

# Multiple spawning of fish



## Multiple spawning

- Refers to spawning fish, female in particular, more than once in a season
- This is particularly important in carps as they have narrow captivity breeding season and are difficult to bring them to maturity to maturity in captivity.
- Resulted in the successful spawning of major carps up to four times in a season

## Factors that facilitate multiple spawning of carps are :

1. Manipulation of water quality
2. Manipulation of diet
3. Use of ready-to-inject spawning agents
4. Use of circular spawning and hatching tanks

# Broodstock management

- Spent brooders of the previous season are preferred as initial broodfish for multiple breeding.
- They are fed with a protein-rich diet, having a protein content of % and fat content of %.
- Water exchange - 30-40% every month.
- Minimum handling of brooders.
- Disinfection of spent brooders
- Rearing of spent brooders with special care.

## Schedule of multiple spawning:

First spawning (March-April) - Spawn yield :



Interval 40-45 days



Second spawning (May-June) – spawn yield :



Interval 40-45 days



Monsoon spawning (June-July) – Spawn yield :



Interval 40-45 days



Fourth spawning (August-September) – Spawn yield

## Advantages of multiple spawning :

1. Increase period of seed availability, i.e. seed will be available over a longer period
  2. Number of broodfish (female) to be maintained gets reduced
  3. Seed production potential of the farm could be improved.
- Recent studies conducted at CIFA, Bhubaneswar show that rohu could be induced bred even in the month of January

# SEED PRODUCTION OF GROUPERS



## Distribution and importance:

- Groupers belong to the family Serranidae and Order Perciformes.
- Important species are *Epinephelus tauvina* and *E. malabaricus*.
- *E. tauvina* is found mainly in the east coast of India
- Can be cultured in brackishwater and marine waters.
- They are demersal, highly carnivorous and highly predatory, cannibalistic when food is scarce.





- An important foodfish, commands high price (up to Rs. 400/- per kg)
- Suitable for culture in net cages as well as in ponds.
- Grows to 500- 800 g in 6 months, maximum size recorded is 100 cm.
- Spends the growing phase in shallow brackishwater, estuaries and rivers.

## Identifying characters:

- Elongate and compressed body, with a deep caudal peduncle.
- Head is pointed with a concave dorsal profile , becoming convex in front of the dorsal fin.
- Mouth large, slightly oblique and the lower edge of the pre-opercle is serrated, with a strong spine.
- Adults are greenish or bluish above and silvery below.
- Eyes are bright pink, glowing at night.



## **Food and feeding:**

- Highly predatory, feeding on small fish and crustaceans.
- Juveniles are omnivorous.
- Fry feed on zooplankton, while fingerlings prefer small crustaceans, worms, mollusks, etc.

## Breeding season:

- Spawning season is November – May.
- It migrates to deeper waters for breeding.
- Is a protogynous hermaphrodite (functions first as female and then turns to male after spawning, i.e. natural sex-reversal).
- Fish in the weight range 2 – 3.5 kg are females, whereas those in the size range 3.5 – 5.0 kg are males.
- Three to four year-old fish show 1:1 (M:F) sex ratio.
- Males mature at 25 cm length.

## Breeding of *E. tauvina* :

- *E. tauvina* is a protogynous hermaphrodite, females when they reach 650-700 g, change to male.
- natural males are difficult to get.
- female groupers are artificially transformed to sexual males by male hormone  $17\alpha$ -methyltestosterone ( $17\alpha$ -MT).
- Oral administration of  $17\alpha$ -MT at 1 mg/kg b.w. given 3 times a week for 2 months is effective.



- Natural females and sex-reversed males have to be maintained separately.
- Spermiation occurs within 4 months and lasts for at least 4 months after implantation.
- Females with egg diameter of 0.4 mm are selected and injected with 2 doses of HCG at 250 IU/kg and a third injection of HCG at 100 IU/kg + salmon pituitary extract at 10 mg/kg at one day interval.
- Full maturation occurs 52-54 hours after injection.
- Fertilization is carried out artificially using dry method.
- Eggs hatch after 24 hours at 27-30°C.

## Larval rearing:

- The hatchlings are small with extremely small mouth opening and hence cannot feed on rotifers.
- The first feed can be egg custard (55-60 um particle size) and trochophore larvae (60-80 um) of green mussel.
- The larvae are obtained by subjecting the mussel to temperature shock treatment.
- CIBA, Chennai is developing a technique for brood-stock development, breeding and larval rearing of this species.