



AQUACULTURE CRSP 22ND ANNUAL TECHNICAL REPORT

CONTROLLED REPRODUCTION OF AN IMPORTANT INDIGENOUS SPECIES, *SPINIBARBUS DENTICULATUS*, IN SOUTHEAST ASIA

*Eleventh Work Plan, Indigenous Species Development Research 2 (11ISDR2)
Final Abstract*

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ABSTRACT

Preliminary studies were conducted to understand some basic reproductive parameters of the indigenous carp *Spinibarbus denticulatus* as a prelude to more specific research studies and subsequent development of hatchery technology. The study objectives were to: 1) Understand the seasonal pattern of gonad development, sexual maturation, and various reproductive parameters; 2) Induce this species to spawn in captivity using natural and artificial methods; and 3) Assess larval growth and survival using available low-cost food items. The first two objectives have been achieved, and the final experiments are underway.

The study was carried out on sub-adult and adult fish. Gonad and egg development was assessed over a 12-month period. Observation of the annuli rings on fish scales was found to be a reliable measure of age. In a population of males and females of similar age, males were generally smaller (2.54 ± 0.34 kg) than females (3.46 ± 0.45 kg). The age at sexual maturation of a natural stock was earlier for males (4 years) than females (5 or older). The gonadosomic index revealed two peaks, April and October. Further examination of the ovaries and eggs during January, February, and March suggested that eggs were developing at various stages. During January, the eggs in the ovary of mature females were uniformly small (0.7 ± 0.1 mm diameter.). Two distinct egg groups (0.7 ± 0.1 mm, 36% and 1.0 ± 0.2 mm, 54%) were observed in February. Three distinct size groups were observed during March (1.1 ± 0.03 mm, 1.6 ± 0.01 mm and 2.1 ± 0.03 mm). The proportion of large eggs (55%) was higher compared to mid (26%) and small eggs (19%) during the near-peak spawning month. The average number of eggs in the ovary of a female (3.1 ± 0.4 kg) was 31,041 (12,632–45,359). Males synchronized milt production with egg maturation and ovulation under pond conditions. Milt flowed out readily during the spawning season. Sperm characteristics were similar to those of most teleosts. The mean sperm concentration was 8.42 ± 0.36 million cells per ml with only a small amount (3.3 ± 0.2 ml) of total expressible milt per male. However, when induced with LH-RHa ($10 \mu\text{g kg}^{-1}$) the milt production increased to 6.2 ± 0.5 ml without an increase in the total number of sperm cells. While this new species for aquaculture shows potential for mass production of seed, low fecundity and late puberty could present obstacles.

A second series of experiments indicated that natural induction methods (rain simulation, decreased/increased water depth and flow) did not induce mature females to spawn in ponds. A series of injection using locally available hormones (e.g., HCG, LH- RHa+Dom, PG) were used to induce females to ovulate. Although all inducing agents resulted in ovulation, the combination of LH-RH and Domperidone resulted in the most consistent results.