

Guana Island Marine Science Month Proposal 2011  
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## **I. Title**

Symbiotic Associations and Population Dynamics of Two Caribbean Sea Anemones

## **II. Introduction**

Sea anemones *Condylactis gigantea* and *Stichodactyla helianthus* are conspicuous and ecologically important members of Caribbean coral reefs. They serve as symbiotic hosts to anemoneshrimp associates, some of which control parasite loads on larger reef fish, yet little quantitative information is available on their biology. Quantification of the symbiont assemblages associated with these sea anemones, and on their patterns of recruitment, growth, and mortality is needed to understand the potential for recovery of this symbiotic complex following disturbance on Caribbean coral reefs.

I propose to conduct research to explore the symbiont assemblages and population dynamics of the above 2 anemone species at Guana Island, British Virgin Islands. A research assistant and I will identify coral reef field sites, map populations of the host sea anemones, and determine their patterns of macrosymbiont association and population dynamics (recruitment, growth, shrinkage, mortality) over time. Data obtained will link with current and planned research on these sea anemones at other sites in the United States Virgin Islands.

## **III. Material and Method**

At each site, we will select a reef area approximately 10x100m (1,000m<sup>2</sup>) at 0-10m depth, after previous studies of population dynamics in reef anemones (Chadwick and Arvedlund 2005; Hattori 2005). We will conduct field surveys primarily by snorkelling and free diving. We will record the following data for each anemone: species, diameter of oral disk and tentacle crown, tentacle length, expansion state, microhabitat (reef hole versus sand, angle of orientation), and numbers and sizes of macrosymbionts (shrimps and fishes, after Chadwick and Arvedlund 2005). Each survey area will be identified using GPS and local maps (no physical markers will be placed), and will be searched carefully to locate all anemones of both species, especially small and/or recently settled juveniles. We may utilize SCUBA to aid in close observation and quantification of host-symbiont complex. In subsequent years, each anemone will be re-examined, and the field sites will be surveyed carefully for any new anemone recruits. Population dynamic models will be applied to the data to assess patterns of sea anemone recruitment, growth, and mortality (after Chadwick-Furman et al. 2000; Goffredo and Chadwick-Furman 2003; Goffredo et al. 2004). Size-specific growth rates will be estimated from observed changes in anemone size during the pilot year (after Chomsky et al. 2004). From the population size structure and growth rates, we will estimate the population age structure, age- and size-specific mortality rates, and population turnover for both anemone species.

## **Inputs**

- (1) Travel – Two personnel from the University of the Virgin Islands (PI and research assistant) will travel between UVI and Guana Island in August 2011. Boat shuttle from Beef Island to Guana Island is requested.

- (2) Equipment, supplies, and facilities – We will use storage facilities, visiting researcher housing, and dive tanks at Guana Island. Field supplies will be supplied by PI. Two dive tanks with up to 5 air fills per tank are requested. Sleeping accommodations and meals for two researchers for 8 days, 7 nights are requested.

#### **IV. Conclusion and Justification**

I aim to advance knowledge concerning the symbiont diversity and demographic processes of the poorly understood but important sea anemone-shrimp association for two Guana Island anemone species. These activities will establish baseline data on sea anemone population dynamics and symbiont diversity and establish field sites for long-term monitoring of *Condylactis gigantea* and *Stichodactyla helianthus* anemones.

#### **V. Bibliography**

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