Lab experiment to test effects of live coral from Porites lobata, Pocillopora sp., Porites rus, and Millepora on Caerasignum maximum larvae after 24 hours.

Website: https://www.bco-dmo.org/dataset/722097
Data Type: experimental
Version: 2017-10-05

Project
» Spatial patterns of coral-vermetid interactions: short-term effects and long-term consequences (Vermetids_Corals)

Contributors	Affiliation	Role
Phillips, Nicole	Victoria University of Wellington	Principal Investigator, Contact
Osenberg, Craig	University of Georgia (UGA)	Co-Principal Investigator
Shima, Jeffrey	Victoria University of Wellington	Co-Principal Investigator
Biddle, Mathew	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Table of Contents

- Dataset Description
  - Methods & Sampling
  - Data Processing Description
- Data Files
- Related Publications
- Parameters
- Instruments
- Deployments
- Project Information
- Funding

Dataset Description

These datasets all provide data for the settlement of *Ceraesignum* (previously *Dendropoma*) *maximum* to live coral.

Related Datasets:

- Experiment 1 day: https://www.bco-dmo.org/dataset/722097(The current page.)
- Experiment 2 hours: https://www.bco-dmo.org/dataset/722118
- Experiment 3 minutes: https://www.bco-dmo.org/dataset/722135
- Settlement to Quadrats: https://www.bco-dmo.org/dataset/722208
- Settlement to Rubble: https://www.bco-dmo.org/dataset/722226

Methods & Sampling

Ceraesignum maximum larvae were obtained from field- collected adults, in Moorea. Individual adult *C. maximum* were chiseled from the coral matrix intact in their tubes, transported to the laboratory in coolers of seawater, and their brooding status ascertained by gently poking each snail until it retracted deep into its shell. If late-stage capsules were observed attached to the inside of the shell, a mesh-sided cage (mesh = 150 µm) was secured around the tube with cable-ties, and the adult (with mesh enclosing the openings to their tubes) was then placed in a large tank with flowing seawater. Swimming larvae were released by females after 1–3 days.

Fragments (approximately 2x3 cm) of live coral were collected from the lagoon on the morning of each

experiment and left for 2 h in flowing ambient seawater to recover. Fragments were examined under a microscope prior to each experiment to ensure that polyps were extended.

For this experiment:

Treatments were established in 1 Liter plastic tubs filled with filtered seawater (FSW; mesh size = 0.5 µm). Each tub contained one of five treatments: fragments of live *Porites lobata*, *Pocillopora* sp., or *Porites rus*, coral rubble (fragments had been scrubbed and dried in full sun for 2–3 days prior), or a control of FSW only (n = 4 replicate tubs per treatment). Twenty 2-d posthatch *D. maximum* larvae from a single female were gently pipetted into each tub, released a few cm above the substrate. In all cases, the velum (the ciliated larval swimming structure) was extended. Tubs were maintained in a flowthrough seawater table and examined after 24 h under a dissecting microscope. The tub and each fragment were thoroughly searched for any settlers, and all larvae scored as either live or dead. If larvae were dead, it was noted whether the larval shells were empty of tissue (i.e., presumably consumed by the coral). This experiment was repeated 3 days later with 1 days posthatch larvae from a different female, and with the addition of a treatment of live Millepora sp. (referred to as run 2).

Data Processing Description

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- blank values replaced with no data value 'nd'.

[table of contents | back to top]

Data Files

File	
Phillipsetal_2014_Expt1day.csv	(Comma Separated Values (.csv), 1.55 KB) MD5:6d57cca25aad6ec266a7eb687996047b
Primary data file for dataset ID 722097	

[table of contents | back to top]

Related Publications

Phillips, N. E., Shima, J. S., & Osenberg, C. W. (2014). Live coral cover may provide resilience to damage from the vermetid gastropod Dendropoma maximum by preventing larval settlement. Coral Reefs, 33(4), 1137–1144. doi:10.1007/s00338-014-1198-2
General

[table of contents | back to top]

Parameters

Parameter	Description	Units
Run	denoting which of two runs of the same experiment with different females; run 2 occurred 3 days after run 1	unitless
Treatment	Corals and controls that larvae were exposed to (FSW = Filtered seawater; Pocilllopora = Pocillopora sp; P.lobata = Porites lobata; P.rus = Porites rus; Millepora = Millepora sp)	unitless
Total_live	total number live larvae	unitless
Total_dead	total number of dead larvae	unitless
Empty_shells	for dead larvae; how many shells were empty	unitless
percent_live	proportion of live larvae. percent live = Live Snails counted/Total number of live and dead snails.	percent
percent_dead	proportion of dead larvae. percent dead = Dead snails counted/Total number of live and dead snails.	percent
percent_empty_of_dead	proportion of dead larvae that had empty shells. percent empty of dead = Snails with empty shells/Dead snails counted.	percent

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	dissecting microscope
Generic Instrument Name	Inverted Microscope
Dataset-specific Description	Tubs were maintained in a flowthrough seawater table and examined after 24 h under a dissecting microscope.
Generic Instrument Description	An inverted microscope is a microscope with its light source and condenser on the top, above the stage pointing down, while the objectives and turret are below the stage pointing up. It was invented in 1850 by J. Lawrence Smith, a faculty member of Tulane University (then named the Medical College of Louisiana). Inverted microscopes are useful for observing living cells or organisms at the bottom of a large container (e.g. a tissue culture flask) under more natural conditions than on a glass slide, as is the case with a conventional microscope. Inverted microscopes are also used in micromanipulation applications where space above the specimen is required for manipulator mechanisms and the microtools they hold, and in metallurgical applications where polished samples can be placed on top of the stage and viewed from underneath using reflecting objectives. The stage on an inverted microscope is usually fixed, and focus is adjusted by moving the objective lens along a vertical axis to bring it closer to or further from the specimen. The focus mechanism typically has a dual concentric knob for coarse and fine adjustment. Depending on the size of the microscope, four to six objective lenses of different magnifications may be fitted to a rotating turret known as a nosepiece. These microscopes may also be fitted with accessories for fitting still and video cameras, fluorescence illumination, confocal scanning and many other applications.

[table of contents | back to top]

Deployments

Osenberg_et_al_Moorea

Website	https://www.bco-dmo.org/deployment/644752
Platform	Osenberg et al Moorea
Start Date	2003-05-19
End Date	2015-07-12

[table of contents | back to top]

Project Information

Spatial patterns of coral-vermetid interactions: short-term effects and long-term consequences (Vermetids_Corals)

Coverage: Moorea, French Polynesia (-17.48 degrees S, -149.82 degrees W)

Description from NSF abstract:
Ecological surprises are most likely to be manifest in diverse communities where many interactions remain uninvestigated. Coral reefs harbor much of the world's biodiversity, and recent studies by the investigators suggest that one overlooked, but potentially important, biological interaction involves vermetid gastropods. Vermetid gastropods are nonmobile, tube-building snails that feed via an extensive mucus net. Vermetids reduce coral growth by up to 80%, and coral survival by as much as 60%. Because effects vary among coral

taxa, vermetids may substantially alter the structure of coral communities as well as the community of fishes and invertebrates that inhabit the coral reef.

The investigators will conduct a suite of experimental and observational studies that: 1) quantify the effects of four species of vermetids across coral species to assess if species effects and responses are concordant or idiosyncratic; 2) use meta-analysis to compare effects of vermetids relative to other coral stressors and determine the factors that influence variation in coral responses; 3) determine the role of coral commensals that inhabit the branching coral, Pocillopora, and evaluate how the development of the commensal assemblage modifies the deleterious effects of vermetids; 4) determine how vermetid mucus nets affect the local environment of corals and evaluate several hypotheses about proposed mechanisms; and 5) assess the long-term implications of vermetids on coral communities and the fishes and invertebrates that depend on the coral.

Note: The Principal Investigator, Dr. Craig W. Osenberg, was at the University of Florida at the time the NSF award was granted. Dr. Osenberg moved to the University of Georgia during the summer of 2014 (current contact information).

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1130359

[table of contents | back to top]