Outbreak of *Montipora* banded tissue loss on the reefs of Kauai

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An outbreak of *Montipora* banded tissue loss was reported on several reefs in Kauai in the summer of 2012 by Mr. Terry Lilley, an Eyes of the Reef member and underwater videographer (http://underwater2web.com/). The Eyes of the Reef is a volunteer reporting network, which trains community members to recognize and report coral bleaching, disease or crown of thorn seastar outbreaks on the reefs of Hawaii (http://www.reefcheckhawaii.org/eyesofthereef.html). The disease has a distinctive semi-circular pattern of tissue loss and frequently has a dark band surrounding the lesion (Fig. 1).

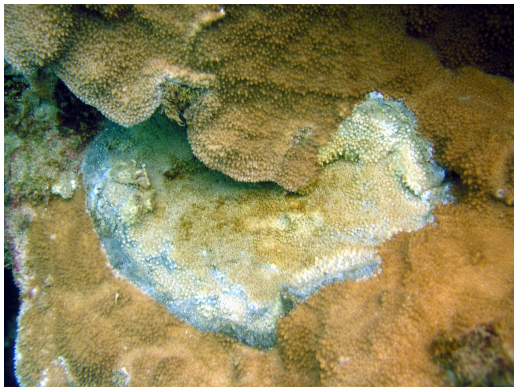

Fig. 1. Picture of *Montipora patula* showing characteristic semi-circular pattern of tissue loss.

It was first documented in Hanalei Bay in 2004 with a prevalence of <1% (Aeby 2007). Scientists from HIMB and USGS conducted a preliminary investigation of the 2012 coral disease outbreak on Kauai. Surveys at Makua reef on the north shore of Hawaii found 3-4% of the montiporids infected, 6-7% prevalence was found at Anini Beach and 8% prevalence at Anini boat ramp. Such high levels of disease compared to baseline levels constitute an epizootic. Surveys conducted two months later at Anini Beach showed the disease was slowing down (~2% prevalence). Mr. Lilley has reported seeing the same lesion on corals at numerous sites on Kauai's north and south shores and follow-up surveys to verify and quantify disease levels on reefs around Kauai are needed.

Disease virulence (harm to host) was measured by marking eight infected colonies with marine epoxy and following tissue loss through time. After approximately 2 months, all 8 colonies suffered significant mortality with an avg. of 18 cm of tissue loss occurring (Fig. 2). Lesion occlusion was tested as a means of disease treatment, whereby the disease lesion and a band approximately 3 cm in front of the lesion were covered in marine epoxy. Four of eight treated colonies had no significant further tissue loss (Fig. 3) and the other four colonies had an average of 6 cm of tissue loss. Lesion occlusion is recommended as a potential treatment for this disease for any further disease outbreaks.

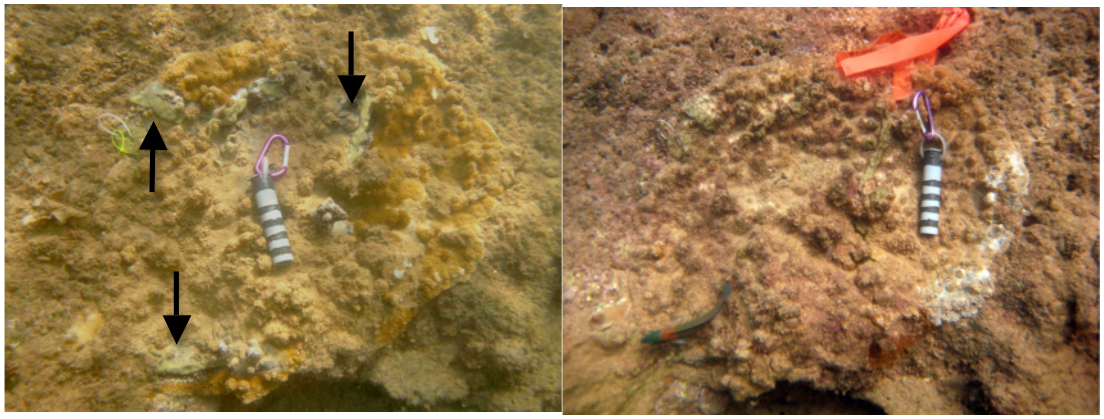

Fig. 2. Photo on the left shows colony of *M. capitata* with *Montipora* banded tissue loss marked by marine epoxy (arrows) on Oct. 1, 2012. Photo on the right shows the same colony with complete mortality on Nov. 28, 2012.

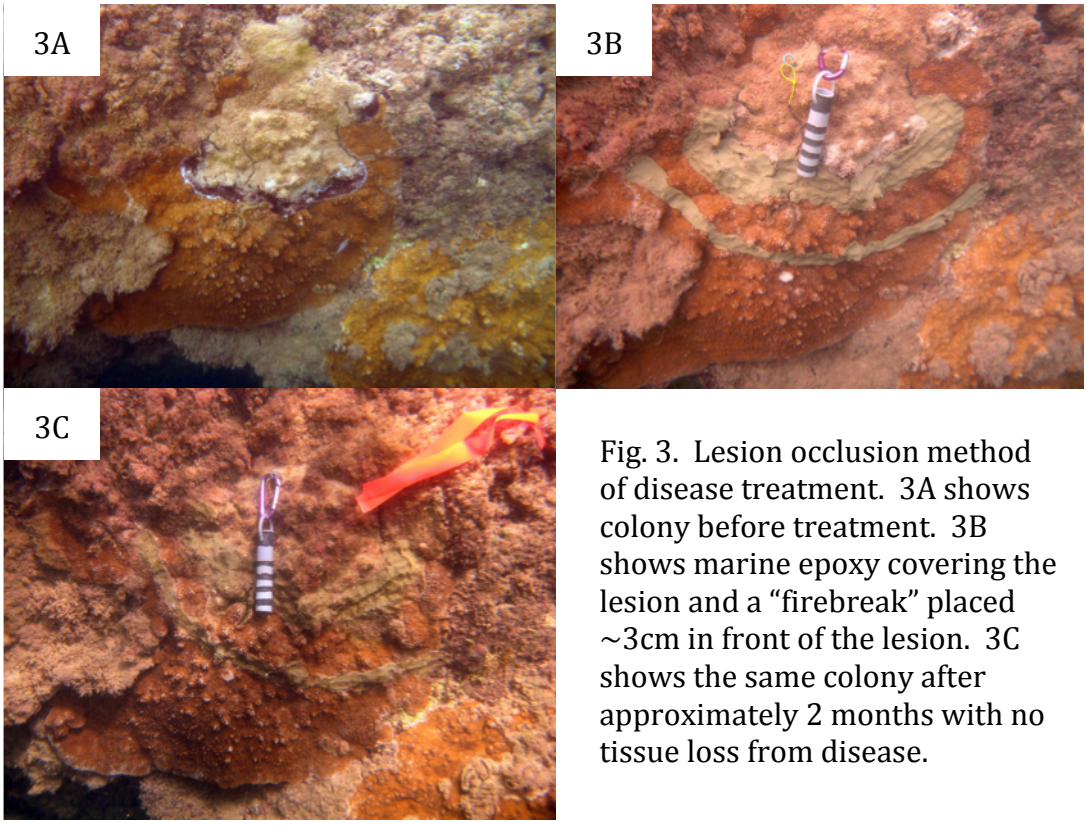

Fig. 3. Lesion occlusion method of disease treatment. 3A shows colony before treatment. 3B shows marine epoxy covering the lesion and a "firebreak" placed ~3cm in front of the lesion. 3C shows the same colony after approximately 2 months with no tissue loss from disease.

Histopathology by Dr. Thierry Work (USGS) revealed a consistent relationship between filamentous cyanobacteria and the lesion (26 out of 33 samples). Follow-up studies on the filamentous cyanobacteria by Dr. Sean Callahan's lab (UH Microbiology) identified the bacteria as *Pseudoscillatoria* and it was found to be genetically similar (99-100%) to cyanobacteria found in black band disease in Palau (Sussman et al. 2006) and the Red Sea (Rasoulouniriana et al. 2009). Black band disease is caused by a microbial consortium dominated by a filamentous cyanobacterium (Rutzler & Santavy 1983, Frias-Lopez et al. 2004). Studies are currently underway at UH to re-create the disease in the lab (infection trials) to verify etiology and to culture and identify other components of the microbial consortium. A UH graduate student has been identified that would like to conduct research on the *Montipora* cyanobacterial infection on Kauai as her dissertation topic. We are currently seeking funding to support the student and her research.

Literature cited

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