**Project Status Report (7/26/16): Spatial Variability of Symbiodinium in *Montipora capitata* in Kane’ohe Bay, Hawai’i**

*Sample Collection*

To understand the spatial distribution of *Symbiodinium* clades in the reef-building coral species *Montipora capitata* across Kane’ohe Bay, Hawaii, samples have been collected from 14 patch reef and 6 fringing reef sites (Figure 1). A total of 540 colonies have been randomly sampled in a depth range of ~0m-7m. Each colony was tagged, photographed for visual assessment of color morph and fragmented (~4cm). A small tissue biopsy was taken from each sample fragment and stored in DNA buffer with 1% SDS for genetic analysis. The remaining fragment was then frozen in liquid nitrogen to be stored at -80°C as an archive for DNA and collaborative projects pertaining to energetics and biogeochemistry in Kane’ohe Bay.

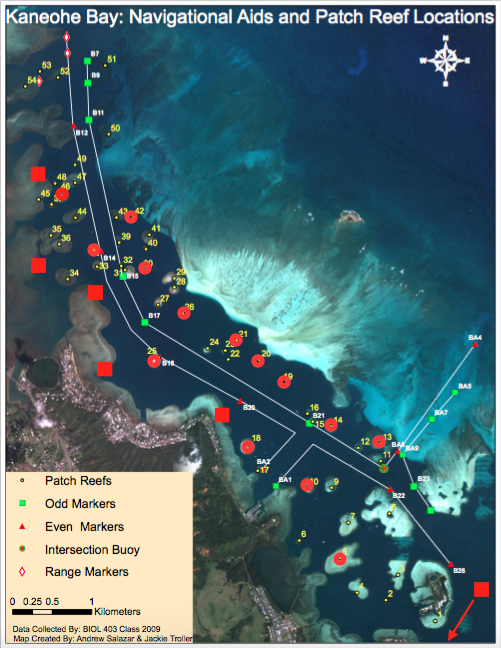


Figure 1. Tagged reefs to date; Circles indicate patch reefs, squares indicate fringing reefs

*Analysis*

All colony photographs have been categorized as either brown or orange color morphs of *M. capitata*. A significant trend is found among color morph and reef area. While the sloping area of the reef from the reef crest is characterized equally by both the brown and orange color morphs, 48% and 52% respectively, the top portions of reefs are characterized by a dominance of the orange color morph, with 77% of colonies exhibiting this coloration (Figure 2, p<0.001). Preliminary genetic analysis via DNA extraction and real- time PCR shows significant trends pertaining to the dominant symbiont clade among colonies. A significant trend is found among the dominant symbiont and reef area. The top portions of reefs are dominated by clade D *Symbiodinium* at 69% of colonies whereas the sloping outer portions of reefs are dominated by clade C *Symbiodinium* at 73% of colonies (Figure 3, p<0.001). Given that the tops of reefs showed a dominance of both the orange color morph and clade D *Symbiodinium*, a relationship between the two variables was analyzed. A significant relationship was observed in which 87% of colonies categorized by the brown color morph possessed clade C as the dominant symbiont and 61% of color morph orange categorized colonies possessed clade D as the dominant symbiont (Figure 4, p<0.001).



Figure 2. Proportion of color morph per reef area (n=540); grey=Orange, black=Brown



Figure 3. Proportion of dominant symbiont clade per reef area (n=348); grey=D, black=C



Figure 4. Proportion of dominant symbiont clade per color morph (n=348); grey=D, black=C

Colonies were tagged along a gradient of depth to analyze its effect on the dominant symbiont present. A logistic regression test produced a significant effect of depth on *Symbiodinium* clade. As depth increases, the dominant symbiont shifts from clade D to clade C (Figure 5, p<0.001). A similar logistic regression test produced a significant effect of depth on color morph. As depth increases, the dominant color morph present shifts from orange to brown (Figure 6, p<0.001).



Figure 5. Proportion of dominant symbiont clade as a function of depth (n=348); 0.0=D, 1.0=C



Figure 6. Proportion of color morph as a function of depth (n=540); 0.0=Orange, 1.0=Brown