CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35930

Project Title

Study on the Effect of the Environment on Brain Coral Fluorescence: A Tool for Early Coral Diagnosis

Abstract

Objectives/Goals

Around the world, the environment is threatened by human pollution. Scientists are facing the problem of diagnosing corals before they become completely diseased. This study observes the effect of the water environment on brain coral fluorescence and the degradation of corals from the fluorescence view point. Fluorescence could be used as a tool for early, noninvasive coral diagnosis.

Methods/Materials

Requires scuba diving equipment, Fluorescence photography equipment, Panasonic GH2 with a yellow filter, format micro 4/3, 45 millimiter lenses, Underwater strobe, GoPro with micro and yellow lenses. Four Brain Corals in decaying conditions and environment, four healthy Brain Corals in a protected and clean area.

1. Identification of fluorescent specimen and suitable marine environment to conduct the experiment.2.Environment dive to record information on the four corals in the healthy and degrading environments through lots of pictures for later grid analysis 3. Night dive to photograph and record fluorescence of corals in optimal and degrading environments through lots of fluorescence pictures for grid analysis

Results

Based off grids on pictures the corals in the degrading environment all showed fluorescence under 50%. The corals in the healthy environment usually had fluorescence over 80%, but some had started to show slight degradation in fluorescence: 83% fluorescence in coral 2. There was an overall direct correlation between the healthiness of the environment and the brightness of the corals under fluorescent lighting.

Conclusions/Discussion

The Philippines was a good place to conduct the project because there were healthy sites in front of the resort and polluted ones by local villages. My results showed a correlation between environment health and brightness of the corals however the corals that appeared healthy on the surface, in a healthy environment were showing early signs of fluorescence degradation, especially around the polyps. I concluded that corals used fluorescence as a means of attracting micro organisms for food. Corals that appeared healthy were in fact dying due to bad water conditions destroying their food supplies. Coral fluorescence can be used as a way for scientists to conduct non invasive diagnoses of corals early and better understand how pollution is affecting coral reefs worldwide to take early action in protecting coral reefs.

Summary Statement

Finding a way to diagnose disease in coral reefs early using noninvasive fluorescent techniques

Help Received

Parents were scuba diving buddies, dive master helped to find the right corals during the dives, family friend who worked as a coral specialist in Australia inspired me to come up with the idea

Preliminary