B-51: Studies on shrimp pond sediments: sediment quality in semi-intensive culture systems

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Shrimp culture is a rapidly expanding industry in Sri Lanka with an annual production of around 3,000 mt. Accumulation of sediments in culture ponds and disposal of these sediments in farm sites have adverse impacts, on cultured shrimps. Information on sediment quality and quantity is essential in sustainable utilization and management of sediments in shrimp culture systems. The present study concentrates on the quality of sediments accumulated in shrimp culture ponds with different water exchange rates during the mid culture cycle.

Selected experimental site was located in Santhiya-Kalliya, bordering Mundal lagoon in west coast of Sri Lanka and extended upto 30 ha with 16 ponds. Pond size varied from 0.5-1.0 ha with a mean depth of 1.6 m. Samples were collected dry mid culture cycle between 10th and 14th week.

Sampling of sediments was performed at 7 randomly selected sites in each pond, weekly, throughout the experimental period, by sediment traps each of 0.0636 m^2. Collected samples were stored in polyethylene bags. Fresh as well as dry weights of each sample were recorded.

Culture ponds in a shrimp farm operated at semi-intensive level with 2 different water exchange rates (25% and 50% in treatment I and II respectively) were used in this study. Traps were placed randomly in pond bottom to collect sediment samples. The samples collected were used to study texture, pH, organic matter content, calcium, magnesium and potassium concentrations. Complete block design was the statistical design used.

The quality of the sediments collected in the 2 treatments did not show significant difference during the observation period. Sediments remained basic and the pH ranges recorded in the 2 treatments (8.04 to 8.33 in treatment I; 7.1 to 8.6 in treatment II) did not show a significant difference. Statistically significant difference was observed for the percentage organic matter content in the 2 treatments. The recorded Ca^{2+}. concentration in sediments varied between 66.4 and 163/4 mg/100 g in treatment I, while it varied between 128 and 180 mg/100g in treatment II. The concentrations of magnesium and potassium ions in sediments did not show significant difference in the 2 treatments.

Sedimentation rate increased with time due to accumulation of left over feed, faeces, and colloidal particles present in the pond water. Highest sedimentation observed at the middle of the ponds may be due to the action of paddle wheel.

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