

Hatchery Production of Black-lip Pearl Oyster Spat in the Andaman and Nicobar Islands: A Success Story

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The lustrous black pearls produced by the black-lip pearl oyster *Pinctada margaritifera* in the inner surface its two shells have become one of the most valuable pearls on earth with prices ranging from a minimum of 100 US\$ and to a maximum of 10,000 US\$ per pearl, in the case of those of exceptional and rare quality. Through the production of black pearls from *Pinctada margaritifera*, the island country of Tahiti became the global leader in this business controlling 28.8% of the world market. Most countries with natural stock of *P. margaritifera* developed extensive mariculture programmes in the second half of last century to rebuild the natural stock and develop black pearl farms. Farming of black-lip pearl oyster has been a viable industry in the tropical Pacific and the South Pacific islands. It is supported by the continuous availability of pearl oysters. Seed for implantation is mainly collected from the wild but hatchery produced spat is very attractive with price per spat being on an average A\$ 0.11 (Rs. 4.75). Myanmar, Indonesia and Philippines have also made rapid strides in pearl production with *P. margaritifera* and *P. maxima* indicating that this feat can be replicated with success in the Andaman and Nicobar Islands too, where black lip pearl oysters are found in inter-tidal and sub-tidal regions. For nearly a century, the shells of this oyster have been extensively used by the islanders for production of exquisite shell craft products.

In the year 2002, the Central Marine Fisheries Research Institute (CMFRI), Kochi, initiated a project on 'Farming and seed production of black-lip pearl oyster in the A & N islands' funded by the Centre for Marine Living Resources and Ecology, Ministry of Earth Sciences at Port Blair. The project work began with all enthusiasm immediately; however, the great Asian Tsunami of December 2004 destroyed all the farm structures thereby bringing to a halt the activity which was progressing significantly. However, the work was revived and a mini pearl oyster hatchery was set up at Marine Hill, Port Blair at a site provided by the Department of Fisheries of A & N Islands. Seed production of the black lip pearl oyster was a major

objective of the project and success was first achieved in producing spat of this precious pearl oyster during February 2009 and subsequently large-scale spat production was achieved in October – November 2009.

Black-lip pearl oyster hatchery at Port Blair: The Black-lip pearl oyster Project site at Marine Hill, Port Blair has a seawater intake arrangement with gravity-driven distribution system having in-line filtration, broodstock conditioning room and larval rearing system (Fig1). To support larval rearing, there is an algal culture lab in which high quality pure live feed, especially *Chaetoceros* spp, *Isochrysis galbana*, *Pavlova lutheri* and *Nannochloropsis* spp are produced continuously (Fig.2).

Seed Production: Broodstock of *P. margaritifera* (Fig3&4) were induced to mature in the hatchery and subsequent to this both natural spawning and chemical (TRIS buffer) induced spawning occurred. The fertilised eggs passed through the different larval stages like the veliger, umbo, pediveliger and finally by 31st day the spat settled (Fig.5&10). The settled spat measured 300-400 µm and more than one lakh spat are now reared at the Port Blair Hatchery. The algal feed produced in the hatchery was provided to the broodstock, the developing larvae and spat. The next batch of larvae is now being reared in the Marine Hill hatchery.

Initially, several problems halted development of veliger larvae to spat. Though millions of veliger larvae were produced on several occasions, either by induced spawning or spontaneous natural spawning, factors like non-conducive environmental factors, especially temperature, poor water quality, and lack of appropriate feed in sufficient quantity hindered larval development. All these problems were overcome through concerted efforts and now a complete technology for seed production of black-lip pearl oyster has been developed in the A&N Islands. Earlier during the late 1980s spat of black-lip pearl oyster was produced in the shellfish hatchery of

CMFRI at Tuticorin on an experimental basis. The present success at Port Blair can be considered as the final step towards development of a black pearl production programme in these islands.

Direct Impact of black-lip pearl oyster seed production: Black-lip pearl oysters can be utilised for pearl production in the A&N Islands. With the successful production of spat in the hatchery it is possible to develop a black pearl production programme in the island. Prior to this, the black-lip pearl production technique is planned to be standardised and through the MoES funded project, this activity will also be undertaken in the A&N Islands within the next few months. Once this is standardised, the black-lip pearl production programme can be sustained through the continuous supply of spat from the hatchery. It will take nearly a year and a half for the spat to reach implantable size and this rearing part can be taken up as a group farming activity. In the Tahiti Islands, several families are engaged in collecting and rearing spat to implantable size oysters. Black-lip Pearl farming and related industries currently employ 7,000 people in Tahiti, in over 1,000 pearl farms throughout French Polynesia's far flung archipelagos. Similarly, black-lip pearl farming is French Polynesia's second biggest income earner, after tourism. It provides about 10,000 jobs.

With proper site selection and grow-out systems, the hatchery produced spat of the system can be reared by the islanders and this can be an alternate source of livelihood for them. The continuous supply of hatchery produced spat to groups which rear the spat to adult size and supply to the pearling industry can support a stable pearl industry in the A&N Islands. This can also support the shell craft industry of the island. Shells of Black-lip pearl oysters, also known as the Mother-of-Pearl (MoP) are presently utilised by the islanders in the shell craft industry. A continuous supply of MoP will be an indirect benefit through this programme.



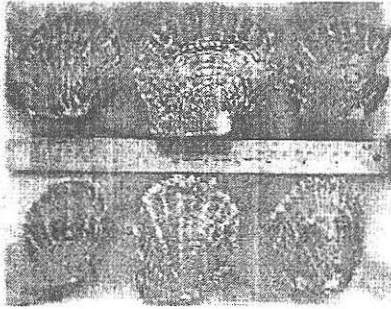


Fig.1: Broodstock oysters.

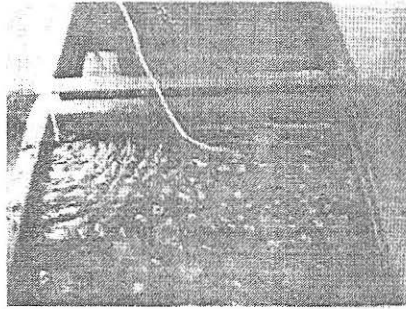


Fig.2: Broodstock facility.

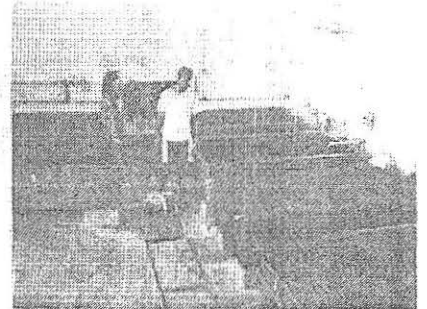


Fig.3: One million spat capacity pearl oyster Hatchery.

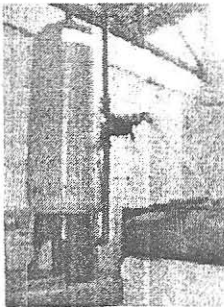


Fig.4: Seawater intake and Pressure sand filtration facility for hatchery.

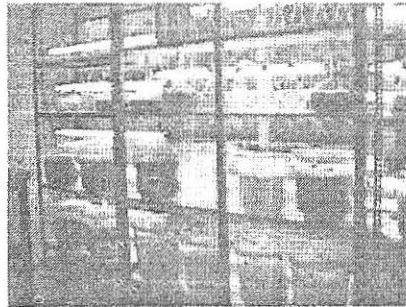


Fig 5: Algal culture facility.

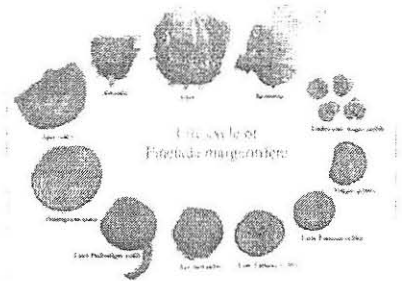


Fig 6: Life cycle of *Pinctada margaritifera*

Growth Stages: Veliger, Umbo stage, Plantigrade stage, Early spat and Late spat

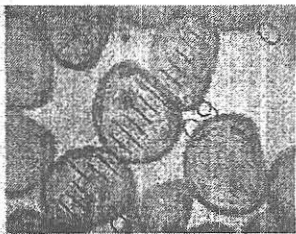


Fig.7: Veliger (7th day).

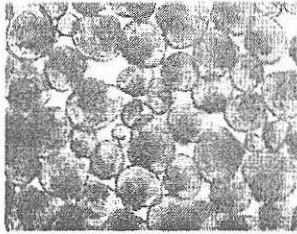


Fig.8: Umbo stage (12th day).

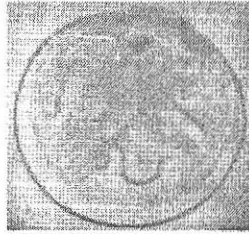


Fig.9: Plantigrade stage (21st day).



Fig.10: Early spat (30th day).



Fig.11: Late spat (35th day).