</td>
<td>8.4</td>
</tr>
<tr>
<td>Dissolved oxygen (DO)</td>
<td>11mg/l</td>
</tr>
<tr>
<td>Ammonia (NH₃)</td>
<td>1.06</td>
</tr>
<tr>
<td>Nitrite I (NH₂)</td>
<td>0.1</td>
</tr>
<tr>
<td>Nitrite II (-NH₂)</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Feed and Quantity used
The two feeds used were undiluted maggot locally prepared, Atermia nuphelii and coppens. The total quantity used are shown in table 2.0

Table 2.0 Quantity feed used during the study

<table>
<thead>
<tr>
<th>Feed used</th>
<th>Feed used</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank A</td>
<td>Coppins (0.3mm)</td>
<td>2502 gm</td>
</tr>
<tr>
<td>Tank B</td>
<td>Maggot</td>
<td>3500 gm</td>
</tr>
</tbody>
</table>

Fish Produced
A total 5230 fish fingerlings were counted and estimated to be the fish produced. Tank A fed with other feed had 2920 while in tank B the count was 2400. Length and weight of the fishes were taken from both tanks; the mean weight and length are shown in table 3.0

Table 3.0 Fish Produced and Mean length and weight Observed

<table>
<thead>
<tr>
<th>Tank</th>
<th>A</th>
<th>B</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Fish</td>
<td>2920</td>
<td>2400</td>
<td>520</td>
</tr>
<tr>
<td>Length (cm)</td>
<td>7.89</td>
<td>6.97</td>
<td>0.92</td>
</tr>
<tr>
<td>Weight (gm)</td>
<td>4.50</td>
<td>3.94</td>
<td>0.60</td>
</tr>
</tbody>
</table>

From the result obtained it was clear that the market obtained artificially formulated and compounded feed gave better result but the main objective was to see how the maggots (not previously used for fish feeding at this level will perform, fry that are freshly hatched have very tiny bodies, and can only eat the smallest of foods. However, they are growing rapidly, and have demanding nutritional needs. This stage is particularly critical, as newly hatched fry can starve to death quickly. Adejoke (2015), in a study highlighted that the fry did not do well on finely powdered feed. Ajana et al (2006), states that Maggots are an excellent high protein supplemental food. However, they do have higher fat levels than other foods and should not be used as the primary food source for aquarium fish. Some of the best foods at this stage are infusoria, freshly hatched brine shrimp, and green water.

It was observed that the water in tank B fed on maggot was frequently becoming more cloudy at short intervals (less 2 hours after feeding) more than that in tank A (more than 4hours after feeding). Though the parameters were not measured during the experimental period due to the frequency of water buffering and changing, it was measured at the initial stage of the experiment so as to have a general idea of the water quality. It was also difficult to obtain crumbles in the maggot diet since the powder was fine and in most cases could form floating balls that become logged and too large for the small fish to swallow. Based on the characterization by Boyd (1998), water parameters as observed were at optimal levels for fish survival and growth and hatching on the farm is a commercial activity.

It is recommended that maggot is a cheap source of good starter feed for fish but much needs to be done for its treatment to form crumbles and improve it preservation for longer shelve life. Its nutritional value also needs to be further assessed.
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