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21. AN INTERESTING CASE OF FISH SPAWNING IN AN OVERCROWDED NURSERY POND

Dubey & Tuli (1961) were the first to record the spawning of Indian major carps in standing water without any flow in two wet bundhs, namely Nagda and Bilaoli reservoirs, of Madhya Pradesh on sandy-clay and stony embankments respectively. Alikunhi *et al.* (1964) recorded major carps spawning in Neorapahari Tallaiya, an ordinary 0.08 ha pond with rocky embankments and sandy-silt bottom, near Nowgong (M.P.). The breeders were stocked in this pond from a nearby tank for induced breeding experiments about 10 days after the accumulation of fresh rain water. They also reported the spawning of catla, rohu and mrigal, soon after fresh rain water had collected, in two typical nursery-cum-rearing ponds (0.08 ha) at Jagatsagar (Nowgong, M.P.) with sandy substratum. There was no flow of water in any of these ponds. A similar case of spawning in a nursery pond, with standing water, at the Experiment Station, Adhartal Lake, Jabalpur, is reported here.

The 0.04 ha nursery pond (25 × 16 × 1.5 m) has been in use for fry rearing for over ten years in connection with the fisheries development programme in the Adhartal Lake (16 ha). This nursery normally dried up during summers but after the 1968 fry rearing season was over, some 500 rohu and 200 mrigal fingerlings, left behind in the nursery, continued to be reared in the pond, with the idea of raising a stock of breeders in the nursery itself. The nursery was filled with lake water at least thrice between February and June each year for the continued rearing of this stock. Between October 1969 and June 1971, the pond was stocked with common carp (*Cyprinus carpio* var. *communis;* 110 mm/25 gm), grass carp (*Ctenopharyngodon idella,* 82 mm/8gm), silver carp (*Hypophthalmichthys molitrix,* 118 mm/11 gm), prawns (*Macrobrachium malcolmsonii,* 55 mm) and mahseer (*Tor tor,* 100 mm) fingerlings. Wild spawning of common carp was recorded in the pond

in November, February-March and July-August each year on marginally growing para grass (*Brachiaria mutica*). Common carp also spawned when water was taken to fill this nursery from Adhartal Lake even in April-May when the air temperatures were as high as 35°-38°C.

Besides the fingerlings listed above, 25 catla (6-15 Kg), 6 rohu (2-4 Kg) and 6 mrigal (1-2 Kg) were further stocked in the nursery between October 1971 and June 1972 with a view to using them as breeders for hypophysation. These large-sized catla and rohu, however, did not mature nor was there any reduction in their mesenterial fat (Tripathi 1972).

The water of the pond was throughout highly turbid and the plankton density extremely poor (traces/50 1). The pH of the pond water varied from 7.5 to 8.2. The pond bottom had about 200-300 mm of loose muck. It often emitted a foul smell and bubbles of gas appeared on the water surface, especially on cloudy days.

During the 1972 monsoon season, mrigal and rohu breeders from this pond were used for hypophysation; the entire induced breeding work was done in the main lake. However, a dry spell from 10th July to 7th August affected the condition of mrigal breeders but rohu breeders continued to respond well to hypophysation even after 7th August 1972. There were heavy rains on 14th/15th August 1972 with 125 mm rainfall. The water level in the nursery, which stood at 442 mm in July, went up to 919 mm on the 15th August. Though there were sporadic rains between 16th and 29th August 1972, the water level in the pond had fallen to 634 mm. Heavy rains were again recorded on 29th August afternoon and it continued raining the whole night (29th/30th Aug.). It was the season's maximum record of rainfall on one day, the details of rainfall and temperature on 29th, 30th and 31st August are given below:

	Temperature (°C)		Rainfall (mm)
Date	Maximum	Minimum	
29-viii-72	23.3	23.3	78.7
30-viii-72	23.0	21.4	304.8
31-viii-72	24.2	21.4	19.3

The water level in the pond went up from 634 to 1164 mm on the 30th August. The dilution on the two occasions (15th and 30th Aug., 1972) could be said to be twice each time.

Despite a heavy downpour from about 2 p.m. onwards on 29th August, rohu breeders from this pond were collected and injected at 5.30 p.m. and about 2.97 lakhs eggs obtained on 30th August morning. Since it was very windy and fixing the hapas in the lake was difficult, breeders were not injected on 30th August evening. On 31st August, when rohu breeders were again collected for hypophysation it was found that they had already bred in the nursery. Though actual

breeding in the pond was not observed it is surmised that it took place in the early hours of 30th morning. A number of hauls were made and several breeders examined. The males were found to be oozing thin milt and the females gave out loose eggs on slight pressure on the abdomen as is commonly observed in case of spent breeders. Several hauls were then made with a plankton net but not a single egg or hatchling was obtained. Since common carp, of all sizes, predominated in the pond, it is possible that they had completely destroyed the eggs while those that survived had probably hatched out by the time the search was made and being few in number could not be collected by the plankton net. The season's fish breeding programme thus came to an abrupt halt.

Hauls made subsequently after a month on October 6, 1972, for the presence of small fry, if any, confirmed that spawning had taken place in the nursery. Six fry (35-40 mm) were collected in two hauls with a fine-meshed drag-net. Since large-sized catla and rohu were also present in the pond, further hauls with this drag-net were not made.

An analysis of the soil and water conditions of the pond after spawning (31st August '72) is given below:

Soil

Sand 63.75%, Silt 8.75%, Clay 27.50% Tex class Scl (Sandy-clay-loam).

Water

pH 7.9, K 6 (ppm), Na 18 (ppm), P 0.10 (ppm), Condivivity 200 (micromhos/cm), Total sol. salts 128 (ppm), Titrable alkalinity 2.3 (me/1).

Analysing the factors influencing the spawning of carps, Hora (1945) observed heavy monsoon floods to be the primary factor acting as a triggering mechanism for spawning. However, other workers have laid emphasis on topographical (David 1959), chemical (Mookerjee 1945; Saha *et al.* 1957) and physical (Khan 1945 and David 1959) conditions. Within the ranges encountered, it has been seen that pH, DO, free CO_2, total alkalinity and turbidity have not noticeable effect on spawning. Dasen (1945) considered monsoon floods from the hills as an indispensable factor as it has, besides, special physical and chemical, certain electromagnetic, properties apart from a peculiar smell or fragrance. Recently, Lake (1967), based on a series of experiments, has postulated that fish are stimulated by some factor resulting from inundation of dry ground or from water entering a pond or river after flowing over dry ground. In the present case, the question of fish getting stimulated by water entering the pond after flowing over dry ground cannot be considered as the bundhs and side slopes of the nursery could not be taken as "dry ground" towards the end of the mon-

soon season. It being a typical nursery there was no catchment area too. Rainwater had already entered the nursery on several occasions during the current season as also during the 1970 and 1971 monsoon season but with no effect.

Swingle (1953) has reported that spawning of fish is inhibited due to the presence of a hormone like excretion or secretion from fish that acts as a repressive factor. Though common carp spawned naturally in this pond during July-August, November and February-March, its breeding was noted on several occasions whenever the nursery was refilled with water from the main lake. It is possible that the dilution required to nullify the inhibiting effect of the factor for common carp is different than that for catla, rohu or mrigal. Swingle (1953) has further observed that "the repressive factor may be specific for a particular species or may affect other species". As already noted above, common carp bred profusely in this pond after a heavy shower on 16th August 1972 but perhaps this dilution was not enough for rohu. Rohu itself, however, bred on 30th August when the repressive factor specific for it was considerably diluted. It may be mentioned that spawning of any of the Indian major carps has never taken place in this nursery ever before and this is the first time that rohu have spawned in this pond.

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