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Effect of Water Energizer on the Growth and Survival of Clarias Gariepinus (Burchell, 1822) Fry

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Abstract: *The effect of water energizer on the growth of African catfish Clarias gariepinus was investigated in the Demonstration farm of the fisheries unit, University of Port Harcout, Choba. The experiment was carried out for a period of 8 weeks. Seven hundred (700) of Clarias gariepinus fry of (1.19cm) standard length and (0.097g) weight was stocked in a (1x1.2x1m^3) concrete tank. Treatment 2 which had the water energizer had the best growth of length (11.65cm) and weight (7.000g) while treatment 1(control) had standard length of 7.75cm and weight 5.40g. Temperature of the water was measured daily using a mercury in glass thermometer. Dissolved oxygen was determined by using the dissolved oxygen meter, and pH was determined by a pocket pH meter. The treatment 2 (water energizer) gave better physico-chemical parameters than the control without water energizer.*

Keywords: *Growth, physico- chemical parameters, energizer, Clarias gariepinus*

I. Introduction

The increasing demand for fish and steady decline in fish production from the wild has caused a spontaneous increase in aquaculture production in Nigeria in recent times (Akinrotimi, *et, al.,* 2010). Fish consumption is increasing at the rate of 2.4% per annum while the human population is increasing at the rate of 2% every year (FAO, 2009). Sustainable capture fisheries and aquaculture play a critical role in food and nutrition security, hence providing for the livelihoods of millions of people. Aquaculture accounts for a growing share of the global aquatic food production. The term aquaculture covers all forms of farming of aquatic animals and plants in freshwater, brackish and marine water (FAO, 2014). Water quality is the most important limiting factor in fish farming poor water quality could cause poor growth, poor feed conversion efficiency and fish kill (Jamabo, et al, 2015).

Water is the medium in which fish carry out their life functions, such as feeding, swimming, breeding, digestion, and excretion (Bronmark and Hansson, 2005). Quayyum *et. al.,* (2005) reported that aerated ponds had higher growth rate and survival of fish compared to non-aerated ponds. Different devices have been technologically developed in order to sustain and maintain water quality. Some of these devices are; life straw, ceramic water filters, water purifying bicycle, life sack, pure water filter, UV rays water filters, hamster ball-shaped and solar ball (Rebecca, 2013). Imploder, vortex, bio disc are also the latest devices developed for maintaining good water quality.

Water Energizer" is a non-chemical, non-magnetic water treatment system, which generates an internal electric field which modifies the degree of polarization and energy content of the water and the substances dissolved in the water within the system. The increase in polarization modifies the physico- chemical properties of the system with a consequent decrease in energy content. Water Energizer is a natural energy generating device. The energy created specifically rejuvenates molecular structures in all liquids which help to improve digestion, increase appetite; it speeds up the metabolism and supports the immune system by increasing cellular oxygenation. Water Energizer is produced by Water Energizers INC of Jeffersonville, Indiana, USA.(http://www.water energizers.com, 2015.)

II. Materials And Methods

Study Area

The study was carried out in the Fisheries unit of Faculty of Agriculture, Demonstration farm, University of Port Harcourt, Rivers State, Nigeria.

Experimental Procedure

The three (3) weeks old frys of *Clarias gariepinus* was obtained from Fisheries unit of faculty of Agriculture demonstration farm, University of Port Harcourt. One hundred and fifty (150) fry of having mean weight 0.09 ± 0.05g and mean length of 1.19± 0.00 cm were stocked in six indoor concrete tanks of 1 x 1 x 1.5 m^3. The tanks were filled with 720 liters of water. Each treatments had three replicates each. The fry were fed on coppens feed 0.5mm and finally on 0.8 - 1.2mm at 5% body weight four times daily. The growth (total length-TL and weight) of the fish sampled in each treatment was measured weekly using a metric rule and electronic

sensitive scale respectively. Water quality parameters (Temperature, Dissolved Oxygen and pH) were monitored weekly. The temperature was determined using mercury thermometer calibrated in degree centigrade (c); dissolved oxygen was determined by using the dissolved oxygen meter, and pH was determined by a pocket pH meter.

Data Analysis

Based on the length and weight increments, the feed conversion ratio (FCR) of the fish was calculated; growth parameters, weight gain, specific growth rate and percentage survival was calculated using the following formulae.

$$\text{Feed conversion ratio} = \frac{\text{total feed consumed by fish (g)}}{\text{weight gain by fish (g)}}$$

Weight gain (WG) = Final weight – initial weight

Specific growth rate (SGR) $\frac{loge w_2 - loge W_1}{T}$ x 100

Where;

$Log_e W_1$ = Natural log of mean initial body weight of fish

$Log_e W_2$ = Natural log of mean finial body weight of fish

T = Duration of study in days

Mortality (M) = $\frac{No - Ne}{No}$ x 100

Where; No = Number of fish at the start of the experiment

Ne = Number of fish at the end of the experience

% Survival rate (% SR) = Final number of fish X 100
Initial number of fish

$$\text{Performance index} = \frac{\text{final mean body weight} - \text{initial mean body weight (g)}}{\text{rearing period (days)}} \times \text{survival rate}$$

Statistical Analysis

The data on growth performance, feed utilization and physico-chemical parameters were subjected to statistical analysis using the student's t-test.

III. Result And Discussion

Growth parameters and Feed conversion ratio

The values of the growth parameters and nutrient utilization are presented in Table 1. The highest mean weight gain 7.00 ± 3.50 was recorded in the treatment 2 (with energizer), and the lowest value, 5.40 ± 0.40 was recorded in treatment 1 (control, without energizer). There was no significant difference ($P > 0.05$) observed among the mean weight gain values of the treatments. Food conversion ratio (FCR) recorded was relatively high in treatment 1 with the value of 0.27 ± 0.25 and lowest 0.22 ± 0.60 in treatment 2. Specific growth rates exhibited a range of 5.91± 0.19, in treatment 1(control) and 6.92 ± 0.87 in treatment 2 (with energizer) respectively. Mortality was higher in treatment 1 control (64.09 ± 1.37) than treatment 2 with energizer (22.91 ± 2.00). Performance index values for the treatment ranged between 0.33 ± 0.13 and 0.06 ± 0.04 for treatment 1 and 2 respectively. The growth data clearly indicated that parameters of treatment and control measured were not significantly different from each other ($P > 0.05$).

Table 1: Variation in growth, survival and food conversion ratio of *Clarias gariepinus* fry with different treatments

	Treatment	
Parameters	T1 (control)	T2 (with energizer)
Initial length (cm)	1.19± 0.00	1.19± 0.00
Final length (cm)	7.75 ± 0.15	11.65± 3.85
Initial weight (g)	0.09 ± 0.05	0.09± 0.05
Final weight (g)	5.40 ± 0.40	7.00± 3.50
F.C.R	0.27± 0.25	0.22± 0.60
Specific growth rate	5.91 ± 0.19	6.92± 0.87
Mortality (%)	64.09 ± 1.37	22.91 ± 2.00
Performance index	0.33 ± 0.13	0.06 ± 0.04

Physico-chemical parameters

The result of the physico-chemical parameters of the treatments are presented in table 2. Dissolved Oxygen values was 4.20 and 5.80mg/l for the treatment 1 and 2 respectively, temperature values ranged from 27.76^{o}C (treatment 1) to 28.16^{o}C (treatment 2). It was observed that pH had values between 6.50 (treatment 1) and 7.80 (treatment 2). Generally, all parameters measured did not differ significantly (at $P > 0.05$) and were all within the optimal range (Boyd, 1982)

Table 2: Mean values of physico- chemical parameters on treatments

Treatments	DO(mg/l)	pH	Temperature (^{0}C)
1 (Control)	4.20	6.50	27.76 $\pm$ 0.00
2 (Energizer)	5.80	7.80	28.16 $\pm$ 0.00

Water quality affects the general condition of cultured organism as it determines the health and growth conditions of cultured organism. The mean temperature and pH values of the control and energizer recorded were within the recommended range of (27^{0}C - 28^{0}C) and (6.5 - 7.8) for fish culture (Craig, 1991). The mean dissolved oxygen observed in the treatment 1 (4.20mg/l), and treatment 2 (5.80mg/l) which is with the energizer, the control was the recommended dissolved oxygen while the energizer was little above the recommended value 0f (5mg/l). The recorded DO may cause retarded growth according to (Lanre, 2014).Water quality recorded in this study conformed with the recommendation by Viveen *et al* (1985).

The results showed that there is a significant difference in the water quality between rearing media with the energizer and the control. This result is in accordance with information available for energizers. Energizers are acclaimed to generate more dissolved oxygen, which is among the most critical water quality factors in fish production (http://528orgonegenerators.com/Aqua-Energizer.html. This free oxygen dissolved in water is made available to the stocked fish through their gills or across their skin. Energizers are said to improve the immune system of fish. It is also acclaimed that because of the associated increase in ambient dissolved oxygen, there is significant decrease in the rate of disease and premature death. These beneficial effects of energizers on fish health and survival were not observed in this study.

IV. Conclusion

The present results showed that the growth performance, water quality and feed utilization of *Clarias gariepinus* fries reared in concrete tanks with energizer increased appetite and consequently improve growth and feed conversion ratio. From the present study, it can be deduced that energizers have beneficial effects on fish growth. The acclaimed beneficial effects of energizers in fish production were thus validated but further studies should be carried to ascertain these findings

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