

KADALEKUM KANIVUKAL

(Bounties of the Sea)

Farm School Series on marine fisheries
broadcast by All India Radio, Thrissur

Edited by

**K. RAVINDRAN
KRISHNA SRINATH
K.K. KUNJIPALU
V. SASIKUMAR**

Published by



CENTRAL INSTITUTE OF FISHERIES TECHNOLOGY
Matsyapuri P.O., Cochin - 682 029

&



ALL INDIA RADIO
Ramavarmapuram, Thrissur - 680 631

CRAB AND LOBSTER CULTURE

Mary K. Manisseri

Central Marine Fisheries Research Institute,
Cochin - 682 014

Crab Farming

In India, crabs are landed as by-catch during commercial fishing operations and used mainly for domestic consumption. However, mud crab has become a highly priced commodity at present. India began to export small quantities of live crab to the Southeast Asian countries in the late eighties. This resulted in a sudden demand for higher production of this commodity and diverted the attention from fishing to farming. As a result, the export of live crab soared from just 36 tonnes in 1987-88 to about 725 tonnes in 1993-94 and over 3000 tonnes in 1995-96. The mud crab, also known as green crab or mangrove crab coming under the genus *Scylla*, is widely used for aquaculture in India and the Indo-west Pacific region.

Biology

Two distinct species of mud crab namely, *Scylla tranquebarica* (Fabricius) and *S. serrata* (Forsk.) occur in the Indo-Pacific region. *S. tranquebarica* grows to a larger size, adults weighing about 1.5 kg to 2.5 kg. This species moves freely and is rarely found in burrows. The upper surface of the carapace is light to dark green. Two sharp spines are seen on the outer margin of the carpus of chelipeds. The polygonal markings seen on all the walking and swimming legs help to identify this species easily. In the case of *S. serrata*, the carapace is greenish brown to ferruginous brown and the polygonal markings are seen only on the distal part of the swimming legs. This species prefers to live in burrows or holes. Adults grow to a weight of about 0.5 kg to 1.0 kg. The outer border of the carpus of cheliped bears one spine, the other spine being absent or blunt.

In mud crab, sexes are separate and the males grow to a larger size than the females. Female crab reach sexual maturity when they grow to a size of about 12 cm in *S. tranquebarica* and 8.5 cm in *S. serrata*. The fertilized eggs

are carried on the pleopods of female crabs for about two weeks. The 'berried' crab migrate from the estuarine areas to the inshore sea where the eggs hatch out. The larvae undergo metamorphosis by passing through different larval stages before developing into the first crab stage. At the megalopa stage they migrate to brackishwater and estuarine areas.

Farming

In India, mud crab farming is gaining popularity in the maritime states of Kerala, Tamil Nadu and Andhra Pradesh. Both *Scylla tranquebarica* and *S. serrata* co-exist in the inshore sea, estuaries, brackish water lakes, mangrove swamps and creeks. Baby crabs are collected from these brackish water areas using trap, cast net, dip net, stake net etc. Live juvenile crab and 'water crab' caught during commercial fishing operations are also transferred to farms whenever possible. Baby crab occurs in good numbers during the months of May to October along our coastal region. At present, crab seed are not produced in large numbers in hatcheries. A hatchery has been established on an experimental basis for production of crab seed at the Central Marine Fisheries Research Institute, in Cochin, Kerala.

Mud crabs are known to tolerate a wide range of salinity that enables farming in low saline water also. The optimum range of salinity is about 10 ppt to 34 ppt, temperature 22°C to 30°C and pH 8.0 to 8.5. The level of dissolved oxygen should be above 3 ppm. Care should be taken to maintain the water quality properly. Small ponds of 0.2 to 1.0 ha with sandy or sand covered muddy bottom and a water depth of 1.5 m are ideal for farming mud crab. Water exchange can be regulated through sluice gates in places where the inflow of tidal water is possible. If the tidal influence is not adequate water has to be pumped in. As the crabs are capable of climbing over the bunds it is desirable to fix overhanging fences of at least 0.5 m height on the dykes. Care should also be taken to see that the crabs do not escape burrowing through the bunds. This can be done by making bunds of over 1 m width. Crabs are highly cannibalistic. In order to protect freshly moulted or otherwise weak crabs it is desirable to provide 'refugee cages' made of cement pipes, concrete blocks, bamboo pieces, tiles or stones. Juvenile crabs, with 2 - 3 cm carapace width are collected from the wild and stocked in ponds at a rate of 2 - 5 per m² after acclimatisation. The crabs can be fed with trash

fish, bivalve meat, etc daily at a rate of 10% of the body weight. After farming for 8 to 10 months, crab weighing more than 500 g can be harvested. Ponds are drained for harvesting. Scoop net, hooks or ring net with bait are also used for harvesting. When crabs are to be marketed live they are tied with thread without breaking their legs.

Mud crabs weighing more than 500 g are sold at Rs. 200/- to Rs. 300/- per kg whereas baby crabs are available for less than Rs. 5/-. Crabs form more than 90% of the live sea food export from India. The export of crab was over 3037 tonnes in 1995-96, earning foreign exchange worth Rs. 30 crores.

Fattening

Fattening is a popular practice adopted in crab farming. Immediately after moulting the crabs remain soft and are called 'water crabs'. Such crabs are obtained live from commercial catchers and are fattened in small ponds, cages or pens until the shell hardens. Stocking is done at the rate of 2 or 3 crab per m² depending on the size. Feeding, water exchange, fencing etc., are to be done with utmost care as explained in the case of growout operations. Crab fattening is highly profitable as harvesting can be done within a short period of 1 to 1.5 months. The practice of farming immature crabs for short periods in similar holdings until their gonads are developed fully is also a popular practice which helps to meet the increasing demand for gravid females.

Lobster Farming

Increased demand for lobster in the export market has led to enhanced fishing activity and farming of lobster in India. A highly priced seafood delicacy, lobster fetches the highest unit value among a variety of sea foods. A lobster weighing over 1 kg fetches Rs. 1300/- at present. The average annual production of lobster in India is only 3000 tonnes as against a world annual production of 2 lakhs tonnes. India exported 1630 tonnes of lobster in 1995-96 fetching foreign exchange worth Rs 55 crores.

There has been an increase in the demand for both live and whole-cooked lobster in the South East Asian countries in recent years and this has resulted in an enhancement in fishing activities and export of lobster from our country. However, this added enthusiasm has also led to unrestricted exploitation

of juvenile and immature lobsters from our coastal waters. As in the case of shrimp, the price structure of lobster varies according to the 'count size'. At present, a large number of juveniles caught are either sold at very low prices or wasted. This peculiar situation has led to the highly lucrative practice of farming juvenile lobsters in tanks, pits or ponds for short periods of 4 to 5 months.

Panulirus polyphagus, *P. homarus* and *P. ornatus* are the three commercially important species of shallow water spiny lobster occurring along the Indian coast. *P. polyphagus*, the mud spiny lobster, predominates the fishery along the Maharashtra and Gujarat coasts occurring in depths less than 40 m. *P. homarus*, the scalloped spiny lobster, is mainly distributed along Kerala and Tamilnadu coasts, inhabiting shallow waters (1-5 m) in rocky areas. *P. ornatus*, one of the largest of the *Panulirus* species occurs in large numbers along the southeast coast of India. The former two species grow to a weight of about 1.5 kg. *P. ornatus* grows to more than 3 kg.

Biology

In tropical waters spiny lobsters do not have a particular breeding season. The number of eggs laid by female lobsters varies from 1 to 15 lakhs. These eggs are carried on the underside of the abdomen until they are hatched out as phyllosoma larvae. As development goes on, the orange colour of the freshly deposited eggs changes to deep brown or black. The planktonic larvae get carried away by ocean currents to offshore waters where they metamorphose into later stages. The larvae, after reaching the 'puerulus' stage which resembles the adult lobster, swim towards shallow coastal waters with suitable benthic habitats and grow into adults.

Farming

Lobsters in the tropical region grow faster when compared to species available in temperate waters. However, the hatched out larvae take months together to metamorphose and develop into early juvenile stage. We have several hatcheries producing lakhs of prawn seeds along our coastal belt. But we have not achieved such a spectacular advancement in the case of both the lobster and crab. Attempts are being made in our research laboratories for large-scale production of seeds of lobster. The hardships faced in lobster farming today are the non availability of puerulus stage in sufficiently large numbers and

the considerably lengthy culture period taken by lobster seed to reach harvestable size. This in turn has promoted the practice of collecting juveniles caught during commercial fishing operations and farming them for a few months to the profitable size range.

In India, lobster culture has become popular in Bhavnagar, Gujarat. Juvenile lobsters are caught using stake net from shallow coastal waters. These juveniles are grown in small ponds covered with nylon nets in the intertidal region of the beach. The tidal flow of water helps in cleaning these shallow ponds. Juveniles weighing 40 to 50 g gain twice the weight in 3 to 4 months and fetch more than Rs. 250.00 per kg. *Panulirus ornatus* is the most suited species for culture along our coastal region because of its faster growth rate and because it attains sexual maturity only after reaching a weight of about 700 g. When the lobsters reach a weight of over 500 g they are exported live to the Southeast Asian countries. The smaller lobsters are either frozen or whole-cooked for export. Juveniles weighing 50 g to 100 g may take 8 to 12 months to gain a weight of 500 g.

Spiny lobsters are cultured in saline water. Wide fluctuations in the environmental parameters have to be avoided. Optimum temperature is 25°C to 35°C. The water quality has to be maintained and the dissolved oxygen level kept above 3.5 ppm. The optimum stocking density is about 10 lobster per m² and if larger in size, less than 5 per m² can be stocked. They can be fed with molluscan meat, trash fish, compounded feed, etc. Care should be taken to remove the left over feed and faecal matter regularly. Cleaning is easier in large, round tanks. Experimental studies show that growth is enhanced by eyestalk ablation and monosex culture.

The success of lobster farming at present depends mainly on the availability of seed or undersized specimens. Attempt is also made to enhance the stock by providing artificial shelters. This is achieved by putting hollow blocks, cement pipes, stones, tiles etc. in shallow coastal waters which may provide food and protection from predators. Some countries strictly enforce a minimum legal size for capture in an attempt to protect the lobster fishery from over-exploitation. If the capture of juveniles from our coastal waters becomes a threat to the natural resources we too may have to enforce such control measures.