

## **B-52: Diurnal variations of water quality in semi-intensive shrimp culture systems with different water exchange rates**

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Shrimp cultured in ponds are extremely sensitive to sudden changes of physico-chemical parameters such as temperature, pH, redox potential, dissolved oxygen and salinity. These parameters in the pond water should be in optimum range or at least acceptable for successful shrimp culture as otherwise shrimp mortalities occur.

The objectives of the study were (i) to determine diurnal fluctuation of pH, dissolved oxygen, redox potential and temperature in shrimp ponds managed at semi-intensive level; (ii) to find out the growth rate of shrimps under above management conditions.

The study was carried out at a private shrimp farm located at Mundel in the west coast of Sri Lanka bordering Mundel lagoon.

Drained ponds were dried for 21 days and the top layer was removed. Then top layer of the pond was laxed up to 5-7,6 cm depth and lime was applied evenly over the entire pond at the rate of 1.5 mt/ha. Ponds were filled up to 90.0 cm level and chemical fertilization was carried out at the rate of 20 kg/ha of triple superphosphate and urea. Postlarvae were introduced at a density of 19.5 postlarvae /m<sup>2</sup>.

Shrimp culture ponds each 0.5 ha in extent with 25% (Treatment I) and 50% (Treatment II) daily water exchange rates at mid culture cycle were used. Diurnal changes in dissolved oxygen, pH, redox potential, salinity and water temperature were monitored at surface and bottom layers of water together with growth of shrimps in the ponds. Ponds were selected randomly to cover the different daily water exchange rates of 25% and 50%. Data were collected at 9th, 10th 11th, 12th, and 13th week. Data were analysed using SAS statistical package & treatment means were compared by DNMRT procedure at 5% probability level. Shrimp gained an average daily weight increment of 0.25 g in Treatment I and 0.32 g in Treatment II.

Water temperature, pH, redox potential, dissolved oxygen, salinity and secchi disk visibility did not show significant difference ( $p < 0.05$ ) in the 2 treatments and also did not show significant difference at different water depths. The average water temperature fluctuation was from 26.5 to 30.5°C in surface layers while the temperature fluctuation was from 26 to 29°C in bottom layers in both treatments. Highest temperatures were observed between 1400 and 1700 h and the lowest temperatures were recorded between 0200 and 0600 h. Dissolved oxygen levels fluctuated between 2.5 and 6.5 mg/l in treatment II, while the recorded diurnal fluctuation was between 2.5 and 7.5 in Treatment I. Diurnal ranges in redox potential recorded were between 195 and 259 mv during the observation period.

Diurnal ranges in water quality parameters observed did not show statistically significant difference at 25% and 50% daily water exchange rates, in semi-intensive shrimp culture systems.

There was no significant difference ( $p < 0.05$ ) between 2 levels of water exchange rates and physico-chemical parameters such as water temperature, pH, redox potential, dissolved oxygen, salinity and growth rate of shrimps. Water exchange is a capital intensive process. In this area water is a limiting resource. Therefore economic daily water exchange rate would be around 25%. To fulfil this, paddle wheel aeration should be applied throughout the day except at the feeding times.

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