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Controlled reproduction in African catfish *Clarias gariepinus*

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ABSTRACT: This breeding experiment is divided into three trial groups. The first trial group consist of 2 males and 3 females *Clarias gariepinus* which were injected with a calculated amount of synthetic hormone (Human chronic Gonadotropin) according to their measured weight. In the second trial group, there are also 2 females and 3 females *C. gariepinus* which were injected with a calculated amount of natural hormone (Pituitary extract). The third trial group consist of 2 males and 3 females *C. gariepinus* which were not injected with anything and therefore serves as control.

85% fertilized eggs were obtained on the synthetic treated *C. gariepinus*¸while 70% fertilized eggs were obtained on natural hormone treated *C. gariepinus*. The control trial group yielded no eggs. A one way of variance (ANOVA) conducted between the synthetic and natural hormones induce trial concludes that there is no significant difference between the treatment (P>0.05).

Keywords: Controlled reproduction, Catfish, *Clarias*, Bagauda Fish Farm.

Introduction

The African catfish *Clarias gariepinus* adoption and general acceptance by fish farmers is because of its favourable food conversion, its resistance to disease, its relatively low requirement for water quality, the possibility for high stocking densities and excellent meant quality (Bruton, 1979).

Controlled reproduction in African catfish *C. gariepinus* in recent years has witnessed an increasing interest in fish farming not only in African countries but also in countries like Holland and North America (Welan, 1984). Catfishes are commonly found in freshwaters on all continents except Antartica and are especially abundant in the tropics. In captivity, the African catfish usually reaches sexual maturity at 6-9 months of age. From this moment, positivitellogernic eggs and ripe sperm cells are present. However, although Oogenesis and spermatogenesis seems to be normal, final oocyte maturation, ovulation, spermiation and reproductive behaviour does not occur (Grande, 1987).

Natural conditions are hard to mimic on a large scale in a laboratory. In order to overcome this problem and be able to induce reproduction artificially by menus of hormonal treatments, it was essential to

investigate the successive steps of its reproductive cycle. Controlled reproduction basically refers to putting the entire fish reproduction under control and subsequent monitoring of the male and female characteristic in presexual behaviours, courtship, mating and parental care. The gonadal functions and regulated by gonadotropic hormone (GTH) (Hogendoorn and Vismans, 1980).

Materials and Methods

This study was carried out at Bagauda Fish Farm, Kano, Nigeria. The study was divided into 3 groups. In the first trial grouip, matured brooders were selected and weighed and then injected intra-muscularly, just beside the dorsalfin with Human Chorionic Gonadotropin. The required dose of the hormone is 4.01U in 1g body weight. Therefore for a fish of 420g:

Sicne 4.01U = 1g
Xml – 420g
$$\text{Xml} = \frac{4 \times 420}{1000} = 1.68\text{-ml}$$

One female and two male *C. gariepinus* were collected from the production tank and their weight taken as 420g, 350g and 320g. The Human Chorionic Gonadotropin powder was diluted with 4ml of stenle diluent and drawn in a 5ml syringe. The female *C. gariepinus* with 420g weight weas injected with 1.68ml of the hormone intramuscularly. The two male *C. gariepinus* with weight of 350g and 320g were injected with 1.40 and 1.28ml respectively.

In the second trial group, a mature fish sacrifices and its head cut and the pituitary extract removed. The pituitary glands were later placed in a mortar and grinded. The grinded extract was then placed in the prepared salt solution. The resulting solution was injected into the fishes at 10% body weight.

The third trial group, consist of matured male and female *C. gariepinus* in a tank and were not subjected to any hormonal treatment. This group serve as a control.

The aim of this study is to compare the different effects of both natural and artificial (synthetic) hormones on the reproduction capacity of the African catfish *Clarias gariepinus*, so as to make the right recommendation to fish farmers.

Results

On reaching the latency time, the female fishes in the 1st and 2nd trial group ovulated. They were hand stripped and the male in each trial group was dissected and the milt removed and used to fertilized the female fishes in their group. In the 3rd group, no ovulation takes place.

Healthy developing eggs examine under the microscope were notice with a transparent green brownish colour (viable eggs).

Table 1 shows the spawning activity of *Clarias gariepinus* in Bagauda Fish farm, both under natural and artificial hormones.

Statistical analysis carried out shows no significant difference between the values obtained in the trials using synthetic and natural hormones ($P > 0.05$).

Discussion

The first trial (using synthetic hormone) has higher incubation time, but produce more eggs compared to the second trial group (using natural hormone), which has lowe incubation time and produces less eggs, but when the results were statistically analyse, using one way of variance, it was found out that there is no significant difference ($P>0.05$) between both the synthetic and natural hormone treated fishes.

The latency time of both synthetic and natural hormone depend on the water temperature and the stimulating strength of the hormone. In this study, the latency time is 15 hours for the synthetic hormone and 14 hours for the natural hormone at a temperature of 25^{o}C. This agrees with the work of Sule and Adikwu (2002) who shows the optimum latency time for *C. gariepinus* in N. East and Zone of Northern Nigeria to be between 9-14 hours at a water temperature of between 30-32^{o}C. The latency period of 14-15 hours in this study also agrees with the values 16-18 hours obtained by Woynarovich and Horvath (1980) for common carp at a water temperature of 21-22^{o}C, but observed that the latency period became shorter (12-13 hours) if the fish were treated with one or more reparatory doses before final injection.

It can be concluded from this study that, the general effect of both the natural hormone (Pituitary extract) and synthetic hormone (Human Chorionic Gonadotropin) on the controlled reproduction in the African catfish, *C. gariepinus* is effective and successful.

Table 1: Spawning activity of *C. gariepinus* in Bagauda fish farm.

	Synthetic hormone treatment	**Natural hormone treatment**	**Control**
Variable eggs	12,230	5,214	-
Non-variable eggs	3,190	2,386	-
Total number of eggs	15,420	7,600	-
Water temperature	25^{o}C	25^{o}C	25^{o}C
Time taken to spawn after injection (Latency time)	15hrs	14hrs	-
Incubation time	22hrs	18hrs	-

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