

## EFFECTS OF DIFFERENT HORMONES ON THE GROWTH PERFORMANCE OF *Clarias gariepinus*

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### ABSTRACT

The effects of different hormones on the growth performance of *Clarias gariepinus* were investigated. A total of eight broodstocks weighing between 500 and 900g (4 males and 4 females) were selected for artificial spawning using different treatments of hormonal dosage of Ovaprim, coconut water, mixture of coconut water and ovaprim and control (0.30ml/kg-0.26ml/kg and 0.00ml/kg) respectively in replicates. The result shows that the mean weight of egg stripped was higher in fish injected with coconut water + ovaprim with 80g. Mortality was highest in first seven days in fish treated with ovaprim (73), seven to fourteen days in fish treated with coconut water (60) and in twenty-first to thirtieth days in fish eggs stripped from fish treated with coconut water+ovaprim (5). Fry from the fish treated with coconut water+ovaprim had highest initial weight gain, final weight gain and weight gain of 1.44±0.91, 12.31±9.30, and 10.87±2.89 respectively. There is significant different in the initial weight, final weight and weight gain of the fry ( $P < 0.05$ ). Fry from the fish treated with coconut water + ovaprim had highest in ADG, SGR, FCR, and PER with 0.36g, 0.07g, 0.20g, and 0.21g. Dissolved oxygen was between 5.8 and 7.8mg/L, 22.5 and 27.8°C, and 7.25 and 7.33. It can be concluded that uses of coconut water+ovaprim at 50% mixture is adequate to improve growth performance of the fry which will also minimize the cost of seed production.

**Keywords:** Ovaprim, Coconut water, *Clarias gariepinus*, growth, performance.

### 1.0 INTRODUCTION

Fish farming is said to be recent in Nigeria, though it has recorded a tremendous achievement. The art of fish culture is over 30 years old in Nigeria [1 & 2]. The demand for fish for food, recreation and ornamental aquarium is steadily increasing. Natural fish population has declined during the last several decades because of environmental degradation and over fishing [3, 4 & 5].

This has resulted in an increased effort in the development of techniques for hatchery production of fish. The awareness of fish nutritional value by the consumer and recommendation from nutritionist and medical doctors has increased the consumption pattern of fish, thereby, created a huge gap between the demand and supply. *Clarias gariepinus* is a highly appreciated species for aquaculture not only in Africa but also in countries like the Brazil, Netherlands, Portugal, Vietnam, etc [6 & 7]. The increase in world population has also called for more food and natural environment is been over exploited. Artificial breeding otherwise known as hypophysation is practiced with the involvement of reproductive hormones. Uses of hormones especially the chemical ones are expensive and increase the cost of production. The hormones used in breeding includes Deoxycorticosteroid Acetate

(DOCA), Human Chronic Gonadotropin (HCG), pituitary, ovaprim, etc [8]. The need to produce fish seed in high number with fast growth ability cannot be over emphasized, hence the need for this study. This objective of this study is to compare the effectiveness of Ovaprim, Coconut (*Cocos nucifera*) water, and coconut water + ovaprim as hormone on growth performance of *Clarias gariepinus*.

### 2.0 MATERIALS AND METHODS

#### 2.1 Study Area

This study was carried out (January to February) in Maiduguri. Maiduguri is capital city of Borno State at Department of Fisheries, University of Maiduguri. It is located on latitude 11°18'N and longitude 13°05'E.

#### 2.2 Experimental Design

A total of eight broodstock of *C. gariepinus* (4 females and 4 males) were purchased from Boda farm in Government Reserved Area (GRA), Maiduguri and acclimatized for fourteen days in a separate tank [9 & 10]. The fish were fed with 35% crude protein and females were injected with three different hormones (Ovaprim, Coconut water and Ovaprim+Coconut water) at different concentration (0.30ml/kg, 0.26 ml/kg and 0.26 ml/kg) with a control (0.00ml/kg) at 45°. The injected spots were rubbed with finger to

ensure evenly distribution. Females were stripped, 12 hours after injection (latency period).

The milt from the male was removed after sacrificing [11] and physiological salt solution (0.9%) was added to aid fertilization [9]. The eggs and milt were mixed thoroughly by the use of chicken feather continuously for 60 seconds to avoid sticking. The fertilized eggs were sprayed uniformly on the egg tray inside an aerated plastic trough (0.8m diameter × 25cm deep) for incubation under flow-through system.

After fertilization, 3g of the fertilized eggs were incubated in replicates for each treatment. The temperature was manipulated using a local warming method to mimic the environment to increase the temperature due to the cold weather condition. After 25hours, hatched larvae were allowed to exhaust their yolk sac before feeding. The fish were fed with Brine Shrimp (artemia) of 52% crude protein two times daily, 0800hours and 1800hours respectively with half of the daily ration feed in the morning and evening. The fry were reared for four weeks and regular sampling was carried weekly to remove fast growers to prevent cannibalism [12 & 13]. Water quality parameter was also monitored using commercial kit (6-H301). The following parameters were calculated:

$$\text{Percentage fertilization} = \frac{\text{Mean Number of fertilized eggs}}{\text{Mean Number of eggs}}$$

$$\text{Percentage hatchability} = \frac{\text{Mean Number of fertilized eggs}}{\text{Mean Number of eggs}}$$

$$\text{Average Daily Growth (ADG)} = \frac{\text{Final weight gain of fry (g)} - \text{Initial weight gain of fry (g)}}{\text{Rearing periods (days)}}$$

$$\text{Specific Growth rate (SGR)} = \frac{\text{Log}W_2 - \text{Log}W_1}{\text{Rearing periods (days)}}$$

$$\text{Protein Efficiency Rate (PER)} = \frac{\text{Wet body weight}}{\text{Crude protein fed}}$$

Where  $W_2$  = Final weight (g)  
 $W_1$  = Initial weight (g)

### 2.3 Statistical Analysis

Data obtained from the trials were subjected to analysis of variance (ANOVA) and statistical difference between the means were separated using Duncan Multiple Range Test at 95% degree of confidence using SPSS v. 16.0 statistical package for window.

### 3.0 RESULTS AND DISCUSSION

Selected broostocks of *Clarias gariepinus* (500 900g)

used for this breeding exercise (females) were induced with Ovaprim, Coconut water, mixture of Coconut water and Ovaprim and Control respectively at different hormonal dosage as shown in Table 3.1. The effectiveness of the hormonal treatment induced in *C. gariepinus* was assessed on growth parameters and recorded. Table 3.1 shows the mean weight of egg stripped was higher in fish injected with coconut water + ovaprim with 80g while the least was in fish treated with coconut water (35g) apart from control treatment that shows 15.5g which agreed with the work of [12]. Mortality was highest in first seven days in fish treated with ovaprim (73), seven to fourteen days in fish treated with coconut water (60) and in twenty-first to thirtieth days in fish eggs stripped from fish treated with coconut water+ovaprim (5) as shown in Table 3.2. However, Table 3.3 shows that fry from the fish treated with coconut water+ovaprim had highest initial weight, final weight and weight gain of 1.44±0.91, 12.31±9.30, and 10.87±2.89 respectively. The result also shows that they eat better than any other fry from experiment as it consumed 215.60±1.72 while fry from fish treated with coconut water consumed least with 137.26±1.59 similar to the works of [7 & 13]. There is significant different in the initial weight, final weight and weight gain of the fry (P<0.05). Table 3.4 shows that fry from the fish treated with coconut water +ovaprim had highest in ADG, SGR, FCR, and PER with 0.36g, 0.07g, 0.20g, and 0.21g. Dissolved oxygen was between 5.8-7.8mg/L, 22.5-27.8°C, and 7.25-7.33 as shown in Table 3.5. The result of the study showed that the type of hormones used for seed production has significant effects on growth performance of *C. gariepinus* (P<0.05). The Coconut water+ Ovaprim at 50% was observed to promoter higher growth of the fishes than Ovaprim and coconut water used separately.

**Table 3.1: Hormonal Administration and Mean Weight of Broodstock**

Parameter	Inducing agent			
	Control	Ovaprim	Coconut water	Coconut water + Ovaprim
Dosage(ml/kg)	0.00	0.30	0.26	0.26
Mean weight of female fish (g)	510	600	515	510
Mean weight of stripped eggs (g)	15.5	60	35	80
Mean weight of male fish (g)	900	815	700	600

**Table 3.2: Mortality recorded during rearing of *Clarias gariepinus* fry for 30days**

Days	Treatments				
	Ovaprim	Coconut water	Coconut water + ovaprim	Control	Average
1-7	73	69	65	70	69.25
7-14	40	60	50	55	51.25
14-21	15	20	30	20	21.25
21-30	5	3	5	10	5.75

**Table 3.3: Growth response analysis of *Clarias gariepinus* fed for 30days**

Parameters	Ovaprim	Coconut water	Coconut water + ovaprim	Control
Initial weight (g)	0.65±0.36 <sup>b</sup>	0.36±0.65 <sup>c</sup>	1.44±0.91 <sup>a</sup>	74±0.91 <sup>b</sup>
Final weight (g)	4.01±2.97 <sup>b</sup>	4.07±0.18 <sup>b</sup>	12.31±9.30 <sup>a</sup>	31±9.30 <sup>b</sup>
Weight gain (g)	3.35±4.27 <sup>b</sup>	3.71±4.84 <sup>b</sup>	10.87±2.89 <sup>a</sup>	57±2.89 <sup>b</sup>
Qty of feed (g)	145.19± 0.29 <sup>b</sup>	137.26±1.59 <sup>b</sup>	215.60±1.72 <sup>a</sup>	108.60±1.72 <sup>b</sup>

Mean of the same letter on the same row are not significant different (P>0.05).

**Table 3.4: Growth and Survival of *Clarias gariepinus* larvae fed for 30days**

Treatments	ADG(g)	SGR(g)	FCR(g)	PER(g)	%
Ovaprim	0.11	0.06	0.29	0.06	80
Coconut water	0.11	0.09	0.16	0.05	50
Coconut water + ovaprim	0.36	0.07	0.20	0.21	85
Control	0.39	0.09	0.17	0.05	42

KEYS: ADG = Average Daily Growth; SGR = Specific Growth Rate; FCR = Food Conversion Ratio; PER= Protein Efficiency Ratio

**Table 3.5: Water quality parameters during rearing of *C. gariepinus* fry for 30day**

Samples	Range	Mean
Dissolved oxygen (mg/L)	5.8 – 7.8	6.8
Temperature (°C)	22.5 – 27.8	25.15
Ph	7.25 – 7.33	7.29

#### 4.0 CONCLUSION

In order the enhance productivity, hatchery production of fish seed must be continually

produced and growth performance of the fry must be adequate. The introduction of spawning with the aid of natural hormonal agents goes a

long way in solving these problems. Based on this study, use of coconut water+ovaprim at 50% mixture is adequate to improve growth performance of the fry and minimize the cost of production.

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