

Induced breeding of warm water
fin fishes and environmental
factors affecting spawning

INTRODUCTION

- Houssay (1930) of Argentina - first to attempt induced breeding of fish by using pituitary extract on a viviparous fish
- Subsequently, Von Ihering and his team of Brazil, in 1934, successfully induced bred a catfish with pituitary hormones and hence credit for the present day concept of induced breeding of fish goes to Brazilians
- In India, Chaudhuri and Alikunhi (1957) successfully induced major carps to spawn through hypophysation technique



Figure : A major carp being injected with a spawning agent for induced breeding

- The IMC, were successfully induced bred twice within an interval of about two months
- Chondar (1990) described a method for the mass scale breeding of silver carp in '*Bangla bundh*' through HCG and its combination with pituitary extract
- Earlier, Chondar (1984) succeeded in mass breeding of IMC and Chinese carps in '*Bangla Bundh*'.

Environmental factors concerned with breeding of fishes

Light:

- Light - controls reproduction in fish
- Early maturation and spawning of fish as a result of enhanced photoperiodic regimes have been reported by several workers for temperate fishes
- In India, *Cirrhinus reba* was found to attain early maturity when subjected to artificial day lengths longer than natural day even at a low temperature of the winter months, viz. 19-20°C (Verghese, 1968)
- The resorption of gonads in *C. reba* was delayed and spawning conditions could be maintained up to November (Verghese, 1967).

Temperature:

- Has a role on sexual maturation and spawning of fish in India
- There are optimum temperature ranges for induced breeding of cultivable fishes
- and critical temperature limits, above and below which fish will not reproduce
- The IMC are found to breed within a range of 24-31°C (Khan, 1945; Chaudhuri, 1960a)
- Alikunhi et al. (1964) spawned fish successfully at a temperature of 20°C in the laboratory and observed that the fish spawned successfully when the temperature rose by only 1.8°-2.3°C

- Ibrahim et al. (1968) did not observe any correlation between water temperature and percentage of spawning success in induced bred fish
- It was opined that lower temperature may provide a favourable external environment for ensuring maximum fertilization and embryonic development
- The Chinese silver and grass carp have been successfully induced bred at temperatures 28.2°C to 34°C (Alikunhi et al., 1963a), whereas Chaudhuri et al. (1966) found that breeding was very poor above 30°C
- Later, Chaudhuri et al. (1967) observed natural spawning of pituitary injected grass carp at a water temperature varying between 28.9 and 31.1°C, the optimum being 27°C, as in the case of IMC.

Other factors:

- It was opined that fresh rainwater and flooded condition in a tank are the primary factors in triggering the spawning of carps
- The presence of repressive factors may be responsible for inhibiting spawning of carps in confined waters
- When this repressive factor is sufficiently diluted by the onrush of floods in bundhs or ponds, spawning occurs

- Sudden drop in the electrolytic level in the environment caused by heavy monsoon rain or water current which induces gonadal hydration, resulting in natural spawning of carps
- Rainwater and weather condition - important for induced breeding of fish
- Successful spawning - induced on cloudy and rainy days, especially after heavy showers
- The Chinese carps that have more or less similar breeding requirements can also be bred under conditions optimum for the IMC

Sympathetic breeding

- Sympathetic breeding is the breeding of uninjected fish at the sympathy of injected fish
- Common in bundh breeding wherein only 10-20 of brooders are injected with either pituitary extract or synthetic spawning agent and the rest are not injected
- After an interval of about 8-10 hours, the injected brooders first start spawning and subsequently the injected brooders spawn at the mercy of the injected ones, thereby leading to the complete spawning of all the brooders

- Sympathetic spawning leads to lesser use of hormone and reduced handling of brooders
- By this method, natural spawning of both grass carp and silver carp is possible in a dry bundh of Bankura District where they spawned naturally, without stripping
- One of the reliable means of mass breeding of Chinese carps to meet the increasing demand of their seed

