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EMBRYOGENESIS ON BREEDING OF WILD *CLARIAS GARIEPINUS* FROM RIVER BENUE

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ABSTRACT

This study technically exposed how embryogenesis on breeding of wild *clarias. gariepinus* in river Benue was established for future reference. Male and female broodstock was used in making clearity on the reality of hatching. Injection was administered using ovaprim at 0.5ml/kg of body weight and the male was weight 1.2kg and the female were 700g. Embryo development divided into seven stages of zygote, cleavage, blastula, gastrula, segmentation, pharyngula and hatching period. In the final stage of the embryonic development, the growing embryo occupied the entire previtelline space exhibiting a frequent twitching movement by lashing the tail against the egg capsule. Suddenly after a few seconds the larvae free itself through violent whipping movement of the tail which eventually ruptured the egg capsule. The newly hatched larvae were slender, straight, and transparent. Hatching occurred 20 to 24 hours after spawning. Also the new hatchlings were characterized by the presence of an almost round yolk sac and ranged between 2.5 to 3.1. At this development stage the new hatchlings had no vent or mouth, no swim bladder as the breath by absorbing oxygen through the fine blood capillaries that surround the yolk sac while still attached to the gut. It was therefore, concluded that two days after hatching the larvae swam freely and by the third day, the larvae had almost completed its morphogenesis by absorbing its yolk sac for further feeding. The embryogenesis became necessary on the early development of clarias gariepinus species, it was therefore good to properly study the various stages of embrayo and larval development in order to knew something on the biology of the fish.

Keywords: Embyogenesis, Breeding, Wild *Clarias. Gariepinus*, River Benue

INTRODUCTION

The embryogenesis became necessary on the early development of clarias gariepinus species, it was therefore good to properly study the various stages of embrayo and larval development in order to knew something on the biology of the fish. It is at a point of life to start with the union of male and female gametes and as soon eggs fertilize with milts the zygote will formed and the embryonic circle under goes organogenesis and ended with the larval stages (Sule and Adikwu 2004). The embryo progress of eggs may hatch within 24 hours and the embryo development can be divided into seven stages of periods: zygote, cleavage, blastula, gastrula, segmentation, pharyngula and hatching period. The cleavage was typically meroblastic and the first division (2 celled stages) occurred 30 minutes after fertilization. Followed by the second cleavage completing 40 minutes after fertilization. The 16 celled stages were reached an hour after fertilization (Bromage et al., 1995). Yolk invasion started 5 hours after fertilization and completed 7 hours after fertilization. The head and the tail of the embryo became distinguishable at the end of the gastrula stage and the notochord could be clearly seen 13 hours after fertilization, the caudal region detaches from the yolk mass and become free. Sule *et al*, (1999). In the final stage of the embryonic development, the growing embryo occupied the entire previtelline space exhibiting a frequent twitching movement by lashing the tail against the egg capsule (Aluko, 1994). Suddenly after a few seconds the larvae free itself through violent whipping movement of the tail which eventually ruptured the egg capsule (Dabrowski,1994).

The newly hatched larvae were slender, straight, and transparent and were gradually tapering towards the tail. Hatching occurred 20 to 24 hours after spawning (Rubin and Glimsater,1996). Also the new hatchlings were characterized by the presence of an almost round yolk sac and ranged between 2.7 – 3.1 mm in length and tried to hide in any refuge they could find while some gathered on the edges of the tank (De-graaf and Janssen, 1996). At this developmental stage the new hatchlings had no vent or mouth, no swim bladder as the breath by absorbing oxygen through the fine blood capillaries that surround the yolk sac while still attached to the gut. Two days after hatching the larvae swam freely and by the third day, the larvae had almost completed its morphogenesis by absorbing its yolk sac (Powell 1998, Lin et al., 1996; Lam, 1982, 1983, Hayden et al., 2010, Park et al., 1997; Nguenga, 2000). Studied on the embryogenesis and larval progress of fish are of great benefits in observing their genetics growth processes. It is beneficial to the study of their biology, trends, environmental desires of different species of clarias gariepinus (Okomoda et al., 2017). It is also important to obtain an information on the development abilities of the fish in comparison to normal and altered pattern and structure (Borcato et al., 2004). An understanding of experiment s of embryology shows that the basic policy and knowledge is required to improve the artificial propagation of any cultured species (Morrinson et al., 2001). The aim of this study therefore is to determine embryogenesis on breeding of wild *Clarias Gariepinus* from River Benue.

MATERIALS AND METHODS

Sample Collection

A male and female broodstock were selected in river Benue from the fishermen in December 2022 and determined the embryogenesis. The female was injected intramascularly

above the lateral line just below the dorsal fins and it was matured with swollen abdomen. The injection was administered using ovaprim at 0.5ml/kg of body weight and the male was weight 1.2kg and the female were 700g. Stripping was done after the mandatory hours which shows eggs started coming out from the genital papilla and the male were sacrified and gonads were removed washed using normal saline and eggs and sperm were mixed using dry method of fertilization. Immediately after fertilization, the samples of fertilized eggs were put inside water in beaker to the department of fisheries and aquaculture laboratory at Joseph Sarwuan Tarka University, Makurdi and snapped the embryo stages of development using binocular microscope and the stages were determined hourly for twenty-four (24) hours.

The Study Area

This study was carried out in Makurdi, Benue State. Makurdi is located on latitude 7° 43' 55.92" N and 8° 32' 20.76" E. Makurdi town has two main seasons: the wet season usually between April and October and the dry season usually between November and March. Wild broodstock of *Clarias gariepinus* were obtained from artisanal fishermen along the River Benue at Makurdi.

RESULTS AND DISCUSSION

The Chemistry of Water Quality Parameters

Temperature: The temperature of water was taken using mercury in glass thermometer (0-100^{0}C).

Hydrogen ion concentration (pH): The pH of the water was taken using an electronic pH meter - B. Bran Scientific pH-meter (Model pHS – 25).

Dissolved Oxygen (DO): This was measured using Hanna Multiparameter Water Quality Probe Model HI-98129.

Microscopical Pictures of 24 hours' Embryogenesis of Fertilized Eggs of Clarias Gariepinus Broodstock

Plate 1: Blastulaperiod

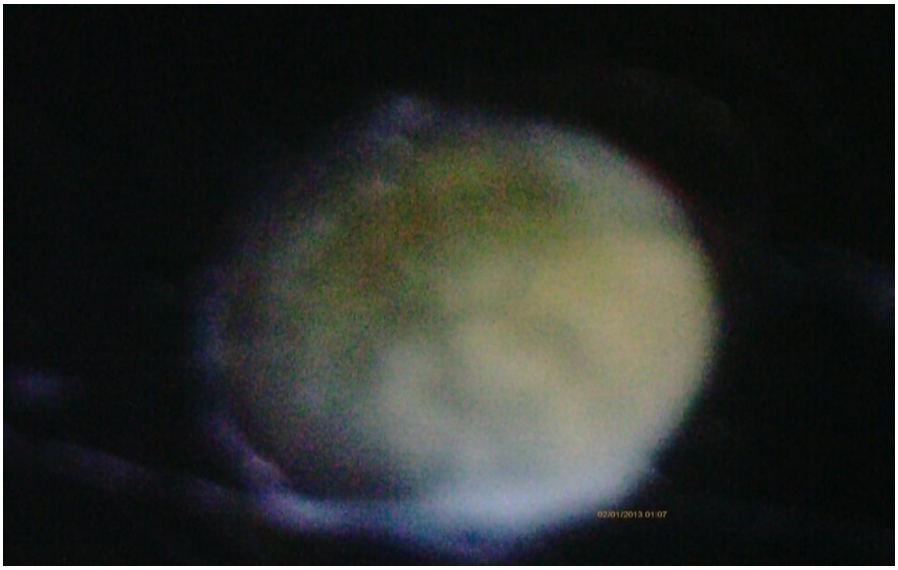

Plate 2: White/Dead egg

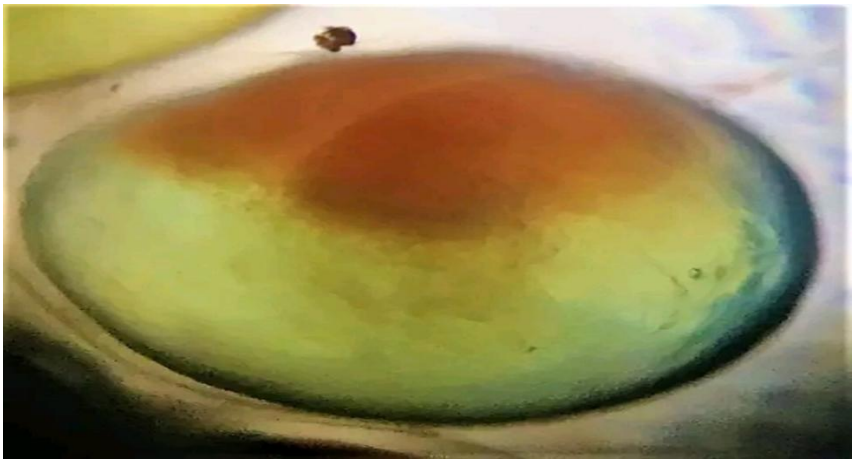

Plate 3: Fertilized Egg

Plate 4: Cleavage Period

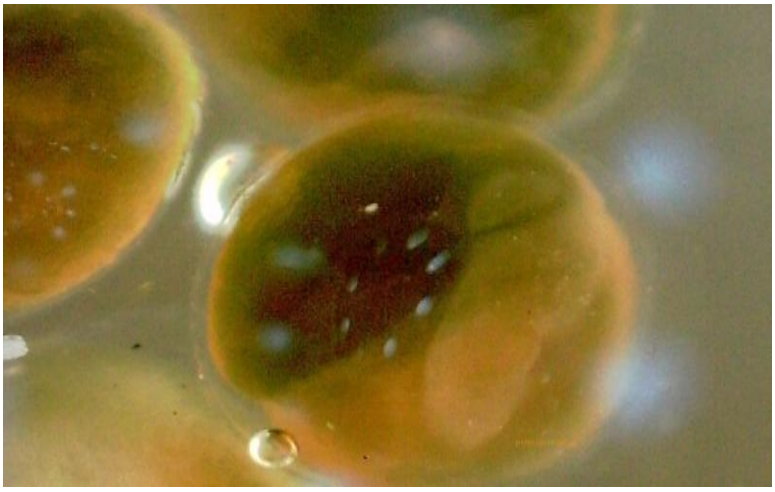

Plate 5: Gastrula Period

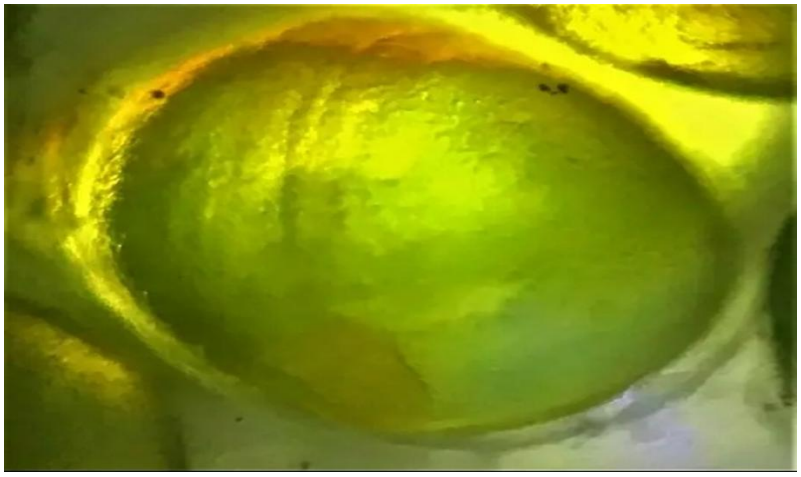

Plate 6: Segmentation Period

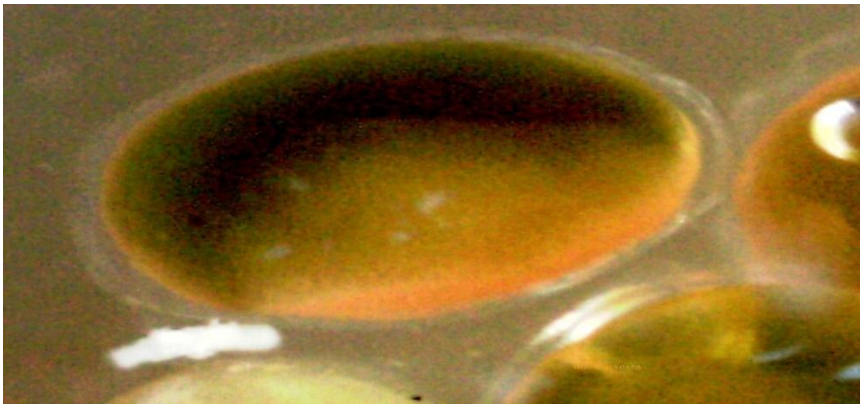

Plate 7: Pharyngula Period

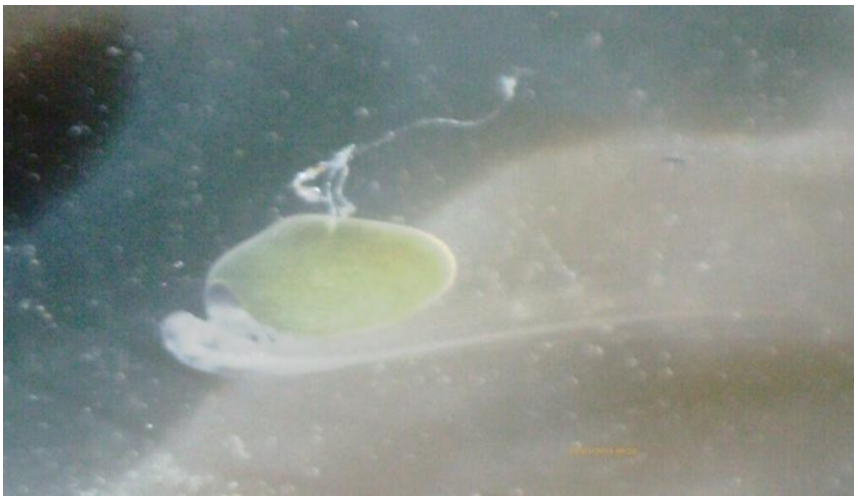

Plate 8: Hatching

Discussion

The embryogenesis became necessary on the early development of clarias gariepinus species,it was therefore good to properly study the various stages of embrayo and larval development in wild fish of river Benue in order to knew something on the biology of the fish. This is almost similar to that of the observation by okomoda et al (2017). However, the differences observed in this study were clearly due to the board of experimental context of egg characteristic of the species used. The pattern of embryonic movement of egg cleavage observed in the 24 hours clarias gariepinus is similar to those previously reported for the parent (Aluko, 1994). Embryo development divided into seven stages of: zygote, cleavage, blastula, gastrula, segmentation, pharyngula and hatching period. In the final stage of the embryonic development, the growing embryo occupied the entire previtelline space exhibiting a frequent twitching movement by lashing the tail against the egg capsule. Suddenly after a few seconds the larvae free itself through violent whipping movement of the tail which eventually ruptured the egg capsule. The newly hatched larvae were slender, straight, and transparent and were gradually tapering towards the tail. Hatching occurred 20 to 24 hours after spawning. Also the new hatchlings were characterized by the presence of an

almost round yolk sac and ranged between 2.7 to 3.1 mm in length and tried to hide in any refuge they could find while some gathered on the edges of the plastic tank. At this development stage the new hatchlings had no vent or mouth, no swim bladder as the breath by absorbing oxygen through the fine blood capillaries that surround the yolk sac while still attached to the gut. Two days after hatching the larvae swam freely and by the third day, the larvae had almost completed its morphogenesis by absorbing its yolk sac.

CONCLUSION

The embryogenesis of clarias gariepinus in wild fish of river Benue can served future references in order to knew something on the biology of the fish. Embryo development divided in to seven stages of: zygote, cleavage, blastula, gastrula, segmentation, pharyngula and hatching Two days after hatching the larvae swam freely and by the third day, the larvae had almost completed its morphogenesis by absorbing its yolk sac.

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