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Seasonal trends of Limnological Parameters In a Lentic Ecosystem and Their Empirical Relations

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Seasonal patterns of nutrients and algal biomass, based on long-term monitoring data during 1993 - 2000, were analyzed in relation to ionic variations, light regime, and seasonal rainfall in ImHa Reservoir. Also, *in situ* nutrient enrichment bioassay experiments (NEBEs) were conducted during June 2002 - July 2003 for identifications of primary limiting nutrient. Nonparametric Mann-Kendall tests and seasonal trend analyses indicated that there were no long-term annual increasing or decreasing trends in major trophic parameters over the 10 years, but the monsoon seasonality was evident. Seasonality in chlorophyll (CHL) and nutrients showed a typical mono-modal pattern, which differed from that of North American and European lakes, where were represented as bi-modal peaks of spring and fall CHL blooms and high nutrient inputs with intervening minima. Such temporal patterns were consistent over the study period, and the magnitude of the variation was directly controlled by intensity of the monsoon. Empirical models of CHL-TP developed support the view that phytoplankton in lentic ecosystems responds to P enrichment and that annual mean TP may provide a reliable basis for predicting the average algal abundance. Ambient nutrient analyses, N:P ratios, and *in situ* nutrient enrichment bioassay experiments (NEBEs) supported the P-limitation for phytoplankton growth. These findings were confirmed by two dimensional graphic approach of trophic state index deviation.

Key words: Seasonal trend, chlorophyll, phosphorus, trophic state deviation, nutrient enrichment