Annual health surveys of the sea fan Gorgonia ventalina in La Parguera, Puerto Rico from 2006-2010

Website: https://www.bco-dmo.org/dataset/3720
Data Type: Other Field Results
Version: 1
Version Date: 2012-09-14

Project
» Influence of Temperature and Acidification on the Dynamics of Coral Co-Infection and Resistance (Climate_CoralDisease)

Contributors	Affiliation	Role
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Abstract
Health surveys of the sea fan Gorgonia ventalina were carried out from 2006 to 2010 at two coral reefs in La Parguera, Puerto Rico. The proportions of healthy and abnormal G. ventalina colonies along survey transects are reported.

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Coverage

Spatial Extent: **N**:17.9349 **E**:-66.9848 **S**:17.8897 **W**:-67.0489
Temporal Extent: 2006-09 - 2010-09

Dataset Description

Health surveys of the sea fan *Gorgonia ventalina* were carried out from 2006 to 2010 at two coral reefs in La Parguera, Puerto Rico. The proportions of healthy and abnormal *G. ventalina* colonies along survey transects are reported.

Methods & Sampling

Sampling and Analytical Methodology:
Sixteen 20 square-meter band transects were randomly laid (4 transects per depth) at two reefs in La Parguera, PR, Media Luna (3 to 18 m depths) and Buoy (18 to 25 m depths). Surveys occurred annually in September or October from 2006 to 2010 at Media Luna and 2007 to 2010 at Buoy. Along each transect all apparently healthy *G. ventalina* colonies and colonies with lesions were enumerated. Any purple or abnormally

colored area on the sea fans was checked carefully. Lesions were also recorded and described as follows: large irregular purple spots (aspergillosis-like; full description Work and Aeby 2006), MFPS, predation, bleaching, and other abnormalities. Other abnormalities included growth anomalies, cyanobacteria, red band disease etc. Signs of predation by snails (flamingo tongue) and by fireworms were noted,. Prevalence (the total number of each abnormality divided by the total number of individuals) of each type of abnormality was calculated per transect, depth, and year.

Data Processing Description

Data Processing:
MFPS prevalence was arcsine transformed before data analysis to meet the assumptions of normality and equal variances (Zar 1999), and an ANCOVA was used to compare depth over time (using time as the co-variate) using IBM SPSS Statistics 17.0 (Insightful Corporation). Statistical differences among depths were identified using Fisher's LSD test; however, due to the differences in depth and number of individuals within each site, the sites could not be compared.

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Data Files

File
sea_fan_survey.csv (Comma Separated Values (.csv), 20.12 KB) MD5:a6b835b675b2694dd85b4f9626bc46ff Primary data file for dataset ID 3720

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Related Publications

Burge, C., Douglas, N., Conti-Jerpe, I., Weil, E., Roberts, S., Friedman, C., & Harvell, C. (2012). Friend or foe: the association of Labyrinthulomycetes with the Caribbean sea fan Gorgonia ventalina. Diseases of Aquatic Organisms, 101(1), 1–12. doi:10.3354/dao02487
Results

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Parameters

Parameter	Description	Units
site	Name of the reef where sampling occurred.	text
lat	Latitude of the site. North = positive.	decimal degrees
lon	Longitude of the site. West = negative.	decimal degrees
year	4-digit year of the survey. in YYYY format	unitless

month	2-digit month of the survey.	mm (01 to 12)
depth	Depth of the survey.	meters
healthy_avg	Average percentage of sea fans per depth which were healthy.	%
bleached_avg	Average percentage of sea fans per depth which were bleached.	%
lg_purple_spts_avg	Average percentage of sea fans per depth which had Large Purple Spots.	%
MFPS_avg	Average percentage of sea fans per depth which had multi-focal purple spots (MFPS).	%
predation_avg	Average percentage of sea fans per depth which showed signs of predation.	%
other_avg	Average percentage of sea fans per depth which had other abnormalities. See Acquisition Description.	%
healthy_avg_sd	Standard deviation of healthy_avg.	%
bleached_avg_sd	Standard deviation of bleached_avg.	%
lg_purple_spts_avg_sd	Standard deviation of lg_purple_spts_avg.	%
MFPS_avg_sd	Standard deviation of MFPS_avg.	%
predation_avg_sd	Standard deviation of predation_avg.	%
other_avg_sd	Standard deviation of other_avg.	%
healthy	Percent healthy per transect.	%
bleached	Percent bleached per transect.	%
lg_purple_spts	Percent large purple spots (i.e. Aspergillosis-like) per transect.	%
MFPS	Percent multi-focal purple spots (MFPS) per transect.	%

predation	Percent sea fans with signs of predation per transect.	%
other	Percent sea fans with other abnormalities per transect. See Acquisition Description.	%
MFPS_log10	log 10 transformed percent MFPS per transect.	%

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Deployments

Coral_Dive_HM

Website	https://www.bco-dmo.org/deployment/58855
Platform	shoreside PR_Keys_Reef
Start Date	2006-09-01
End Date	2010-09-01
Description	Four dive sites for the Harvell/Mydlarz project 'Influence of Temperature and Acidification on the Dynamics of Coral Co-Infection and Resistance': Big Pine Ledges, Florida Keys: 24° 33.207 N, 81° 22.731 W Laurel patch reef, La Parguera, Puerto Rico: 17° 56.608 N, 67° 03.208 W Media Luna, La Parguera, Puerto Rico: 17°56.093 N, 67°02.931 W (3 to 18 m depths) Buoy, La Parguera, Puerto Rico: 17° 53.38 N, 66° 59.09 W (18 to 25 m depths)

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Project Information

Influence of Temperature and Acidification on the Dynamics of Coral Co-Infection and Resistance (Climate_CoralDisease)

Coverage: Florida Keys & Puerto Rico

This award is funded under the American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

Coral reef ecosystems are highly endangered by recent increases in temperature and by projected increases in ocean acidification. Although temperature has been identified as a driver of some coral disease outbreaks, nothing is known about direct effects of acidification on host immunity and pathogen virulence, or the potential for synergism with temperature. Natural coral populations often suffer from simultaneous infection by multiple pathogens that can also influence host immune responses, but co-infection dynamics have not been investigated in invertebrate systems lacking classical adaptive immunity. Changing climate will very likely influence the outcome of single and co-infection.

This project will investigate the influence of environmental stress on co-infection dynamics of the sea fan coral, *Gorgonia ventalina*, with a fungal pathogen, *Aspergillus sydowii* and a protist parasite, SPX. The goal is to identify the mechanisms through which multiple infections, temperature and acidification modify host resistance, leading to changes in within- and among-colony rates of disease spread.

The objectives of this project are to:
(1) Identify incidence and co-infection frequency of *Aspergillus sydowii* and SPX. Detailed field surveys of the two diseases will test the hypothesis that co-infection is significant, provide valuable information about drivers of aspergillosis, and will help to characterize an emerging new sea fan disease.
(2) Investigate how co-infection influences sea fan susceptibility, resistance, and within host disease dynamics.

Through manipulative lab inoculation experiments we will test the hypothesis that single infections increase susceptibility to a second pathogen.
(3) Examine the effects of temperature increase and ocean acidification on pathogen virulence, on underlying host resistance, and on the dynamics of single and co-infections.

The hypotheses that acidification will increase pathogen virulence and host susceptibility will be tested in a temperature and pH controlled experimental system. This system will also allow the potential synergistic effects of temperature and acidification on host immunity and co-infection dynamics to be explored. The primary intellectual merit of the proposed work will be a greater understanding of how changing climate mediates co-infection and immunity in a non-model invertebrate. While fungal pathogens are primarily opportunistic, labyrinthulid protozoans are recognized as primary pathogens in shellfish. Even in shellfish, little is known about co-infections involving labyrinthulids, and these protists are entirely unstudied in corals.

Publications associated with this project:
Burge CA, Douglas N, Conti-Jerpe I, Weil E, Roberts S, Friedman CS & CD Harvell. (May 2012) Friend or foe: the association of *Labyrinthulomycetes* with the Caribbean sea fan, *Gorgonia ventalina*. Dis Aquat Org. 101:1-12. doi: 10.3354/dao02487

Burge CA, Mouchka, ME, Harvell, CD & S Roberts. (In review) Immune response of the Caribbean sea fan, *Gorgonia ventalina* exposed to an *Aplanochytrium* parasite as revealed by transcriptome sequencing.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0849776

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