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# GROWTH CHANGES ASSOCIATED WITH FEEDING *CLARIAS GARIEPINUS* WITH MOULDY FEEDS

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**Key Words:** Growth changes, Mouldy feeds, *Clarias gariepinus*.

**Abstract**

This study was undertaken to determine the effects of consumption of mouldy feeds on the growth of the African catfish *Clarias gariepinus*.
Forty-five juvenile fishes were maintained on mouldy feed ration while another forty-five served as controls. The control fishes remained healthy and steadily gained weight, reaching about 68% of their starting weight on the last day of the feeding trial. The test fishes in all the groups showed a significant decrease in weight gain comparable to the control fishes by the 2-way analysis of variance (ANOVA) and Duncan's multiple range test at 95% confidence interval ($p<0.05$).
The study showed that feeding mouldy rations to *Clarias gariepinus* would result in decrease weight gain. This could be associated with the fact that many fungi elaborate mycotoxins and potent anti nutritional factors. Wholesome, dry and freshly compounded rations is advocated for intensively managed fishes.

**Introduction**

Aquaculture has been defined as a form of agriculture practiced in a water environment (Olukunle,2004). It has been called, "the art of cultivating the natural produce of water; the raising or fattening of fish in enclosed ponds; the rearing of aquatic organisms under controlled condition"(Olufemi,1988).Fish farming is still a new concept in many developing countries such as Nigeria. It started with the establishment of a small experimental station at Onikan, Lagos State . The first industrial farm was constructed at panyam in Plateau State by the Federal Government. Today, aquaculture accounts for over 13million metric tons of aquatic products harvested each year throughout the world and the industry is growing rapidly even in Nigeria (Olufemi,1988).

Fish is an important source of both food and income to many people in the developing world. In Africa, as much as 5% of the population, some 35 million people, depend wholly or partly on fisheries sector for their livelihood (FAO,1996) while captive fisheries based on species that are presently exploited seem to have reached their natural limits, there is considerable potential to expand aquaculture in Africa in order to improve food security.

Feeding is an essential arm of fish production in culture. The quality and quantity of feed fed to fishes in culture directly affects the productivity of such system. It has been frequently stated that sustained growth of aquaculture will depend on high quality and/or complete diets. Therefore, feed management in these geographical areas is paramount since warm climates promote spoilage (Noe Sanchez – Perez,2000).

Most fishes in culture are usually fed compounded rations and the quality of the feed made available to the fishes can be affected by the storage method. Pelleted feed not properly stored could create an atmosphere for growth and proliferation of microbes with the elaboration of potent toxins. Some of the toxins may either cause pathological lesions in the organ of affected fishes or reduce the quality of nutrients available in the feed (Olufemi,1986).
The advantages of adequately managed fish production are numerous and cannot be over emphasized. They include substantial contribution to increased fish supply, provision of employment opportunities for the growing population and improvement of the nutrition standards particularly through fish protein consumption by the populace (Falaye 1988).

Based on the fore going, this study was designed to establish the effect of moulds and mycotoxins arising from improper storage on the quality of feed fed to *Clarias gariepinus*.

## MATERIALS AND METHOD

**Fish species:**
Ninety *Clarias gariepinus* juveniles purchased from a homestead fish pond were reared in the laboratory for the purpose of this experiment. Forty-five were used as the test fishes and forty-five were used as control fishes.

**Feed sample:**
Two types of diets were used as control and experimental diets respectively. Both feed were compounded & pelleted under the same conditions. The control diet was properly dried and stored in an air tight container while the experimental diet had increased moisture content which provided the right environment for the moulds to grow on the feed. The basic ingredients were fish meal, soybean cake, mesolina, growers premix, oyster shell, groundnut oil, salt and vitamin C .The crude protein requirement for juveniles to be provided by the feed is 40%.

**Experimental Procedure**
The fishes were starved for 36hrs to induce appetite. Three groups of 15 each were placed in uniformly coloured bowls with tap water up to 15liter mark. Both control and test fishes were fed with the control diet for the 1$^{st}$ week to determine the baseline .The fishes were fed at the rate of 5% of their body weight twice daily and their weight recorded on a weekly basis.

**Laboratory Analysis of the mouldy feed**
A sample of the feed was inoculated on Sabouraud 2% Dextrose Agar (SDA) to grow the fungi as recommended by Janke(1961) for the cultivation of dermatophytes. The fungi colonies which grew on the medium was judged macroscopically after an incubation period of 7 days at 28$^{o}$C

aerobically. However evaluation and characterization of elaborated toxins by moulds were not determined.

**Statistical Analysis**

The data collected for both control and test fishes were subjected to statistical analysis using the 2-way analysis of variance (ANOVA) and Duncan's multiple range test(Duncan, 1959).The mean and standard errors of the mean were compared at 95% confidence interval( $p<0.05$).

## RESULTS

**Changes in body weight of *Clarias gariepinus* fed mouldy ration**

The weight of the fishes was taken on a weekly basis and the following observations were made. The mean weekly weight gain of the control fishes at the end of the first week was 18.2g. There was a progressive increase in the weight of the fishes until the end of the seventh week where an average weight of 40.0g was recorded.

For the test fishes on the other hand, it was observed that the average weight of the fishes by the end of the first week was 19.4g. The rate of increase of the test fishes was gradual when compared with that of the control. Surprisingly there was a decline in the average weight of the fishes by the end of the sixth week which progressed to the seventh week with an average weight of 23.3g.(Fig 1, Table 1)

## DISCUSSION AND CONCLUSION

The species *Clarias gariepinus* had all along been considered to be a good variety of fish for culture because of it's hardiness and resistance to infections.(Koizinenko II et al,1991).This experiment further supported this claim as mortalities were not recorded in both control and test groups throughout the period of the experiment. Fungi can infest growing grain or finished feeds and produce toxic chemicals called mycotoxins. These mycotoxins subsequently produce disease or decrease in growth when they are consumed (Parlat et al,1999) which supports the findings of this experiment. Mycotoxin production in living animals has not been documented to exacerbate clinical disease.

Finished feeds or stored grains can become mouldy. Many of the fungi are known to elaborate mycotoxins. Mycotoxins are known to produce disease or decrease growth in animals. From the results obtained there was a decline in growth rate by the $6^{th}$ and $7^{th}$ week of the experiment. This is similar to what was documented by Aravind et al, (2003).

Aflatoxicosis has been documented in other species such as birds resulting in decreased growth and poor feed conversion.(Parlat et al,1999).This was also supported by observations of Jordan (1998),who associated Ochratoxicosis with reduced weight gain in poultry. Although individual mycotoxins were not determined in this experiment, it is suggested that the reduced weight gain may be associated with the direct influences of the mycotoxins on the organs or tissues of affected fishes.

It could also be related to the effects of fungal contaminants on the micronutrients in feed. Some fungi elaborate potent anti nutritional factors which may adversely affect growth in affected animals (Vasanthi et al, 1998).

Another possibility is that the fungi themselves may compete by utilizing the micronutrient in the feed, for their metabolism. The micronutrients may also be denatured by fungi and the environment that favour their proliferation. It can be concluded from the outcome of this experiment that mouldy feed is not safe for fishes especially juveniles of *Clarias gariepinus*. The act should be discouraged as it may lead to poor weight gain and serious economic losses to fish farmers. Wholesome, dry and freshly compounded rations should be made available to intensively managed fishes. It is also suggested herein that further work be carried out to discover the possible causes of reduced weight gain in feeding mouldy rations to fishes.

**Table 1**
**Mean Body Weight of *Clarias gariepinus* fed Mouldy Ration**

| Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Control | $18.2\pm1.7^{d}$ | $21.4\pm1.7^{c}$ | $25.0\pm1.7^{c}$ | $29.4\pm2.2^{b}$ | $31.3\pm1.5^{b}$ | $36.0\pm2.6^{a}$ | $40.0\pm2.9^{a}$ |
| Test | $19.4\pm1.0^{d}$ | $22.2\pm1.9^{c}$ | $22.8\pm2.5^{c}$ | $24.7\pm4.0^{c}$ | $25.0\pm2.9^{c}$ | $24.1\pm2.6^{c}$ | $23.3\pm1.7^{c}$ |

Data presented as mean $\pm$ standard deviation. Values presented with different superscript differ significantly ($p<0.05$)

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