Breeding of Carps with Ovaprim in India

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Introduction

Carp culture in India is believed to be as old as carp culture in China. Although in early years, carp culture was largely restricted to the North-Eastern States of India, during the last four to five decades, it has spread to almost all parts. The traditional carp culture practice is rapidly transforming into scientific farming in several parts of India. Generally, carp culture in India is a polyculture of 3-6 species of major carps, namely, catla (Catla catla), rohu (Labeo roffita), mrigal (Cirrhinus mrigala), silver carp (Hypophthalmichthys molitrix), grass carp (Ctenopharyngodon idella) and common carp (Cyprinus carpio). In the freshwater sector, carps are the most widely cultured species throughout the country. The area readily available for culture is reported to be over one million hectares, while the area under actual scientific culture practice is less than 0.2 million hectares.

Till recently, carp culture remained almost on a low profile in several states. However, for the first time, carp culture is being undertaken on a commercial scale in Andhra Pradesh, which is one of the southern States of India. A few enterprising farmers of this State initiated carp culture around a perennial lake called Kolleru. The success achieved by these farmers induced several paddy growers of this area to convert their paddy fields into fish ponds. The resounding success of carp culture has already resulted in conversion of nearly 50,000 ha of paddy fields into fish ponds. On an average, it is estimated that nearly 10,000 ha of paddy fields are being converted annually into fish ponds. The experience of Andhra Pradesh fish farmers has clearly shown that there is great potential for commercial culture and there is no major risk involved in adopting carp culture technology to improve the socioeconomic status of farmers (Nandeesha and Rao, 1989). Infused by the success story of carp culture in Andhra Pradesh, several other states are now giving reorientation to their programmes to follow the foot steps of Andhra Pradesh fish farmers.

The major constraint for the expansion of carp culture is the non-availability of quality fish seed. Till 1960s, the major part of carp seed required for culture used to be collected from riverine sources. However, the major breakthrough achieved by Chaudhury and Alikunhi (1957) in induced breeding of Indian major carps using pituitary extract has greatly contributed for the rapid development of carp culture in India without having to depend heavily on the riverine collections. The hypophysation technique was later extended successfully for the breeding of silver carp and grass carp (Alikunfil et al., 1962). Although, the technique of hypophysation is practised throughout the country, there are certain inherent problems which have prevented it being taken up widely by fish farmers.

These problems are as follows:

1. Varying potency of the pituitary gland results in unsuccessful spawning and this problem cannotbe easily rectified since the farmer cannot measure the potency of the available gland.
2. Pituitaries have to be collected at the right time and preserved properly for use. However, there are serious difficulties in large-scale collection and storage of pituitary glands owing to the limited period available for collection just before the commencement of the breeding season.
3. There is large gap between the supply and demand of pituitary. As a result, several fish breeders either use poor quality glands yielding unsatisfactory results or do undertake only limited breeding operations due to lack of glands.
4. For preparation of pituitary extract basic equipments like a chemical balance and centrifuge are required which are normally not available in several farms.
5. For achieving successful spawning, pituitary extract has to be administered necessarily in two split doses to female fish. This not only results in increased handling of brood Fish, often leading to spawning failure, but also consumes considerable amount of labour and time.
6. Pituitary glands need to be stored in a refrigerator to avoid spoilage. However, several farms do not possess this equipment.

Because of the above mentioned drawbacks, several fish seed farms in India still breed only common carp which does not require pituitary hormone treatment for breeding under tropical conditions. It is reported that only about 15% of the existing carp seed farms use the hypophysation technique for breeding carps (Dehadral, 1984).

Alternate inducing agents

In order to overcome the above problems, search has been on for the last few years to find effective substitutes to carp pituitary. Although Varghese *etal.* (1975) and Varghese and Rao (1976) succeeded n using marine catfish (Tachysurus spp.) pituitary for breeding carps, the problems mentioned above remained unsolved. Moreover, the dosage of catfish pituitary required for spawning was significantly higher (20 mglkg for female major carps and 30 mg/kg for female exotic carps).

In recent years, human chorionic gonadotropin (HCG) received some attention as a substitute for pituitary, but has met with little success, excepting in the breeding of silver carp (Chondar, 1985; Chondar, 1990). It was found that for successful spawning, it is always necessary to combine HCG with carp pituitary. Although several other drugs, hormones and homeopathic preparations have been tried in India with varying degrees of success (Trip athi and Khan, 1990), none has gained acceptance at the farmer's level either due to cost, non- avail ability or procedural difficulties.

Conclusion

The results of the large number of breeding trials conducted in nine different states of India clearly demonstrate that the Ovaprim is far superior to carp pituitary in inducing spawning in several species of carps.

1. The rates of fertilisation and hatching were generally higher in Ovaprim treatment when compared to pituitary.
2. The size of eggs after water hardening was always considerably bigger in Ovaprim treated fish as compared to that of pituitary treatment. This probably indicates complete development of eggs.
3. The spawning response time was almost equal in both Ovaprim and pituitary treatments.
4. The hatchlings obtained from Ovaprim treatment appeared to be healthier than those produced with pituitary. However, this aspect is being confirmed.
5. Based on the observations of the present study, the dosage of Ovaprim required for female brood fish of various species is as follows:
    a. Catla 0.40 to 0.50 ml/kg
    b. Rohu 0.30 to 0.40 ml/kg
    c. Mrigal 0.25 to 0.30 ml/kg
    d. Silver carp 0.50 to 0.70 ml/kg
    e. Grass carp 0.50 to 0.70 ml/kg
    f. Big head carp 0.50 ml/kg
    g. Bata 0.50 mI/kg
    h. Fringe-lipped carp 0.50 ml/kg
6. Although the dosage required for males of various species could not be standardised, it appears that males of most species will respond to 0.10 to 0.20 ml/kg. On several occasions of the present study, males could be induced with dosages of 0.10 to 0.15 ml/kg.
7. At present, 100 ml of Ovaprim costs about 180 CAN dollars, while about 5 mg pituitary gland costs about Rs. 21, Considering these rates as base, the economic analysis carried out has indicated that the use of Ovaprim more economical than pituitary.
8. The post-spawning mortality of Ovaprim treated fish was negligible due to relatively less handling in comparison to pituitary treatment.
9. Ovaprim does not require refrigerated storage and hence can be preserved at ambient temperature.

Further trials are now in progress to confirm the results obtained during the last two years as well as to gather additional information on the eggs and hatchlings produced through Ovaprim treatment, such as their size, rate of growth, survival etc. Standardisation of dosages for other species is also being taken up. The results of these nation-wide experiments should go a long way in revolutionising the carp seed industry of India.

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