

Fish brood stock management and transportation of brood fish

INTRODUCTION

Management of broodfish ponds

- Broodfish - prerequisite for all induced breeding programmes
- Good broodstock - better breeding responses, increased fecundity, fertilization, hatching and larval survival rates and more viable fish seed

Carp broodfish pond:

- Carp broodstock ponds - large (0.2-2.5 ha), 1.5-2.5m deep, rectangular, seasonal or drainable and earthen in nature
- Water inlet and outlet - simulate riverine/fluvial conditions

Source of broodfish:

- No reliable source
- Hence the source of future brood fish is stock ponds from the same farm or different farms or live adult of different species procured from capture fishery waters like rivers, lakes or reservoirs

Care of brood fish:

- Recommended stocking density of carp broodfish is 1,000-3,000 kg/ha
- While rohu and mrigal are stocked at a higher rate, catla is stocked at a lower rate since it requires more space for proper gonadal development
- Stocking rates are manipulated to permit individual and collective care of broodfish, enabling them to get nutritional and environmental advantages for onset of right degree of maturity

- A gravid fish when held by hand with tail up should practically ooze milt and also ova
- Carp broodfish fed with a traditional diet consisting of rice bran and oil cake (1:1) at a feeding rate of 1-2% body weight daily
- In addition to the artificial feed the grass carp is also given tender aquatic weeds/terrestrial grass.

- Common carp demand their separation from other carp species due to their natural breeding in ponds with aquatic vegetation
- The common carp broodfish is segregated sex-wise and stocked in separate ponds to prevent accidental spawning in pond
- Catla, in particular, needs to be separated from the rest of the species as it shows poor response to hormonal injection when stocked with other species
- It is believed that catla broodfish need special care and diet such that deposition of mesenteric fat in the maturation phase does not hinder gonadal development of the species.

Broodstock management practice in Karnataka State

- Described by Basavaraja et al. (1999)
- The number and quality of eggs produced are significantly affected by the conditions under which the broodstock is maintained
- The quality of broodstock diet, feeding regime, the quality of broodstock and water management are the principal factors that influence the condition of the broodstock
- Most seed farms raise broodstock in their own farm (there are instances of inbreeding depression, as reported by Eknath and Doyle (1985) and maintain them in ponds at a density of 1,000-2,500 kg/ha.

- The earthen broodstock ponds vary in area from 0.2 to 1.0 ha, with depth ranging from 1 to 2 m
- The main basic steps in the preparation of broodstock ponds are :
 - control of aquatic weeds, which is done manually;
 - eradication of unwanted fish by applying mahua oilcake at 2,000-2,500 kg/ha
 - pond liming at 100-200 kg/ha depending on the pH of soil and water

- Fertilizing the pond with cattle dung, at 15,000-20,000 kg/ha/yr or poultry manure at 5,000-10,000 kg/ha/yr to enhance heterotrophic food production
- 200-400 kg/ha/yr NPK mixture is applied in split doses at fortnightly or monthly intervals
- The initial dose of organic manure is reduced by half if mahua oil cake is used as piscicide

- After stocking the pond with carps that are one-year-old or more, they are fed with a conventional feed containing a mixture of groundnut oil cake and rice bran (1:1 or 1:2 ratio) at 1-2% b. w., once daily
- To ensure better and timely development of gonads, fish breeders use a special broodstock diet (protein : 25-30%) prepared using locally available cheap ingredients
- This diet is nutritionally superior, advances maturation and spawning by one or two months and results in increased fecundity and better seed quality.

Ingredients	%
Rice bran	25
Groundnut oil cake	25
Fish meal	10
Maize	10
Broken rice	10
Horse gram	10
Blackgram	10

Table : Feed ingredients and their contribution to broodstock diet

- This diet is given at 2% b.w. daily, starting in December
- At some farms about a third of the broodstock will be injected with a low dose of HCG at 6-7 mg/kg body weight every 20 days, starting from mid-February for advancing maturation so as to induce spawning by the end of May

- At some seed farms, a few vitamin E tablets are mixed, in the diet to facilitate gonad development
- Algal blooms and oxygen depletion -common problems in broodstock ponds
- Overcome by frequent water exchange
- Infestation by *Lernaea* and *Argulus* on catla are common - manual removal of adult specimens, followed by a dip treatment in a mild solution of potassium permanganate



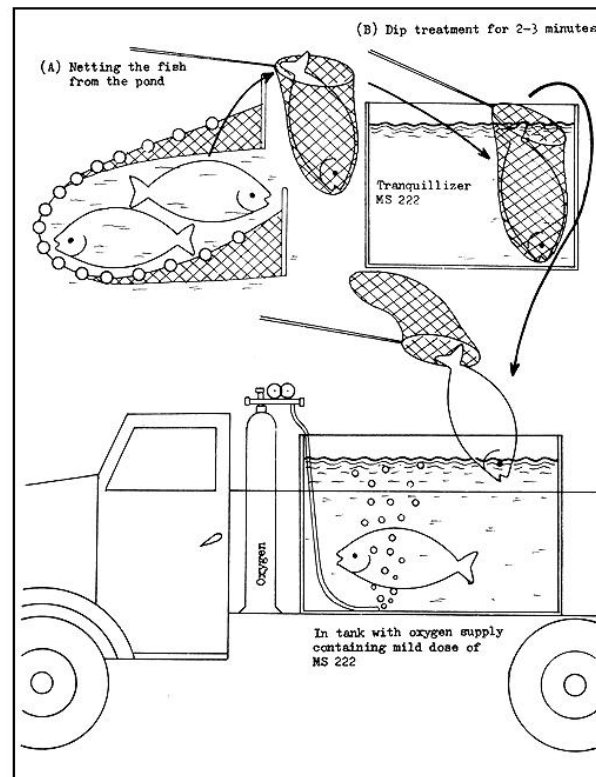
Lernaea



Argulus

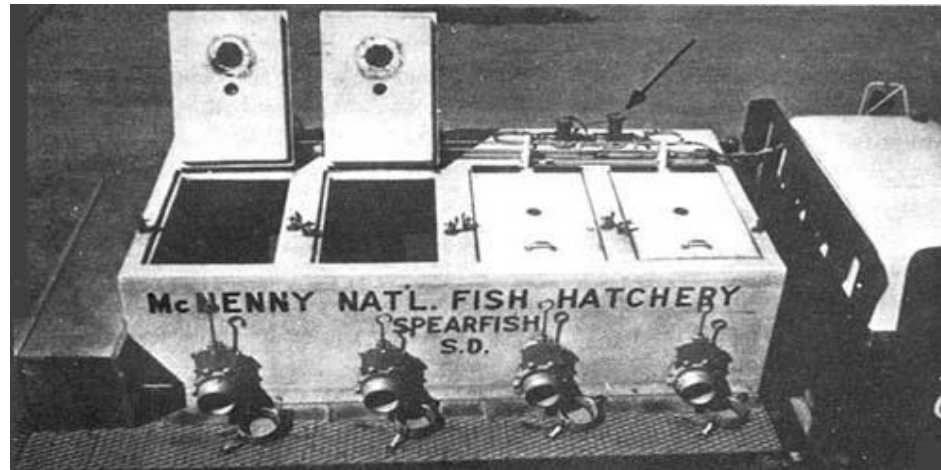
Transportation of broodfish

- Transport of bigger fingerlings/yearlings and broodfish in small packing containers- not economically feasible
- Truck mounted open tanks with facilitates for mechanical aeration and/or circulation were initially used quite successfully (Hora and Pillay, 1962; Mammen, 1962)



- Open canvas containers (1m x 1m x 1.25m) are used in Punjab and Madhya Pradesh for transporting major carp breeders
- In those States galvanized iron drums of 180 l capacity are also used
- In India, two successful models of closed system of live-fish carrier were designed. One is due to Mammen (1962), which he called 'Splashless tank'.

- The later model of the splashless tank is of a petrol tanks design of 1,150 l capacity with an autoclave-type lid
- It has a built-in aeration system for supplying compressed air, which works on a belt driven by the engine of the transporting vehicle
- An oxygen cylinder is carried only as a stand by for emergency
- The inner surface of the tank is lined with U-foam which prevents physical injury to live fish during transport
- A total weight of about 250 kg live fish can be transported at a time in the splashless tank, as also 90,000 carp fingerlings
- The load ratio of fish to water in this type of carrier is about 1 kg of fish per 4.5 l water



Fiberglass transport tank with four compartments, each with an electric aerator (arrow). Additional oxygen is provided through carbon rods or micropore tubing on the bottom of the tank (Piper *et al.*, 1982)



Installation of transport tanks on a truck. The transport capacity of the truck is about 8 000 litres; when the truck is combined with a trailer, the volume of the fish tanks is about 15 000 litres

- Patro (1968) developed a tank which has an outer chamber of 120 cm diameter open from top and a slightly smaller one closed from top; the latter, during transport, fits inside the former
- The top of the inner chamber is provided with an air vent and an oxygen valve
- The outer chamber serves as a storage tank and is initially filled with water along with fish to be transported
- The inner chamber, which is shipped from the upper open end of the water serves as an oxygen holding chamber at its top and is lined throughout with U-foam to prevent fish from sustaining injury during transport
- This double-barrel type carrier as stated by Patro can transport a total weight of 100 kg of live fish at a time

