ABSTRACT

Some authors have argued net primary production on coral reefs is nutrient limited. However, over the past several decades coral reefs throughout Florida and the Caribbean have undergone a transition from coral to algal dominance, without proportional changes in the nutrient concentrations of surrounding water. Recent research has recognized the importance of benthic nutrient sources for the growth of some coral reef algae and observed the accumulation of dissolved nutrients within algal mats. In this study algae and associated detritus were sampled to investigate and compare the ability of the dominant algae on Florida Keys Reefs, *Halimeda opuntia, Dictyota spp.* and turf algae, to accumulate detrital material, an important source of dissolved nutrients. Dissolved nutrient concentrations of water occurring within these algae were measured in order to compare the ability of these algae to impede the flux of benthic nutrients to the water column and establish nutrient enriched microenvironments. Finally, growth experiments were conducted to compare the benefits of this localized nutrient enrichment to the growth of two algae with different morphologies, *H. tuna* and *Dictyota spp.* Results indicated that all three algal types examined are capable of trapping detrital material. The depleted nitrogen content of this detritus suggested that significant remineralization had occurred. Elevated nutrient concentrations were observed in water collected from within clumps of *H. opuntia* and *Dictyota spp.,* and suggested the remineralization of detrital material was a source of these dissolved nutrients. In the growth experiments, enrichment of NH_4 and NO_3, to concentrations observed within these algae, increased the growth rate of *Dictyota spp.* above that observed in control treatments. A similar treatment effect was not observed in *H. tuna*. These results suggest that *Dictyota spp.* was N-limited at ambient nutrient concentrations, and likely benefits from the microenvironment nutrient enrichment observed to occur within this alga.

Growth of *H. tuna* may have been P-limited since concentrations of PO_4 were not elevated in enrichment treatments, however is unlikely based on ambient PO_4 concentrations. The differences observed here suggest the ability to establish and take advantage of internal, nutrient enriched microenvironments may be related to algal morphology.

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