Trophic Impacts and Invasion Ecology of Black-Chinned Tilapia (*Sarotherodon melanotheron*) in the Anthropized Estuarine Systems of Manila Bay Using EcoPath

Anselmo P. Quitco
Adviser: Benjamin M. Vallejo, Jr., PhD

ABSTRACT

The *Sarotherodon melanotheron* is an invasive fish species native to western and central Africa. It has established colonies in coastal and estuarine habitats of Manila Bay thanks to its adaptable diet, rapid growth, and broad environmental tolerance. Concerns regarding *S melanotheron* are raised by the growing number of Blackchin tilapia in Manila Bay's highly anthropogenized estuarine environment, which is subject to excessive aquaculture, factory, and residential waste, as well as deteriorating water quality—the ecological function of *S. melanotheron* and its possible effects on regional food webs and nutrient cycling. However, information on how this species adapts to varying habitat conditions within the bay remains limited.

This study examines the trophic ecology and invasion-related characteristics of *S. melanotheron* across selected sites in Manila Bay by integrating biological, environmental, and ecosystem-level analyses. For 1 year, fish will be sampled every 2-3 months at 3 locations representing the northern, southern, and central parts of Manila Bay. To assess variance in diet composition, growth trends, and body form, specimens will undergo length-weight measurements, geometric morphometric analysis, gut content analysis, and otolith-based age calculation. A Horiba U-50 will be used to measure environmental factors in situ, such as temperature, salinity, pH, dissolved oxygen, and turbidity. To provide further environmental context, water samples will also be collected and analyzed using API water quality test kits to assess nutrient concentrations at the sampling site.

Diet composition will be quantified using standard stomach-content indices, and growth parameters will be estimated from length-frequency and otolith data. Morphological variation among sites will be assessed using landmark-based geometric morphometrics. These empirical data will be incorporated into an exploratory Ecopath with Ecosim (EwE) model to characterize the trophic role of black-chinned tilapia in simplified estuarine food webs and in established food webs derived from Manila Bay data. In addition, semi-structured interviews with local fishers and aquaculture stakeholders will be conducted to incorporate local ecological knowledge. The findings aim to contribute to invasion ecology research and support management strategies for invasive species in tropical estuarine systems.