UNIT:5
(AQUACULTURE)

Prawn Culture

PRAWN CULTURE

India has vast freshwater resources that have not been fully exploited. With the development and standardization of many new production and associated techniques of input and output subsystems. Indian aquaculture has evolved from a level of subsistence activity to that of an industry.

There are about 73 species grouped into 20 genera belonging to 5 families of class Crustacea which are of commercial value. The important genera include *Palaeomon* (Fig.1) *Macrobrachium, Penaeus, Metapenaeus, Parapenaeopsis, Acetes etc.* The fresh water prawns belong to the first two genera, while others are marine forms. The penacid prawns migrate into estuaries and backwaters for growth and development. This habit is beneficial in the rice prawn fisheries.

The common species of prawns fished from various parts of Indian coast line and their average lengths are given in Table 1.

Table 1 : Species of Prawns fished in India.

Species	Length	
Penaeus corinatus	25 cm	Not fished in large numbers
P.indicus	23 cm	Most important commercial species in cochin sea
Metapenaeus sp.	18 cm	Common in estuaries, brackish water lakes
M. brevicornis	12.5 cm	Low lying paddy fields of brackish water
M. dobosoni	12.5 cm	Kerala
Parapenaeopsis	14 cm	Caught off in Malabar coast
Acetes	2-4 cm	Caught in large number in river mouths, coastal water

1.1. HABITAT AND HABITS

Prawns inhabit marine, fresh and estuarine waters. They are bottom dwellers, nocturnal and omnivorous feeding on small organisms like algae, mosses, aquatic weeds, insects, tadpoles and fish debris *etc.* They breed during May, June and July. Eggs are laid in large numbers in spring. The fertilization is external and development is direct without any free larval form. Juveniles hatched out of eggs in 5-6 weeks, resemble adults except in size. Growth occurs in short periods of moulting in between and adult form is reached after a series of moults. The life span varies from 3-5 years.

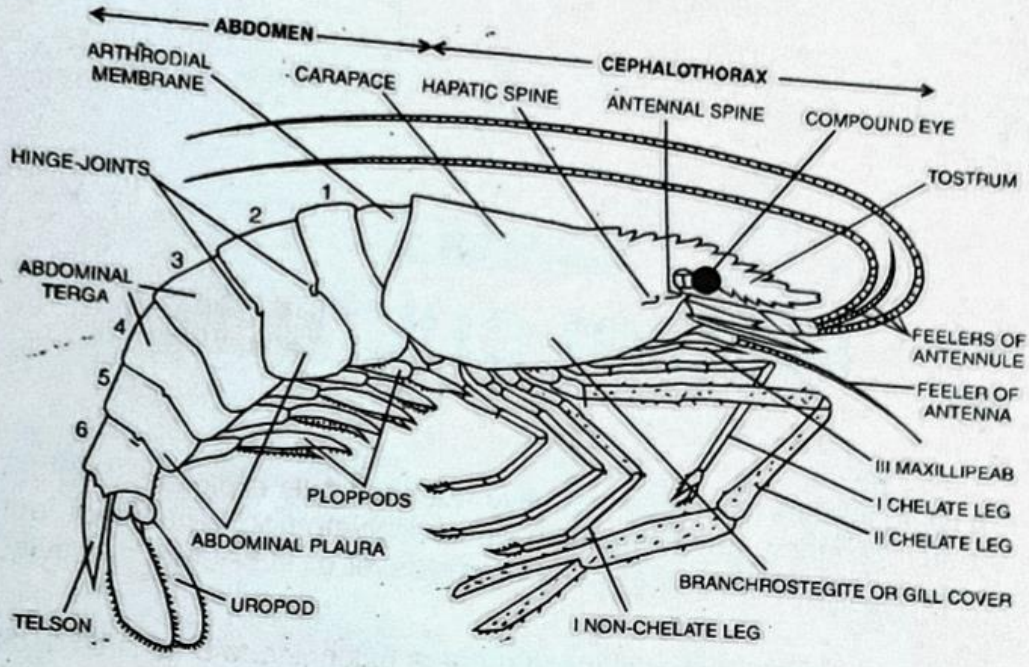

Fig. 1. Palaemon. External features in lateral view (male).

1.2. PRAWN FISHERIES AND ITS TYPES

Prawn fishery is quite advanced in India. It is giving employment to thousands of people. India exports prawns and their products and earns foreign exchange. Prawn fishery refers to capturing of prawns from natural resources as well as their culture. Prawns are rich sources of proteins and vitamins A and D. Their flesh is sweet and tasty because of large amounts of glycogen and free amino acids in their muscles. Moreover the fat content is very low.

Based on the habitat from where prawns are caught, prawn fishery can be differentiated into three types.

(a) Marine : It accounts for more than 60% of total catch and is restricted to shallow coastal waters up to 40m deep. Eastern (December to August) and Western (November - May) coastlines are rich sources of prawn production.

(b) Estuarine : Offshore deep fishing grounds are located in Bombay, Mangalore, Cochin and Vishakhapatnam.

(c) Freshwater : Prawns are caught from rivers, lakes and ponds throughout the country.

The major bulk of prawn fisheries is through capture from marine or fresh water resources, but there is a large scope for prawn culture industry.

1.3. PRAWN CULTURE

Generally prawns are cultured by trapping juveniles in paddy fields. They are allowed to grow till they reach maximum size that takes few months time. This is called **paddy field culture.** It is common in Kerala. In India, there are about 2 million hectares of area which can be utilized for prawn culture. Freshwater prawn culture has potential in India as it can be cultivated as mono- or poly-culture with compatible freshwater fishes in existing and new ponds.

On a large scale prawn culture is carried out by following ways :

(*i*) **Extensive culture :** Extensive culture is also known as **paddy field prawn culture** or paddy **cum prawn culture.** It is natural method of prawn culture where juveniles are trapped from fields used for rice culture in brackish water estuaries *etc.* It is less expensive, but quality control is not possible. This is common in Bengal and Kerala in India and in many East Asian Countries.

(*ii*) **Semi-intensive culture :** This method is also used in India and the countries of Indo-pacific region. In this method, fast growing prawns of best quality are selected and reared in ponds. Here predator is eradicated and quality of water is maintained. Further the quality of stock per unit area is maintained and they are properly fed with living or compound feed till marketable size is attained.

(*iii*) **Intensive culture :** This method is used in countries like Japan, Philippines, Taiwan, Australia and Korea. It is highly developed method of prawn culture. Here, from spawning till capturing stage, controlled conditions of food, quality of water and aeration are maintained. The rearing of post-larval prawns to marketable size is done in tanks of suitable sizes by recirculation system.

1.4. FRESHWATER PRAWN FARMING

1.4.1. SCOPE FOR FRESH WATER PRAWN CULTURE

Considering the high export potential, the giant fresh water prawn, *Macrobrachium rosenbergii*, the scampi, enjoys immense potential for culture in India. About 4 million hactare of impounded freshwater bodies in the various states of India, offer great potential for fresh water prawn culture. *Scampi* can be cultivated for export through monoculture in existing as well as new ponds or with compatible freshwater fishes in existing ponds. It is exported to East European Countries and USA. Since the world market for scampi is expanding with attractive prices, there is great scope for its production and export.

The most common giant freshwater prawn is quite suitable for culture in tropical and subtropical climates as it can adapt to various types of fresh and brackish water habitats.

It is omnivorous and accepts pelleted feed also. Although seed may be collected from natural sources for large scale culture, there is a need for regular supply. To ensure the availability in good quantity, prawn hatcheries have to be maintained. The technical parameters required for prawn hatcheries are as follows :

A. Site selection

The site selection plays an important role as the entire management aspect of the farm ultimately depends on specific conditions of the site. The following aspects are to be considered :

(*i*) Topography of the area

(*ii*) Soil type

(*iii*) Availability of quality water *etc.*

(*iv*) Area should be free from pollution and flooding. Other considerations like approach roads *etc.* have also to be taken into account.

B. Soil quality

The ideal soil for *Macrobrachium* culture should be clay silt mixture or sandy loam comprising of 60% sand and 40% silt with good water retention capacity.

C. Water quality

There should be availability of abundant and good quality water. The water should be free from any kind of pollution. The pH should be maintained at 7 to 8.5. The temperature should range from 18° to 34°C with an optimum range of 27 to 31°C. Dissolved oxygen content should be higher than 75% saturation.

D. Pond construction

Rectangular pond with a width of 30-50 m and length of 0.5 to 1.5 *ha.* is found suitable from the point of view of harvesting. The average depth of the ponds should be 0.9m with a minimum of 0.75m and a maximum of 1.2m. Dike and pond slope may be kept at 2:1. Bund must have a freeboard of at least 60 cm above the highest water level in the pond. Designing and layout of the farms may be carried out by keeping in view the water intake and outlet facilities. The drainage system must ensure that there is no mixing of outlet with incoming waters.

E. Water supply and drainage

Appropriate water supply and drainage systems have to be designed keeping in view the water source and topography of the area. Tubewell and pumping system may be considered, if required for water intake/exchange. Water exchange on weekly or fortnightly basis, as required, is desirable and provisions are to be made accordingly.

1.5. FARM MANAGEMENT

1.5.1. MODE OF CULTURE : MONOCULTURE AND POLYCULTURE

The type of pond preparation to be adopted before stocking is based on the type of culture and its intensity and nature of the culture pond. In this case, liming of the pond is of great importance than that in the case of freshwater fish culture. The application of fertilizers is restricted in case pelletized feed is used. However, occasionally cow dung, single superphosphate, urea *etc.* can be applied on assessing the productivity.

In case of monoculture, the stock density can vary from 4000-5000 numbers of post-larvae per hectare, while in system of polyculture with carps, this may vary from 2500-20,000 post larva.

In order to get desired production, feeding, aeration, water exchange and periodic monitoring has to be continued. The quality and type of feed is based on culture system. *Macrobrachium* with its omnivorous feeding habits can make use of a variety of feeds from common wet feed made from rice bran and oil cake to scientifically formulated pelleted feed. The following factors control the rate of feeding which include :

(*a*) stage of growth of prawn

(*b*) water quality

(*c*) density of stock

(*d*) other manuring practices

Generally the feeding rate may be 5% of the body weight.

The duration of culture varies from 6 to 12 months depending on the type of culture practice. Generally, the culture period may be 6-8 months under monoculture and 8-12 months under polyculture. The average growth of prawn may range from 50 to 200 gms depending on the duration, density, water quality, feeding *etc.* The survival rate may range from 50 to 70% depending on the type of management practices.

1.5.2. EXTENSION SERVICES

The borrower should have experience in prawn farming and should be conversant with production technology, trade *etc.* Fish Farmers Development Agencies (FFDA) have been established in almost all districts for providing necessary training. The offices of Marine Products Export Development Authority (MPEDA) in most of the coastal states also provide necessary assistance.

1.5.3. MARKETING

There is a good demand for fresh water prawn in both local and international markets, as such there may not be any problem in marketing the same. Fresh water prawns can be sold directly by the farmers either in the market or to exporters for processing before export.