# RELATIONSHIPS BETWEEN VARIOUS MATURITY GROUPS AND SIZE OF WET PITUITARIES OF AFRICAN CATFISH *(Clarias gariepinus)*

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## ABSTRACT

*This study was conducted to determine relationships between maturity of various groups of Clarias gariepinus and size of their wet pituitaries. The maturity groups of the fish species used during the research were unripe males, ripe males, immature females and mature females. Data were obtained and recorded according to sex and maturity groups. The data were later subjected to correlation and coefficient analysis. Results showed that increase in length of the specimen did not follow the same pattern as the increase in size of the pituitary. Diameter size of the pituitary gland was highest in mature female donors and least in unripe-male- donor group. Relative reproductive potentials were observed in the result of both the ripe-male and immature female groups. No significant correlation was shown between length of donor and size of the wet pituitaries. There seem to be a higher reproductive potential in the mature female donors. This might be dependent on reproductive process and the need of the fish breeders.*
***Keywords:*** *Clarias gariepinus, wet pituitaries, maturity groups*

## INTRODUCTION

In induced breeding with fresh pituitary, hormone dosages have always been based on weight relationships between donors and recipients. Matching of weights of donors and recipient fish specimens before extracting pituitary gland, as the most successful method of initiating activity in induced artificial breeding of Clarias gariepinus has been demonstrated (Viveen, Richter, Van Oordt, Janssen and Huisman, 1986). According to Akpaniteaku (2006) the efficiency of pituitary glands in breeding of catfish especially Clarias species has also been demonstrated. Relationship between weight and size of male and female fish (Oreochromis niloticus) and wet weight of its pituitary as been investigated (Obi and Igbinosun, 1996). The consequences of indiscriminate use of pituitary gland of male and female fish by assuming that their gonadotrophic content are the same has been highlighted (Akpaniteaku, 2006). There is hardly a work on size relationships between the maturity stage of the donors and their pituitaries, despite the fact that such information is as important as assay on the pituitary gland of the fish species. This study therefore determined the relationships between various maturity groups of Clarias gariepinus and size of their wet pituitaries.

## MATERIALS AND METHODS

Clarias gariepinus were procured from the live-fish market on the bank of

River Niger at Onitsha, Anambra State, Nigeria. Skin pigmentation was used to identify and separate the fish species from the other catfish (Viveen, et al 1986). The males weighed between 100g and 205g (mean 162.1g). The female weights ranged from 95g to 205g (mean 166.6g). The standard lengths of the specimens were obtained by measuring from the tip of the snout to the end of caudal peduncle. Sexual-maturity status of the specimens was determined by external characteristics, using visual and contact methods (Hogendoorn, 1979). Confirmatory assessment of maturity in females was carried out by Viveen, et al (1986).

Male specimens were assessed for maturity using physical behaviour and papilla-tip colour (Hogendoorn, 1979). The pituitaries used for study were extracted by partial decapitation of the specimen with sharp knife. The specimen was turned upside down and the lower jaw cut away. The pituitary gland located at the ventral side of the brain was carefully separated from brain tissues, after opening the palate with pair of pincers. The gland was carefully collected with stainless laboratory pin and metallic spatula, to avoid compression of the size. Each and every pituitary extract was dropped on transparent glass slide and diameter measurement taken with ocular micrometer. Data were obtained and recorded according to sex and maturity groups (Dadzie, 1968, 1974). The data were later subjected to correlation and coefficient analysis. Data on standard length and complimentary information were used because; the specimens had all their tail fins intact (Akpaniteaku and Nwuba, 2007). Standard length was used as a result of the eroding effects of handling on the fins.

## RESULTS AND DISCUSSION

The standard length measurement of male and female *Clarias gariepinus* of various maturity levels obtained during the research are presented on table 1. The highest mean standard length of 26 $\pm$ 1.01cm was obtained from immature females, while the least standard length of 24.7 $\pm$ 0.84 cm was recorded in mature females. Total lengths 29.2cm and 28.3cm for immature and mature females respectively have been recorded (Akpaniteaku and Nwuba, 2007). The relationships between length at maturity and estimated sexual maturity are methods that can be used to determine length at maturity of *Clarias species* (Ezenwaji, 1999). Where tail fins are mutilated in the course of investigation, standard length instead of the total length can be used (Arawomo, 1982). In the present research, standard length was used as a result of the eroding effects of handling on the fins.

**Table 1:** Mean standard length of maturity groups of male and female Clarias gariepinus

| **Sex** | **Maturity Group (1-6)** | **Standard Length (cm)** |
|---|---|---|
| M | Unripe | 25.2 + 0.64 |
| M | Ripe | 25.5 + 0.93 |
| F | Immature | 26.0 + 1.01 |
| F | Mature | 24.7+ 0.84 |

*Unripe/Immature: gonad stages 1, 2 and 3*
*Ripe/mature: gonad stages 4 and 5*

The highest diameter size of pituitary (1.8mm) was obtained from mature female donors (fig 1). The least diameter size of 1.3mm was recorded in unripe-male-donor group. In line with research findings of Akpaniteaku and Nwuba (2007) resemblance in figures of mean standard length of ripe males and immature females (fig 1) seems to indicate a kind of body size relationship. A closer relationship in terms of induction of spawning between ripe male and mature female hormones than in other maturity groups has been observed (Akpaniteaku, 2006). This might also infer that pituitary extracts from donors of those maturity groups, have almost the same potentials in induced breeding. There were no significant correlations between standard length of donors and size of wet pituitaries ($P>0.05$). Weight can be a function of seasonal variations and physiological state, but the achieved length is hardly lost (Arawomo, 1982). An increase in weight of the gland relative to the increase in the weight of fish has been reported (Obi and Igbinosun, 1996). In the present research, it may be inferred that increase in the length of fish does not necessarily lead to increase in the size of pituitary.

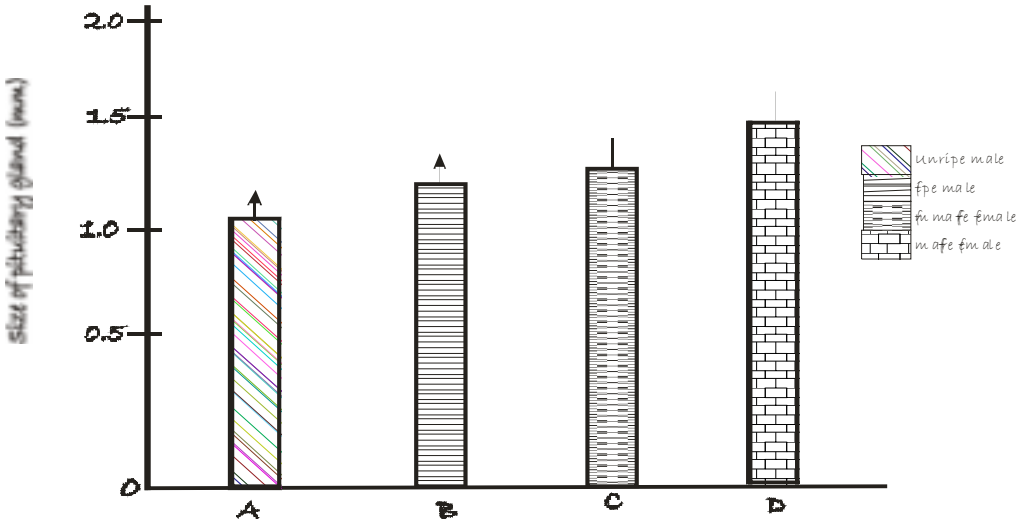


**Fig 1:** Diameter size of pituitary gland of various maturity groups of male and female Clarias gariepinus

Perhaps the relationship between size of pituitary gland and maturity stage of the fish species is a function of the gonad development. Relative reproductive potentials in both ripe-male and mature-female group of *Clarias gariepinus* has been reported (Akpaniteaku and Nwuba, 2007). However, pituitary of the mature female donors may be preferred depending on the need of the fish breeder.

## CONCLUSION

A study was conducted to determine relationships between maturity of various groups of *Clarias gariepinus* and size of their wet pituitaries. The maturity groups of the fish species used during the research were unripe males, ripe males, immature females and mature females. Results showed that increase in length of the specimen

did not follow the same pattern as the increase in size of the pituitary. Diameter size of the pituitary gland was highest (1.8mm) in mature female donors and least (1.3mm) in unripe-male- donor group. Relative reproductive potentials were observed in the result of both the ripe-male and immature female groups. No significant correlation was shown between length of donor and size of the wet pituitaries. There seem to be a higher reproductive potential in the mature female donors. This might be dependent on reproductive process and the need of the fish breeders.

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