Bleaching card scores for colonies of Muricea atlantica, M. elongata, and Plexaurella dichotoma across the 2015 Bleaching event (May 2015-August 2017) in the Florida Keys.

Website: https://www.bco-dmo.org/dataset/896894
Data Type: Other Field Results
Version: 1
Version Date: 2023-06-05

Project
» RAPID: Variations in symbiont diversity in octocoral across seasons and a predicted bleaching event (Octocoral symbiont diversity)

Contributors	Affiliation	Role
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Abstract
Visual assessment of bleaching in Muricea atlantica, M. elongata, and Plexaurella dichotoma across the 2015 Bleaching event (May 2015-August 2017) using the CoralWatch coral health chart (Siebeck et al. 2006).

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Coverage

Spatial Extent: **N**:24.8246 **E**:-80.6864 **S**:24.7451 **W**:-80.7799
Temporal Extent: 2015-09-01 - 2017-08-01

Acquisition Description

Colonies at two sites were tagged in May 2015. Starting in September 2015, the coloration of each colony was compared to a CoralWatch coral health chart (Siebeck et al. 2006), and the matching color on the card was recorded. Bleaching card scores continued to be recorded after bleaching - November 2015, March 2016, May 2016, September 2016, November 2016, March 2017 and August 2017. Bleaching card scores ranged from 5 (dark color, not bleached) to 1 (very pale and obviously bleached).

Location:
Two patch reefs in the vicinity of Long Key in the Florida Keys (CMF-N24.44.704, W 80 46.793 and SC2- N24 49.478 W80 41.187)

Taxonomic identifiers (Genus species, LSID):
Muricea atlantica, urn:lsid:marinespecies.org:taxname:287554
Muricea elongata, urn:lsid:marinespecies.org:taxname:287559
Plexaurella dichotoma, urn:lsid:marinespecies.org:taxname:290812

Processing Description

BCO-DMO Processing Notes:
* Sheet 1 from ALL_BleachingCardScores_DRAFT_BCO-DMO_REVISED.xlsx that was submitted 2023-06-22 was imported into the bco-dmo data system.
* lat lon in decimal degree columns extracted from degrees decimal minutes provided within text of "site" column.
* rounded lat and lon to 5 decimal places

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Data Files

File
bleaching-card-scores.csv (Comma Separated Values (.csv), 47.27 KB) MD5:b8bf187c269547a3b415ac9306aea552 Primary data table for dataset 896894.

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Related Publications

Coffroth, M.A., Buccella L., Eaton K. M., Franklin H., Gooding A. T., Lasker, H. R. (submitted) Octocoral thermotolerance may signal resilience to major bleaching events: roles of symbiont and host. Submitted to Global Change Biology
Results

Siebeck, U. E., Marshall, N. J., Klüter, A., & Hoegh-Guldberg, O. (2006). Monitoring coral bleaching using a colour reference card. Coral Reefs, 25(3), 453–460. doi:10.1007/s00338-006-0123-8
Methods

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Parameters

Parameter	Description	Units
Species	Species of each octocoral host monitored in the study	unitless
Sample_ID	Identification of the octocoral colony in which the bleaching state was recorded across the study	unitless
Month	Month in which the colony bleaching state was recorded (Full month name).	unitless
Year	Year in which the colony bleaching state was recorded.	unitless
SITE	Latitude and longitude where the colony bleaching state was recorded (lat and lon in degrees decimal minutes)	unitless
lat	Latitude where the colony bleaching state was recorded	decimal degrees
lon	Longitude where the colony bleaching state was recorded	decimal degrees
Comment	"DEAD" indicates colony missing or skeleton located but dead. "not scored" indicates colony was not scored.	unitless
BC_Score	Blank cells indicate sample not collected/located that month, or dead (See Comment column).	unitless

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Project Information

RAPID: Variations in symbiont diversity in octocoral across seasons and a predicted bleaching event (Octocoral symbiont diversity)

Coverage: Florida Keys

Description from NSF award abstract:
Within the marine environment microorganisms form one of the most important marine symbioses in the world: the symbiosis between corals and photosynthetic single-celled algal symbionts. In nutrient poor waters of the tropics, this symbiosis maintains the coral's high productivity, allowing corals to flourish and provides the foundation of the coral reef ecosystem. However, these reefs are currently threatened by anthropogenic-induced perturbations (i.e., global warming, overfishing, pollution). In fact, corals and their associated biodiversity on reefs are being lost at an alarming rate, especially in the Caribbean, where coral cover has declined by 80% over the last thirty years. Much of this decline has been attributed to coral bleaching, a loss of these algal symbionts in response to increase ocean temperatures. Octocorals, in contrast, do not show this decline and are increasing in relative abundance and importance in the Caribbean as scleractinian corals decline. Part of this has been attributed to the fact that bleaching is rarer among octocorals. However, during recent warming events (2005, 2010 and 2014) bleaching was reported in many octocoral host species. Although a great deal is known about bleaching among scleractinian (hard) corals, virtually nothing is known of this phenomenon among octocorals (sea fans, sea whips, sea feathers, etc.). Their growing importance on Caribbean reefs and the lack of knowledge of their response to "bleaching" creates an urgency to understand the dynamics of these algal symbiont populations within octocorals during periods of scleractinian bleaching. Bleaching susceptibility varies among host species and this has been attributed in part to the type of algal symbiont that they contain. In this project, specific octocoral colonies will be followed over the course of a year and symbiont type determined using molecular techniques. These data will be used to determine if bleaching susceptibility is related to symbiont type. This project will significantly add to an understanding of cnidarian-algal symbioses that form the foundation of the coral reef ecosystem. Octocorals dominate many Caribbean reefs and serve as structure and habitat for numerous fish and invertebrates. These data will contribute to our understanding of how these symbioses function and allow for a comparative study with bleaching among other cnidarians. This work will include the training of undergraduate and graduate students, dissemination of the findings to the general public through a collaboration with the Aquarium of Niagara, and sharing of an extensive symbiont culture collection with the scientific community.

Coral bleaching has been an important component of the dynamics on coral reefs for the past 3 decades. Although a great deal is known about bleaching among scleractinian corals, virtually nothing is known of this phenomenon among octocorals. As scleractinian abundance is declining, the relative abundance of octocorals has remained more constant. Part of that success is likely due to a seemingly lower sensitivity of these cnidarians to bleaching conditions. However, the contrast in octocoral bleaching between the 20th century events and those of more recent years suggests that thermal events of increasing frequency and/or intensity will affect octocorals as well and that octocoral sensitivity does vary between species. Thus projecting how octocoral communities will fare requires a greater understanding of variation in their sensitivity to bleaching and the basis of that variation. One potential source of that variation is in the algal symbiont type that these species harbor. Symbiont diversity among Caribbean octocorals is lower than that of scleractinian species with the vast majority of Caribbean octocorals harboring symbionts in the B1-ITS2 lineage which is composed of multiple Symbiodinium species. The aim of this project is to identify symbiont variation within octocoral species before, during and after a predicted bleaching event and to compare symbiont type with bleaching susceptibility. To do this, specific octocoral colonies will be followed over the course of a year and symbiont density and phylotype determined. Colonies from three host species, Plexaurella dichotoma, Muricea muricata and Eunicea flexuosa will be tagged (20 per species at each of 2 reefs) and sampled every 3 months. Symbiont density will be determined through cell counts using a hemocytometer and symbiont phylotype identified using markers that resolve among the different symbiont species in the B1 lineage (i.e., Sym15 flanker, ITS and chloroplast 23S rDNA). If bleaching is not observed in these colonies, these data will inform the diversity within an understudied group and provide information on seasonal change in these symbionts and variation within and between host species. Understanding the dynamics of octocoral bleaching is important. If octocorals are more resistant to bleaching, this may explain observations of increasing abundance. As coral cover declines, these species represent more of the living cover and are often the visually dominant organism on reefs. Furthermore, octocorals are fast growing and have the potential to colonize open space and help to stabilize the ecosystem by providing habitat for other reef organisms.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1552949

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