

Types of hatching pits

Hatching pits are of two types :

1. **Hatcharies.** These are small sized ponds (Fig. 4) in which fertilized eggs are transferred. After 2 to 15 hours the fertilized eggs are hatched. Some drawbacks make the hatcharies unfit for advanced fish culture programme. These drawbacks are as under :

(i) sudden rise and fall in temperature, (ii) entrance of predators in ponds, (iii) drying of water from ponds may cause mortality of eggs.

To overcome all these drawbacks specially designed hatcharies and hatching hapas are constructed.

2. **Hatching hapas.** Hapas (Fig. 5) are rectangular trough shaped tanks made up of cloth supported by bamboo poles fixed in the river. In these hapas fish eggs are aerated by continuous flow of current. The size of hapa is about $3' \times 1.5' \times 1'$ and is made up of mosquito net cloth which is fixed into outer larger hapa made up of coarse cloth. Two types of hapas are designed :

(a) **Fixed type hapa.** If possible to fix the perpendicular poles (arms of hapa) only then the fixed type of hapa is used for hatchings of eggs otherwise floating type of hapas should be used.

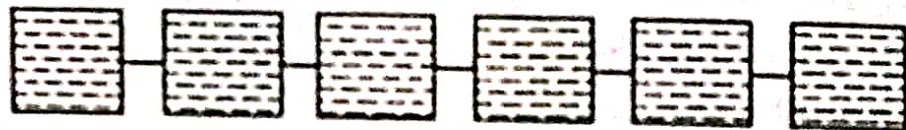


Fig. 4. Hatcharies.

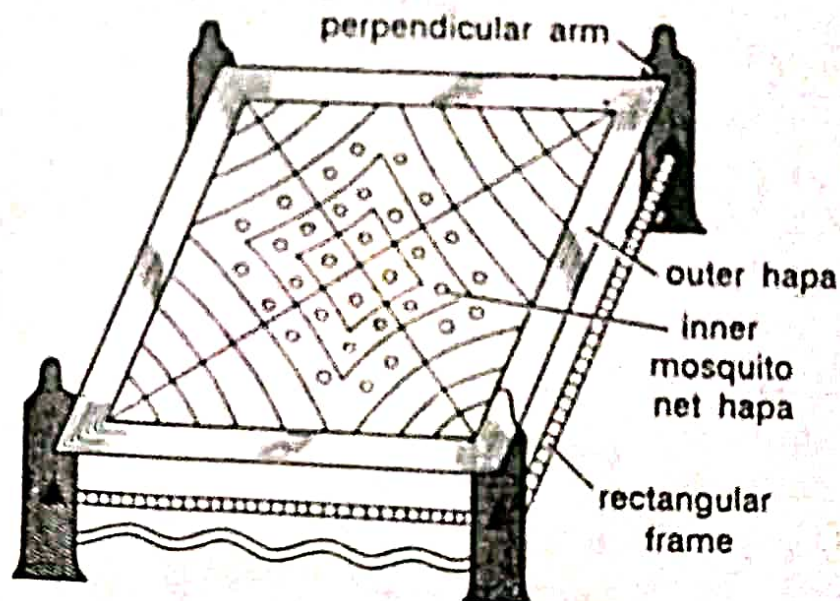


Fig. 5. Hatching hapa.

(b) Floating type hapa. In hard bottom areas where it is not possible to use fixed hapas, floating hapas are built. These hapas are arranged in large number in series attached with the bamboo and floated on water surface. To avoid overcrowding of eggs, only one layer of eggs is spread in each hapa. Hatching of eggs takes place in the outer hapas leaving the egg membrane in the inner one. The hatchings are kept for 36 to 48 hours in hapas and then transferred to the nurseries.

Transport of Fish Fry to Nursery Ponds

The fish fries are collected and transported to nurseries. In West Bengal these are transported in earthen 'Hundies' which cause heavy mortality due to the following factors.

- (1) Decreased dissolved oxygen concentration in water.
- (2) Increased carbondioxide concentration in water.
- (3) Toxicity of wastes like excreted ammonia.
- (4) Hyperactivity and its strain.
- (5) Physical injury to fries during transport.

To overcome the above mentioned injuries, fries are subjected to conditioning before transportation by keeping them into fixed volume of water for definite period and then transported in open or closed vessels. Temperature of the water of the vessels can be kept lower by tying a wet cloth around the vessel. Dead fries should be removed to avoid the pollution and infections. Now-a-days fries are transported in sealed metal containers with oxygen. In India alkethen bags of different sizes are used for the transportation of fish fries from hatching hapas to nursery-ponds.

Nursery Pond

The newly hatched fries transported from hatching hapa to nursery ponds (Fig. 6) are very tender so one should be very careful in maintaining them there. Nursery ponds should always be near the hatching hapas. The nursery ponds are small set of shallow (3' to 5' in depth) water reservoir. But now-a-days generally more deep (5' to 8') ponds are prepared having an area of about 1/2 acre. The ideal and recommended nursery ponds are 50 to 60' × 30 to 40' × 4 to 5'. The nursery ponds should be prepared before the hatching of fries. The exit and entrance of water should also be under control.

In nursery ponds natural resources of food are less and when large number of fries are released they certainly suffer due to lack of food. First of all predatory and weed fishes should be removed from pond. The chemical fertilizers viz., ammonium sulphate, sodium nitrate and superphosphate should be used along with cowdung. The amount of chemical fertilizers should be less in quantity. 5,000 to 70,000 kg. cowdung/hectare is recommended in accordance with the nature and fertility of the pond soil. Due to these manures numerous zooplanktons

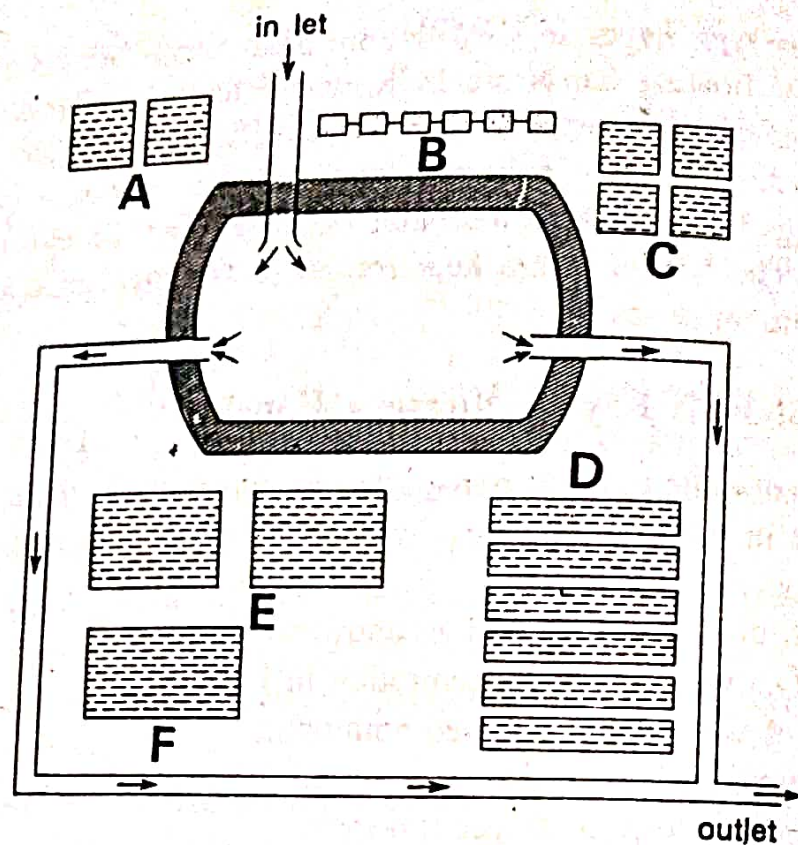


Fig. 6. A Fish farm. (a) Breeding ponds; (b) Hatching pits; (c) Nursery ponds; (d) Rearing ponds; (e) Stocking ponds; (f) Marketing ponds.

are developed within 10 to 20 days and phytoplanktons are also grown up within 10 to 15 days. On these phyto-and zooplanktons they can feed easily and comfortably.

Mortality in nursery pond

The heavy mortality of fish fries has been recorded in nursery ponds. The following factors are responsible for such mortality :

- (1) Sudden change in the quality of water form hatching hapa to nursery ponds.
- (2) Lack of suitable food in pond.
- (3) Presence of predatory fishes and predatory aquatic insects in the pond.
- (4) Overgrowth of plankton.
- (5) Decreased oxygen concentration in water.
- (6) Cannibalism.

Precautions for nursery ponds

- (1) In the nursery ponds water should be under good control and circulating.
- (2) Pond should be nearer to the hatching ponds.
- (3) Ponds should be predator free.
- (4) To avoid the overcrowding, fries should be kept in limited number.
- (5) Supply of food material should be proper.

When fries are more developed in the nursery ponds and attain a length of 10 to 15 cm they should be transferred into the rearing ponds.

Rearing Ponds

1205

For good health and growth of fingerlings the exercise is essential for them inside the rearing ponds (Fig. 6). So these fingerlings are reared in longer and narrower ponds to provide them long distance for swimming. The water of this pond may be seasonal or perennial. The rearing ponds should be free from toxicant and predators. The depth of the pond should be about six feet containing nutritive food material in accordance with the population of fingerlings. As fingerlings attain a length of about 20 cm they should be transferred to the other type of ponds called as stocking ponds.

Transport of fingerlings

The fingerlings are transported from rearing ponds to stocking ponds in a container of 1,000 litre capacity. This container is internally lined with foam to avoid physical injury. The proper arrangement for aeration of the tank is essential during transport. To make the fingerlings inactive various sedative (sodium amylate and barbifurate) are used. This is only for less consumption of dissolved oxygen during transport. Sometimes some diseases, parasites and predators are also transported alongwith fingerlings.

To avoid these the fingerlings should be washed carefully before packing and the use of antibiotics, methyl blue, copper sulphate, potassium permanganate, formalin and common salt are recommended. Taking all these precautions, the fingerlings are transferred to the stocking ponds.

Stocking Ponds

The stocking ponds (Fig. 7) should be cleaned of weeds and predatory fishes. Sufficient food is essential for good growth of fishes in these ponds hence proper manuring should be done to increase the production of zooplankton because large number of fishes may not be able to feed properly due to lack of food material. As for the proper organic manuring cowdung is the best and should be used at the rate of 20,000 to 25,000 kg/hectare/year. The inorganic chemical fertilizers are also used viz., super-phosphate, ammonium nitrate and ammonium sulphate at the rate of 1,000 to 1,500 kg/hectare/year.

The powdered rice, paddy, oil cakes, coconut, mustard, groundnut, etc. are commonly used as artificial food for the fishes. The artificial food used for the fishes should be easily digestible in natural form and economically suitable. The best time for feeding the fishes is in the morning hours. The quality of food should not be changed suddenly. The amount of fertilizers used is totally dependent on the fertility of the soil, number of fishes and types of fishes being kept in the stocking ponds. When fishes attain maximum length and weight they should be harvested.