

Domestication of *Chrysichthys Nigrodigitatus* of the Cross River, as an Adaptation to Climate Change and a Boost for Aquaculture Expansion in Nigeria

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Abstract

Chrysichthys nigrodigitatus, commonly known as silver catfish, is a prized food fish in Nigeria. It occurs in several African rivers. In the Cross River system, it occurs all year round with peak in the rainy season, from April to October. Several studies have reported on some threatening factors to the species' survival, including overfishing, low genetic diversity and climate change. The proposed method to curb the depletion of the resource is domestication. Studies were conducted to determine the reproductive ecology of the species. Simulation of these ecological factors in the hatchery for possible domestication of the species was carried out. Results show that the species is a freshwater species with salinity range from 0.01-0.06 ppt. Their preponderance was directly correlated with turbidity and indirectly correlated with transparency, showing that they prefer dark and shaded conditions. Rainfall triggered reproductive activities. Spawning occurred within the rainy period in crevices and holes in the rocky substratum of the river bed. We simulated these conditions in the hatchery and fish farm by placing cylindrical pipes as holding receptacles in the ponds. This provided hiding place and shade for them. Spawning inside the receptacles was observed in the month of June through September, coinciding with the phenomenon in the wild. The species is shown to embark on parental care. The male parents carry the brood in their mouths until they were able to fend for themselves. Thus, understanding the reproductive ecology of *Chrysichthys nigrodigitatus* in the river, enabled us to develop protocol that assisted in its domestication. This is the first time *Chrysichthys nigrodigitatus* has been raised in the hatchery and made to spawn in captivity. Thus, our work has expanded the aquaculture range in Nigeria and Africa.

1.0 INTRODUCTION

Chrysichthys nigrodigitatus, commonly known as silver catfish, is a prized food fish in Nigeria. The species is widely distributed in freshwater of West Africa, where they are valued in human nutrition (Holden, 1991). According to Paugy *et al* (2003), *Chrysichthys* is found in Nile, West Africa and western coast of Central Africa. In the Cross River system, east of Niger Delta, the species occurs all year round with peak in the rainy season (Ama-Abasi *et al*, 2019); here the species forms the most commercially important single species fishery, providing employment opportunity for the teeming populace. In the Cross River estuary, the species is the third most important species after bonga and croaker (Holzloehner, *et al*).

However, the species is listed in the IUCN list of threatened species (Da Costa, 2010). Recent researches have also shown declining population of the species due to overfishing (Ama-Abasi and Uyoh, 2020) and possible impacts of climate change, Ama-Abasi, *et al* (2019). Adilije *et al* (2020) and Uyoh *et al* (2020) demonstrated that *Chrysichthys nigrodigitatus* of the Cross River has low genetic diversity with the potential of spontaneous wiping out of the population in the face of environmental variability.

Such trends may predispose the species to decline. To shield the species from the vagaries of climate change and overfishing, there is need for domestication of the species. Domestication will not only shield

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