Proportion of infected polyps at Days 31, 52 and 69 in newly settled polyps of Antillogorgia bipinnata inoculated with one of five genotypes of Breviolum antillogorgium and reared at 26 and 30 degrees Celsius.

Website: https://www.bco-dmo.org/dataset/855162
Data Type: experimental
Version: 1
Version Date: 2021-11-16

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
Proportion of infected polyps at Days 31, 52 and 69 in newly settled polyps of Antillogorgia bipinnata inoculated with one of five genotypes of Breviolum antillogorgium and reared at 26 and 30 degrees Celsius.

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Coverage

Spatial Extent: **Lat**:24.7525 **Lon**:-81.754583

Methods & Sampling

Larvae were collected from *Antillogorgia bipinnata* colonies that were maintained in seawater tables at the Keys Marine Lab on Long Key, FL. *Antillogorgia bipinnata* colonies were initially collected from Tennessee Reef (N 24° 45.150' W 81° 45.275').

Breviolum antillogorgium cultures, representing five genotypes, were used to infect polyps reared from larvae collected from *A. bipinnata*. Three cultures had been grown at 26-degree C since isolation in 2016 (G1 [16-0590F], G2 [16-0875] and G3 [16-1631]) and two had been grown at 30-degree C since isolation in 2016 (G4 [16-0587] and G5 [16-0763]). Polyps from all treatments were reared at both 26 and 30 degree C in the lab under 12:12 light dark cycles. Containers with polyps were inoculated on Day 1 and Day 5. Starting on Day 32, containers were inoculated three times a week with water changes. Polyp location in the containers was

mapped and infection status for each individual polyp was recorded every 3-4 days through visual observation as indicated by a light brown coloration in the polyp. At the end of the experiment (Day 69) infection status was based on cell counts.

Data Processing Description

Proportion and percentage of infected polyps was calculated at three timepoints and was determined based on the number of polyps alive at that time.

Infection status of the polyps was assessed visually using a Leica dissecting microscope approximately every 3 days from Day 1 – Day 67 and by cell counts on Day 69.

BCO-DMO processing notes:

- Adjusted parameter names to comply with database requirements

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Data Files

File
infected_polyps.csv (Comma Separated Values (.csv), 5.46 KB) MD5:9712186b9aba01c072cd7df46c9ab535
Primary data file for dataset ID 855162

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Related Publications

Pelosi, J., Eaton, K. M., Mychajliw, S., terHorst, C. P., & Coffroth, M. A. (2021). Thermally tolerant symbionts may explain Caribbean octocoral resilience to heat stress. Coral Reefs, 40(4), 1113–1125. doi:10.1007/s00338-021-02116-8
Results

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Related Datasets

IsRelatedTo

Coffroth, M. A., terHorst, C. (2021) **Cell counts in newly settled polyps of Antillogorgia bipinnata inoculated with one of six genotypes of Breviolum antillogorgium and reared at 26 and 30 degrees Celsius.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-11-16 doi:10.26008/1912/bco-dmo.809388.1 [view at BCO-DMO]
Relationship Description: Part of same experiment.

Coffroth, M. A., terHorst, C. (2021) **Survivorship of newly settled polyps of Antillogorgia bipinnata inoculated with one of five genotypes of Breviolum antillogorgium and reared at 26 and 30 degrees Celsius.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-11-16 doi:10.26008/1912/bco-dmo.855116.1 [view at BCO-DMO]
Relationship Description: Part of same experiment.

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Parameters

Parameter	Description	Units
Genotype	Genotype of culture (based on 5 microsatellite loci) used to inoculate the polyps,	Unitless
Temperature	Temperature at which the polyp was reared	Degrees Celsius (°C)
Container	Identification of container replicate	Unitless
Day	Day indicates the timepoint, post-inoculation, at which proportion of infected polyps was determined.	Unitless
Proportion_infected	Proportion infected polyps at that timepoint and was determined based on the number of polyps alive at that time. nd indicates that there were no surviving polyps at that time point. No polyps Alive	Unitless
Percent_infected	Percentage infected polyps at that timepoint and was determined based on the number of polyps alive at that time. nd indicates that there were no surviving polyps at that time point. No polyps Alive	Unitless

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Instruments

Dataset-specific Instrument Name	Leica dissecting microscope
Generic Instrument Name	Microscope - Optical
Dataset-specific Description	Infection status of the polyps was assessed visually using a Leica dissecting microscope approximately every 3 days from Day 1 – Day 67 and by cell counts on Day 69. See BCO-DMO dataset “Cell counts in polyps – Fall 2018 experiment”
Generic Instrument Description	Instruments that generate enlarged images of samples using the phenomena of reflection and absorption of visible light. Includes conventional and inverted instruments. Also called a "light microscope".

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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 antillogorgium) 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-1559286

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