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(Indian Council of Agricultural Research)
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EXPERIMENTAL SEA-RANCHING OF PEARL OYSTER IN THE GULF OF MANNAR

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INTRODUCTION

Sea-ranching of laboratory/captive reared organisms/animals is a technique which aims at rebuilding the wild population from its destruction/catastrophe by man-made and natural causes. One important difference between land-ranches and sea-ranches is that the land-rancher retains ownership of his animals whereas the sea-ranched animals become part of the common property resource which can be harvested by anybody. Artificial supplementation of commercial catches is thus the theme of sea-ranching and forms part of fishery management technique.

In species enlisted as endangered, attempts were made to sea-ranch them with a little success. Taking advantage of their high potentialities in reproduction and simultaneously slashing their early natural mortality through captive rearing of hatchlings, offers a powerful tool to help rebuild and conserve these endangered species like turtles (Henry, 1979). To achieve this in turtles, he has recommended two courses of action, to reduce man's incidental and intentional catch of wild turtles and restock the wild population with captive-reared animals from commercial operation. Sea-ranching is advantageous for 'homing' species where the sea-ranching country stands to benefit.

Abalones are produced in the hatcheries and transplanted in the sea as a practice to increase production (Imai, 1977). In the case of pearl oysters which are sedentary, no attempt was made in the past to sea-ranch them for augmenting the natural population. The recent development in the mass production of spat of pearl oysters (Alagarwami *et al.*, 1983) has opened up this possibility and an experimental sea-ranching programme was started in the Gulf of Mannar.

FLUCTUATIONS OF PEARL OYSTER RESOURCE IN NATURAL BEDS

The widespread mortality of pearl oysters, both young and old, in the beds of Gulf of Mannar may be due to physical causes such as shifting of sand due to strong currents, or to destruction by natural enemies. Factors like overfishing, overcrowding and diseases may also be responsible for the depletion of stock from the beds (Herdman, 1903). Predation by fishes like *Balistes* sp., *Lethrinus* sp., *Serranus* sp., *Tetrodon*, sharks and rays, mainly *Rhinoptera* and *Ginglymostoma* (Hornell, 1916), moray eels and octopi (Salvadori, 1960), covering the spat by *Modiolus* ('suran') mat (Mahadevan and Nayar, 1973, 1976) and predation by gastropods (Chellam *et al.*, 1983) have been found to be some of the causes responsible for the destruction of oysters. In the recent years, several industries have sprung up along the coast which discharge their effluents into the sea. Ship traffic has been on the increase with the construction of a commercial harbour at Tuticorin with resultant oil spillage. Operation of fishing trawlers in the paars and their vicinity is disturbing the bottom ecology of pearl oyster beds.

Revival of natural beds may be possible only with a series of favourable seasons. The mutual dependence between the pearl banks of Sri Lanka and India in replenishing the beds by larval drift was suggested by Hornell (1916). But Devanesan and Chidambaram (1956) were of the opinion that the beds revive by self-effort only. Alagarwami (1977) observed good spat setting in the inshore areas and also resurgent populations of species of pearl oyster other than *Pinctada fucata* in the natural beds which he attributed to coastal larval drift.

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CONSERVATION OF PEARL OYSTER IN THE
NATURAL BEDS

Herdman (1906) suggested transplantation of young 'strikes' or brood of oysters from useless or unreliable paars to other paars which afford better growing and survival conditions. Hornell (1916) endorsed the above strategy and suggested rehabilitating the outer series of pearl banks by transplanting the scattered oysters found in the shallow areas (5-7 f) around the reefs and islands at the head of the Gulf. Maintaining a 'breeding reserve' of *P. vulgaris* (= *fucata*) in the Tholayiram paar (Devanesan and Chidambaram, 1956) and development of hollows in the pearl oyster beds by filling with rocks to provide better anchorage for oyster (Salvadori, 1960) are some of the measures suggested to conserve and promote the survival of the pearl oyster population.

For the sea-ranching of pearl oyster in the Gulf of Mannar one of the shorewards paars, the Vanthivu arupagam paar was selected initially for its accessibility and easy monitoring. The depth of the paar is 12 m. Between December, 1985 and July, 1986 a total of 7,20,000 spat of *P. fucata* (Gould) were sea-ranching on 6 occasions. The size of the spat ranged from 1.7 mm to 4.8 mm with an average length of 3.1 mm. The spat collected from the hatchery tanks were allowed to settle on synthetic materials like old fish nets, velon screen fabric and tufts of monofilaments. These materials with the spat were placed in large rectangular cages (90 × 60 × 15 cm) covered with synthetic webbing. The cages were further enclosed with old fish nets. The spat could crawl out through the meshes for dispersal on the paar. The spat-filled cages were lowered and kept inside hollows or secured to coralline projections with synthetic ropes to prevent drifting. Efforts are underway to monitor the sea-ranching stock of pearl oysters.

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