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## Assessment of Diurnal Fluctuation of Water Quality Parameters in Different Types of Ponds in Rupandehi District, Nepal

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### ABSTRACT

Nepal has an abundant source of water and the number of farmers involved in fish farming is gradually increasing in recent years especially in the Terai region. In Nepal, fish are cultured in earthen ponds, concrete ponds and plastic ponds in intensive or semi-intensive way. Assessment of diurnal fluctuation of water quality parameters was carried out in selected 18 ponds from the tole Baidauli, Siyari Municipality of Rupandehi district, Nepal in the year 2021. The treatment consisted of pond type as between-subject factor with Six earthen nursery ponds, Six earthen production ponds and Six plastic production pond ponds. Data were taken by using Aquaread, a multi-parameter water quality testing meter, at dawn (6 AM), noon (12 PM), dusk (6 PM) and at night (2 AM), with Time as within-subject factor. Ten repeated observations were taken on Cloudy and Sunny days during three summer months viz. March, April and May. Field determination of physical (temperature and total dissolved solid) and chemical (pH, Dissolved Oxygen, Salinity, Electrical Conductivity and Oxygen Reduction Potential) properties of water of the ponds was carried out. Mean values and range were computed and data was represented graphically. Variation in each parameter at different sampling hours in three types of ponds were compared by Repeated Measures Analysis of Variance (ANOVA) using R-studio which showed that the values of water quality parameters varied with Time and Day of observation, but not with the pond type. Pairwise comparison for each significant factor explained that the parameters vary significantly between daytime and morning/nighttime. Results of T-test showed that values differ between Cloudy and Sunny days. There was a linear correlation among Temperature, pH, Dissolved Oxygen and Oxygen Reduction Potential with greater diurnal fluctuation for all ponds. Earthen Nursery Ponds had statistically higher values of Total Dissolved Solid, Electrical Conductivity and Salinity and these parameters were highly correlated. Lower Mean Absolute Percent Error for best fitted linear regression model depicted good predictability of pH, Electrical Conductivity, Dissolved Oxygen and Oxygen Reduction Potential for different time of a day. This research observed the fluctuation of water quality parameters affecting fish survival at certain time interval thus opening up the scope for improvement in water quality at local management conditions.

**Keywords:** Aquaculture, water quality

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