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Note

Successful induced spawning and hatching of hill stream carp, *Labeo dyocheilus* (McClelland) in Kosi river

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ABSTRACT

Among the food fishes in the Kumaon Himalayan region of India, the carp, *Labeo dyocheilus* has high consumer preference as well as good market value. The fish belonging to the order Cypriniformes is in an endangered species. Successful breeding of *L. dyocheilus* (McClelland) by intramuscular administration of synthetic hormonal drug, ovaprim is reported. 90-95% fertilisation and high rate of hatching was observed. The performance of various facilities used for spawning and incubation process is discussed. Successful breeding of this fish enabled us to produce populations in the natural stream environment.

Induced spawning and the release of induced bred individuals into the wild are among the techniques used for the conservation of endangered fish species. Attempts have been made to breed the endangered hill stream fish *Tor putitora* in the Kumaon region (Tripathi 1977; Pathani and Das, 1979; Sehgal, 1991; Shyam Sunder *et al.*, 1993; Ogale 1997) and at Lonavala and Western Ghats. Pandey *et al.* (1998) succeeded in induced spawning of pond raised endangered golden mahseer with ovaprim administration and (Bhowmik *et al.* 2000 in non-airbreathing catfish *Ompok pabda*. Scanning of literature indicates that no research have been done on the biology, life history, captive breeding and induced spawning of coldwater medium carp *L. dyocheilus* either in pond condition, laboratory condition or in streams.

In the Kumaon Himalayan region, *L. dyocheilus* locally called 'Kali' one of the most economically important fish (Joshi, 1994) has been categorised at different times as threatened (Desai, 1994) and vulnerable (Dubey, 1994; Prasad, 1994; Sinha 1978). The fish is a bottom feeder inhabiting upland streams and rivers at an elevation of 400-800m. The fish is reported to attain a length of 91.44 cm (Day, 1977; Hora, 1936). Over the last 10 years, its wild population has undergone a steady decline (>50%) and is listed among the 82 vulnerable freshwater fish species of India (CAMP, 1998). The induced spawning of this species has not yet been attempted. Hence the present study was undertaken to breed the fish in the natural environment with ovaprim.

The induced breeding programme was

TABLE 2. Details of experimental set up for incubation of *Labeo dyocheilus* eggs

Sl. No.	Type	Incubation Temp. (°C) Eggs				Incubation incubated (%)	Incubation period (hr.)
		Atmosphere		Water			
		Day	Night	Day	Night		
1	HAPA (4.5 x 2.3' x 1.5')	Day 33,	Night 29	Day 28,	Night 24	70	13
2	PLASTIC TUB (2 x 1.5)	Day 33,	Night 29	Day 31,	Night 28	95	12
3	INSTREAM (3 x 1.5')	Day 33,	Night 29	Day 25,	Night 21	20	18

The fertilised eggs were kept in three different conditions to examine the hatching process (Table 1). About 40,000 eggs were fertilised.

In the hatching hapa, the flow of stream water was regulated by placing boulders one meter upstream from the hapa. The incubation was first noticed in the eggs kept in plastic tub fixed in the stream where aeration was provided and the temperature recorded was 31°C (Table 2). The incubation percentage was 95 and duration 12 hours. Fertilised eggs kept in hapa (water temperature 28°C) exhibited 70% of incubation which took 13 hours. Aeration was provided in hapa. Under stream condition, however, the percentage of incubation was very low (20%) after 18 hours (Table 2). Twitching stage of embryo was noticed after ten hours of fertilisation for the eggs reared in plastic tubs.

Eggs of *L. dyocheilus* were creamy white in colour and the size of the ovarian eggs (Stage VI) ranged between 1.19 ± 0.20 and 1.38 ± 0.18 mm. The absolute fecundity observed was 85838. The eggs were semi-adhesive in nature and the water hardening of the eggs took 5 hours. The average diameter of the fertilised egg was 3.3 ± 0.65 mm. Hatching was preceded by movement of the larvae inside the egg shell. The hatchlings were whitish in colour. The average size of the one day hatchling was

3.19 ± 0.15 mm. Very fast swimming movement the hatchlings was noticed. All the hatchlings produced were released into low velocity areas of the stream.

In the present study, the experimental instream incubation technique of fixing plastic tubs in streams which has yielded the best results can be utilised in breeding trials of other endangered species having similar kind of eggs. The dose of 0.60 ml/kg body weight of ovaprim could be utilised in future breeding of *Labeo dyocheilus* especially for instream condition. However, more experiments are needed for standardisation of doses under captivity.

Ovaprim is highly effective in inducing ovulation of *L. dyocheilus*. The time taken for response in *L. dyocheilus* is lower (18 hours) compared to *Tor putitora* (24 hours) as reported by Pandey *et al.* (1998). The rate of fertilisation in the present experiment is higher (90-95%) compared to earlier reports in *T. putitora* (Pandey *et al.*, 1998) using ovaprim. Sridhar *et al.* (1989) reported 75% fertilisation rate in endangered catfish *Ompok bimaculatus* using ovaprim. The variation observed for incubation of fertilised eggs in different systems might be due to variations in temperature, dissolved oxygen, water flow, depth and other physico chemical factors.

As *L. dyocheilus* is one of the

important food fishes of local people in the hilly region, it is very essential to conserve natural stocks and improve its fishery. The successful instream induced breeding opens avenues for enhancement of stocks of endangered species through collection of wild broodstock, induced breeding at the collection site itself and releasing hatchlings into natural habitat.

Acknowledgements

The authors express their deep sense of gratitude to Dr. A.G. Ponniah, Director NBFGR for providing necessary facilities, guidance and encouragement. They are also thankful to Miss Roy for typing the manuscript.

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