Seawater temperature and salinity of mesocosms and a field location collected while conducting experiments on seagrass in Nahant, Massachusetts

Website: https://www.bco-dmo.org/dataset/851059
Data Type: Other Field Results
Version: 1
Version Date: 2021-05-04

Project
» CAREER: Linking genetic diversity, population density, and disease prevalence in seagrass and oyster ecosystems (Seagrass and Oyster Ecosystems)

Contributors	Affiliation	Role
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Abstract
This dataset includes seawater temperature and salinity measurements from mesocosms and from a field location at Curlew Beach. Data were collected as part of a study examining seagrass responses to Labyrinthula zosterae conducted in a greenhouse at Northeastern University Marine Science Center in Nahant, Massachusetts from May to August 2016.

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Coverage

Spatial Extent: **N**:42.5971 **E**:-70.6559 **S**:42.4206 **W**:-70.9158
Temporal Extent: 2016-05 - 2021-08

Methods & Sampling

During the experiment, we monitored water temperature and salinity in each mesocosm using an YSI 556 Handheld Multiparameter Instrument with a 556 DO/Temperature/Conductivity Field Cable coinciding with the *Zostera* monitoring. For each set of measurements, we sampled all control mesocosms before sampling disease mesocosms, rinsing the YSI probe in 10% bleach and DI water between each container to prevent cross-contamination. In addition, we monitored water temperature continuously using a HOBO® water temperature data logger (UA-002-64, Onset) at the CB (Curlew Beach, Nahant, 42° 25.2378' N, 70° 54.9474' W) subpopulation location to confirm temperature in our mesocosms reflected conditions in the field.

Data Processing Description

BCO-DMO processing description:
- Adjusted field/parameter names to comply with BCO-DMO naming conventions
- Missing data identifier 'NA' replaced with 'nd' (BCO-DMO's default missing data identifier)
- Added a conventional header with dataset name, PI names, version date

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Data Files

File
mesocosm_conditions.csv (Comma Separated Values (.csv), 73.98 KB) MD5:57e3e7d887ac0dd554932e6ae31ebc63 Primary data file for dataset ID 851059

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Related Datasets

IsRelatedTo

Hughes, A. R., Schenck, F. (2022) **Seagrass responses to Labyrinthula zosterae inoculation base on a subpopulation from mesocosm experiments conducted in Nahant, Massachusetts.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-05-04 doi:10.26008/1912/bco-dmo.851047.1 [view at BCO-DMO]

Hughes, A. R., Schenck, F. (2022) **Wasting disease prevalence and severity and seagrass length and density based on subpopulations of Zostera marina on the North Shore of Massachusetts surveyed in July and September 2016.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-05-04 doi:10.26008/1912/bco-dmo.851122.1 [view at BCO-DMO]

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Parameters

Parameter	Description	Units
tank	Unique identifier number assigned to each of the eleven 54 liter tanks in the MSC glasshouse supplied with flow-through seawater used as water baths for our mesocosms	unitless
mesocosm	Unique identifier assigned to each of the 88 transparent cylindrical acrylic mesocosms (45 centimeter tall and 15 centimeter diameter) used to hold a Zostera marina plant	unitless
subpopulation	Descriptor of the subpopulation source of Zostera marina plants	unitless
treatment	Descriptor of the mesocosm treatment or field location associated with temperature and salinity measurements: CB (Curlew Beach, Nahant); Control (mesocosm receiving control-inoculation); Disease (mesocosm receiving L. zosterae-inoculation)	unitless
experiment_day	Timing of sampling following start of inoculation treatment: 0 (2 August, 2016)	Days
time	Time of day of temperature and salinity measurement	hh:mm
temperature	Seawater temperature	Degrees Celsius
salinity	Seawater salinity	Parts per thousand

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Instruments

Dataset-specific Instrument Name	YSI 556 Handheld Multiparameter Instrument
Generic Instrument Name	Multi Parameter Portable Meter
Dataset-specific Description	YSI 556 Handheld Multiparameter Instrument with a 556 DO/Temperature/Conductivity Field Cable
Generic Instrument Description	An analytical instrument that can measure multiple parameters, such as pH, EC, TDS, DO and temperature with one device and is portable or hand-held.

Dataset-specific Instrument Name	HOBO® water temperature data logger (UA-002-64, Onset)
Generic Instrument Name	Onset HOBO Pendant Temperature/Light Data Logger
Generic Instrument Description	The Onset HOBO (model numbers UA-002-64 or UA-001-64) is an in-situ instrument for wet or underwater applications. It supports light intensity, soil temperature, temperature, and water temperature. A two-channel logger with 10-bit resolution can record up to approximately 28,000 combined temperature and light measurements with 64K bytes memory. It has a polypropylene housing case. Uses an optical USB to transmit data. A solar radiation shield is used for measurement in sunlight. Temperature measurement range: -20 deg C to 70 deg C (temperature). Light measurement range: 0 to 320,000 lux. Temperature accuracy: +/- 0.53 deg C from 0 deg C to 50 deg C. Light accuracy: Designed for measurement of relative light levels. Water depth rating: 30 m.

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Project Information

CAREER: Linking genetic diversity, population density, and disease prevalence in seagrass and oyster ecosystems (Seagrass and Oyster Ecosystems)

Coverage: Coastal New England

NSF Award Abstract:
Disease outbreaks in the ocean are increasing, causing losses of ecologically important marine species, but the factors contributing to these outbreaks are not well understood. This 5-year CAREER project will study disease prevalence and intensity in two marine foundation species - the seagrass Zostera marina and the Eastern oyster Crassostrea virginica. More specifically, host-disease relationships will be explored to understand how genetic diversity and population density of the host species impacts disease transmission and risk. This work will pair large-scale experimental restorations and smaller-scale field experiments to examine disease-host relationships across multiple spatial scales. Comparisons of patterns and mechanisms across the two coastal systems will provide an important first step towards identifying generalities in the diversity-density-disease relationship. To enhance the broader impacts and utility of this work, the experiments will be conducted in collaboration with restoration practitioners and guided by knowledge ascertained from key stakeholder groups. The project will support the development of an early career female researcher and multiple graduate and undergraduate students. Students will be trained in state-of-the-art molecular techniques to quantify oyster and seagrass parasites. Key findings from the surveys and experimental work will be incorporated into undergraduate courses focused on Conservation Biology, Marine Biology, and Disease Ecology. Finally, students in these courses will help develop social-ecological surveys and mutual learning games to stimulate knowledge transfer with stakeholders through a series of workshops.

The relationship between host genetic diversity and disease dynamics is complex. In some cases, known as a dilution effect, diversity reduces disease transmission and risk. However, the opposite relationship, known as the amplification effect, can also occur when diversity increases the risk of infection. Even if diversity directly reduces disease risk, simultaneous positive effects of diversity on host density could lead to amplification by increasing disease transmission between infected and uninfected individuals. Large-scale field restorations of seagrasses (Zostera marina) and oysters (Crassostrea virginica) will be utilized to test the effects of host genetic diversity on host population density and disease prevalence/intensity. Additional field experiments independently manipulating host genetic diversity and density will examine the mechanisms leading to dilution or amplification. Conducting similar manipulations in two marine foundation species - one a clonal plant and the other a non-clonal animal - will help identify commonalities in the diversity-density-disease relationship. Further, collaborations among project scientists, students, and stakeholders will enhance interdisciplinary training and help facilitate the exchange of information to improve management and restoration efforts. As part of these efforts, targeted surveys will be used to document the perceptions and attitudes of managers and restoration practitioners regarding genetic diversity and its role in ecological resilience and restoration.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1652320

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