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Commercial Hatching/Culture of Catfish to Boost Agricultural Food Supply in Zone C Area of Benue State

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Abstract:- Farming Catfish in commercial quantity is done by using hormones that are synthesized and are most times very expensive like ovaprim. One of the aim of this work of research is to reduce the cost of ovaprim by its dilution with normal saline in induced breeding of catfish and compare it with pituitary gland from the brain of a male catfish to see which one can quickly induce the female to spawning and enhance the production of the fish in Zone C area of Benue state, Nigeria. Different breeds will be used like Heterobranchus bidorsalis been cross bread with Clarias gariepinus will be cross breaded for optimum result. After hatching, at table size level, fish production will be estimated in the pond using the "capture –recapture" statistical method. In the cause of the research, it was noted that Fry needs to be fed regularly with good quality food so that it can grow smoothly to Fingerlings and to Juveniles. The research recommends among others that the quality of water should be at its best and it is better to grow the Fry from a hatchery than using Fingerlings caught from the wild using fish nets or any other method.

Keywords:- *Catfish, Fry, Fingerlings, Juveniles, Ovaprim, Aquaculture, Lincoln Index.*

I. INTRODUCTION

A system of acquiring the catfish (Fingerlings or Juveniles) from their natural habitat sometimes produces stocks that are disease infested and the numbers of this Fingerlings or Juveniles are not always large enough. The practice of obtaining stocks from the wild is not productive enough as most times, the amount of labour employed is far above the outcome in terms of Catfish caught. According to Sudarto, 2007, Catfish can be found in virtually every part of Africa and in the majority of the Asian continent. The Specie Clarias gariepinus of catfish is by no means, the commonly farmed or cultivated. Although, this specie does not reproduce rapidly when cultivated in ponds, Clarias farming has a major limitation which is availability of its seed. (Pouomogne, Nana and Pouomegne, 1998; Brummett, 2007) stated that breeding of the Clarias gariepinus has been established but, the well- with-though, management of hatchery techniques and the system of production of quality seeds of catfish to enhance the availability to the majority of African nation has not been established. However, hatchery for African catfish fry develop from eggs under man made condition in substantially large quantity.

Year	Population (million)	Fish demand (million tons)
2010	158.8	3.02
2011	163.9	3.11
2012	169.1	3.21
2013	174.5	3.32
2014	180.1	3.42
2015	185.9	3.53
2016	191.9	3.65
2017	198.0	3.76
2018	204.3	3.88
2019	210.9	4.01
2020	217.6	4.13
2021	224.6	4.27
2022	231.7	4.40
2023	239.2	4.54
2024	246.8	4.69
2025	254.7	4.48

Table 1:- Projected population and fish demand 2010 to 2025 (Source: FDF, 2007)

What we need to know is that;

- Catfish contains high level of protein.
- Comparatively, catfish remains the best fish meal that is good for the heart.
- Research has it that Catfish is very good for the aged people.
- Catfish has very low cholesterol level.
- Calories are virtually absent in the African Catfish.

According to FAO 2000, human population is on the increase and the number of persons suffering from under nourishment or are starving especially in the third world countries is very high and this has led to higher need and demand for more food which of course is of serious concern. Activities that lead to food production include; Agriculture, Fisheries and Aquaculture.

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Recent discoveries show that the number of stocks of catfish and other fish species through renewable method can be exhausted except under good policies of management. Also information available indicates the maximum limit that is sustainable for fishing for our lakes and other water bodies has been surpassed.

According to Tacon 2001, rearing of Fish in ponds will help to reduce the shortage of fish food supply.

Findings show that there exists much evidence of long term decline in fish production in Zone C of Benue state. Consequently, the scenario calls for prudent management of the fish stocks in ponds. This work further reviewed that, there is much need to make – up for the short – fall in catfish production which has caused protein supply to be below demand level of the people in zone c of the state and elsewhere through Aquaculture. The positive Aquaculture should have occupied has not really been occupied in our communities especially in zone c of Benue state maybe due to awareness on the profitability of catfish and other fish farming is lacking among potential farmers.

Aquacultures are good places to produce any type of catfish species, especially the Fry. They mostly consist of channels that allow good quality of water to pass through hatcheries which holds varying capacities of water depending on the size of the hatcheries. This is used for both fry development and for incubation of eggs.

Tanks for egg incubation are prepared to carry some kind of pad placed to run along the length of the container (concrete wall or tanks) so that knitted wire basket can hang in between the pads. After the eggs have been mixed with the sperm properly, some quantity are placed on the wire baskets and the pads are rowed in such a way that the eggs goes through the water. This helps water to circulate properly through the eggs and it improves aeration. The length of time it takes for eggs to hatch after incubation varies between 6 and 9 days depending on the temperature of the water.

In the hatchery, Fry, which at this point, are referred to as Sac – Fry (the yolk sac is a source of nourishment for the growing fry) go through knitted wire basket and move clusters. The sac – fry are then sucked into any container that can be used to carry them to a tank where they can be reared. Fry needs aeration to develop properly and this can be achieved by agitating the surface of the water or by creating bubbles via putting of stones into the tanks.

When the fry are hatched, the sac is absorbed into their body and the fry becomes black in colour. For proper development and growth, the fry must be fed severally a day (severally here, implies more than thrice). This feeding is done for between 3 to 7 days in the hatchery before they are moved to the ponds.

- *The stage of production of Fingerling*

The practices of production of fingerlings are closely the same everywhere. That is, there is a standard practice for production of fingerlings especially when we compare the processes that one has to go through for the fry to grow to full maturity or to the size that they can be used as food meal. At any stage of the development of the catfish, density of fish and space availability for the fishes is very important to the growth rate; as less density of fish and more of space for them in the ponds will enhance faster growth. Growing of fish to maturity vary in time period but in general, growing of fingerlings to food size catfish will take of period of between 5 and 10 months.

Fry grows and develop better with natural feeds, so it is of essence that the nursery ponds are saturated with such feeds to enhance better growth of the fry until they are grown enough before switching to manufactured process feeds. Finely grinded feed were used initially, once or two times daily to make the fish get used to the feed and subsequently accept the feed.

These feed particles are made larger as the fishes grow. The process was continued by feeding the fishes with crude protein (about 30 to 35 percent content) when they are at the fingerlings stage for about a month or thereabout. The fingerling feeding is also done once or two times per day.

One major challenge of Aquaculture is disease management and prevention of the ponds from attacks from predators like birds. In any case, research has shown that any pond that records up to 60 percent of Fry growing to fingerlings is a very good work.

II. OBJECTIVES OF THE RESEARCH

- To meet up with protein requirement among adults especially.
- Estimate abundance of fish in a pond using mark – recapture statistical methods.
- Establish that the method of mark – recapture is useful in estimating catfish population in fish farming and consequently useful in wild animal populations.
- To check among pituitary gland or ovaprim which is more effective for spawning.
- To provide for easy accessibility of fingerlings and/or Juvenile for interested or would be farmers.

III. PURPOSE OF THE RESEARCH

- The research is important because it will suddenly meet the protein need of the people in the zone.
- To encourage people to engage in the practice of fish production/culture to meet up with the growing needs of fish in the area.

- We shall compare the between ovaprim and pituitary gland (which is relatively low in price), which is better for spawning the Catfish.
- Estimation of fish in pond using the statistical technique will serve as a literature review to others who may wish to estimate population of other aquatic animals or in ecology.
- The finding from the research will be available for would be fish farmer in zone c.

IV. RESEARCH QUESTIONS

- How can the protein needs of the people be arrested?
- How do we tackle idleness among youths in the zone and transform them to be self – reliant through fish farming?
- Can the use of pituitary gland be more effective for spawning than the ovaprim?
- Can the fish in pond be estimated without draining the water and counting all?

V. METHODOLOGY

The technique employed to induce final maturation and ovulation in catfish is to inject the female with hormone and pituitary gland and kept in separate basin. To enhance quicker ovulation, the temperature was made moderate between 37°C – 40°C. Stripping of the female bloodstocks was carried out by gently pressing the abdomen with a thumb from the pectoral fin towards the genital papilla and eggs are collected into a dry plastic basin. Male were sacrificed by dissecting the testis and put in a small cup. The testis were cut into pieces, mix the milt with diluted salt solution and poured over the stripped eggs and mixed thoroughly. Then the mixture diluted with water is spread on a carcarbasin and water then is allowed to flow over it at slowly for about 25 – 35 hours. Fries were seen to hatch after the hours lapsed.

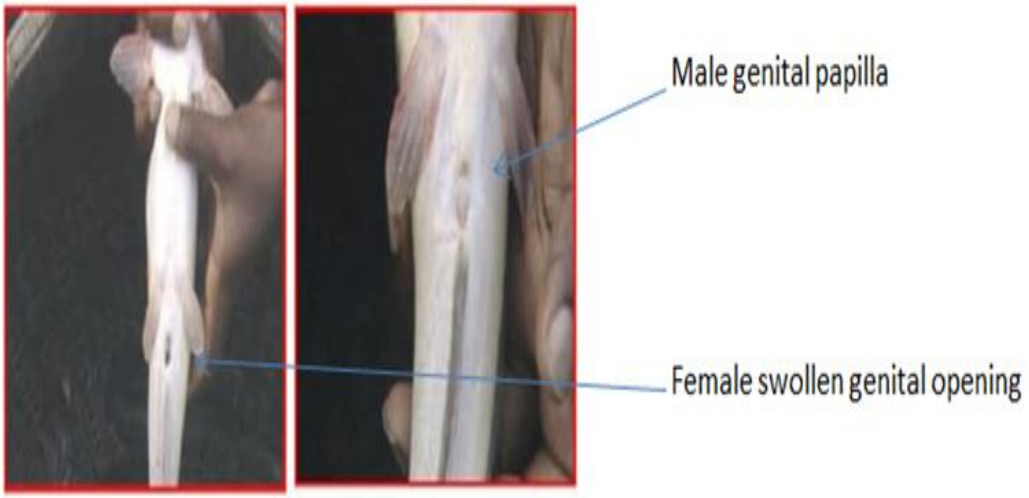

Fig 1

Fig 2:- Identifying the sexes of Catfish

Fig 3:- Pituitary Gland from Catfish Ovaprim

➢ *The Lincoln – Petersen Method*

(Also known as the Petersen – Lincoln index or Lincoln index) was used to estimate population size since the population of fish in this research is a closed population.

The model was used by marking the fishes at different times of visit to the ponds and it was also assumed that the marks made are indelible on the fishes and cannot clean off between visits to the pond site by the researcher, and all recordings were properly noted done.

With these assumptions, we estimate the population using the formula:

$$N = \frac{Qn}{p}$$

➢ *Derivation*

It is assumed (Krebs, 1998) that all individuals have the same probability of being captured in the second sample, regardless of whether they were previously captured in the first sample (with only two samples, this assumption cannot be tested directly). This implies that, in the second sample, the proportion of marked individuals that are caught $\left(\frac{p}{Q}\right)$ should equal the proportion of the total population that is caught $\left(\frac{m}{N}\right)$.

For example, if half of the marked individuals were recaptured, it would be assumed that half of the total population was included in the second sample.
In symbols, $\frac{p}{Q} = \frac{m}{N}$
A rearrangement of this gives $N = \frac{Qm}{p}$
The formula used for the Lincoln – Peterson method (Krebs, 1998).

➢ *Notation*

- N = Number of fishes in the population
- Q = Number of fishes marked on the first visit
- m = Number of fishes captured on the second visit
- p = Number of recaptured fishes that were marked

VI. RECOMMENDATIONS

Base on the findings from this work, it is recommended that;

- The practice of rearing Catfish in ponds should be encouraged.
- Fingerlings captured from the wild should not be introduced into existing fish farms.
- Any one practicing Aquaculture should find ways of making maximum use of locally made feedstuff.
- It is highly recommended that a fish farmer should as a matter of necessity be able to produce 90% of the required feed to cut down cost.
- The fish produced need to be sold or should reach the end consumers; therefore, the farmer must establish means of getting the fish to the market or the end users.

VII. CONCLUSION

People in the Zone even though like catfish, are far from rivers and sources of water that have fishes except those in Apa/Agatu area of the zone who depends on what the river produces (whether large or little). Having the knowledge of catfish production/culturing is very scanty in the zone generally. Because of the rise in demand for catfish and the decline in the amount of catfish available in the wild, this practice of fish pond is highly encouraged. In conclusion, it is hoped that this work will help to enlarge the production of catfish in this zone and ultimately lead to more availability of fish meal around.

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