Cell counts for 11 P. homomalla embryos taken every 5-10 minutes from fertilization to 13 hours after fertilization from adult corals collected in Round Bay, St. John, USVI in July of 2019

Website: https://www.bco-dmo.org/dataset/855801
Data Type: Other Field Results
Version: 1
Version Date: 2021-07-15

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
Tonra, Kaitlyn	State University of New York at Buffalo (SUNY Buffalo)	Scientist, Contact
Wells, Christopher	State University of New York at Buffalo (SUNY Buffalo)	Scientist
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
Cell counts for 11 Plexaura homomalla embryos taken every 5-10 minutes from fertilization to 13 hours after fertilization. Adult corals used in this study were collected in Round Bay, St. John, USVI on July 14–15, 2019. The results publication for this dataset is Tonra et al. (2021, see Fig. 3).

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Coverage

Spatial Extent: **Lat**:18.345 **Lon**:-64.681
Temporal Extent: 2019-07-21

Methods & Sampling

Methodology:

Eleven female and four male branches of *Plexaura homomalla* were collected from adult colonies on an octocoral-dominated reef in Round Bay, St. John, USVI on July 14–15, 2019. All branches were about 15 cm long. Colonies were determined to be gravid in the field by cutting a 5-cm piece diagonally and looking for spermaries or eggs. Colonies were transported to the Virgin Islands Environmental Research Station and maintained in a sea table.

We monitored for signs of spawning for 5 hr starting at sunset starting one night after the full moon from July 17–23, 2019. Eggs and sperm were collected together with 60- mL syringes as they were released from the colonies and were stored in water from the tank for 30 min to ensure fertilization. We refer to the time at which gametes were collected as t = 0. On the third night of spawning detailed observations of embryo development were conducted by counting the number of cells in 11 embryos in triplicate every 10 min for the first 2 hr after fertilization, every 5 min for the next 4 hr, and every hour for the next 8 hr. Individual embryos were kept in separate containers. We stopped counting the number of cells after embryos reached 128 cells because further divisions became difficult to detect.

Instruments:
dissecting microscope, hand lens

Data Processing Description

BCO-DMO data manager processing notes:

* Data from file NSF.Phomomalla_development_fine_monitoring.xlsx sheet "data" imported into the BCO-DMO data system.
* Added column ISO_DateTime_UTC_Start from times and dates provided in local time UTC-4.
* Renamed data columns to meet BCO-DMO naming conventions (only [a-zA-Z0-9] and underscores). Periods changed to underscores.
* 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
p_homomalla_dev_fine.csv (Comma Separated Values (.csv), 3.96 KB) MD5:09d184919184e699e90a94f7aba96bdf Primary data file for dataset ID 855801

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Related Publications

Tonra, K. J., Wells, C. D., & Lasker, H. R. (2021). Spawning, embryogenesis, settlement, and post-settlement development of the gorgonian Plexaura homomalla. Invertebrate Biology, 140(2). doi:10.1111/ivb.12319
Results

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Related Datasets

IsRelatedTo

Tonra, K., Wells, C., Lasker, H. (2021) **Counts of individuals and cell division for 100 Plexaura homomalla embryos from fertilization to 24 hours after fertilization from adult corals collected in Round Bay, St. John, USVI in July of 2019.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-07-15 doi:10.26008/1912/bco-dmo.855766.1 [view at BCO-DMO]
Relationship Description: Embryos collected on consecutive nights from the same adult colonies.

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Parameters

Parameter	Description	Units
start_time	start time of measurement	unitless
time	time relative to the time eggs were collected	unitless
date	date of observation	unitless
indiv_01	number of cells composing individual 01 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_02	number of cells composing individual 02 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_03	number of cells composing individual 03 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_04	number of cells composing individual 04 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_05	number of cells composing individual 05 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_06	number of cells composing individual 06 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_07	number of cells composing individual 07 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_08	number of cells composing individual 08 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_09	number of cells composing individual 09 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_10	number of cells composing individual 10 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
indiv_11	number of cells composing individual 11 (can be 1 to 64, 128 [more than 64], or X [dead])	unitless
ISO_DateTime_UTC_Start	start Datetime of that counting period in ISO 8601 format yyyy-mm-ddTHH:MMZ (UTC)	unitless

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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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