

Traits of three Symbiodinium genotypes measured at ambient and elevated temperatures

Website: <https://www.bco-dmo.org/dataset/738212>

Data Type: experimental

Version: 1

Version Date: 2018-05-23

Project

» [RUI: Collaborative Research: Genetic variation as a driver of host and symbiont response to increased temperature on coral reefs](#) (Host Symbiont Temp Response)

Contributors	Affiliation	Role
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Abstract

Traits of three genotypes measured at ambient and elevated temperatures. Replicates of each Symbiodinium genotype were grown in ambient (26 degrees) and elevated (30 degrees) temperatures, after which were measured physiological parameters, including the number of cells, quantum yield, variable fluorescence, and chlorophyll content.

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Coverage

Spatial Extent: N:25.1326 E:-80.26195 S:24.54955 W:-81.75458

Temporal Extent: 2015-06-01 - 2015-07-31

Dataset Description

This dataset includes the abundance, quantum yield, fluorescence, and chlorophyll values from three Symbiodinium genotypes that were grown at two temperatures, 26 and 30 degrees C.

Methods & Sampling

Replicates of each Symbiodinium genotype were grown in ambient (26 degrees) and elevated (30 degrees) temperatures, after which were measured physiological parameters, including the number of cells, quantum yield, variable fluorescence, and chlorophyll content.

Data Processing Description

BCO-DMO Processing notes:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- reduced decimal precision of NumberCells to 0

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Data Files

File
genotypes_temp.csv (Comma Separated Values (.csv), 1.78 KB) MD5:bf8e0a23b2fb3e9b7b8e8c7c36c9d6e6
Primary data file for dataset ID 738212

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Parameters

Parameter	Description	Units
Genotype	Genetic identifier	unitless
Temp	Temperature	degrees Celsius
NumberCells	Number of cells per mL	number cells/milliliter (#/mL)
QY	Quantum Yield	unitless ratio
Vfl	Variable Fluorescence	unitless
Chla	Total Chlorophyll per sample	Relative Fluorescence Units
Chlapercell	Chlorophyll per cell	Relative Fluorescence Units
Replicate	Replicate identifier, designated as 'a' through 'e'.	unitless

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Instruments

Dataset-specific Instrument Name	Trilogy Laboratory Fluorometer
Generic Instrument Name	Fluorometer
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

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Deployments

Coffroth 2016

Website	https://www.bco-dmo.org/deployment/683693
Platform	SUNY-Buffalo
Start Date	2016-08-25
End Date	2016-10-23

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Project Information

RUI: Collaborative Research: Genetic variation as a driver of host and symbiont response to increased temperature on coral reefs (Host Symbiont Temp Response)

Coverage: Florida Keys, Caribbean

Description from NSF award abstract:

On coral reefs, mutualisms with single celled algae (Symbiodinium) and reef species literally and figuratively form the foundation of reef ecosystems. Coral reefs are among the most threatened ecosystems under a changing climate and are rapidly declining due to increasing levels of environmental stress, namely increased temperatures. Climate change is resulting in even warmer ocean temperatures that threaten associations between Symbiodinium and their hosts. In this project the investigators examine the genetic diversity of Symbiodinium and the potential for this important species to evolve in response to temperature. The project will also address whether the ecological and evolutionary dynamics of the Symbiodinium population affect the performance of their host. If so, this suggests that the evolution of microscopic organisms with short generation times could confer adaptation to longer-lived host species on ecologically and economically vital coral reefs. Given that diversity is already being lost on many reefs, considering how evolutionary changes in Symbiodinium will affect reef species is crucial for predicting the responses of reefs to future climate change. This project provides training for two graduate students and several undergraduates at a Hispanic-serving institution. This work includes outreach to the students and the general public through the Aquarium of Niagara, local K-12 schools, and web-based education modules.

The effects of evolution on contemporary ecological processes are at the forefront of research in evolutionary ecology. This project will answer the call for experiments elucidating the effects of genetic variation in Symbiodinium performance and the effect on the response of the holobiont (host and symbiont) to increased temperature. These experiments examine the effects of temperature through both ecological and evolutionary mechanisms and will determine the relative importance of adaptation and acclimatization in replicated experimental populations. The investigators will examine how genetic variation within a species (Symbiodinium antillovirogorgium) affects symbiont performance in culture and in the host and how this affects the response of the holobiont to increased temperature. Further, the project examines whether holobiont response to increased temperature associated with climate change depends on particular GxG host-symbiont combinations. Moreover, the investigators will examine the effects of symbiont history on mutualist hosts, which have been largely ignored in eco-evolutionary studies. These experiments provide a first step in predicting whether invertebrate hosts on coral reefs will respond to global change via adaptation of their symbionts.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1559105

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