

Introduction



Mud crabs, also known as mangrove crabs, belong to Family Portunidae under genus *Scylla* with four species, *S. serrata*, *S. tranquebarica*, *S. olivacea* and *S. paramamosain*. These large marine and estuarine crustaceans live in soft muddy bottom in sheltered estuaries, tidal flats and rivers lined with mangroves. However, females carrying eggs are present in deeper waters up to 50 km offshore in tropical to warm temperate waters. Mud crabs vary in colour from dark olive-brown to greenish and blue-black, and patterns of lighter colored dots cover the walking legs.

Mud crab aquaculture has been practiced for many years in Southeast Asia and is an important source of income among fisherfolks. Traditionally, these activities were mainly based on stocking wild-caught juveniles and adults for grow-out culture and fattening. The demand for mud crabs in the export market has multiplied farming activities leading to intensified collection of wild seed. Thus, SEAFDEC Aquaculture Department developed technology for large-scale production of juvenile mud crabs, *S. serrata*, *S. olivacea* and *S. tranquebarica* to ensure the sustainability of mud crab farming and reduce the fishing pressure on wild stocks.

With the state-of-the-art of mud crab larval rearing in hatcheries, not all mortality is caused by disease and much remains to be learned to improve the survival of hatchery-reared zoeae to megalopae, which is currently at 4%. Although hatchery production of megalopae is already feasible, the initial source of spawners and broodstock is mostly wild stock. Thus, broodstock development is also an important component of SEAFDEC Aquaculture Department's project on mud crabs to avoid undue environmental impact due to over-harvesting and continuous collection of gravid females from nature. This activity is aimed at learning more about domestication of crabs for sustainable aquaculture development and independence from natural populations of spawners.

Because crab culture operations have not taken off to the level of other crustacean species like shrimps and prawn and stocking densities in culture systems have been comparatively low, numerous diseases with potential economic impact may not have been observed and caused problems. For example, the septicemic "orange crab disease that was responsible for losses of crabs (*Scylla serrata*) cultured in floating cages in Singapore is not included in this manual since not a case was observed in the course of our study. *Scylla* baculovirus (SBV) and the parasite *Hematodinium* sp. that have been reported infecting the digestive organs of juveniles, sub-adult and adult *S. serrata* in Australia, were not observed or probably have been missed out in routine diagnosis. *Hematodinium* infection can be difficult to diagnose and is believed to cause substantial mortality in the field because infections are generally considered terminal. Another reported disease of unknown prevalence is *Sacculina granifera*, a parasite that causes sterility among infected crabs and alteration of taste of infected meat. If such diseases remain unreported or unsolved during culture, they will

hamper production or affect the marketability of products. Moreover, infected crabs may potentially transmit pathogens to various rearing facilities, adjacent farms, and, worse, into the natural environment. At present, most diseases are observed in crab grow-out only when the quality of the water or the soil is poor.

We recognize that many of the diseases and associated fouling organisms on crabs presented here are classified under non-specific taxonomic groupings. This is because not much in-depth study has been conducted on the pathogens so far and our aim is to provide a practical guidance rather than an academic review. Our endeavor to bring academic significance to our work is continuing by collaborating with various scientists and specialists. For now, this book intends to inform crab industry stake-holders on diseases commonly observed during culture of various stages of crabs, and methods and practices to minimize losses from diseases. The diagnostic techniques described for each disease or abnormality gives emphasis on gross observation, and simple microscopy and microbiology. Specifically, the goals of the book are to:

- present the disease problems commonly observed in larvae, juvenile and adults
- provide simple diagnostic background for hatchery and farm technicians
- introduce techniques for disease prevention
- increase awareness about hazards of diseases to the operation and the environment

Background information on the development of disease and the relationships between the hosts, pathogens and the environment that result to outbreaks, as well as sources of more information can be obtained by starting with the references and links below. It has been observed that diseases of crustaceans have many similarities. Thus, references on shrimps and other species of crabs are useful materials in studying diseases of mudcrabs. Interestingly, the internet offers a vast array of information, though not necessarily on mud crab that will surely widen everyone's perspective on crab culture. The few links to web-based information that are listed below, as well as after every disease problem described, are intended to lead readers to the wealth of web-based information.

References



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Web-based Resources



<http://aquanic.org/> = This is the website of The Aquaculture Network Information Center which provides a gateway to the world's electronic aquaculture resources.

<http://www.dpi.qld.gov.au/extra/pdf/fishweb/mudcrab.pdf> = This is the link to a leaflet on mud crab available for download and shows a simple life cycle illustration.

www.pac.dfo-mpo.gc.ca = The website has an array of diseases of aquatic animals. Find the AQUACULTURE pages and search for crab diseases.

<http://www.dpi.qld.gov.au/fishweb/2698.html>

www.blue-crab.org

<http://www.blue-crab.org/lifecycle1.htm>

[http://www.aciar.gov.au/web.nsf/doc/ACIA-5VL3HK/\\$file/WP54%20Web.pdf](http://www.aciar.gov.au/web.nsf/doc/ACIA-5VL3HK/$file/WP54%20Web.pdf)

http://www.enaca.org/AquacultureAsia/Articles/July-Sept-2002/Seed_production_crucifix.pdf

<http://www.dec.ctu.edu.vn/sardi/AacrabCWare/Publication/309CRA.htm>

http://www.spc.org.nc/aquaculture/site/commodities/PDF/MudCrab_page.pdf

Discussion Groups



Aquataalk at <http://www.data-case.com/index.htm>

AquaFarmers' Corner at <http://www.seafdec.org.ph/ubbthreads/ubbthreads.php>

Training



AquaHealth Online at: <http://www.seafdec.org.ph/training/aquahealthonline.html>