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## Water column nutrients control growth and C:N ratios of symbiont-bearing benthic foraminifera on the Great Barrier Reef, Australia

Uthicke, Sven, and Christine Altenrath

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**ABSTRACT:** In situ growth of two abundant diatom-bearing benthic foraminiferal species (*Amphistegina radiata*, *Heterostegina depressa*) was investigated to elucidate whether differences in abundance between inshore and offshore reefs are influenced by water quality. Five experiments were conducted over 2 yr, comparing growth rates of foraminifera at inshore coral reefs, which are exposed to terrestrial runoff, with those at reefs further offshore. Concentrations of most dissolved and particulate water quality variables were significantly higher inshore and during periods of high runoff (summer wet season). Foraminiferal growth was generally significantly lower on inshore reefs than offshore reefs, and growth of both species was reduced during the wet season. Depth transplantations confirmed that light was not an important factor for growth regulation. In contrast, multiple regression analyses of the effects of water quality variables on foraminiferal growth explained 69% of the variance in growth for *A. radiata* and 78% for *H. depressa*. Increased concentrations of dissolved nitrogen were associated with reduced growth. Intracellular carbon-to-nitrogen ratios in the foraminifera also reflected patterns in water quality, with generally lower values in foraminifera from inshore or during periods of high runoff, driven by higher intracellular N contents during these periods. It is suggested that increased nutrient availability releases foraminiferal symbionts from nutrient limitation. This may lead to reduced translocation of organic carbon to the host and resulting reduced host growth.

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