Acropora cervicornis buoyant weight measurements under different pH and temperature treatments from experiments at Summerland Key, Florida from July to September 2017

Website: https://www.bco-dmo.org/dataset/811853
Data Type: experimental
Version: 1
Version Date: 2020-05-19

Project
» CAREER: Applying phenotypic variability to identify resilient Acropora cervicornis genotypes in the Florida Keys (Resilient Acerv)

Contributors	Affiliation	Role
Muller, Erinn M.	Mote Marine Laboratory (Mote)	Principal Investigator
Rauch, Shannon	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
This dataset contains Acropora cervicornis buoyant weight measurements from different pH and temperature treatments. The experiments were conducted in tanks at Summerland Key, Florida (24.6616,-81.4538) July to September of 2017.

Table of Contents

Coverage

Temporal Extent: 2017-07-12 - 2017-07-16

Dataset Description

This dataset contains *Acropora cervicornis* buoyant weight measurements from different pH and temperature treatments. The experiments were conducted in tanks at Summerland Key, Florida (24.6616,-81.4538) July to September of 2017.

Methods & Sampling

A 5 gallon aquaria was filled with treatment water conditions and an analytical balance was suspended over the aquaria using a solid wooden board with a hole cut through the middle. Corals were placed on a suspended structure that was attached underneath an analytical balance and held until the total buoyant weight was stable. The data was recorded each month for each fragment. Photographs were also taken to determine the surface area of the coral using ImageJ analysis.

Data Processing Description

BCO-DMO Processing:
- renamed fields;
- converted date to yyyy-mm-dd format.

[table of contents | back to top]

Data Files

File
buoyant_weight_2017.csv (Comma Separated Values (.csv), 21.05 KB) MD5:b72ae5981da3ea6d626d7cac3b7658b4 Primary data file for dataset ID 811853

[table of contents | back to top]

Parameters

Parameter	Description	Units
Tank	identifies the tank number that held the particular coral fragment	unitless
Genotype	identifies the genotype number of the coral animal for each fragment	unitless
Date	the day that the buoyant weight measurement was taken; format: yyyy-mm-dd	unitless
pH	identifies the treatment pH level: Ambient = 8.1 pH; High CO2 = 7.7 pH	unitless
Temp	identifies the treatment temperature level: High = 31.5C; Ambient = 27C	unitless
Weight_July_g	identifies the buoyant weight of the coral fragment in July 2017	grams (g)
Weight_Aug_g	identifies the buoyant weight of the coral fragment in August 2017	grams (g)
Weight_Sept_g	identifies the buoyant weight of the coral fragment in September 2017	grams (g)

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Camera
Generic Instrument Description	All types of photographic equipment including stills, video, film and digital systems.

Dataset-specific Instrument Name	analytical balance
Generic Instrument Name	scale
Generic Instrument Description	An instrument used to measure weight or mass.

[table of contents | back to top]

Project Information

CAREER: Applying phenotypic variability to identify resilient Acropora cervicornis genotypes in the Florida Keys (Resilient Acerv)

Coverage: Florida Keys, Summerland Key, FL 24.563595°, -81.278572°

NSF Award Abstract:
Caribbean staghorn coral was one of the most common corals within reefs of the Florida Keys several decades ago. Over the last 40 years disease, bleaching, overfishing and habitat degradation caused a 95% reduction of the population. Staghorn coral is now listed as threatened under the U.S. Endangered Species Act of 1973. Within the past few years, millions of dollars have been invested for the purpose of restoring the population of staghorn coral within Florida and the U.S. Virgin Islands. Significant effort has been placed on maintaining and propagating corals of known genotypes within coral nurseries for the purpose of outplanting. However, little is known about the individual genotypes that are currently being outplanted from nurseries onto coral reefs. Are the genotypes being used for outplanting resilient enough to survive the three major stressors affecting the population in the Florida Keys: disease, high water temperatures, and ocean acidification? The research within the present study will be the first step in answering this critically important question. The funded project will additionally develop a research-based afterschool program with K-12 students in the Florida Keys and U.S. Virgin Islands that emphasizes an inquiry-based curriculum, STEM research activities, and peer-to-peer mentoring. The information from the present study will help scientists predict the likelihood of species persistence within the lower Florida Keys under future climate-change and ocean-acidification scenarios. Results of this research will also help guide restoration efforts throughout Florida and the Caribbean, and lead to more informative, science-based restoration activities.

Acropora cervicornis dominated shallow-water reefs within the Florida Keys for at least the last half a million years, but the population has recently declined due to multiple stressors. Understanding the current population level of resilience to three major threats - disease outbreaks, high water temperatures, and ocean acidification conditions - is critical for the preservation of this threatened species. Results from the present study will answer the primary research question: will representative genotypes from the lower Florida Keys provide enough phenotypic variation for this threatened species to survive in the future? The present proposal will couple controlled laboratory challenge experiments with field data and modeling applications, and collaborate with local educators to fulfill five objectives: 1) identify *A. cervicornis* genotypes resistant to disease, 2) identify *A. cervicornis* genotypes resilient to high water temperature and ocean acidification conditions, 3) quantify how high water temperature and ocean acidification conditions impact disease dynamics on *A. cervicornis*; 4) determine tradeoffs in life-history traits because of resilience factors; and 5) apply a trait-based model, which will predict genotypic structure of a population under different environmental scenarios.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1452538

[table of contents | back to top]