Enhancing Growth and Survival of Mrigal (*Cirrhinus mrigala*): Effects of High-Protein Diets on Early Development

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This study evaluated the effects of high-protein formulated diets on the early growth and survival of *Cirrhinus mrigala* (Mrigal) larvae under hatchery conditions at the Iranamadu Aquaculture Development Centre, Kilinochchi, Sri Lanka. Day-old larvae (initial mean weight: 0.003 g, length: 0.493 cm) were stocked at 100 larvae per tank in nine 100-L fiber-reinforced plastic tanks and reared for 36 days under three dietary treatments: T1 (control: boiled, mashed chicken egg), T2 (55% crude protein feed), and T3 (65% crude protein feed), each replicated thrice. Formulated feeds comprised fishmeal, shrimp meal, soybean meal, and a vitamin-mineral premix, ground to a particle size suitable for larval consumption. Larvae were fed to apparent satiation four times daily, with growth parameters (weight and length) measured every 15 days and survival rates assessed at the trial's end. Larvae fed the 65% protein diet exhibited significantly higher growth (final mean length: 1.84 cm, weight: 0.060 g) compared to the 55% protein group (1.70 cm, 0.055 g) and the control (lowest growth). Survival rates were numerically higher in the protein-fed groups (70.27% for 55% protein, 73.47% for 65% protein) than in the control (47.10%), though differences were not statistically significant ($p>0.05$). Enhanced growth in high-protein groups is attributed to improved amino acid availability and feed digestibility, while higher survival likely results from better nutrient profiles, reducing stress and microbial contamination compared to the control. These findings underscore the efficacy of 65% protein-formulated feeds in optimizing larval development, offering a cost-effective strategy to enhance hatchery efficiency and support sustainable Mrigal aquaculture in Sri Lanka.

Keywords: Aquaculture, *Cirrhinus mrigala*, High-protein diet, Larval growth, Survival rate