

Aquaculture-based Enhancement and Restoration of Giant Clam in Thailand

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Abstract

Giant clams are protected species under Thailand's Wildlife Conservation and Protection Act of B.E. 2535. Natural stock of giant clams has been declining to scarcity in almost every natural distribution area. Among three living giant clam species in Thai waters, *Tridacna squamosa* was considered the most endangered with less than 1% in existing number. Successful hatchery breeding and seed production of this species has been achieved by Thailand Department of Fisheries since 1993. After that, the giant clam restocking programs have been carried out at several sites both in the Gulf of Thailand and the Andaman Sea with various levels of success. Unlike other fisheries resources, the giant clam seed production and restocking in Thailand have been targeted mainly for conservation purposes. The restocking programs were cooperated by Department of Fisheries and Department of Marine and Coastal Resources. The activities have been conducted in collaboration with local communities, private sectors, as well as conservationists. Details on methodology, constraints, and results will be presented and discussed.

Introduction

In Thailand, giant clams (*Tridacna* spp.) are protected species under the Wildlife Conservation and Protection Act of B.E. 2535. These species are known to have potentials for commercial culture, especially for the aquarium trade. There are three existing giant clam species in Thailand (**Fig. 1**): *Tridacna crocea*, *T. maxima* and *T. squamosa*. These species are distributed in

the waters of Thailand (**Fig. 2**), such as the Gulf of Thailand (25%) and the Andaman Sea (75%). Recent reports have indicated that in Thai waters, *T. crocea* is still abundant and *T. maxima* relatively abundant. However, *T. squamosa* is already endangered (**Fig. 3**). It is for such reason that efforts are being made to breed and enhance the stock of *T. squamosa* in Thai waters.

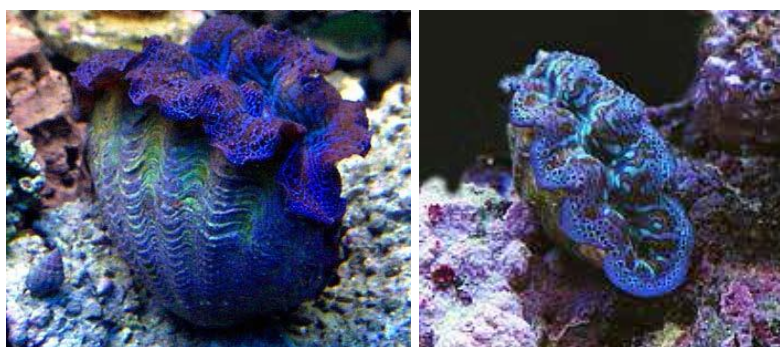


Fig. 1. Existing giant clam species in Thailand (clockwise from left): *T. crocea*, *T. maxima*, and *T. squamosa*

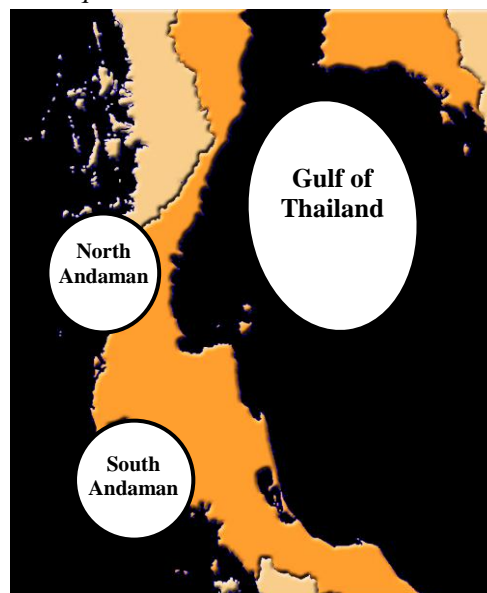


Fig. 2. Distribution of giant clams in Thai waters

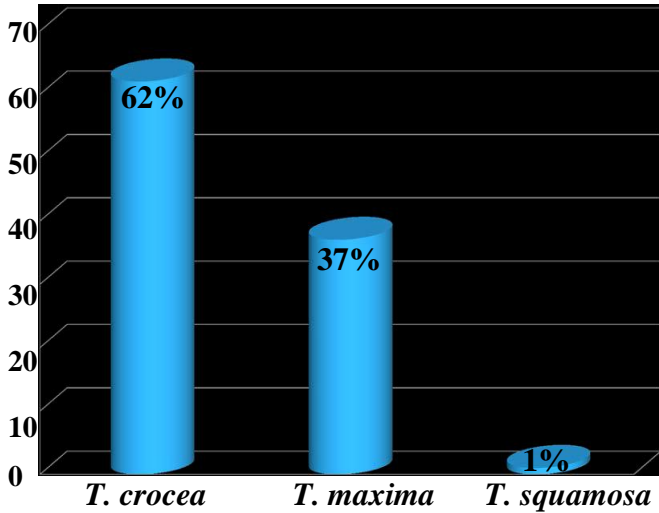


Fig. 3. Level of abundance of giant clams in Thai waters

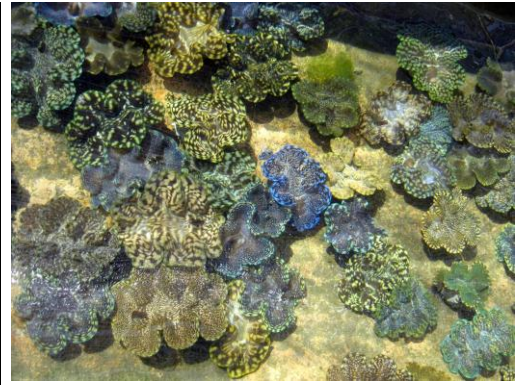


Fig. 4. Successful breeding of *T. squamosa* in Thailand

Activities Conducted

Tridacna squamosa has been successfully bred since 1993 (Fig. 4). This was achieved through cooperative works on enhancement and restoration by the Department of Fisheries of Thailand under the Ministry of Agriculture and Cooperatives and the Department of Marine and Coastal Resources under the Ministry of Natural Resources and Environment. The specific activities included broodstock management; hatchery, breeding and larval rearing; land-based nursery; and transportation of juveniles.

Ocean nursery and releasing/transportation had also been carried out since 1994 by restocking juveniles into natural reefs. Bottom cages were fabricated to serve as ocean nursery, in the waters of Koh Tao in Surat Thani Province; Koh Maithon in Phuket Povice; and in Islands at the Chumphon Natural Marine Park (Fig. 5). Various stakeholders join the restocking activities, such as local communities, SCUBA diver-volunteers, members of diving clubs/operators, conservationists, etc.

Results and Lessons Learnt

During the installation and monitoring of the ocean nurseries, it was noted that natural predators were common in the ocean beds preying on the stocked juvenile clams. The predators include the yellow-margin triggerfish *Pseudobalistes flavomarginatus*, giant triggerfish *Balistoides viridescens*, tripletail wrasse *Cheilinus trilobatus*, sea turtles, and others. It is therefore necessary that the ocean nurseries (Fig. 6) should be regularly maintained and monitored.



Fig. 5. Map of Thailand showing the locations of ocean nurseries for the giant clam *T. squamosa*



Fig. 6. Ocean nursery for the giant clam *T. squamosa*

Conclusion

From 1994 to 2015, about 16 sites in Thai waters had been restocked with the giant clam *T. squamosa*. Different populations were stocked in the Gulf of Thailand and the Andaman Sea. So far, more than 6,000 clams were stocked in the Andaman Sea and more than 250,000 in the Gulf of Thailand. During the restocking important considerations were always kept in view. These include the genetic diversity of broodstock populations and hatchery-produced juveniles. Monitoring of the restocked clams indicated survival rate of 5-65% one month after release. The activity was however confronted with various problems and constraints.

These included natural environmental factors such as storms, wave surge and sea turbulence, increasing seawater temperature that could lead to bleaching, habitats destruction, and predation by other marine animals; and human interferences. The activity has provided juvenile clams for the Giant Clam Garden Project under the Royal Patronage of H.M. the Queen of Thailand since 1997. Moreover, special conservation activities had been promoted including the so-called Giant Clam Adoption scheme. This way, the concerned stakeholders monitor and make sure that their adopted giant clams are growing well.