Biology and Hatchery of Mangrove Crabs *Scylla* spp.

Emilia T. Quinitio Fe Dolores Parado-Estepa Joana Joy dela Cruz-Huervana



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FOREWORD

Culture of mangrove crabs or mud crabs of the Genus *Scylla* is a valuable source of income. The high demand both in local and export markets has led to the over-exploitation of natural resources in many coastal areas. The sustainability of the mangrove crab industry depends on the management of the remaining wild resources and the establishment of several hatcheries as source of seedstock. Recognizing the need for seedstocks of the mangrove crab industry, the Southeast Asian Fisheries Development Center/Aquaculture Department (SEAFDEC/AQD) developed the seed production technology.

SEAFDEC/AQD started research on Scylla spp. in 1977. Studies on various stocking densities and feeding schemes in the grow-out phase of mangrove crabs started in 1981, followed by culture management and economic analysis in the succeeding years. In 1996, Research and Development on mangrove crabs was resumed under the project funded by the Australian Centre for International Agricultural Research (ACIAR) aimed at developing the seed production technology and improving farming techniques in collaboration with the University of the Philippines Visayas, Queensland Department of Primary Industries and the Northern Territory Department of Primary Industries and Fisheries in Australia. In 2002, the European Union funded a 4-year collaborative project for the culture and management of Scylla species. The objective was to improve the reliability and economic viability of mangrove crab hatchery and nursery production for supporting mangrove-pond aquasilviculture production systems and stock enhancement. Partner universities of this project include the University of Wales Bangor (U.K.), University of Ghent (Belgium), and Can Tho University (Viet Nam). After the EU project, SEAFDEC/AQD continued its R&D on mangrove crab culture. To sustain the growing industry, domestication of mangrove crab was initiated through funding from the Government of Japan (GOJ) Trust Fund in 2005. Refinements in the various culture technologies of mangrove crab and other waves of innovations were reported from all of these activities. The most recent refinements done in the hatchery, nursery, and grow-out phases were based on the results of several projects funded by GOJ from 2007 to 2012; and by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCCARRD) of the Department of Science and Technology (DOST) from 2012 to 2017. Innovations in the hatchery are incorporated in this manual.

This manual builds upon the 2nd edition of "Biology and Hatchery of Mud Crabs *Scylla* spp." published in 2008. The updated information found here is a product of SEAFDEC/AQD's thrust to continually improve mangrove crab culture through science-based technologies. We hope this publication will be of benefit to existing and prospective hatchery, nursery, and grow-out investors, operators, as well as technicians, instructors, and students.

Dan D. Baliao Chief SEAFDEC/AQD

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INTRODUCTION

Overexploitation of mangrove crab (mud crab) resources and loss of habitats have resulted in both reduced landings and smaller mean capture size. In the past, 'match box' size or bigger crabs (3-5 cm carapace width or CW) are stocked in grow-out ponds but due to the declining catch of this size, 'fly' size crabs (0.6-1.2 cm CW; crab instar) have now become acceptable for stocking. The 'fly' size crabs are cheaper and can easily adjust to salinity changes. Triangular net or scissors net with fine mesh size (locally known as 'sid-sid') are used for gathering these crablets. This method is destructive to the environment as the bottom substrate is scraped, killing not only crabs but also other organisms. This also further aggravates the declining population of the wild crabs.

Further expansion of crab farming has been sluggish due to the seasonal availability of seeds, which are sourced from the wild. Proper fisheries management and development of commercially viable techniques for producing seeds are crucial in making crab aquaculture sustainable. To address the issue on lack of seed supply, SEAFDEC/AQD developed a hatchery technology for mangrove crab. Tests have proven that the performance of hatchery-reared crablets is comparable with those of the wild crablets.

Hatchery is the first phase in crab culture and has become an important phase to meet the increasing seed requirement of the industry. Since the second publication of the manual in 2008, studies have been conducted to further improve the viability of the hatchery technology. This third edition incorporates the modifications that have been made to refine the previous hatchery technology.

This manual includes the biology of crab (*Scylla serrata*, *S. tranquebarica*, and *S. olivacea*), and describes principles and procedures for spawning the mature crabs and rearing the zoea to 'fly' size crabs. It focuses on the hatchery rearing of *S. serrata* as the farming of this species is more economically viable than the two other species. The techniques may be modified depending on the conditions or problems encountered in a specific site.