International Journal
Of Scientific And University
Research Publication

ISSN No 301/704

Listed & Index with
ISSN Directory. Paris

Multi-Subject Journal

Volum : Issue :

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INTERNATIONAL JOURNAL OF SCIENTIFIC AND UNIVERSITY RESEARCH PUBLICATION

Research Paper

INDUCED BREEDING OF AFRICAN MUD CATFISH, CLARIAS GARIEPINUS (BURCHELL 1822), USING DIFFERENT DOSES OF NORMAL SALINE DILUTED OVAPRIM

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African mud catfish, Clarias gariepinus is the most sought after farmed fish species in West A commercial breeding is done using expensive synthetic hormones one of s one of which is ovaprim. The aim of the present paper is to reduce the cost of ovaprim by its dilution with normal saline in induced breeding of *C. gariepinus*. Induced breeding performance of *Clarias gariepinus* was evaluated using five different doses of normal saline diluted ovaprim at 0%,25%,75% and 100% while undiluted ovaprim served as the control. The ovaprim was administered at the rate of 0.5 ml for each treatment per kg body weight of the fish, represented as treatments A, B, C, D and E respectively. Mean weight of stripped eggs collected were 18.45 g, 17.50 g and 17.25 g in treatments A, B and C respectively with no significant difference ($p<0.05$) in the values. Spawning did not occur in D and E, thus no egg was collected. Percentage fertilization of the stripped eggs in treatments A, B and C were 88.70%, 87.50% and 77.38% respectively with treatment A showing significant difference ($p<0.05$) from B and C. Percentage hatchability from the stripped eggs were 56.58%, 54.07% and 57.75% for treatments A, B and C respectively with no significant difference ($p<0.05$) among the three treatments, while percentage survival of the fry were observed to be 40.27%, 40.87% and 42.52% in treatment A, B and C. There was no significant difference ($p<0.05$) in the survival rate among the treatments. Comparative cost benefit analysis between the control (undiluted ovaprim) and the different doses of normal saline diluted ovaprim shows that normal saline diluted ovaprim at 50% is the most cost effective. In conclusion, generic ovaprim with 50% normal saline will ensure spawning in *Clarias gariepinus* with high percentage hatchability of the eggs and survival of the fry.

Clarias gariepinus; Fertilization; الكلمات
Hatchability; Survival; Ovaprim;

commonly used form of saline solution is prepared by dissolution of 9 g of NaCl in 1 litre of water [10]. Till now, the expensive ovaprim for the average fish breeders is used undiluted, thereby increasing the cost of fish production among fish farmers and consumers.

This study which is a pioneer study on the use of diluted ovaprim is aimed *C. gariepinus* with normal saline on the induced breeding of at comparing the effect of various doses of normal saline diluted ovaprim with undiluted ovaprim for use as hormones in induced . This is to test the effectiveness, *Clarias gariepinus*breeding of efficiency and efficacy of diluting the ovaprim with normal saline to .*Clarias gariepinus*induce the breeding of

This is in attempt to reduce the cost of ovaprim on fish breeders in and overall cost of the fish *Clarias gariepinus* the induced breeding of production while at the same time achieving a high spawning, hatchability and survival success of the fish.

rials and MethodseatM

The study was carried at the laboratory of the Department of Zoology, University of Ilorin, Nigeria.

d stock source and managementoorB

Clarias Twenty-five (25) healthy brood stock of Mud Catfish (Burchell, 1822) (18 females and 7 males) where *gariepinus* purchased form Midland Aquaculture Project Limited, Ilorin, Nigeria. All brood fish were selected by external morphological characteristics using the method of Ayinla et al. [11]. Both males and females were acclimatized in separate concrete pond of 8 x 8 x 5 ft for 3 weeks during which they were fed with a formulated diet of 40% crude protein containing fishmeal, toasted soya, groundnut cake, maize, bone meal, lysine methionine and Vitamin premix twice daily 7-9 am and 4-6 pm at 5% of total fish biomass.

xperimental designE

Fifteen (15) Spawning trials were carried out in all i.e. five (5) treatments with three (3) replicates of each. The five (5) treatments based on inclusion levels of undiluted generic ovaprim 0%, normal saline diluted ovaprim at 25%, 50%, 75% and 100%, represented as treatments A, B, C, D and E respectively.

n of brooderoitceleS

مقدمة

The success of fish farming enterprises is premised by the availability of good quality fish seeds. This is because as the marketable adults are sold out from the farm, young ones are provided to replenish the stock for the sustenance of the business.

Mud catfish is the most sought after fish species among fish farmers and consumers because it commands a very good commercial value in Nigerian markets [1]. In recent past, fish fingerlings are sources from the wild i.e. natural waters however, due to problems associated with wild fish seed, viz. seasonality in availability, uncertainty of species of fish seed collected, disease infestation and limited quality of harvestable fish seed, it is unreliable with respect to sustenance of commercial fish farming [2].

Artificial propagation of fish is the most promising and reliable way of ensuring availability of good quality fish seed all year round and sustainability of the aquaculture industry. It involves the use of natural (hypophysation) or synthetic hormones to induce ovulation and spawning in farmed fishes [3]. As promising as artificial propagation of mud catfish seems, one of the major constraints to fish breeders is the cost of procurement of these hormones. According to Madu [4], hormone input accounts for about 50-60% of the recurrent expenditure of a cat fish fingerling production project in Nigeria. Ovaprim for instance cost about N5, 500 per vial, Ovatide N3, 200 while the cost of a donor Mud Cat fish brood stock ranges between N1,500 and N2,500 [5]. Other synthetic hormones in use include Human Chorionic Gonadotrophin (HCG). Decorticosterone Acetate (DOCA), and Leutenizing Hormone Releasing Hormone [2], all of which are equally expensive.

Other workers have use non-piscine pituitary hormones such as Bull) [7] in order to*Bufo regularis*) [6] and the Toad (*Rana adspersa*frog (get a cheaper but equally effective hormone. Ovaprim is one of the most widely acceptable and readily available synthetic hormones because it has been found to be very effective [5,8]. It is a combination of SGnRHa and domperidone [9].

Saline solution is very cheap solvent (comprising NaCl dissolved in distilled water) in which natural hormones in pituitary are dissolved prior to administration in recipient fish [5,7]. Normal saline which is

C than in A and B but there was no significant difference (p<0.05) among the 3 treatments (Table 2).

The cost benefit analysis of the experiment is shown in Table 3. As the rate of dilution of ovaprim with normal saline increases, the cost of hormone per brood stock decreases. Also the number of fry produced per ml of hormone increases. Treatment C showed the cheapest cost with small amount of hormone used per milliliter.

Latency Period (hrs)	Mean D.O	Mean pH	Mean Temp. at Hatching (°C)	Mean wt loss (g)	Mean wt after stripping (g)	Mean Wt before stripping (g)	Treatments
11.30	6.30	6.50	24.5	18.45a	481.55	500.35	A
13.45	6.50	6.70	24.5	17.50a	482.23	499.73	B
27.50	6.80	6.50	24.5	17.25a	483.05	500.30	C
			-	0.00	501.35	501.35	D
-			-	0.00	500.00	500.00	E

Values with same superscript in the column do not differ significantly ($p < 0.05$)

using different doses *C. gariepinus* Table 1: Induced breeding of of normal saline diluted ovaprim.

E	D	C	B	A	Treatments
0.00	0.00	77.38a	87.58b	88.70b	Fertilization (%)
0.00	0.00	57.75a	54.07a	56.38a	Hatchability (%)
0.00	0.00	42.52a	40.87a	40.27a	Survival (%)

Values with same superscript in a row do not differ significantly ($p < 0.05$)

Table 2: Means of percentage fertilization, hatchability and survival of fry.

Cost per Fry (N)	No of fry produced / ml of Hormone	Mean Qty of Hormone used (ml)	Mean No of Fry Produced per treatment	Cost of Hormone per Brood stock (N)	% Inclusion Level of normal saline	Treatment	S/N
0.104	4832	0.25	1208	125	0	A	1
0.085	5889	0.19	1119	93.75	25	B	2
0.058	8592	0.125	1074	62.50	50	C	3

1m of ovaprim = N500
N = Naira (Unit of Nigeria currency)

Table 3: Cost benefit analysis of fry production per ml of ovaprim in each treatment.

Discussion

Mean weight of eggs collected from the brooders showed that normal saline diluted ovaprim at 75% and 50% is effective in . It should also be noted that *Clarias gariepinus*induced breeding of latency period varies directly with level of dilution of normal saline and this could be the reason why hatching does not occur at all in treatments D and E. This scenario has already been reported by Shepherd and Bromage [2]. The hatchability rate recorded in the experiment was similar to results obtained by Olubiyi et al. [8], where he examined the effects of various doses of ovaprim on reproductive . This work however showed that *Clarias gariepinus*performance of diluting generic ovaprim with normal saline at 75% and 50% could also result in the production and hatchability of eggs as well as survival of fry which compared well with undiluted ovaprim. Thus, it shows that normal saline could enhance the production, hatchability of eggs and survival of fry. The percentage survival was however relatively lower compared to results obtained by Nwokoye et al. [5], and this could be attributable to the size of the receptacle (tank) in

Fifteen (15) Female brooders with mean weight of 500 ± 0.35g were selected while 3 males having a mean weight of 2000 ± 0.2g were selec- ted. A female is considered ripe if the abdomen is well distended and eggs oozed out freely when the abdomen was gently pressed anteroposteriorly while the male was considered ripe if the top of the genital papilla was reddish in colour [8].

rmone injectionoH

Selected female brooders were injected using a 2 ml graduated syringe intramuscularly at an angle of 30-45° at the dorsal fin with 0%,25%, 50%, 75% and 100% inclusion levels of normal saline. Each injected brooder was secured in different holding trough to prevent them from inflicting injury on one another. The males were not administered with hormones.

ripping and fertilizationtS

Injected female brooders were removed from their respective troughs after 15 hours (latency period) and stripped into dry bowls and 10 g of eggs were collected from each sample into hitherto labeled bowls for ease of identification. Milt of the male brooders were removed after dissecting them and the sperm collected by laceration of the milt with a clean razor blade into 25 ml of normal saline into a Petri dish. The sperm was then used to fertilize each treatment by mixing both the eggs collected and sperm with a plastic spoon after adding equivalent volume of clean water.

ncubationI

Fertilized eggs were then spread on a plastic netting substrate of 2 mm mesh size and placed in a 15 litre plastic trough containing about 10 litres of clean water.

imation of percentage fertilization, hatchability and survivalstE

Twenty eight (28) hours after fertilization, dead and unviable eggs which have turned whitish were collected after removal of the plastic netting by siphoning, counted and percentage fertilization was estimated. Percentage hatchability and survival were also calculated at 30 hrs and the fifth (5th) day after hatching respectively using the method of Adebayo and Popoola [12].

r quality parametersetaW

pH and dissolved oxygen of the water were monitored daily using pH meter and dissolve oxygen meter respectively while mercury in glass thermometer was used to take temperature readings.

ta analysisaD

Data obtained were pooled for each treatment means and compared by one way ANOVA test to test significant differences (p<0.05) in spawning, hatchability and survival using Duncan's multiple range test analyzed by SPSS package 2010.

esultsR

using the generic *C. gariepinus* The result of induced breeding of undiluted ovaprim as control and four different doses of normal saline diluted ovaprim at 25%, 50%, 75% and 100% is presented in Table1.Treatment A which is the control showed the highest mean weight of eggs collected than B and C, however there was no significant difference (p<0.05) in the weight of eggs released in the 3 treatments. Spawning or release of eggs did not occur in treatments D and E. After fertilization of the spawned eggs in the treatments, the percentage fertilization of eggs in treatment A was higher than in B and C. However treatment C showed a significant difference (p<0.05) in percentage fertilization as compared to treatments A and B. Similarly, the values of percentage hatchability from the fertilized eggs showed that treatment C has a relatively higher value than treatments A and B, however there was no significant difference(p<0.05) in hatchability of the three treatments. The means of percentage survival of fry was also relatively higher in treatment

which the experiment was conducted which was relatively smaller -and also more eggs were fertilized and the tank was not power aerated. The high hatchability and survival recorded in treatment C was due to the high effects of physicochemical parameters such as high concentration of dissolved oxygen [9,13,14]. Comparing the costs in the 3 treatments, it is evident that treatment C with 50% inclusion of normal saline diluted ovaprim is highly cost effective, reducing the cost of the hormone used by half.

استنتاج

From the research, normal saline diluted ovaprim at 50% with *Clarias gariepinus* inclusion level will induce breeding in similar effectiveness, efficiency and efficacy comparable to generic ovaprim. With this,50% of the cost incurred on the hormone can be saved without having to jeopardize its *Clarias* performance with respect to induce breeding of . This will reduce the cost to farmers as well as *gariepinus* more at an *C. gariepinus* ensuring a high production of affordable cost.

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