

Effects of Future Ocean Conditions on the Microbiome of Crustose Coralline Algae with
Implications for Coral Settlement and Growth

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ABSTRACT

Environmental stressors are known to disrupt the microbiome of reef dwelling organisms, leading to more extensive habitat damage through species loss or the alteration of reef relationships. Crustose Coralline Algae (CCA) are vital calcifiers for reef ecosystems that are known to induce the settlement and metamorphosis of many reef inhabitants, including corals. However, there is limited research on the differentiation of microbes between CCA species, and how these differences in microbiome structure may influence CCA interactions or responses to environment. The objective of this study was to investigate how two species of CCA with differing microbiomes may alter their microbial dynamics and settlement cues with the combined stressors of ocean acidification and sea surface temperature rise. CCA were acclimated to ambient and high temperature or low pH conditions in a full factorial cross, resulting in 4 treatments, for 6 months. The two species of CCA were found to have distinct bacterial assemblages from one another. Microbiome structure and DOM exudates in both CCA species changed in response to environmental stressors, primarily responding to temperature and most markedly under the combined treatment of ocean acidification and sea surface temperature rise. Settlement of *Pocillopora acuta* coral larva increased in higher temperatures. Thus, our results suggest that both microbial dynamics and coral larval settlement cue exudates from CCA may be altered with the progression of climate change.