

## **Research Focus**

My research focused on application of genetics and biotechnology tools in aquaculture development and aquatic environment's resource identification, resilience, management and Conservation for improved production and Utilization for food security. I utilized fisheries phylogenetics, Fish-breeding Technology, Nutri-genomic, Climate Change Resilience Strategies to bridge some existing knowledge gaps and enrich gene bank with genome datasets in fisheries and aquaculture. My study on freshwater prawn *Macrobrachium vollehovenii* population in Asejire Lake and in Ogun River Nigeria revealed chelae variants having unique allozyme markers for their delineation in selection. The variants were different in proximate and amino acids profiles, in-vitro digestibility and food grades. In addition, wastes from processing of the variants also varied in nutritional quality. Barcode gene sequence of the variants was submitted at gene bank. Supply of high-quality fish seed ranked high among the challenges of aquaculture. Knowledge on genetic structure/variants/strains of commercially cultured species such catfish and Tilapia can help to generate robust base population and highlight possible source of bottlenecks in production units. Genetic structure of the farmed *Clarias gariepinus* in Nigeria showed bottleneck with implications on hatchery management. Cytogenetic characterization of *Clarias gariepinus* and *Heterobranchus bidorsalis* were undertaken in South Western Nigeria. A phenotypic variability study discovered discriminate pectoral spine variants in small population of *C. gariepinus* in hydrodynamic Asejire Lake environment with implications on divergence of low-cost allozyme / biochemical (SDS PAGE) and Randomly Amplified Polymorphic DNA (RAPD) Markers in congruence with some latent production traits. Inbred and crossbreds of the variants diverged in growth rate and responses to bacteria (*Pseudomonas aeruginosa*) challenge. Barcode gene DNA sequence of the tolerant and vulnerable specimens was submitted to NCBI as their phylogenetic relationship showed single nucleotide polymorphism markers for delineation. I discovered mass mixing of egg from multiple brooders without cognizance of within species subgrouping contributes to frequency of "shooters" in early life of *C. gariepinus* in hatcheries, as shooters showed distinct markers. I investigated and reported genetic admixture in farmed *C. gariepinus* in relation to invasion of foreign *Clarias* gene in Benin Republic, in climate impact on cage-culture of Tilapia in Nigeria, highlighting the need for ecological considerations to protect native genotypes in aquaculture in climate change scenarios.

### (a) Completed Research

- (i) Genetic Diversity and Food Relevance of Freshwater Prawn Populations in Asejire Lake, Nigeria.
- (ii) Impact of Climate Change on Genetic Structure of Tilapia, *Oreochromis niloticus* Population in Fish Cage Installed and Fish Cage free Lakes in South Western Nigeria
- (iii) Assessment of Intra-specific pectoral spine crossbred of *Clarias gariepinus* for Improved Economic Traits (Growth Rate, Survival, and Disease Resistance) for Accelerated Fish Production in Nigeria
- (iv) Genomic sequencing of Farmed *Clarias gariepinus* and *Oreochromis niloticus* in Southwestern Nigeria and Benin Republic for Monitoring, Control and Marker Assisted Improvement.
- (v) Assessment of Pathogenic Microorganism Resistant Strains in Farmed African Catfish, *Clarias gariepinus*

(b) In progress

- (i) Genetic Diversity, Sea Water Quality Changes and Adaptive distribution of the Declining Croaker (*Psuedotolithus* sp.) fishery in West African Coasts.

This study was initiated to understand the dimensions of genetic structure and sea water changes in climate change scenario to the vulnerability of the declining croaker species population in the Gulf of Guinea. Currently, the trend of mortality in the species have been investigated through a reconnaissance survey at the coast of the Gulf of Guinea at Nigeria, Cameroon and Republic of Benin. Preliminary genetic analysis including morphometric and genetic sequencing of the *P. senegalensis* and *P. typus* of the croaker family in Lagos lagoon and other Nigeria locations is ongoing. The study is expected to continue till 2027.

- (ii) Integrated and Circular Technologies for Sustainable city region FOOD systems in Africa (INCiTIS-FOOD)

The project aimed to provide sustainable food from fish, vegetables, and insect in circularity of production to enhance nutrition in African Cities, minimizing wastes and using limited land area. Currently, food system analysis has been carried out. The project is concluding the preparatory stage of creating the “Living Laboratory” where innovations and models for sustainable circular food production system will be formulated and investigated for performance, and subsequently disseminated to stakeholders. The project will be completed by 2027.

(c) Project, Dissertation and Thesis

- (i) Oyebola O. O. (1997). Epizootiology of Some Fish Farms in Oluyole Local Government, Oyo State. B.Sc. Project, Department of Wildlife and Fisheries Management, University of Ibadan, Nigeria, 65p
- (ii) Oyebola O. O. (2001). Comparative Study of Genetically Improved (Triploid) *Clarias gariepinus* (Burchell 1822) Produced by Cold Shock at Two Different Temperatures. M.Sc. Project, Department of Wildlife and Fisheries Management, University of Ibadan, Nigeria, 85p
- (iii) Oyebola, O. O. (2014). Assessment of Genetic Structure of *Clarias gariepinus*, Burchell, 1822 Population in Asejire Lake, Ph.D. Thesis, University of Ibadan, Nigeria, 292p