



## Biology and Diet of Invasive *Caulerpa brachypus* *F. parvifolia* Blooms on Coral Reefs in the Southeast Region of the United States

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### Abstract

Over the past 20 years, invasive chlorophyte blooms have devastated coral reefs of the southeast coast of Florida in an unprecedented sequence, with the non-native *Caulerpa brachypus* *F. parvifolia* being the most recent. We monitored benthic cover, water column dissolved inorganic nutrients, tissue C: N: P ratios, and stable nitrogen isotopes ( $\delta^{15}\text{N}$ ) of *C. brachypus* and native chlorophytes (*Caulerpa racemosa*, *Caulerpa verticillata*, *Caulerpa mexicana*, and *Codium isthmocladum*) quarterly at two reef sites, the Princess Anne (PA) and North Colonel's Ledge (NCL) in 2003-2004. These observations helped us gain a better understanding of the ecology and nutrition of the *C. brachypus* invasion. Stormwater discharges from the Lake Worth inlet had an impact on the PA site, while NCL was located further away from these discharges.

*Caulerpa brachypus* *F. parvifolia*; Coral reefs; Chlorophyte; Brachypus; Benthic cover

Benthic cover of *C. brachypus* decreased in July 2003 after cold temperatures ( $13^{\circ}\text{C}$ ) coupled with strong upwelling and high nitrate concentrations ( $21\ \mu\text{M}$ ) at NCL, indicating that upwelling can stress the growth of this tropical alga. Mean concentrations of ammonium ( $0.60\ \mu\text{M}$ ), nitrate ( $2.7\ \mu\text{M}$ ), and DIN ( $3.2\ \mu\text{M}$ ) were elevated in comparison to coral reef settings [1,2].

Around the world, changes in coastal ecosystems have been attributed primarily to the invasion of both native and non-native macroalgae. Over the past 20 years, native and non-native chlorophytes have invaded coral reefs in southeast Florida in an unprecedented series of macroalgal blooms. In the summer of 1989-1990, spectacular blooms of detached *Codium isthmocladum* first appeared on deep reefs (24-43 m) off the coasts of northern Broward and southern Palm Beach counties. In the late 1990s, attached populations of *C. isthmocladum*,

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