



Responses of seagrass communities to fertilization along a gradient of relative availability of nitrogen and phosphorus in a carbonate environment

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Limnol. Oceanogr., 49(6), 2004, 2082-2094 | DOI: 10.4319/lo.2004.49.6.2082

ABSTRACT: Patterns of relative nutrient availability in south Florida suggest spatial differences regarding the importance of nitrogen (N) and phosphorus (P) to benthic primary producers. We did a 14-month in situ fertilization experiment to test predictions of N and P limitation in the subtropical nearshore marine waters of the upper Florida Keys. Six sites were divided into two groups (nearshore, offshore) representing the endpoints of an N: P stoichiometric gradient. Twenty-four plots were established at each site with six replicates of each treatment (+N, +P, +N+P, control), for a total of 144 experimental plots. The responses of benthic communities to N and P enrichment varied appreciably between nearshore and offshore habitats. Offshore seagrass beds were strongly limited by nitrogen, and nearshore beds were affected by nitrogen and phosphorus. Nutrient addition at offshore sites increased the length and aboveground standing crop of the two seagrasses, *Thalassia testudinum* and *Syringodium filiforme*, and growth rates of *T. testudinum*. Nutrient addition at nearshore sites increased the relative abundance of macroalgae, epiphytes, and sediment microalgae. N limitation of seagrass in this carbonate system was clearly demonstrated. However, added phosphorus was retained in the system more effectively than N, suggesting that phosphorus might have important long-term effects on these benthic communities. The observed species-specific responses to nutrient enrichment underscores the need to monitor all primary producers when addressing questions of nutrient limitation and eutrophication in seagrass communities.

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