

## Quantification of phosphorus and nitrogen uptake in a tropical freshwater ecosystem in Southeast Asia suggests N limitation

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Nitrogen and phosphorus kinetics plays an essential role in the sustainability of watersheds but their increased availability also brings adverse impacts to water quality, species diversity, human health and ecosystem balance. This study reports on nitrogen limitation in headwater streams in Silang-Santa Rosa Subwatershed (SSRS). Moreover, this is the first attempt in studying nutrient spiralling in Philippine headwater streams using Tracer Addition for Spiralling Curve Characterization (TASCC). Phosphorus uptake kinetics showed shortest uptake length ( $Sw_{amb} = 25.27m$ ), highest areal uptake rate ( $U_{amb} = 37.46 \text{ mg-P/m}^2/\text{min}$ ) and uptake velocity ( $Vf_{amb} = 162.12 \text{ mm/min}$ ) in an agricultural site and longest uptake length ( $Sw_{amb} = 109.24m$ ), lowest areal uptake rate ( $U_{amb} = 0.31 \text{ mg-P/m}^2/\text{min}$ ) and uptake velocity ( $Vf_{amb} = 2.76 \text{ mm/min}$ ) in a residential site. Nitrogen uptake showed undetected peaks that is suspected as N limitation supported by significant correlations for  $U_{amb}\text{-P}$  and  $NH_3$  ( $R=0.919, 95\%$ ) and N:P ratio (0.4923). Overall, this research aids in the Philippine land use planning and watershed management for ecological sustainability and serves as a contribution in tropical studies particularly in nutrient dynamics.

Keywords: Tracer Addition for Spiralling Curve Characterization, Philippines, nutrient dynamics

