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COLLECTION, TRANSPORTATION AND STOCKING OF FISH SEED

Anulekshmi Chellappan, Sujith Sundaram and S. D. Kamble

Introduction

The collection of seeds from the wild is the main source to obtain the stocking material for the cage. This can be carried out when the seed production cost is very high or where the availability of seed from nature is in large quantity. It is important to know the biology of the fish species either to duplicate reproductive condition on the farm or to know when and where to collect the fish. The artificially produced seeds in the hatchery are used widely in cage culture practice all over the world to avoid depletion of stock in the wild. The transportation of the seeds to the culture site plays an important role as maximum mortality occurs during this process because of change in metabolic pattern of the fish due to stress. The appropriate quantity of seeds should be stocked in each cage for obtaining good production. This chapter mainly deals with all these aspects in detail.

Collection of fin fish and shell fish seeds

Any culture activity begins with the stocking of fish seed in adequate number to meet production goals. These fish seed can be captured from wild or from hatcheries. Many of the hatchery techniques have not been developed in India, except for *L. calcarifer* (Sea bass), *T. blochii* (Silver pompano) and *R. Canadum* (Cobia). However, certain fast growing fish seed are easily available in the wild. The cultivable marine fin fish seed resources such as Milkfish, (*Chanos chanos),* grey mullets, (*Mugil cephalus*, *Liza parsia, Liza tade, Liza cunnesius, Liza vaigiensis* and *Valamugil seheli),* Pearlspot, (*Etroplus suratensis),* Sandwhitting (*Sillago sihama)*, Rabbitfish (*Siganus javus, S.canaliculates),* Seabass (*Lates calcarifer),* Grouper, (*Epinephelus tauvina, E.hexagonatus),* Red snapper (*Lutjanus* spp.*)* and Seabream (*Lethrinus* spp.*)* are available from estuaries, brackish waters and coastal waters of India. the identification of potential areas of their availability and relative abundance in different seasons have been reported. The means of collection of fish seed from the wild differ with species to species. It is imperative to have a sound understanding of the biology of the fish species to know when and where to collect the fish. Although the occurrence and

collection of milk fish seed may vary from several centres along the east and west coasts of India, the peak season in most places is from April to July and the secondary season from October to December. Among grey mullet seed, *Mugil cephalus* is abundant from October-February, where as other grey mullets (*L. macrolepis, L. parsia, L. tade, L. cunnesius, L. vaigiensis* and *V. seheli),* occur throughout the year. The fry and fingerlings of Pearlspot (*Etroplus surantensis)* occur throughout the year with a peak from April-July. The fry and fingerlings of sand whitting (*Sillago sihama)* are available in good numbers throughout the year with a peak from January-May. The fry and fingerlings of seabass (*Lates calcarifer)* occur from October-February and May-September. The seed of red snapper (*Lutjanus* spp.*)* are available from January-June and September-October. The fry and fingerlings of grouper (*Epinephelus spp*.) and seabream (*Lethrinus* spp.*)* are available from January-April. The fish seed is collected through local fishermen using local fishing crafts and gears. The *Trachinotus blochi* is also a candidate species for cage culture and the seeds are available from CMFRI hatchery, Mandapam, Tamil Nadu. The important fish species collected from wild in Maharashtra are Sea bream, (*Acanthopagrus latus*), Red snapper (*L. argentimaculatus*), Seabass, (*L. calcarifer)* and Spiny rock lobster (*P. polyphagus*).

Season of seed availability in Maharashtra

S.No.	Name of the fish		Season of availability
1.	*Acanthopagrus latus*	:	August- November
2.	*L. argentimaculatus*	:	June- October
3.	*P. polyphagus*	:	August- November
4.	*L.calcarifer*	:	November - February

Transportation of the seeds to the site

The transportation of fish seed is of prime importance in aquaculture. The knowledge of the basic physiological requirements of fishes in different stages of their life history would be helpful. The fish transport technology has developed over the years. At present, transportation is done in polythene bags under high pressure of oxygen and use of anesthetics and chemicals.

A few days before transport, fish (species wise and size wise) should be kept in clean water in separate holding tank and conditioned for long transport. The weak, injured and

diseased fishes have to be removed. The fish should not be fed for some days, depending on their size. A practical schedule, right from packing until delivery at the destination, should be made. The sufficient plastic bags, insulated boxes, rubber bands and pure oxygen should be available for packing and transport of live fish (Fig 1). The fish density is the quantity of fish that can be packed in a litre of water. This density depends on the average weight of the fish transported. The temperature can be reduced to prevent the increase of metabolic rate by keeping bottles filled with cool water or ice.

Fig 1: **Transportation of fish seeds**

The factors responsible for mortality of fish seed during transportation includes

- Depletion of dissolved oxygen in ambient water due to respiration by fish and also due to oxidation of any organic matter (BOD load), including excreted waste of the fish, by micro-organisms.

- Accumulation of free carbon dioxide (CO_2) resulting from respiration and ammonia (NH_3) as excretory end product.
- Sudden fluctuations in temperature.
- Hyperactivity and stress due to handling and 'confined space' - these result in lactate accumulation and affect lessening blood oxygen capacity and also cause 'fatigue collapse'
- Ion-osmotic imbalance due to stress.
- Physical injury due to handling before transport and during transport.
- Diseases.

The large fish can withstand starvation for long periods and it is advisable not to feed fish under conditioning and transport. The transport carriers are of two types: (a) open system comprising of open carriers with or without artificial aeration/oxygenation/water circulation and (b) closed system having sealed air tight carriers partially filled with water and oxygen. In any carrier system the factors which basically determine successful transport of fish are:

- Total biomass of fish to be transported.
- The rate of utilization of oxygen.
- Initial oxygen content of water carried.
- The rate of entry of oxygen into the system.
- The rate of accumulation of harmful excretory wastes, especially CO_2 and NH_3 and capacity of the system to trap/remove these.

The transportation of lobster can be done with clean aerated seawater. To reduce the metabolism of the fish to mimimum, the temperature should be reduced to 12-15^0 C by adding cool water. The reducing temperature to 13^0 C is enough for keeping lobster in live condition for 24hrs. The lobsters can be arranged in a tray and the number would vary depending upon the size of the lobsters (Fig 2). Packing can be started few hours before transporting.

Fig 2: **Transportation of lobster**

Stocking of seeds in the cage

For raising fish in cage, the stocking density needs to be ascertained according to the species. The fry should be shifted late in the day or early in the evening to allow conditioning at the site of procurement and acclimatization at the site of release in cages. The fry acclimatization is essential at the site of release in cages to ensure a balanced environment, especially in terms of temperature (Fig 3&5). Prior to release, fry should be subjected to some prophylactic measures to protect them from diseases and ecto-parasites. The seed can then be released in the pond after counting (Fig 4&6). This is very essential for good management of stock, environment and predictions.

Fig 3: **Acclimatization of fin fish seeds** Fig 4: **Stocking of fin fish seeds in cage**

Fig 5: **Acclimatization of lobster**

Fig 6: **Stocking of lobster in cage**

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