

EFFECT OF NITROGEN AND PHOSPHORUS SUPPLY ON GROWTH AND TISSUE COMPOSITION OF *ULVA FENESTRATA* AND *ENTEROMORPHA INTESTINALIS* (ULVALES, CHLOROPHYTA)[†]

1. Bo R. Björnsäter^{*},
2. Patricia A. Wheeler[†]

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The chlorophyte macroalgae *Ulva fenestrata* (Postels and Ruprecht) and *Enteromorpha intestinalis* (Linnaeus) Link. were grown under various nutrient regimes in indoor semi-continuous and batch cultures. Tissue nitrogen contents ranged from 1.3–5.4% N (dry wt), whereas tissue P ranged from 0.21–0.56% P (dry wt). Growth in low nitrogen medium resulted in N:P ratios of 5–8, whereas growth in high nitrogen medium resulted in N:P ratios of 21–44. For *U. fenestrata*, tissue N:P < 16 was indicative of N-limitation. Tissue N:P 16–24 was optimal for growth and tissue N:P > 24 was indicative of P-limitation. Growth of *U. fenestrata* was hyperbolically related to tissue N but linearly related to tissue P. Phosphorus-limited *U. fenestrata* maintained high levels of tissue N, but N-limited algae became depleted of P. For *E. intestinalis*, tissue N remained at maximum levels during P-limitation whereas tissue P decreased to about 85% of maximal levels during N-limitation. Growth rates for *U. fenestrata* decreased faster during P-limitation than during N-limitation. Simultaneously, tissue P was depleted faster than tissue N. Our results suggest that comparing tissue N and P of macroalgae grown in batch cultures is useful for monitoring the nutritional status of macroalgae.

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