



Changes in the fluorescence of the Caribbean coral *Montastraea faveolata* during heat-induced bleaching

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ABSTRACT: In order to evaluate the response of commonly occurring green and orange fluorescent host-based pigments, a thermal stress experiment was performed on specimens of the Caribbean coral *Montastraea faveolata*. Seven paired samples were collected from a small oceanic reef near Lee Stocking Island in the Bahamas. Seven of the fourteen corals were subjected to elevated temperatures for 28 d, followed by a recovery period lasting 53 d. Throughout the experiment, high-resolution (~400 μm pixel⁻¹) multispectral images of induced fluorescence were recorded at wavelengths corresponding to the green and orange host pigments, plus chlorophyll. These images revealed that the fluorescence of both host pigments was concentrated at polyp centers and declined by 70-90% in regions between polyps. Chlorophyll fluorescence, however, was distributed almost uniformly across the entire coral surface, but with decreases of 10-30% around polyp centers. A normalized difference ratio between the green and orange pigments (GO ratio) was developed to facilitate comparison with chlorophyll fluorescence as a bleaching indicator. Analysis showed a high correspondence between a sustained GO ratio of less than zero and the death of corals. Finally, this ratio was resistant to contamination from other sources of chlorophyll fluorescence, such as filamentous

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