



Spat in micro-nursery silos.

Clam spat in oxygen filled bags

RANCHING AND FIELD RELEASE

In December 2024, three million hatchery - produced seeds of *Paphia malabarica* were released into selected protected clam sanctuaries of Ashtamudi Lake, in collaboration with local fishers, state fisheries officials, and CMFRI scientists, to replenish natural populations and strengthen the fishery.

This activity demonstrated how hatchery technology can work hand in hand with community participation to restore depleted resources. Ranching not only supports ecological recovery and biodiversity but also ensures sustainable livelihoods for the fisherfolk who depend on the clam beds of Ashtamudi Lake.



Ranching of yellow-foot clam spat in Ashtamudi Lake

BENEFITS

The technology offers multiple benefits. By restoring depleted stocks, it ensures a reliable supply of clams for future generations. It secures livelihoods for thousands of fishers and workers engaged in clam-related activities, while contributing to the ecological balance of Ashtamudi Lake. Considering the high market value of yellow-foot clams in both domestic and international markets, this technology also opens up a promising new farming sector in India. As a non-fed aquaculture system, clam farming requires no artificial feed inputs, relying instead on natural phytoplankton in the water. This makes it both environmentally friendly and highly cost-effective compared to feed-based aquaculture ventures. With strong export potential to countries like south east Asian countries and Japan, hatchery-based clam seed production strengthens the local economy. Furthermore, CMFRI's capacity to scale up production to over 100 million seeds annually creates new possibilities for large-scale ranching programs covering clams, oysters, and mussels in India's coastal waters.

PREPARED BY:

P. Gomathi, Mariam Fasula,
M.K Anil, P.M Krishnapriya, O.Shalini.

CONTACT: Director, ICAR- Central
Marine Fisheries Research Institute
Kochi, Kerala-682018

PUBLISHED BY:

Dr. Grinson George, Director
ICAR-CMFRI,
Post Box No. 1603, Ernakulam North P.O.
Kochi-682 018, Kerala, India; Tel: +91-484-2394867;
Fax: +91-484-2394909
E-mail: director.cmfri@icar.org.in; Web: www.cmfri.org.in

DEVELOPED BY:

ICAR- Central Marine Fisheries Research Institute
Kochi, Kerala- 682 018

CMFRI Pamphlet Series No.170/2025



YELLOW-FOOT CLAM

(*Paphia malabarica*)

SEED PRODUCTION TECHNOLOGY

A Sustainable Ranching
Solution for Ashtamudi Lake

ICAR- Central Marine Fisheries
Research Institute
Kochi, Kerala- 682 018

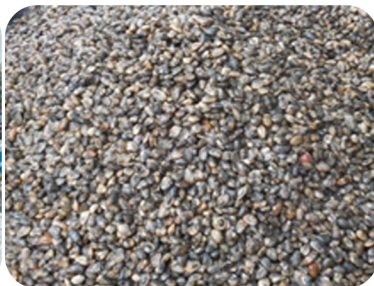


INTRODUCTION

The yellow-foot clam (*Paphia malabarica*) in Ashtamudi Lake, Kerala, has long been a lifeline for local communities, directly supporting around 1,000 fishers and indirectly benefiting 3,000 to 4,000 people in processing, marketing, and allied activities. In 2014, this fishery became India's first to receive Marine Stewardship Council (MSC) certification, a global recognition of its sustainable practices. During the 1990s and early 2000s, the fishery yielded nearly 10,000 tones annually, driven by strong domestic and export demand. However, overfishing, habitat loss, climatic stressors, freshwater flooding, and the invasion of non-native species caused a drastic decline, with present catches falling below 1,000 tones. To address this alarming situation, the Vizhinjam Regional Centre of ICAR-CMFRI has successfully developed hatchery-based mass seed production technology. This approach is now being used for ranching and farming, offering fresh opportunities for stock restoration and long-term sustainability of this valuable fishery.



Yellow-foot clam fishery



Clam harvest

HATCHERY TECHNOLOGY

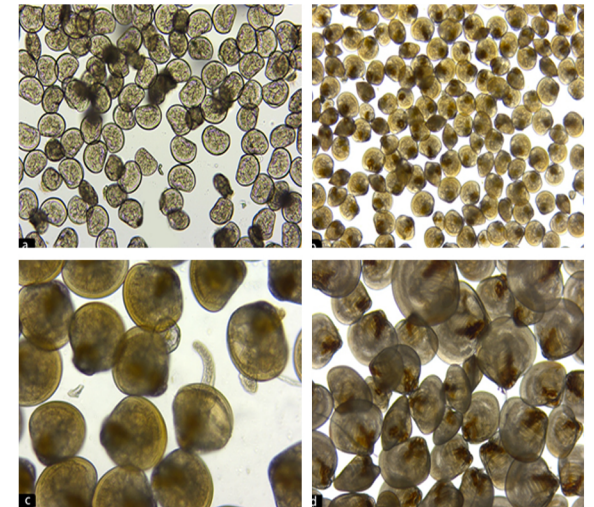
Broodstock clams measuring 31–39 mm in shell length and weighing around 8 g were collected from Ashtamudi Lake. After cleaning and a week-long quarantine, they were transferred to temperature-controlled broodstock tanks maintained at 23–24°C, 35 ppt salinity, and pH between 7.7 and 8.2. The clams were fed three times daily with a multispecies algal diet consisting of *Isochrysis galbana*, *Chaetoceros* sp. and *Pavlova* sp. while drip-fed cultures from a photobioreactor were supplied to maintain nutrition.

Spawning was achieved in two ways. The first method was maturation in captivity followed by thermal induction, where raising the temperature by 5–10°C — sometimes occurring naturally during water exchange — resulted in spontaneous spawning. Male clams released sperm as smoky clouds, followed by females releasing eggs intermittently into the water, where fertilization occurred. In the second method, spawning was induced by intramuscular injection of serotonin into mature clams, which triggered gamete release. Both methods were standardized at CMFRI for reliable spawning, though thermal induction is easier and therefore used for mass production.



Spawning

The fertilized eggs developed into free-swimming D-larvae measuring about 91 µm. These larvae were stocked in FRP tanks at densities of 0.5 to 1.0 larvae per milliliter under optimal water quality conditions—28–30°C temperature, 34–35 ppt salinity, and pH between 7.6 and 8.2. Within three to five days, the larvae reached the umbo stage (138 µm) and later the late umbo stage (185 µm). By the seventh to ninth day, the larvae grew to 230 µm, developed a foot, and were then transferred to a micro-nursery system for further rearing.



P. malabarica larval stages:

- a. D-veliger b. Umbo stage
- c. Pediveliger d. Clam spat

The micro-nursery system consisted of downwelling and upwelling silos connected to a 2000-litre reservoir. The pediveliger larvae were stocked in silos fitted with mesh bases, initially 150 µm and later upgraded through 250 µm, 500 µm, and 1 mm mesh