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COMPARATIVE STUDIES ON THE EFFECT OF OVAPRIM AND COCONUT WATER (*Cocos nucifera*) ON THE HATCHABILITY OF CATFISH(*Clarias gariepinus)*

BY

[1]Adewale, Y.A. and [2]Adeshina, I.

[1]Department of Biotechnology, Deakin University, Australia

[2]Department of Aquaculture and Fisheries Management, University of Ibadan

Corresponding Author: Padibra4all@yahoo.co.uk, yusuf.adewale@csiro.au

+2347054994559, +61469356345

Abstract

The effect of ovaprim and coconut water (*Cocos nucifera*) on the fecundity and hatchability of *Clarias gariepinus* were investigated. A total of eight broodstocks make up of males (550-900g) and four females (500 – 517g) 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. The eggs hatched after 25 hours at temperature 23^0C – 27^0C. The effectiveness of the coconut water induced in *C. gariepinus* was assessed using percentage fertilization and hatchability as indices. However, mixture of coconut water and ovaprim respond effectively on *C. gariepinus* with fertilization 50.66±10.00 followed by ovaprim 38.66±7.63 and hatchability 50.00±10.00 followed by ovaprim 38.66±18.92. There was no significant difference (P <0.05) in mortality in all the treatments.

Keywords: *Ovaprim, Coconut water, Clarias gariepinus, hatchability*

INTRODUCTION

The African catfish *Clarias gariepinus*, is a highly appreciated species for aquaculture not only in Africa but also in countries like Netherlands. This is because of its favourable food conversion, its resistance to diseases, its relatively low requirements for water quality, the possibility for high stocking density and the excellent meat quality. The development of a reliable method for the *clarias* fingerlings production is one of the priorities of aquaculture research in Africa (Anonymous, 1987; Imsland, *et al.*, 2003). Aquaculturists are then poised with the responsibility to develop techniques on how to increase the production of fish to meet the demands of teeming consumers. Artificial breeding otherwise known as hypophysation is practiced with the involvement of reproductive hormones (Sahoo *et al.*, 2008). Induced breeding through hormone treatment and artificial incubation of fertilized egg has advantages of better rate of fertilization and hatching, better conditions for growth and survival of larvae to fingerling and better protection of larvae against unfavourable environmental condition and predators (Woynarovich and Horvath, 1980; Cabrita *et al.*, 2006). However, most of the hormones that are generally used for induced breeding are deficient in various ways, such as Deoxycorticosteroid Acetate (DOCA) causes severe ulcer on the injected female; Human Chorionic Gonadotropin (HCG) is very expensive; Common carp *(Cyprinus carpio)* pituitary gland material are not easily accessible to small scale fish farmers. Although ovaprim had recorded numbers of success but its price is very high (Chereguini *et al.*, 2007; Howell, *et al.*, 2009).

The costly synthetic hormones been continually produced in the market vary in their cost. In this case, there is urgent need to try other hormones that will boost fish production and reduce cost. Increasing fish

production throughout the year round to meet the demand of teeming consumers, therefore the techniques to produce fish using natural hormones at lower cost necessitate this study. The aim of this study was to compare the effectiveness of ovaprim and coconut (*Cocos nucifera*) water as synthetic and natural hormone on hatchability of *Clarias gariepinus* (Oliveira *et al.*, 2009; Rasines *et al.*, 2013).

MATERIALS AND METHODS

The study was carried in the Department of Fisheries, University of Maiduguri, Alau. Alau is located in Jere Local Government Area of Borno state. It lies between latitude of 11^0 41' 60N and longitude of 13^0 16'0E of the equator (Bankole and Okaeme, 1999).

Collection and Acclimatization of *Clarias gariepinus*

Eight (8) *C. gariepinus* brood stocks were purchased from a reputable farm in Maiduguri. The weight of females were 500g, 520g, 513g and 517g with weight rage of (500 – 517g) while the weight of males were 550g, 632g, 630g, and 900g with weight range of (550-900g) and acclimatized for six days in two indoor concrete tanks (one tank for males and the other for females to avoid fighting) and fed 35% crude protein diet (Madu *et al.*, 1999; Sule and Adikwu, 2003). The females (5) and males (5) broodstocks were kept separately to avoid fighting.

Hormonal Administration

The female broodstocks were injected with hormonal dosages of Ovaprim, Coconut water (Table 1), mixture of coconut water and ovaprim and control (0.30ml/kg, 0.26ml/kg, 0.26ml/kg, 0.00ml/kg as described by Jean, *et al. (*2009) with modification respectively intramuscularly at an angle of 45^0 and rubbed with finger to disperse the hormone into the muscles (Table2).

Artificial fertilization

Females were stripped 12 hours after injection (latency period). A physiological solution was prepared (9g/L) of sodium chloride (Nacl) to a litre of distilled water (Viveen *et al.*, 1985; Sule and Adikwu, 2003). The male sacrificed with ice and milt was removed with scissors and squeeze directly (dry fertilization) on to the eggs (Viveen *et al.*, 1985; Imsland *et al.*, 2003). The physiological salt solution was added to aid fertilization (Madu *et al*., 1999). 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.

Egg incubation and larvae management

About 3g of the fertilized eggs were incubated in triplicate for each treatment. The unfertilized eggs were siphoned out to avoid pollution which may lead to fungal disease. The eggs hatched between 25 hours (Diyaware, *et al.*, 2006) under laboratory temperature of 23.5^0C to 27.9^0C (Harvey *et al.*, 1979). The total numbers of unfertilized and hatched eggs were estimated.

The following parameters were calculated:

Feeding

Larvae were allowed to exhaust their yolk sac before feeding. They were fed Brine Shrimp (artemia) of 52% crude protein two times daily, 0800hours and 1800hours respectively for four weeks. Sampling was carried weekly to remove fast growers to prevent cannibalism.

Monitoring of Water Quality

Water temperature was taken daily and recorded before feeding at 0800hrs – 0900hrs with graduated mercury in glass thermometer. Dissolved oxygen was recorded using DO/temperature meter and pH was recorded using A/C pen digital pH meter (6-H301).

Statistical Analysis

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

RESULTS AND DISCUSSION

The effectiveness of the hormonal treatment induced in *C. gariepinus* was observed as shown in Table 3. The result shows that broodstocks treated with coconut + water had highest fertilization, egg hatched and hatchability (50.66±7.63; 215.00; 50.00±10.00) while the control had the least (23.00±10.00; 45.00; 23.33±10.40) respectively. The results is similar to the results of previous works of Woynarovish (1989), Haruna, (2003), Harvey *et al.,* (1999), Madu *et al.,* (1999), and Diyaware, *et al.,* (2006) who recorded about 50% to 85% hatchability and survival. Mortality of fry was highest in control treatment (80) while fish treated with coconut + water had the least (50). Table 4 shows the average mortality recorded during the thirty days (30) rearing. The highest mortality was recorded in the first seven days (69) while between twenty-first (21) and thirtieth (30) days recorded the least of 6 fishes. Table 5 shows the survival rate of fry during the trials. The highest survival was recorded in twenty-first (21) and thirtieth (30) days with about 94 fry. However, fry from the treatment of coconut water + ovaprim had highest survival throughout the period (95, 50, 35) except during the fourteenth (14) to twenty-first (21) days where fry from fish treated with ovaprim has highest survival (85). Water quality parameters (in mean) were recorded in table 6 where the dissolved oxygen had of 6.8mg/l, temperature of 25.15^{0}C, and pH of 7.29.

CONCLUSION AND RECOMMENDATION

It can be concluded that broodstock treated with coconut water + water had highest hatchability and survival rate but lowest mortality. This study recommended that broodstock should be induced with coconut water + water to achieve higher hatchability and survival at 0.26ml/kg with about 50.00% hatchability. This is because the catfish do not spawn in all year round in captivity. The introduction of spawning with the aid of natural hormonal agents goes a long way in solving these problems. Several synthetic hormones are also been produced in the market, although with variation in their cost price. The high cost price of synthetic hormone and low fish seed availability in the wild had been a factor affecting fingerling production cost.

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Table 1: Constituents of coconut water

Proximate	Value
Water (%)	94.99
Dry (%)	5.01
Energy value (kcal)	19.0
Total lipid (%)	0.2
Carbohydrate (%)	3.71
Fibre (%)	1.1

Table 2: 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: Mean Percentage Fertilization and Hatchery (Mean±SD) of *Clarias gariepinus* after Hormonal Dosage

Dosage (ml/kg)	Fertilized eggs	Fertilization%	Egg hatched	Hatchability%	Mortality
0.30 O	1525	38.66± 18.92^{b}	146.00^{b}	38.33± 12.58^{b}	62
0.26 C	1525	30.66±25.16^{c}	83.33^{c}	30.33±10.40^{b}	70
0.26 C + W	1525	50.66±7.63^{a}	315.00^{a}	50.00± 10.00^{a}	50
0.00 Control	1525	23.00±10.00^{d}	45.00^{d}	23.33±10.40^{c}	80

Mean with different letters in columns are significantly different (P<0.05)

O = Ovaprim, C = Coconout water, C + W = Coconut water + Water,

Table 4: 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 5: Survival rate recorded rearing of *Clarias gariepinus* fry

Days	Treatments				
	Ovaprim	Coconut water	Coconut water + ovaprim	Control	Average
1-7	27	31	35	30	30.75
7-14	60	40	50	45	48.75
14-21	85	80	70	80	78.25
21-30	95	97	95	90	94.25

Table 6: Water quality parameter recorded during rearing of *Clarias gariepinus* fry for 30day

Samples	Range	Mean
Dissolved oxygen (mg/L)	5.8 – 7.8	6.8
Temperature (^{0}C)	22.5 – 27.8	25.15
pH	7.25 – 7.33	7.29