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# Experimental Trials of the use of Pineapple juice in disticking *Clarias gariepinus* egg in indoor hatchery at Niger Delta Area. Nigeria

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**Abstract**
Four treatments including three different concentrations of pineapple solution (1%, 3%, 5% and 0%) and the control (without juice) were used to test for elimination of egg stickiness of *Clarias gariepinus*. The control, fertilization and hatching rates were 74.5% ± 1.2 and 70.2% ± 1.1, respectively. The highest fertilization rate (89.3% ± 0.7) and hatching rate (86.6% ± 1.4) were found with treatment of 1% pineapple juice solution and was significantly different from those obtained from other treatments ($P<0.05$). Results of the trails showed that pineapple juice used for desticking *Clarias gariepinus* eggs reduced the time of egg handling.
**Keywords**: Propagation, aquaculture, systems, Broodstock and Hormonal

## Introduction

Aquaculture in Nigeria is in the developing stage, because it has not been able to meet the demand and supply of the ever-increasing population. It is acknowledge as the efficient means of providing food rich in protein source, income and employment opportunities for the populace. Ojutiku (2008) noted that interest in fish culture is growing very rapidly in Nigeria but the scarcity of fingerlings of widely acceptable species such as *Heterobranchus longifilis* (Val. 1840) and Clarias species tend to constitute a major constraint to the rapid development of fish farming in Nigeria. Nwachi, (2011) also mentioned that economically productive in aquaculture is heavily dependent on adequate supply of stock to pond enclosures and other culture systems. Fish culture today is hardly imaginable without the artificial or semi-artificial mass propagation of fish seeds of culture fish species. as reported by (Adebayo, 2006) But it was reported by Ojutiku (2008) that supply of fingerlings from the wild are most unreliable, unstable and inadequate, since the breeding habit of most culturable species is seasoned and the fish has to be captured at the time which may not correspond to the optimum production conditions.

African catfish are mentioned within traditional capture-based aquaculture for centuries. Their culture in modern times follows a similar trend to that of tilapias: first domestication trials by the year 1950 and adoption of the North African catfish *Clarias gariepinus* as the most desirable catfish for aquaculture in the mid 1970's. This instigated the protocols for artificial propagation based on hormonal stimulation from the 1980's. Subsequently, researches on the development of the best, cheap and most effective farming technology has been (and still) conducted in (Belgium and the Netherlands) as well as in Africa (central Africa republic, south Africa, Cote d'voire, Nigeria). For many reasons, including the current availability of this species in almost all its water bodies, a huge expanding population with increasing demand for fish and its superior technical skill and infrastructure compared to other Africa countries, Nigeria has certainly benefited by far the most from these research studies.

Clarias gariepinus has good feed conversion rate, resistance to some endemic diseases, ability to withstand high density in culture, ability to grow on a wide range of natural and low cost artificial foods and ability to with stand low oxygen and PH levels (Zheng et al, 1988; Fagbenro, et al 1993)

## Materials and Methods

### Procurement and Selection of Broodstock:

A total of three (3) healthy parent stocks of *C. gariepinus made up of one male and two female* used in this study were procured from Delta State University Hatchery broodstock pond, , Asaba campus. Delta State, Nigeria. They were (15) months of age, weighing between 0.8 and 1 kilogram's body weight. Care was taken when selecting the male and female brooders. The male brooder selected was elongated with slightly swollen reddish urogenital papilla. It was ensured that the female brooders have the attributes of maturity such as a well-rounded and soft abdomen, which extended anteriorly beyond the pectoral fins to the genital opening; also the genital opening was swollen and reddish.

**Administration of hormone (Ovaprim)**
The female brooder (*Clarias gariepinus*) was injected with Hormone (Trade mark: Ovaprim) at a dosage rate of 0.5ml per kilogram body weight. The injection was done intramuscularly above the lateral line just below the dorsal fin. The injected area was rubbed with a finger in order to distribute the Ovaprim evenly throughout the muscle and to prevent a backflow of the ovaprim. The injected fish were kept in a bowl and covered with a netting piece to prevent it from jumping out. The temperature of the water holding the fish was measured with mercury in accordance with (Eric, 2002).

**Procurement of Milt:**
The milt used was procured by sacrificing and dissecting the male (*C. gariepinus*) in order to remove the gonad (testis). Prior to this action the physiological solution was prepared by dissolving 9 gram of salt (NaCl) in one liter of water. Incisions was made into the creamy colored lobes of the testis and then squeezed and washed out of the testis sac with the physiological solution into a beaker (Lawson and Ishola, 2003).

**Stripping of Eggs from Female Brood Stock**
The first step taken during the stripping process will be to mop the body of the female brooder with a towel; this was done to prevent the eggs from coming in contact with water, which may consequently seal up the micropyle and prevent fertilization. Gentle pressure was applied on the abdomen of the female brooder and the ovulated eggs that were ooze out easily from the genital opening was collected in a stainless steel bowl where the eggs were collected.

**Pineapple juice preparation**
Pineapple juice was prepared by squeezing peeled fresh fruit. Solutions were made up at 1% (1ml juice to 99 ml clean water), 3 %( 3ml juice to 97ml clean water) and 5 %( 5ml of juice to 95ml of clean water).

**Fertilization and Pineapple juice application**
The stripped egg was collected into a clean stainless bowl; milt solution was prepared from the male broodstock. The eggs were fertilized and divided into four equal part of 1200g in duplicates (A1, A2, B1, B2, C1, C2 and D1, D2 ) representing 1%, 3%, 4% and 0%. A small volume of each of the solution was first poured over the eggs and stirred continuously with a feather for about 1 min. Then while stirring continuously sufficient solution was added to just cover the eggs, for a further 1 min and the supernatant decanted. The procedure was repeated with fresh juice and the eggs washed with clean hatchery water and maintained in hatchery water.

**Hatching of Fertilized Eggs**
Hatching is the mechanical and enzymatic process of breaking of the eggshell and release of larvae. Commencement of hatching was noticed after 28 hours of incubation.

**Larval Rearing**
Larval rearing was carried out by placing the hatchlings, into 200 liters receptacle. In the first three days, the healthy larvae were nourished by the yolk deposit under their belly. From the fourth day the fry were fed with shell free artemia for two weeks they were fed with commercial feed (coppens) of required sizes from 0.3mm to 2mm twice in a day at 5% body weight. Weekly mean weight, mean length and survival rate was monitored and recorded for the duration of the study which lasted for 6 weeks.

**Water quality monitoring**
Water quality parameters such as dissolved oxygen, pH and temperature required for growth and other biological processes were monitored weekly. Water in the culture receptacles was changed daily throughout the period of the study to ensure high good water quality.

**Statistical analysis**
Data gotten from the experiment was subjected to One-way Analysis of Variance (ANOVA) using the SPSS software and difference between means was examined using Duncan's multiple range tests.

**Results and Discussion**

Table 1: Mean (± SD) fertilization and hatching rate of *Clarias gariepinus* egg treated using different concentration pineapple juice.

| Treatment | Fertilization rate (%) | Hatching rate (%) |
|---|---|---|
| (A) Pineapple (1%) | 89.3±0.7[b] | 86.6±1.4[b] |
| (B) Pineapple (3%) | 52.4±3.4[c] | 47.4±1.5[c] |
| (C) Pineapple (5%) | 28.1±1.9[d] | 25.3±2.9[d] |
| (D) Control | 74.5±1.2[a] | 70.2±1.1[a] |

Source: Field Survey 2012

Different superscripts within rows indicate significant differences (P< 0.05)

Treatment A with 1% pineapple juice showed the highest fertilization rate (89.3% ± 0.7) and hatching rate (86.6% ± 1.4), and was significantly different from the other treatments (P < 0.05) Fertilization rate (74.5% ± 1.2) and hatching rate (70.2% ± 1.1) in the control (without pineapple) were higher than those of treatment B (3% of juice) and treatment C (5% of juice).

The experiment indicated that the application of pineapple juice for disticking of *Clarias gariepinus* eggs increases handling time

Reduction of stickiness of eggs is very important procedure in controlled artificial reproduction in fresh water aquaculture. It improves hatching of fish under hatchery conditions (Rottmann *et al.,* 1991). Elimination of egg stickiness in fin fishes is traditionally carried out by using salt, Urea and tannin. The use of these traditional methods requires some time lagged during treatment compare to the use of pineapple juice which works immediately on application and chemical like tannin can be toxic to eggs if not well used, or at a contact exceeding a few seconds. (Horvath *et al*., 2002). A researcher Billard (1999) suggested the use of egg and milk mixtures in Zoug Jars with the aid of bubbled air, despite the merit of this procedure it is of note that most of the area that need this technology might not have the capacity to power aerating system at a profitable level. Pineapple fruits have a high concentration of ascorbic acid (Vitamin C) in their composition. The juice is extracted and mixed with water; the solution (juice and water) is added to the egg which reacts with the egg shell, thereby reducing the blood vessel and the hardness (thickness) of the egg shell. This helps to improve hatchability.

Desticking of egg using pineapple is quick and simple and requires three (3) minutes only instead of the one hour (1hr) for conventional desticking. This work involves the use of 1%, 3%, 5% of pineapple juice and control (without application of pineapple) on the eggs, 1% of pineapple juice application on the egg was found to be most effective in all treatments with hatching rate of (88%), followed by the control with hatching rate of (78%), then 3% of juice (H.R. 45%), the 5% of pineapple juice application had the lowest hatchability rate of (27%).This technique does not only increases hatchability rates, but has the advantage over conventional procedures by dramatically reducing egg handling period.

**CONCLUSION**

In conclusion, pineapple juice solution effectively reduces stickiness of *Clarias gariepinus* eggs. This method is therefore recommended to hatcheries in Nigeria because it does not require skilled personal to handle and any trained hatchery hand can easily handle.

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