

Best Operational Practices for Biosecure Farming of Black Tiger Shrimp (*Penaeus monodon*) in Earthen Ponds

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Preface

The black tiger shrimp (*Penaeus monodon*) is still a high-value aquaculture commodity, with strong demand in both domestic and international markets. It has long been one of the most widely farmed shrimp species globally, contributing significantly to the economies of many coastal nations. However, the rapid and often unregulated expansion of shrimp farming has led to the conversion of extensive mangrove areas into ponds, resulting in serious environmental degradation. Additionally, the industry has faced recurring disease outbreaks, beginning in the 1990s, that continue to threaten shrimp production and sustainability worldwide.

In response to these longstanding challenges, and to help revive the black tiger shrimp industry, SEAFDEC/AQD launched the Oplan Balik Sugpo as SEAFDEC/AQD's banner program in 2018. As part of the program, a biosecure shrimp hatchery complex was established at the Tigbauan Main Station in the same year. Postlarvae produced were then transported to the Dumangas Brackishwater Station (DBS) for the grow-out phase using environment-friendly strategies.

The learning experiences from the establishment of the biosecure hatchery have already been compiled in a book "Black Tiger Shrimp (*Penaeus monodon*) Hatchery Operations Using Enhanced Biosecurity Measures" which was published by SEAFDEC/AQD in 2023.

This time, the best practices observed and learned through several years of grow-out operation at DBS are now compiled in this manual, with an emphasis on good aquaculture practices, thorough biosecurity, and religious health monitoring.

With this manual, SEAFDEC/AQD hopes to encourage investors and aquafarmers to venture again in black tiger shrimp farming. It is also hoped that current shrimp farmers would prompt current producers to review and strengthen their own practices when necessary.

DAN D. BALIAO
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About the Manual

This extension manual "Best Operational Practices for Biosecure Farming of Black Tiger Shrimp (*Penaeus monodon*) in Earthen Ponds," is designed to meet the urgent needs for a comprehensive, time-ready guide that bridges gap between theoretical aquaculture models and on-ground execution. It consolidates critical technical protocols, from pond design, water management, feed scheduling, biosecurity, probiotics, and efficient harvesting into a coherent step by step format suitable for farm managers and extension workers. Rooted in regionally relevant evidence-based practices, including stocking densities reflective of extensive to intensive systems, precise water quality targets (salinity 15–25 ppt, temperature 29–33 °C, and dissolve oxygen >2.7 ppm), and sludge-removal and disinfection protocols. It provides clear performance benchmarks for growth, survival and productivity. Further, it emphasizes biosecurity-covering intake filtration, probiotic use, routine sampling, and pond drying to mitigate diseases risks endemic to *P. monodon*. The manuals adaptability across farming intensities and its insistence on monitoring and record-keeping empower farmer to continuously optimize operations, enhancing both economic resilience and environmental stewardship.

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1

Introduction

Shrimp aquaculture has made considerable contributions to the food and livelihoods of coastal people in several Asian countries, including Taiwan, Indonesia, and the Philippines. It is a profitable industry that generates significant annual earnings. The discovery of the black tiger shrimp (*Penaeus monodon*) as an accidental crop in milkfish cultivation marked the beginning of its production. By using eyestalk ablation to induce maturation, SEAFDEC/AQD successfully bred penaeid shrimps in captivity in 1975. As a result, small-scale barangay hatcheries produced large quantities of fry from ablated breeders. Programs for technological transfer and training were also carried out. Since then, considerable research and development work have been conducted to increase the production of this commodity.

The widespread adoption of the black tiger shrimp was initiated in the Philippines through intensive monoculture practices. Subsequently, this shrimp species experienced outbreaks of infectious diseases, resulting in a decline in both aquaculture and economic viability. In response to viral and bacterial outbreaks, intensive shrimp farmers in the Philippines have decreased the frequency of their culture runs. The diseases affecting penaeid shrimps can be attributed to various pathogens, including bacteria, fungi, parasites, and non-living viruses, as well as nonliving factors such as nutritional deficiencies, toxic substances, and environmental issues. Nevertheless, the emergence of viral diseases, such as the white spot syndrome virus (WSSV), in the early 1990s led to a notable decline in shrimp production across Asia. The occurrence of viral illnesses, including WSSV, luminous bacteria, and acute hepatopancreatic necrosis disease (AHPND), has been reported in various provinces across the Philippines.

Due to the growing demand for shrimp, aquaculture has become more intensive, which has had an adverse effect on the ecosystem. Due to their lack of an adaptive immune system, cultured shrimp are susceptible to diseases. Recurrence of current infections or the appearance of new

ones could result from non-compliance with good aquaculture practices (GAQPs), which are usually a part of farm intensification. Farm disease outbreaks are frequently severe, expensive, and have the potential to cause the local industry to fail.

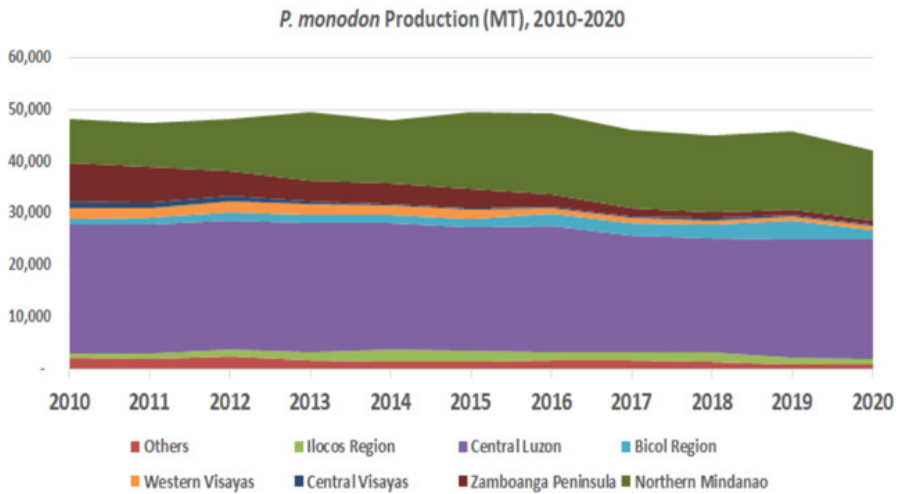


Figure 1. Philippine black tiger shrimp production by region from 2010 to 2020 (BFAR)

With this, SEAFDEC/AQD has launched the "Oplan Balik Sugpo," an initiative aimed at enhancing and bolstering the production of black tiger shrimp in the Philippines. This program emphasizes the enhancement of local broodstock, the reinforcement of biosecurity measures, and the encouragement of sustainable farming methods to increase the industry's productivity and resilience.