Polyp settlement and polyp counts on experimental tiles with different levels of turf algae cover during an in-situ experiment in St. John, US Virgin Islands in August and September of 2019.

Website: https://www.bco-dmo.org/dataset/855867
Data Type: Other Field Results, experimental
Version: 1
Version Date: 2021-07-16

Project
» Collaborative Research: Pattern and process in the abundance and recruitment of Caribbean octocorals (Octocoral Community Dynamics)

Contributors	Affiliation	Role
Lasker, Howard	State University of New York at Buffalo (SUNY Buffalo)	Principal Investigator
Martinez-Quintana, Angela	State University of New York at Buffalo (SUNY Buffalo)	Scientist
Tonra, Kaitlyn	State University of New York at Buffalo (SUNY Buffalo)	Scientist
Wells, Christopher	State University of New York at Buffalo (SUNY Buffalo)	Scientist, Contact
Anderson, Emily	State University of New York at Buffalo (SUNY Buffalo)	Technician
York, Amber D.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Polyp settlement and polyp counts on experimental tiles with different levels of turf algae cover (low: “scrubbed”; medium: “reef”; high: “protected”) up to 57 days after settlement. The in-situ experiment took place in Grootpan Bay, St. John, US Virgin Islands between August 3rd to September 9th, 2019.

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Coverage

Spatial Extent: **Lat**:18.309 **Lon**:-64.719
Temporal Extent: 2019-08-01 - 2019-09-29

Methods & Sampling

Methodology:

Custom-fired stoneware clay tiles were deployed and conditioned on an octocoral-dominated reef in Grootpan Bay, St. John, U.S. Virgin Islands. One of three treatments was applied to each tile (n = 8 per treatment): a control, referred to as Reef; scrubbed with a soft nylon bristle brush, referred to as Scrubbed; or removed from the reef and maintained in a sea table for 15 days, referred to as Protected. Tiles were placed into 41 29

17 cm plastic containers filled with 12 L of 10 m filtered seawater. Two tiles from the same treatment were placed in each container on top of 1 cm square plastic mesh, rolled into 5 cm tall cylinders so that tiles were lifted off the bottom of the container to provide water circulation underneath. Competent planulae (n = 150) were added to each container and allowed to settle for eight days and then polyps were counted.

Nine days after adding planulae, the tiles were deployed onto the reef at Grootpan Bay, where the tiles were initially conditioned. We counted the number of polyps on the undersides of the tiles on the day of deployment (day 0) and 2, 5, 9, 14, 19, and 57 days after deployment. On 9 of the 24 tiles, polyps were also counted and mapped on days 6, 9, 11, 14, 16, 19, and 57 to assess polyp survival and quantify settlement in the field.

Location: Grootpan Bay, St. John, U.S. Virgin Islands (also known as East Cabritte in other studies) (18.309, -64.719). All tiles were deployed at this site.

Data Processing Description

BCO-DMO data manager processing notes:

* Data from file NSF.Turf_Exp_polyp_counts.xlsx sheet "data" imported into the BCO-DMO data system.
* Converted Date to ISO format yyyy-mm-dd
* Renamed data columns to meet BCO-DMO naming conventions (only [a-zA-Z0-9] and underscores). Periods changed to underscores.

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Data Files

File
turf_polyp_counts.csv (Comma Separated Values (.csv), 9.23 KB) MD5:3d59813d954bfcce22b030160049bcb4
Primary data file for dataset ID 855867

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Related Publications

Wells, C. D., Martínez-Quintana, Á., Tonra, K. J., & Lasker, H. R. (2021). Algal turf negatively affects recruitment of a Caribbean octocoral. Coral Reefs. doi:10.1007/s00338-021-02103-z
Results

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Related Datasets

IsRelatedTo

Wells, C., Martinez-Quintana, A., Tonra, K., Lasker, H. (2021) **Locations of mapped polyps on experimental tiles with different levels of turf algae cover during an in-situ experiment in St. John, US Virgin Islands in August and September of 2019.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-07-16 doi:10.26008/1912/bco-dmo.855889.1 [view at BCO-DMO]
Relationship Description: Coordinates (in cm) for the polyp locations of a subset of the tiles from the same experiment.

Wells, C., Martinez-Quintana, A., Tonra, K., Lasker, H. (2021) **Percent cover of living organisms on experimental tiles with different levels of turf algae cover during an in-situ experiment in St. John, US Virgin Islands in August and September of 2019.** Biological and Chemical Oceanography Data

Management Office (BCO-DMO). (Version 1) Version Date 2021-09-14 doi:10.26008/1912/bco-dmo.855879.1 [view at BCO-DMO]
Relationship Description: Polyp counts on different tile parts measured over time for the same experiment.

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Parameters

Parameter	Description	Units
container	container number the tiles started out in during the laboratory experiment (1 to 12)	unitless
tile_letter	tile letter within each container (either A or B)	unitless
tile_code	individualized code for each tile: concatenated container and tile letter	unitless
tag	tile tag number when placed out in the field	unitless
treatment	which pre-treatment the tile experienced	unitless
date	date of polyp count in ISO 8601 format yyyy-mm-dd	unitless
day	experimental day the polyps were counted (either counted at the conclusion of the lab settlement period [lab.count] or during the field experiment [0 through 57]	unitless
polyps_bottom	number of polyps on the bottom of the tile	per individual polyp
polyps_side	number of polyps on the side of the tile	per individual polyp
polyps_top	number of polyps on the top of the tile	per individual polyp
polyps_total	total number of polyps on the tile	per individual polyp

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Project Information

Collaborative Research: Pattern and process in the abundance and recruitment of Caribbean octocorals (Octocoral Community Dynamics)

Coverage: St. John, US Virgin Islands

NSF Award Abstract:
Coral reefs are exposed to a diversity of natural and anthropogenic disturbances, and the consequences for ecosystem degradation have been widely publicized. However, the reported changes have been biased towards fishes and stony corals, and for Caribbean reefs, the most notable example of this bias are octocorals ("soft corals"). Although they are abundant and dominate many Caribbean reefs, they are rarely included in studies due to the difficulty of both identifying them and in quantifying their abundances. In some places there is compelling evidence that soft corals have increased in abundance, even while stony corals have become less common. This suggests that soft corals are more resilient than stony corals to the wide diversity of disturbances that have been impacting coral corals. The best coral reefs on which to study these changes are those that have been studied for decades and can provide a decadal context to more recent events, and in this regard the reefs of St. John, US Virgin Islands are unique. Stony corals on the reefs have been studied since 1987, and the soft corals from 2014. This provides unrivalled platform to evaluate patterns of octocoral

abundance and recruitment; identify the patterns of change that are occurring on these reefs, and identify the processes responsible for the resilience of octocoral populations. The project will extend soft coral monitoring from 4 years to 8 years, and within this framework will examine the roles of baby corals, and their response to seafloor roughness, seawater flow, and seaweed, in determining the success of soft corals. The work will also assess whether the destructive effects of Hurricanes Irma and Maria have modified the pattern of change. In concert with these efforts the project will be closely integrated with local high schools at which the investigators will host marine biology clubs and provide independent study opportunities for their students and teachers. Unique training opportunities will be provided to undergraduate and graduate students, as well as a postdoctoral researcher, all of whom will study and work in St. John, and the investigators will train coral reef researchers to identify the species of soft corals through a hands-on workshop to be conducted in the Florida Keys.

Understanding how changing environmental conditions will affect the community structure of major biomes is the ecological objective defining the 21st century. The holistic effects of these conditions on coral reefs will be studied on shallow reefs within the Virgin Islands National Park in St. John, US Virgin Islands, which is the site of one of the longest-running, long-term studies of coral reef community dynamics in the region. With NSF-LTREB support, the investigators have been studying long-term changes in stony coral communities in this location since 1987, and in 2014 NSF-OCE support was used to build an octocoral "overlay" to this decadal perspective. The present project extends from this unique history, which has been punctuated by the effects of Hurricanes Irma and Maria, to place octocoral synecology in a decadal context, and the investigators exploit a rich suite of legacy data to better understand the present and immediate future of Caribbean coral reefs. This four-year project will advance on two concurrent fronts: first, to extend time-series analyses of octocoral communities from four to eight years to characterize the pattern and pace of change in community structure, and second, to conduct a program of hypothesis-driven experiments focused on octocoral settlement that will uncover the mechanisms allowing octocorals to more effectively colonize substrata than scleractinian corals on present day reefs. Specifically, the investigators will conduct mensurative and manipulative experiments addressing four hypotheses focusing on the roles of: (1) habitat complexity in distinguishing between octocoral and scleractinian recruitment niches, (2) the recruitment niche in mediating post-settlement success, (3) competition in algal turf and macroalgae in determining the success of octocoral and scleractian recruits, and (4) role of octocoral canopies in modulating the flux of particles and larvae to the seafloor beneath. The results of this study will be integrated to evaluate the factors driving higher ecological resilience of octocorals versus scleractinians on present-day Caribbean reefs.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1756381

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