Growth rate, protein:RNA ratio and stoichiometric homeostasis of submerged macrophytes under eutrophication stress

Growth rate hypothesis (GRH) and stoichiometric homeostasis of photoautotrophs have always been questioned. However, little is known about GRH and stoichiometric homeostasis of aquatic plants, especially submerged macrophytes. Therefore, we aim to test the GRH and explore stoichiometric homeostasis of four freshwater submerged macrophytes under eutrophication stress. At the single species level and the multi-species level, N:P ratios of Potamogeton maackianus, Myriophyllum spicatum, Vallisneria natans and Ceratophyllum demersum had no consistent trends with growth rates. However, protein:RNA ratios of P. maackianus, M. spicatum and V. natans all correlated negatively with growth rates, demonstrating GRH can apply to freshwater submerged macrophytes, even though they are threatening by eutrophication stress. Protein:RNA ratios positively correlated with N:P ratios in culture media and tissues in submerged macrophytes except in P. maackianus (30d), suggesting effects of varying N:P ratios in culture media on protein:RNA ratios are basically in concert with tissue N:P ratios under short-time eutrophication stress. Stoichiometric homeostasis coefficients (HN:P) indicated submerged macrophytes have weak homeostasis. Stoichiometric homeostasis of V. natans was stronger than those of P. maackianus, M. spicatum and C. demersum. The differences in GRH and homeostasis of the four submerged macrophytes may be due to species traits.

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