Settlement challenge experiment after 10 days post hatch in Moorea, French Polynesia from September to October 2009 (Vermetids_Corals project)

Website: https://www.bco-dmo.org/dataset/725335
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
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Coverage

Spatial Extent: **N**:-17.47279 **E**:-149.78277 **S**:-17.48365 **W**:-149.84698
Temporal Extent: 2009-09-24 - 2009-10-12

Dataset Description

These data are from an experiment that tests the nutritional strategies of Ceraesignum (Dendropoma) maximum larvae. For additional datasets see related files.

Related Datasets:

- Phillips_2011 - Experiment 1 Larval Mortality: https://www.bco-dmo.org/dataset/725276
- Phillips_2011 - Experiment 1 Larval Size: https://www.bco-dmo.org/dataset/725317
- Phillips_2011 - Experiment 1 Settlement Challenge 10: https://www.bco-dmo.org/dataset/725335 (Current page)
- Phillips_2011 - Experiment 1 SettlementChallenge18: https://www.bco-dmo.org/dataset/725392
- Phillips_2011 - Experiment 2 Larval Mortality: https://www.bco-dmo.org/dataset/725880
- Phillips_2011 - Experiment 2 Larval Size: https://www.bco-dmo.org/dataset/725943
- Phillips_2011 - Experiment 2 Larval Velum Size: https://www.bco-dmo.org/dataset/725957
- Phillips_2011 - Experiment 2 Settlement Challenge 6: https://www.bco-dmo.org/dataset/725973
- Phillips_2011 - Experiment 2 Settlement Challenge 8: https://www.bco-dmo.org/dataset/726002

Methods & Sampling

In this experiment, larvae were placed into feeding treatments with different types of phytoplankton to determine larval nutritional strategies.

Larvae hatched on Sept 24, 2009 and were distributed into tubs on 500mL filtered sea water (FSW). Three larval feeding treatments with different species of phytoplankton, all at 10 x 104 cells mL-1: *Isochrysis galbana* (''Iso'' treatment), *Dunaliella tertiolecta* (''Dun'' treatment), a 1:1 ratio of *I. galbana* and *D. tertiolecta* (''Mixed'' treatment), plus an Unfed treatment in which larvae were raised in FSW. Investigators used a hemocytometer to count algal cells and calculate densities of phytoplankton stocks and amount of stock to add to containers for each treatment. At 10- post-hatch, larvae were placed in settlement challenges. These were done in plastic containers with 200 mL FSW and two small fragments (*2–3 cm diam.) of coral rubble. Before use in settlement challenges, the coral rubble fragments were rinsed in freshwater and lightly scrubbed to remove any associated macrofauna. Each piece of rubble had 25–50% cover of live coralline algae, but no apparent other live or boring organisms associated with them. Coral rubble was chosed because a pilot experiment had shown that after 24 h of exposure to coral rubble, fed, swimming larvae were capable of completely losing or reabsorbing the velum, and subsequently actively crawling on the substratum. The settlement challenge on day 10 consisted of pooling three larvae from each replicate container within each food treatment and redistributing them into the settlement challenge containers. Thus, nine larvae were added to each of three replicate containers for the settlement challenge (N = 27 larvae total from each food treatment). Larvae were examined every day for 3 days for loss of velum or complete metamorphosis. Complete metamorphosis was evident by several obvious morphological changes: the previously long and active foot was lost, the margin of the protoconch aperture became light pink, and early growth of the juvenile tube. In most cases at metamorphosis, the protoconch became cemented to the substratum (either the coral rubble or the bottom of the container), but in others the shell remained unattached. Investigators left swimming larvae in the containers and removed dead larvae. The water in the settlement challenge containers was changed each day.

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
- empty values were replaced with 'nd' (no data).

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Data Files

File	
Phillips_2011_Expt1_SettlementChallenge10.csv	(Comma Separated Values (.csv), 1.28 KB) MD5:6058fd2733c046a3e0dc10a11506cfaa
Primary data file for dataset ID 725335	

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Related Publications

Phillips, N. E. (2011). Where are larvae of the vermetid gastropod Dendropoma maximum on the continuum of larval nutritional strategies? Marine Biology, 158(10), 2335–2342. doi:10.1007/s00227-011-1737-0
General

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Parameters

Parameter	Description	Units
Larval_food_treatment	type of food given to larvae (Isochrysis galbana = Iso; Dunaliella tertiolecta = Dun; 1:1 ratio of Iso and Dun = Mixed)	unitless
Replicate_settlement_container	replicate tub	unitless
initial_number_larvae	initial number of larvae	unitless
day_1_number_live_larvae_with_velum	larvae with velum day 1 after start of challenge	unitless
day_1_number_dead	number of dead larvae on day 1 after start of challenge	unitless
day_1_number_missing	number of larvae missing on day 1 after start of challenge	unitless
day_1_number_larvae_without_velum	number of larvae without velum on day 1 after start of challenge	unitless
day_1_number_metamorphosed	number of larve that metamorphosized on day 1 after start of challenge	unitless
day_2_number_live_larvae_with_velum	number of live larvae with velum day 2 after start of challenge	unitless
day_2_number_dead	number of dead larvae on day 2 after start of challenge	unitless
day_2_number_missing	number of larvae missing on day 2 after start of challenge	unitless
day_2_number_larvae_without_velum	number of larvae without velum on day 2 after start of challenge	unitless
day_2_number_metamorphosed	number of larve that metamorphosized on day 2 after start of challenge	unitless
day_3_number_live_larvae_with_velum	number of live larvae with velum day 3 after start of challenge	unitless
day_3_number_dead	number of dead larvae on day 3 after start of challenge	unitless
day_3_number_missing	number of larvae missing on day 3 after start of challenge	unitless
day_3_number_larvae_without_velum	number of larvae without velum on day 3 after start of challenge	unitless
day_3_number_metamorphosed	number of larve that metamorphosized on day 3 after start of challenge	unitless
end_number_live_larvae_left_with_velum	number of live larvae end of challenge	unitless
end_number_dead	number of dead larvae end of challenge	unitless
end_number_missing	number of larvae missing end of challege	unitless
end_number_larvae_left_without_velum	number of larvae without velum end of challenge	unitless
end_number_metamorphosed	number of larve that metamorphosized end of challenge	unitless
end_percent_without_velum_plus_metamorphosed	Percent of larvae without velum and that metamorphosized at end of experiment	unitless (percent)

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Instruments

Dataset-specific Instrument Name	hemocytometer
Generic Instrument Name	Hemocytometer
Dataset-specific Description	Investigators used a hemocytometer to count algal cells and calculate densities of phytoplankton stocks and amount of stock to add to containers for each treatment.
Generic Instrument Description	A hemocytometer is a small glass chamber, resembling a thick microscope slide, used for determining the number of cells per unit volume of a suspension. Originally used for performing blood cell counts, a hemocytometer can be used to count a variety of cell types in the laboratory. Also spelled as "haemocytometer". Description from: http://hlsweb.dmu.ac.uk/ahs/elearning/RITA/Haem1/Haem1.html.

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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

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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).

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Funding

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

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