Phenotypic Adaptability of *Acropora cervicornis* to Possible Future Climate Conditions

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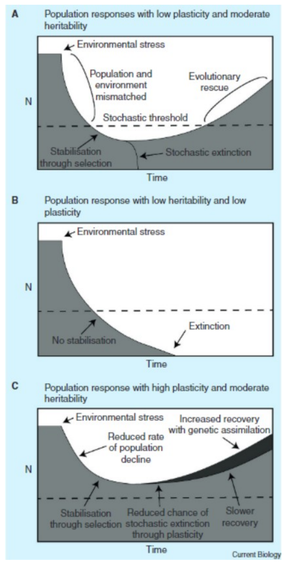
BACKGROUND

- With future climate predictions appearing to suggest more acidification, it is unlikely that the *Acropora cervicornis* population in the Florida Reef Tract (FRT) will be able to fully recover.
- Our results show that within our genotypes from the FRT, there are phenotypes which are more adept at handling heat-stress and acidification stress. Sometimes, even in tandem with each other.
- The physiological processes behind these are unknown, however, this may show that they can survive through the impending climate disaster.



Catullo et al., 2019

METHODS

- Multiple temperature and CO2 experiments were run within 8 flow-through tanks
- 4 tanks were kept at ~380-400ppm (Current CO2), 4 were kept at 1000ppm (Future CO2) via CO2 bubblers
- Each week, buoyant weight was measured for each individual until death (total algae cover)
- Data was compiled from each experiment for analysis

RESULTS

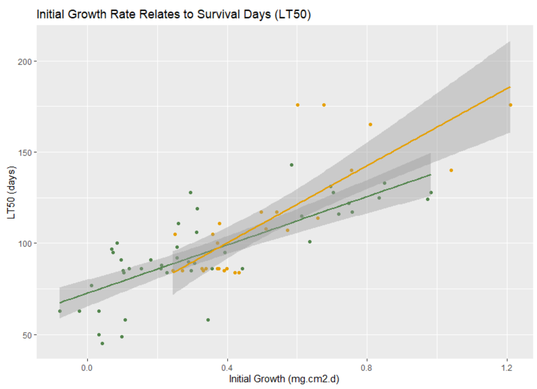


Figure 1. The genotypes which had higher initial growth rates typically survived longer in both HCO2 and LCO2 conditions. The graph also shows, as expected, that corals exposed to LCO2 conditions typically survived longer and had higher initial growth rates than those under HCO2 conditions.

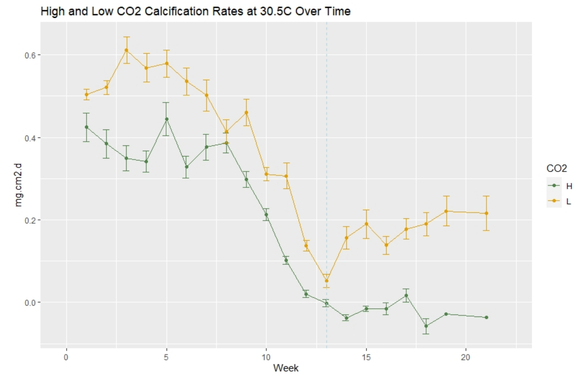


Figure 2. After reaching 30.5C (week 0), the corals began to die off. The figure shows that those which experienced the tandem of treatments had a significant decrease in growth. While the genotypes under LCO2 also showed a loss of growth and death, once they adjusted to the temperature, they began growing again as seen in Week 13 (marked by blue line).

CONCLUSIONS

- *A. cervicornis* survived longer and had more growth in LCO2 conditions compared to HCO2
- For both HCO2 and LCO2, the genotypes with higher initial growth rates survived longer (higher LT50)
- Across temperature experiments, the genotypes which did better at lower temperatures did better at higher ones as well
- This may suggest that *A. cervicornis* in the FRT does possess the phenotypic ability to handle climate stressors to a point.
- Future work can focus on specific genotypes and have more repetition within genotype; we lacked repetition within some key genets (i.e. – Floyd)

RESULTS

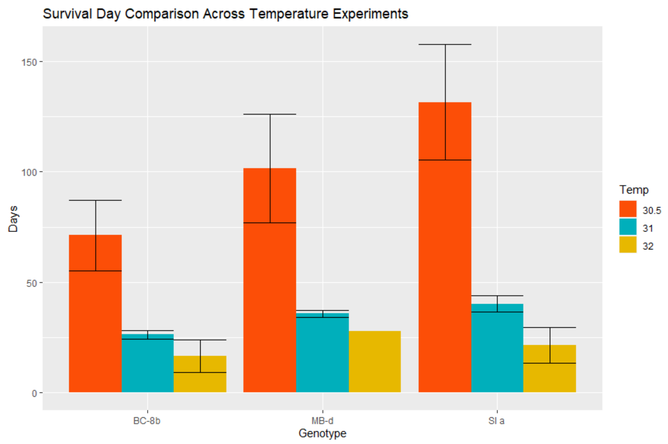
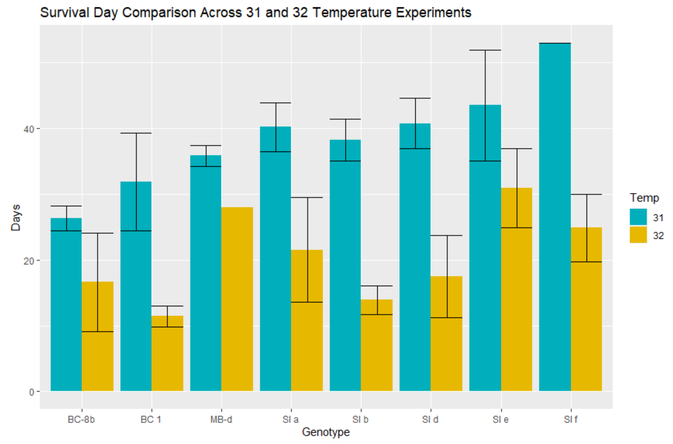


Figure 3 (left) displays the difference in days survived across temperature experiments of all genotypes in the 30.5C, 31C, and 32C experiments. Figure 4 compares the same data for genotypes in the 31C and 3C2 experiments.



ACKNOWLEDGMENTS

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