The Role of Fluorescent Pigments in Protecting Zooxanthellae

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A decline in photosynthetic rates of zooxanthellae due to heightened ocean temperatures decreases the energy produced by the algae for the coral, leading to an expulsion of zooxanthellae from coral polyps and coral bleaching, a critical and worsening global threat. Fluorescent pigments absorb heat, causing increased zooxanthellae photosynthesis levels. Increased photosynthetic rates of zooxanthellae, as measured by a increase in pH due to an uptake of carbon dioxide, should produce more energy for the coral, reduce the likelihood of zooxanthellae expulsion, and cause bleaching events to decrease. The zooxanthellae with an increased amount of fluorescent pigments applied will increase the pH of the saltwater more significantly than the zooxanthellae with less or no fluorescent pigments applied. Zooxanthellae were placed in tubes containing zero [control], one, five and 10 mL volumes of fluorescent pigment solution and then placed in four tanks. The pH of each tank was measured over 37 days. pH levels of tanks with fluorescent pigments increased in comparison to pH levels of the control (p-values for all experimental tanks were below 1%). The data signify that fluorescent pigments placed on coral could prevent bleaching.

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