

Do marine herbivores select for nutrient-rich foods?: An Annotated Bibliography

Boyer, K. E., Fong P., Armitage A.R., and Cohen, R.A. 2004. Elevated nutrient content of tropical macroalgae increases rates of herbivory in coral, seagrass, and mangrove habitats. Coral Reefs (Online First).

This is one of the few studies I found that directly tests for preferential feeding on nutrient-rich foods in a marine system. The authors conducted a brief field experiment in Honduras to determine whether marine herbivores selectively feed on nutrient-enriched algae. Their results suggest that herbivores do prefer algae with a higher nitrogen content, but that this preference may be less strong in areas with naturally high rates of herbivory. The authors also suggest that although macroalgae may exhibit increased biomass when enriched, herbivores may be able to compensate for the increase, provided that fishing pressure is not high.

Giannotti, Amy and McGlathery, Karen. 2001. Consumption of *Ulva lactuca* (Chlorophyta) by the omnivorous mud snail *Ilyanassa obsoleta* (Say). *Journal of Phycology* 37: 209-215.

This is another direct test of food preference in marine systems. Two laboratory experiments were conducted to determine whether the mud snail selectively feeds on *Ulva* based on nitrogen content and whether snails preferred macroalgae to alternative food sources from the sediment. Results indicate that snails do prefer the nitrogen rich macroalgae, even in the presence of alternative food sources, but that algae is a poor sole food source for the snails. The paper also discusses the positive effects snails have on algal growth and tissue nitrogen.

Mattson, William J. Jr. 1980. Herbivory in relation to plant nitrogen content. *Annual Review of Ecology and Systematics* 11: 119-161.

An extensive review of nitrogen and herbivory which, though rather old, provides a good overview of reasons why herbivores may develop selective feeding habits. This paper focuses on the terrestrial realm, but those interested in marine systems may find it useful as a background source.

McGlathery, Karen J. 1995. Nutrient and grazing influences on a subtropical seagrass community. *Marine Ecology Progress Series* 122: 239-252.

This is an interesting field study conducted for 10 weeks at 2 sites with different background nutrient levels in a Bermuda lagoon. The author placed roofless cages at both sites, manipulating urchin presence/absence and allowing fish access to all cages; she also developed ambient and elevated nutrient treatments. The author observed increased grazing on nutrient-treated turtlegrass and concluded that fish were selectively

feeding on the nutrient-rich plant material. Although I did find it odd that fish were allowed access to all treatments, whereas urchin (the other dominant herbivore) presence/absence was a manipulated variable, the results reached regarding food preference are unaffected by this questionable approach.

Miller, M.W., et al. 1999. Effects of nutrients versus herbivores on reef algae: A new method for manipulating nutrients on coral reefs. *Limnology and Oceanography* 44(8): 1847-1861.

This study does not directly test for food preference, but the authors suggest that the absence of macroalgal germlings in their nutrient treated plots was due to selective grazing by herbivores. Since literature on selective feeding for nutrient-rich foods by marine herbivores is lacking, I found this to be an intriguing assertion.

Pennings et al. 1998. Feeding preferences of a generalist salt-marsh crab: Relative importance of multiple plant traits. *Ecology* 79(6): 1968-1979.

This is an interesting study on preferential feeding, which includes an experiment on preference for foods with high protein content. Feeding increased on plants with higher protein content, but highest feeding levels occurred at protein levels that were much higher than those found in nature. The authors concluded that protein content is not a main factor in salt-marsh crab preferential feeding. They acknowledge that their study only considered C:N ratios, and that more complex nutritional traits, untested in this experiment, may play a role in preferential feeding. Overall, an interesting study exploring the mechanisms that induce preferential feeding.

Yates, J.L. and Peckol, P. 1993. Effects of nutrient availability and herbivory on polyphenolics in the seaweed *Fucus vesiculosus*. *Ecology* 74(6): 1757-1766.

This study focuses on influences on polyphenolic concentrations in *Fucus*. However, the authors do conduct a small feeding selectivity experiment with algae from low-N areas and high-N areas; polyphenolic concentrations were found to be inversely proportional to tissue N concentrations, with tissue N being low at low-N sites and high at high-N sites. They found that snails grazed more heavily on algae from the high-N area. Their results indicate preferential feeding for high-N tissue content and/or low polyphenolic concentrations.