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# Effect of different sources of water and three different supplementary diet on the propagation of cat fish Claria gariepinus.

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**A B S T R A C T**

This study investigated the effect of the river and deep well suitability for the hatching of Clarias gariepinus fingerlings and the effect of blood meal, fish meal and chicken offal meal on the growth of Clarias gariepinus. The experiment is 2x3 arrangements, treatment in a randomized complete block design. The experiment made up of six treatments and three replicates. The treatments are Fish fed with blood meal in rivers water ($T_1B$), fish fed with blood meat and in deep well treated water ($T_2B$), fish fed with chicken offal in river water ($T_1C$), fish fed with chicken offal in deep well water ($T_2C$), fish fed with fish meal in river water ($T_1F$), fish fed with fish meal in deep well water ($T_2F$). The survival rate, length, girth and weight were taken for four weeks and data collected were analyzed using descriptive analysis ANOVA. Results indicated that fish hatched in river water has the best viability rate of 45.5cm. Also there was significant differences in the mean length girth and the weight across the treatment with fingerlings fed with blood meal ($T_2B$) having the highest mean of survival rate of 87.5% mean length of 1.94cm, mean girth of 1.22cm mean weight of 3.45g, followed by fish fed with fish meal ($T_2F$) which has the mean survival rate of 86.3% mean length of 1.74cm, mean girth of 1.1cm and mean weight of 3.15g. The fingerlings fed with chicken offal ($T_1C$) has the lowest performance of mean survival rate of 84.4%, mean length of 1.63cm mean girth of 0.9cm and mean weight of 2.98g. It is concluded that river water is the best for propagation of Clarias gariepinus because of it low content of chlorine and concentration of high dissolve oxygen.



**Key words:** *water, supplementary, cat fish, Claria gariepinus*



## Introduction

As the world populations continue to expand at an almost exponential rate, cultured fisheries are becoming important sources of food and resources. The natural stock of fish that swim in oceans can only supply a limited amount of food sustainably. Over fishing, pollutions and habitat destruction have severely limited sea food populations' world wide and experts believe that current level of fishing may not be sustainable beyond the year 2040, (Nelson 2006). Faced with an ever growing population and an ever shrinking food source culture fisheries may be one of the answers to feeding a hungry population. (Helisize et al., 2006).

Capture fisheries are the most widely known and recognized form of harvesting aquatic organism and have been practiced since pre historic time. Recreational fishing is a form capture fishing, although for commercial purposes capture fishing is more efficient and productive. Culture fisheries involves growing a selected organism or in some case several selected organisms in a controlled environment, (Forse and Paudly 2007). The sole purpose of the organism to be harvested and then sold commercially. Aquaculture farms are very similar to their land based counterpart in terms of concept and management strategies (Hee et al 2005).

In the 1960s, the price of fish began to climb as wild fish capture rates peaked and the human population continues to rise. Today, commercial aquaculture exists on an unpresented huge scale. In the 1980s,open net cage salmon farming also expanded; these particular types of aquaculture technology remains a minor part of the production and farmed fin fish

worldwide, but possible negative impacts on wild stocks which have came into question since the late 1990s have caused it to become a minor of controversy.

The stigma in the world's fisheries and exploitation of 20 to 30% of marine fish species have provided additional impetus to domestic species, just as over exploitation of land animals provided the impetus for early domestication of land species (Fenaris and Roberto 2005).

Fish farming in Nigeria however encounter certain problems which are seriously hindering the development of this industry. One major constraints fish farming in Nigeria is inadequate hatching facilities for the farmers and this caused inadequate supply of fish seed Mill ( 1996). F. A. O. (1995) observed unavailability of adequate number of healthy fish seed of culturable fishes in Nigeria because they do not readily breed in captivity. This has called for urgent need for the knowledge of artificial breeding. This knowledge of artificial propagation was relatively new to fish seeds from the wild.

Another major factor hindering the development of fish seed multiplkication is the high cost of setting up a good modern hatchery which most aquaculturist do not really have the financial resources to do and therefore only few farmers who are financially buoyant are involved in the fish seed production. However, the production of fingerlings from the few hatcheries are not enough to meet the overgrowing demand of fish seed which is about 4.3 billion to the supply of 55 million and which has led to many closing down or producing below normal production level.

**General Objective**

To determine the effect of different sources of water (River and deep well water) and three different supplementary diet on the propagation of Cat fish.

**Specific Objective**

The specific objectives are to,
determine sources of water that gives the best egg viability.
know the water sources that water sources that has the best pH for good hatching
determine the sources of water that best support fish farming.
determine the feed that suitable for the growth of catfish seed

**Justification**

Since the development of aquaculture depend solidly on the availability of fish seed, the increase in the production of fish seed will makes the farmers to stock their farmer to maximum capacity thereby boosting up the fish production in Nigeria.

**Materials and method**

**Area of study**

This project was carried out at Akufo farm settlement in Ido local Government Oyo state Ibadan.

**Materials used**.

Mosquito net, broad stock (Male and Female cat fish), Measuring scale, Bowl, Hatching tank, water(River and deep well water), pumping machine, pituitary gland of catfish, water storage tank, fish feed (Blood meal, Chicken offal and fish meal), Hatching set, syringe, microscope, clock, hose, record book, water pH indicator. Mug cup and small spoon, volumetric flask, thermometer, sensitive weighing balance, venire caliper.

**Procedure**

**Selection criteria for brood stock**

**Female**

The female fish that have protruding abdomen towards the the side which is gravidness, egg ooze out at the apply of slightest pressure on the abdomen with swollen genital opening reddish in color were selected.

**Male**

They have genital papillae that is long, it reaches the beginning of the fin at the centre part of the fish and the papillae has a red tip at its opening.

Those tested gravid mature ones are kept in the plastic basin according to sexes. Normally about one hour to the time that they are need. The basins are covered with netting materials to discourage jumping out after with which they have weighed.

**The selection of the donors**

Those who donated their pituitary for induced breeding, there was no specific criterium, they are either sexes, diseases free and table sized. The fishes were weighed before utilization.

**Extraction of pituitary gland**.

Pituitary gland is the location at the base of the brain. The donors are beheaded by very sharp knife. The jaws are separated for the easy removal of the cranium (Brain cover) with scalpel. The pituitary gland is situated underneath the cerebrum. It is removed with a spatula. The removal gland is immediately dropped inside mortal.

**Preparation of the extraction**

**Injection**

The female was injected with 1ml of the extract intramuscularly. The syringe was adjusted to expel any form of air bubble to prevent air pockets in the epidermis of the recipient which caused discomfort. The injection was placed on the skin of the recipient at angle $45^0$, little but below the dorsal fin and just above the lateral line. After the Administration, the extract was lateral line. After the administration, the areas throughout the muscles around the area injected. The recipients were then gently placed in the bowl of water.

**Preparation of spawning tanks or hatchery**

Tanks are made up of concrete it was watched clean and covered and the bottom with kankarban, with some stone, all for the adhesion of the egg to be spawned. Clean water of deep well and river water 30lt was used to fill the tanks.

**Incubation of eggs**

In the next day (Morning 12 hours after injection), the egg in the female fish was stripped into a clean bowl. Milt was extracted from the male fish and cut into the egg and stared with feather. The saline solution was used in rinsing the melt and stared for five minute before setting it into the tanks.

**Care of frys**

The kankarbans and stone which still carry the unfertilized egg and empty eggs shells are removed gentle out of the hatchery. This is to prevent the water from fouling because unfertilized egg on the kankarban when decaying lead to the depletion in the dissolved oxygen content and pollution.

This larva were not fed till the immediately after the absorption of their yolk-sack when they were fed with atemia.

**Variable parameter that are measured**

pH indicator paper was used to determined the pH of each water . Temperature of each water, chlorine, iodine, lead and percentage (%) of egg viability, survival rate and growth rate (length girth weight) were assessed after four weeks.

**Experimental design**

The experiment was 2X3 factoria arrangement laid out in complete randomized design according to Daurt (2007). The experiments consist of six treatments and 3 replicate

**Experimental layout**

| | | |
|---|---|---|
| $T_2B$ | $T_2C$ | $T_1F$ |
| $T_1F$ | $T_1C$ | $T_1B$ |
| $T_2C$ | $T_1B$ | $T_2F$ |
| $T_1B$ | $T_1F$ | $T_2C$ |
| $T_2F$ | $T_2B$ | $T_1C$ |
| $T_1C$ | $T_2F$ | $T_2B$ |

KEY:

| | |
|---|---|
| $T_1$ | River water |
| $T_2$ | Deep well treated water |
| F | Fish meal |
| C | Chicken offal |
| B | blood meal |

Table 1: Proximate composition of supplementary diet

| Sample | %CP | %EE | %CF | %ASH | %TDN |
|---|---|---|---|---|---|
| B | 77.35 | 0.53 | 1.46 | 4.4 | 60.0 |
| C | 55.00 | 3.47 | 6.5 | 60.0 | 78.0 |
| F | 63.11 | 1.31 | 1.31 | 17.0 | 72.0 |

Sample B is Blood meal, Sample C is chicken offal, sample F is Fish meal, C.P is Crude protein, E.E is Ethyl Energy, C.F is Crude fiber, TDN is total digestible nutrient.

**Feeding procedure**

All the fingerlings in were fed with 10% of their body weight twice in a day (morning and evening).

**Data analysis**

The data obtained was analyzed by using descriptive statistics (ANOVA).

**Result and Discussion**

Table 2: PHYSIOCHEMICAL ANALYSIS OF WATER USED RELATED WITH HATCHING TIME

| Parameter | Rivers water (T1) | Deep well treated water (T2) |
|---|---|---|
| Mean pH | 7.5 | 7.3 |
| Mean Temp 0C | 26 | 28 |
| Iodine% | 5.15 | 2.5 |
| Chlorine (Mg/l) | 0.6 | 1.0 |
| Dissolve oxygen (Mg/l) | 3.0 | 2.3 |
| Mean hatching time (hrs) | 26 | 22 |

The mean pH of deep well water is 7.3 while the temperature of 280C was recorded for it, but that of river water was pH 7.5 and temperature of 260C. The iodine percentage in deep well treated water and 25 percentage in deep well water and the chlorine present in each water is different that is in river water is 0.6ml and in deep well treated water is 1.0. Also the dissolve oxygen in river water is 30 and 23 in deep well treated water, the hatching time was 22hrs for deep treated water while that of river water was 26hrs.

The time of hatching in deep well treated water is shorter than that of river water which agreed with Robert (1996) findings that fish egg hatches faster while the temperature is high and slightly alkaline water is best for hatching. This might be due to the fact that the temperature during incubation in deep well treated water is higher and at the same time, the pH in deep well treated water has slightly alkaline.

Table 3: Viability of Clarias gariepinus egg

| Parameter | Rivers water (T1) | Deep well treated water (T2) |
|---|---|---|
| Initial mean weight Of female fish (Kg) | 1.00 | 1.10 |
| Mean of final weight Of female fish (kg) | 0.95 | 1.04 |
| Mean weight of egg set (g) | 50.00 | 60.00 |
| Mean no of egg released | 20,000 | 37,000 |
| Mean no of egg hatched | 9,100 | 5,920 |
| Means of egg viability (%) | 45.50 | 16.00 |

The initial mean weight of female used to breed in deep well treated water is 1.04kg and the final mean weight after stripping their egg is 1.00kg gives 0.06kg (60g) as a mean weight of egg set with the mean number of 37,500 which gave viability of 16%, were as the initial mean weight of female used in rivers water is 0.95kg therefore, weight of egg set was 0.05kg (50g), the number of egg was 20,000 and 47.5% was obtained for the viability.

From the result, the egg used for hatching in river water has the higher viability which agreed with the findings of Maxwell (1996) that high level of oxygen concentration contributed to high hatching of egg when hatching. Which indicate that river water has high level of dissolved oxygen concentration then deep well treated water has proved by Mercer (1998) that deep well treated water is low in oxygen concentration while river riches in oxygen concentration because it is running and well exposed to air.

Table 4: Mortality, cannibalism and survival rate of C.gariepinus seed

| Treatment | No of fish stock | No of mortality(%) | Cannibalism(%) | Survival(%) |
|---|---|---|---|---|
| $T_1B$ | 800 | 100(12.5) | - | 700(87.5) |
| $T_2B$ | 800 | 120(15.0) | - | 680(85.0) |
| $T_1C$ | 800 | 125(15.6) | 15(1.88) | 675(84.4) |
| $T_2C$ | 800 | 115(14.4) | 10 (1.25) | 685(85.6) |
| $T_1F$ | 800 | 200(25) | 20(25) | 600(75.0) |
| $T_2F$ | 800 | 110(13.8) | - | 690(86.3) |

Table 4 shows that fish fed with blood meal ($T_1B$) gave the highest survival rate of 87.5% with the lowest 12.5% number of cannibalism followed by fish fed with fish meal ($T_2F$) which has the survival rate of 85.6% and 13.8% mortality rate, it has no cannibalism. The lowest rate is fish meal which has 75% survival rate and 25% of mortality rate and 2.5% cannibalism which agreed with Otubusin (1987) findings that fish feed with fish meal gave the worst performance out of the three diet meal.

Table 5. mean for the length of C. gariepinus fingerlings Weeks (cm)

| Treatment | 1 | 2 | 3 | 4 | Mean |
|---|---|---|---|---|---|
| $T_1B$ | 1.14 | 1.21 | 2.33 | 3.07 | 1.94 |
| $T_2B$ | 1.15 | 1.26 | 2.37 | 2.93 | 1.93 |
| $T_1C$ | 1.18 | 1.19 | 1.77 | 2.37 | 1.63 |
| $T_2C$ | 1.12 | 1.33 | 2.00 | 2.50 | 1.74 |
| $T_1F$ | 1.14 | 1.22 | 2.00 | 2.60 | 1.69 |
| $T_2F$ | 1.14 | 1.22 | 2.00 | 2.60 | 1.74 |
| SEM | 1.14 | 1.20 | 2.06 | 2.67 | |

The table 5 showed that among all the treatment the fish that was fed with blood meal in treatment T1B has the highest figure of 1.94cm which is the best among all the treatment followed by fish fed with blood meal in T2B which has 1.93cm point, while fish fed with chicken offal T1C has the lowest point of 1.63cm. This means that the fish fed with fish meal among the fish diet has the lowest performance among this three diet which agreed with the findings of Maxwell (1996).
There is significant differences ($P<0.05$) in the length of fingerlings and in the interval period of assessment.

Table 6. Table mean for the girth of C. gariepinus fingerlings Weeks

| Treatment | 1 | 2 | 3 | 4 | Mean |
|---|---|---|---|---|---|
| $T_1B$ | 0.70 | 1.03 | 1.47 | 1.83 | 1.26 |
| $T_2B$ | 0.60 | 1.00 | 1.50 | 1.77 | 1.22 |
| $T_1C$ | 0.43 | 0.77 | 1.70 | 1.43 | 1.10 |
| $T_2C$ | 0.53 | 1.00 | 1.27 | 1.57 | 1.09 |
| $T_1F$ | 0.73 | 1.30 | 1.23 | 1.67 | 1.23 |
| $T_2F$ | 0.50 | 0.93 | 1.20 | 1.47 | 1.03 |
| SEM | 0.58 | 1.00 | 1.40 | 1.62 | |

From the above table shown above fish fed with blood meal in the river water (T1B) having the highest mean girth of 1.26cm followed by T1F which has the mean point of 1.23 while TIC that is fish fed with chicken offal has the lowest mean point of 0.93cm.

Table 7 :Mean for the weight of C. gariepinus fingerlingsWeeks (g)

| Treatment | 1 | 2 | 3 | 4 | Mean |
|---|---|---|---|---|---|
| $T_1B$ | 2.30 | 3.00 | 3.70 | 4.20 | 3.30 |
| $T_2B$ | 2.30 | 3.10 | 3.90 | 4.50 | 3.45 |
| $T_1C$ | 2.10 | 2.60 | 3.30 | 3.90 | 2.98 |
| $T_2C$ | 2.40 | 2.90 | 3.50 | 4.00 | 3.20 |
| $T_1F$ | 2.20 | 2.90 | 3.60 | 4.10 | 3.20 |
| $T_2F$ | 2.00 | 2.70 | 3.40 | 3.90 | 3.00 |
| SEM | 2.22 | 2.87 | 3.57 | 4.1 | |

Table 7 shown that fish fed with blood meal in treatment $T_2B$ has the highest figure of 3.45g followed by fish meal in $T_1B$, which has measurement of 3.3g point, while fish fed with fish meal $T_1C$ has the lowest means weight of 2.98g. There is significant difference ($P<0.05$) on the weight of C. gariepinus among the treatment and at interval of period of assessment showed significant differences.

## Conclusion and recommendation

### Conclusion

The river water is the best for propagation of Clarias gariepinus because it has the highest egg, less chlorine content and highest dissolve oxygen. Also the fish fed with blood meal has the highest survival growth performance, while least performance was recorded for chicken offal meal diet in the deep well water. The blood has the highest protein content needed for the growth of the fish, followed by fish meal which gave the second performance in the absence of blood, fish meal can be use for the supplement of blood meal because this two diet has high protein content needed for the breeding and the growth of fingerlings.

### Recommendation

It is recommended that rivers water is the best for the hatching of Clarias gariepinus egg. Also blood meal feed is suitable for the feeding of fingerlings since it gave the better performance and if utilized or incorporated into feed it could boast fish production.

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