

The broodstock maintained by SEAFDEC/AQD spawns spontaneously year-round with a range of 13 to 37 days between spawnings. Although survival to juvenile size in the hatchery is still low, spawning is consistent and spontaneous. The animals are fed *Gracilaria*, the agar-bearing seaweed. An artificial diet has been formulated which can be used to supplement the natural food. The artificial diet gives the shell of the animal a bluish color providing a good way to mark the abalone prior to release. Feeding the abalone with the artificial diet for one month prior to its release is sufficient for the animal to form a distinctive blue band on its shell once the abalone goes back to its regular seaweed diet, making post-stocking monitoring and assessment an easier task.

Seahorse

Commanding a good price either in live form for the aquarium or in dried form for traditional Chinese medicine, seahorse gathering in the Philippines and other parts of Southeast Asia is a good supplemental livelihood activity.

SEAFDEC/AQD research on seahorses started in 1996. At present, juvenile seahorses are being regularly produced so that SEAFDEC/AQD now has at least second generation hatchery-bred animals in captivity. Sites are now being evaluated where seahorse juveniles may eventually be stocked.

Other Species

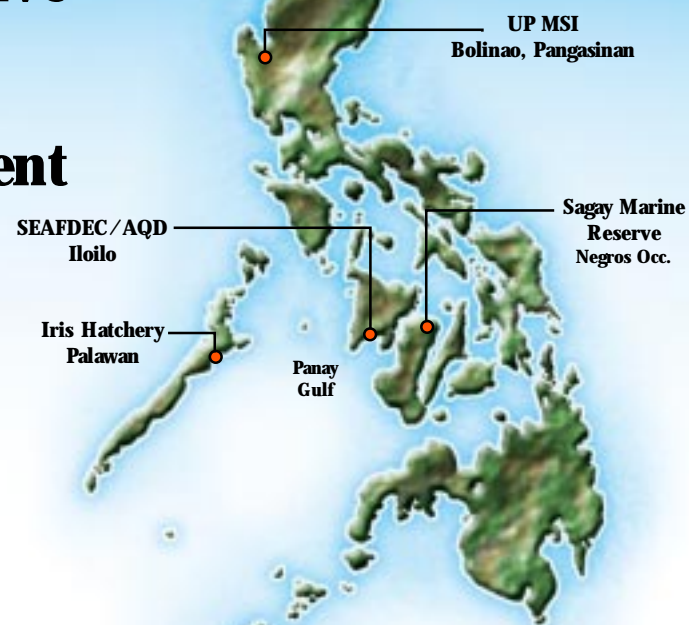
Other species shall eventually be included for breeding. In the meantime, SEAFDEC/AQD is involved in the dispersal of the giant clams (*Tridacna* spp) and of the top shell *Trochus niloticus* through its tie-up with other institutions. Giant clam seedstock comes from the University of the Philippines Marine Science Institute; top shell seedstock from Iris hatchery, a private hatchery in Palawan.



ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium "Fish for the People" 19-24 November 2001, Bangkok, Thailand

Recommendation 3. The ministers recognize the growing demand for fish and fishery products and the need to obtain sustainable fish supplies for food security as well as the increasing pressure on ASEAN's aquatic environment and fisheries resources. The ministers underline the increasing role of fisheries including aquaculture that could play in supporting food security primarily as source of animal protein, expanding job opportunities, improving the incomes of small-scale fishermen and fish farming families and to the better attainment of economic growth as a whole, and should be further promoted in a sustainable manner.

AQD's collaborative work on stock enhancement



The Southeast Asian Fisheries Development Center (SEAFDEC) is a regional treaty organization established in December 1967 for the purpose of promoting fisheries development in the region. Its member countries are Japan, Malaysia, the Philippines, Singapore, Thailand, Brunei Darussalam, the Socialist Republic of Vietnam, Union of Myanmar, and Indonesia.

SEAFDEC undertakes research on appropriate fishery technologies, trains fisheries and aquaculture technicians, and disseminates fisheries and aquaculture information. Four departments were established to pursue the objectives of SEAFDEC.

- The Training Department (TD) in Samut Prakan, Thailand, established in 1967 for marine capture fisheries training
- The Marine Fisheries Research Department (MFRD) in Singapore, established in 1967 for fishery post-harvest technology
- The Aquaculture Department (AQD) in Iloilo, Philippines, established in July 1973 for aquaculture research and development
- The Marine Fishery Resources Development and Management Department (MFRDMD) in Kuala Terengganu, Malaysia, established in 1992 for the development and management of the marine fishery resources in the exclusive economic zones (EEZs) of SEAFDEC Member Countries.

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PROTECTING LIVELIHOOD THROUGH STOCK ENHANCEMENT



Southeast Asian Fisheries Development Center
Aquaculture Department
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THE STOCK ENHANCEMENT PROGRAM OF SEAFDEC/AQD

Background

Stock enhancement as a program of SEAFDEC Aquaculture Department (AQD) started formally only in 2000 but, as an activity, it had its start in 1991 as part of the Community Fishery Management Project undertaken in Malalison Island, Culasi, Antique (west central Philippines). The program is one of four regular programs of AQD focused on addressing urgent issues in aquaculture in Southeast Asia. The importance of stock enhancement was articulated as early as 1969 in the Kyoto Declaration on Aquaculture (Sections 17 and 18) and was affirmed in 2000 in the Bangkok Declaration and Strategy for Aquaculture Development (Sections 3.9 and 3.10).

Resource enhancement is one of the major issues taken up during the ASEAN-SEAFDEC Conference on Sustainable Fisheries for the New Millennium held in Bangkok, Thailand on 19-24 November 2001. One of the ten-point recommendations in the said Conference reads: "Promote re-stocking activities (seed release programs) from hatchery-produced stocks and/or wild collected sources in areas where they are considered to be feasible, particularly in localities operating within a regime of rights-based fisheries."



Program Components

The program has two research components, namely:

- Adaptation of breeding and hatchery production technologies of appropriate species for stock enhancement
- Development of strategies for release and stock enhancement of appropriate species

The breeding component brings together previous works on the propagation of three types of organisms, window-pane oyster (*Placuna placenta*), abalone (*Haliotis asinina*) and seahorses (*Hippocampus barbouri* and *H. kuda*). Other species for propagation are to be added based on prioritized need. Meanwhile, through collaboration with other institutions in the Philippines, AQD also has access to the seedstock or juveniles of the giant clam (*Tridacna* spp) and of the top shell (*Trochus niloticus*).

AQD researchers are now identifying and evaluating areas where the various species mentioned may be stocked. To be developed by the program are strategies for the following activities:

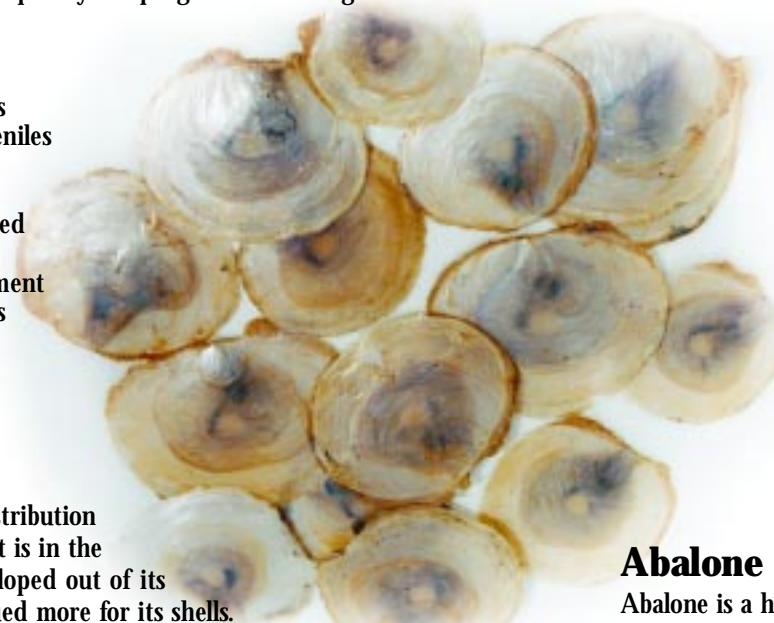
- Release, marking, and monitoring
- Transplantation of breeding adults
- Release of hatchery-produced juveniles
- Co-management of resources

Stock enhancement technology developed shall be disseminated to fishers, non-government organizations, local government units and appropriate national agencies through manuals, videos, seminars, and training.

Window-Pane Oyster

The window-pane oyster has a wide distribution throughout the Indo-Pacific waters but it is in the Philippines where an industry has developed out of its fisheries. Its meat is eaten but it is valued more for its shells.

Craftsmen in the Philippines have created a very wide range of products out of its translucent shells. Its common name is derived from its traditional use as window panes, which are distinctive for their soft pearly glow when light shines through. Products crafted from its shells are decorative household items, a large volume of which goes to the export market. From its collection, shucking and washing up to its fabrication into various items, the window-pane oyster has provided livelihood and employment to thousands of people.



Due to the high demand for its shell, many of the rich window-pane oyster beds have been depleted by fishing them, oftentimes with metal dredges which are non-selective and collect even young individuals. Consequently, the number of areas where they can be found in the Philippines decreased over the years. Its disappearance in an area means loss of livelihood for thousands of fisher families dependent upon it.

SEAFDEC/AQD researchers have succeeded in propagating the species in the hatchery. The juveniles can be nursed to larger sizes in tanks so they can survive better in nature once released. Initial attempts have also been made to enhance the depleted beds along the Gulf of Panay by releasing both immature stock and breeding stock collected from a neighboring island. Close collaboration with the concerned local government has also resulted in the closure of the stock-enhanced area to all forms of gathering so that a viable breeding population can be established. This will be followed by the establishment of a permanent protected area so that a breeding population will always be available to restock the area.

Abalone

Abalone is a high value species of gastropod mollusk. Its large "foot" with which it clings to rocks or moves about and spills out from its shallow shell is one big muscle that is highly prized in Chinese cuisine. Often the abalone entrée in a Chinese restaurant is one of the priciest items. The most common species in the Indo-Pacific waters is the donkey's-ear abalone (*Haliotis asinina*). Although the species do not grow as big as its temperate equivalent, its dried form can still command a good price in the international market. Its continued occurrence will therefore be of great benefit to the coastal fishing communities where they are found.