

Identify and Widen Bottlenecks in the Asexual Restoration of Endangered *Orbicella* Boulder Corals

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Landscape scale coral reef restoration is constrained by our understanding of context-dependent responses of corals to environmental and ecological conditions throughout a region. Asexual propagation of corals for restoration is dependent upon rapid tissue regeneration following the relatively traumatic fragmentation process. The propagation process can, however, decrease a colonies' fitness by fragmenting colony resources, creating open wounds, and diverting resources to healing, which increases the potential for disease incidence. Nonetheless, high volume asexual propagation and the culture of corals is presently needed to scale up coral reef restoration efforts and identify factors affecting the growth and survival of key reef-building species and any context-dependent effects therein are necessary.

Orbicella faveolata (OFAV) is a major reef-building coral species whose mass reproduction has been designated as critical to restoration efforts on Florida's Coral Reef. Unfortunately, the species is also susceptible to SCTLD, and there is strong evidence that the source of the parent colony (genotype), culture conditions (nursery location and system type), and the interaction of these factors affect the growth, survival, and fitness of OFAV cultured for restoration. This research proposes to evaluate the effect of source coral colony location (ECA and Florida Keys) and genotype, *ex-situ* nursery system characteristics (five systems between Nova Southeastern University, University of Miami, and Mote Marine Laboratory), and *in-situ* nursery placement (Florida Keys, Key Biscayne, and Broward County) on tissue regeneration and survival of OFAV after fragmentation. The experiment involved the synchronized collection of corals of opportunity, source colony exchange between facilities, synchronized fragmentation, and standardized water quality testing and fragment monitoring across the five facilities.

This study will provide insights into optimal nursery systems and conditions for OFAV propagation and rearing based on source colony location, and allow the standardization of materials, methods, and general workflows. This will aid in determining the regional capacity and infrastructure needs for scaling up OFAV production to enhance the resilience of Florida's Coral Reef ecosystems.