# Hatching and Rearing of Carp *(Cyprinus carpio* L.) in the Polonnaruwa Nursery

Carp fingerlings have been raised at Polonnaruwa since 1957 (Ling, 1962), by a method essentially the same as that described by Hora and Pillay (1962). The present work was initiated to assess and increase the efficiency of the nursery.

Carp were spawned using a modification of the " kakkaban " or Indonesian method described by Hasanudin Saanin (1960). Instead of arenga fibres, strands of *Hydrilla* tied into bundles, were used in our experiments. Cement ponds measuring 17′ × 10′ × 2′ were used for spawning the fish. The ponds were thoroughly dried, filled with well-water and 3 coir strings were stretched across the short axis of each. These strings were about 1 foot apart and two inches below the water surface and occupied the central portion of the pond. Strands of *Hydrilla* tied into bundles were hung on the 3 strings at regular intervals. The strands in each bundle were approximately the same in number and length. Ripe males and females which had been earlier segregated were released into the spawning ponds late in the afternoon. Next morning after the fish had completed spawning, they were removed. Bundles from the 3 strings were taken at random and the eggs counted. From this the total number of eggs was estimated. All the bundles of *Hydrilla* were then placed in two other cement ponds of the same dimensions as the ones used for spawning. The eggs hatched out on the third day after fertilisation. Four days from spawning a number of bundles were taken out at random, the number of unhatched eggs counted and an estimation made of the total number of unhatched eggs. The percentage of the eggs hatched out was thus obtained. The fry were fed on egg yolk until they were a week old and later with zoo-plankton and " Bemax ". When they were 6 weeks old they were collected, counted and introduced into a larger pond, approximately 60′ × 35′, cut out of earth. This had 2½ ft. of water in it and here the diet of the fry consisted of the autochthonous plankton supplemented with poonac. In this pond they grew for another 6 weeks. The fingerlings were then collected and counted.

Two experiments were carried out. In the first, 3 females and 6 males were used. Thirty bundles of *Hydrilla* were tied to the 3 strings and 10 of them taken at random were used for egg counts. In the second experiment the same number of fish were used but 36 bundles of *Hydrilla* were tied to the 3 strings and 9 of these taken at random for egg counts. The results of these 2 experiments are given in Table 1.

In both experiments the greatest mortality, 92.57% and 98·22%, was during the first six weeks. Unhatched eggs varied in percentage, being 7·02 and 1·09. The survival to fingerling stage was very low, being 0·32 and 0·51 per cent. of the eggs laid.

The factor most affecting the mortality of fry seems to be predatory animals. The physical condition of the water and the oxygenation were apparently well within the tolerance of the fry, although sometimes the oxygen content was rather low. In the cement ponds the temperature varied from 25·5°C. to a maximum of 30·2°C. The oxygen content varied from 2 to 15 ppm. No free carbon dioxide was detected.

The predators included frogs (*Rana* spp.), backswimmers (*Anisops batillifrons* Lundb., reported in 1963 by Fernando and Leong in the nursery ponds at Polonnaruwa) and several species of dragonfly larvae. The frogs and dragonfly larvae were removed by a small meshed hand net. Backswimmers occurring in large numbers were difficult to control. The use of an emulsion of soap and coconut oil in sufficient quantity just to cover the surface resulted in temporary eradication of the backswimmers and had no effect on the fish. But the ponds were soon recolonised. The use of small wire mesh to cover the fry ponds from the time they are filled with water will prevent frogs and dragonflies from entering. Regular use of soap and coconut oil will prevent the backswimmers from surviving.

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TABLE I

| | *No. of eggs* | *of fry hatched* | *Percentage unhatched eggs* | *No. of fry collected after six weeks* | *Percentage mortality weeks 1–6* | *No. of 3 month old fingerlings* | *Percentage mortality weeks 7–12* | *Percentage total mortality weeks 1–12* |
|---|---|---|---|---|---|---|---|---|
| 1st Exp. | 367,870 ±4,415 | 342,019 ±4,827 | 7·02 | 1,490 | 92·57 | 1,153 | 0·09 | 99·68 |
| 2nd Exp. | 276,480 ±4,752 | 273,452 ±4,786 | 1·09 | 1,884 | 98·22 | 1,397 | 0·18 | 99·49 |