Number of Briareum asbestinum juveniles at 4 sites with a given Symbiodinium type over time (months) during 1999-2002 (Fig. 2, Poland et al 2013) (SymBioSys project)

Website: https://www.bco-dmo.org/dataset/683783
Data Type: experimental
Version:
Version Date: 2017-03-10

Project
» Ontogenic change in Cnidarian-algal symbioses: A genomic and ecologic perspective (SymBioSys)

Contributors	Affiliation	Role
Coffroth, Mary Alice	State University of New York at Buffalo (SUNY Buffalo)	Principal Investigator
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

Data on symbiont *Symbiodinium* type in *Briareum asbestinum* juveniles, 1999-2002. These data were used for Figure 2 in Poland et al (2013) MEPS.

Methods & Sampling

For details, see Poland et al 2013. *Briareum asbestinum* larvae, collected directly from the surface of the maternal colonies at the Florida Bay, reared for three days in filtered seawater and then divided into 3 replicate groups and transferred to 1 of the 3 study sites (Florida Bay, Grassbed or Outer Reef tract) where they were placed in 2 l jugs (500−2000 larvae jug−1) and allowed to settle on dead gorgonian branches (the preferred settlement site). After 3 to 7 d, the branches with newly settled juveniles were removed from the jugs and suspended off the substrate at each site. Deployment techniques varied along the Outer Reef tract site. In 1999, *Briareum asbestinum* juveniles were settled onto plexi-glass plates and were floated 0.5 m above the substrate on a shallow (5 m) part of the Tennessee reef tract, while in 2000 to 2002 juveniles were settled on branches and maintained within the jugs to avoid fish predation. In 2000 and 2001 these jugs were suspended at 5 m below the surface above the deeper (23 m) part of the reef tract and in 2002, the jugs containing juveniles were floated 0.5 to 1.0 m above the substrate at 23 m depth at this same site. Data from the outer reef tract provided a comparison of symbiont types infecting juvenile hosts in the same area over depth and time.

Symbiont identification/typing followed that of Santos et al. 2003, Mar.Biotech. 5:130-140

Data Processing Description

BCO-DMO Processing:

- original file: Poland et al 2013_symbiont type by site & month.xlsx
- added conventional header with dataset name, PI name, version date, reference information
- changed parameter names to be BCO-DMO compatible
- replaced spaces with underscores
- blank values replaced with no data value 'nd'

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Data Files

File
Poland_2013_symb_type.csv (Comma Separated Values (.csv), 8.67 KB) MD5:d47f2a64eec9e3d9fa1642b433328605
Primary data file for dataset ID 683783

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Related Publications

BURR webpage (http://www.nsm.buffalo.edu/Bio/burr/) for details of symbiont isolation and culturing
Methods

Poland, D., Mansfield, J., Hannes, A., Lewis, C., Shearer, T., Connelly, S., ... Coffroth, M. (2013). Variation in Symbiodinium communities in juvenile Briareum asbestinum (Cnidaria: Octocorallia) over temporal and spatial scales. Marine Ecology Progress Series, 476, 23–37. doi:10.3354/meps10165
Related Research

,
Methods

ROWAN, R., & POWERS, D. A. (1991). A Molecular Genetic Classification of Zooxanthellae and the Evolution of Animal-Algal Symbioses. Science, 251(4999), 1348–1351. doi:10.1126/science.251.4999.1348
General

Santos, S. R., Gutierrez-Rodriguez, C., & Coffroth, M. A. (2003). Phylogenetic identification of symbiotic dinoflagellates via length heteroplasmy in Domain V of chloroplast Large Subunit (cp23S)-Ribosomal DNA Sequences. Marine Biotechnology, 5(2), 130–140. doi:10.1007/s10126-002-0076-z
Methods

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Parameters

Parameter	Description	Units
site	location of sample collections	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
year	year of experiment	unitless
cptype	symbiont genetic type identifier	unitless
Jun	number of Briareum asbestinum juveniles with symbiont type in June	unitless
Jul	number of Briareum asbestinum juveniles with symbiont type in July	unitless
Aug	number of Briareum asbestinum juveniles with symbiont type in August	unitless
Sep	number of Briareum asbestinum juveniles with symbiont type in September	unitless
Oct	number of Briareum asbestinum juveniles with symbiont type in October	unitless
Nov	number of Briareum asbestinum juveniles with symbiont type in November	unitless
Dec	number of Briareum asbestinum juveniles with symbiont type in December	unitless
Jan	number of Briareum asbestinum juveniles with symbiont type in January	unitless
Feb	number of Briareum asbestinum juveniles with symbiont type in February	unitless
Mar	number of Briareum asbestinum juveniles with symbiont type in March	unitless
Apr	number of Briareum asbestinum juveniles with symbiont type in April	unitless
May	number of Briareum asbestinum juveniles with symbiont type in May	unitless

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Instruments

Dataset-specific Instrument Name	Automated Sequencer
Generic Instrument Name	Automated DNA Sequencer
Dataset-specific Description	LI-COR 4200 NENH Global IR2 DNA sequencing system (LI-COR Biosciences, Lincoln, NE,USA)
Generic Instrument Description	General term for a laboratory instrument used for deciphering the order of bases in a strand of DNA. Sanger sequencers detect fluorescence from different dyes that are used to identify the A, C, G, and T extension reactions. Contemporary or Pyrosequencer methods are based on detecting the activity of DNA polymerase (a DNA synthesizing enzyme) with another chemoluminescent enzyme. Essentially, the method allows sequencing of a single strand of DNA by synthesizing the complementary strand along it, one base pair at a time, and detecting which base was actually added at each step.

Dataset-specific Instrument Name	Thermal Cycler
Generic Instrument Name	Thermal Cycler
Dataset-specific Description	MJ Research PTC-100
Generic Instrument Description	A thermal cycler or "thermocycler" is a general term for a type of laboratory apparatus, commonly used for performing polymerase chain reaction (PCR), that is capable of repeatedly altering and maintaining specific temperatures for defined periods of time. The device has a thermal block with holes where tubes with the PCR reaction mixtures can be inserted. The cycler then raises and lowers the temperature of the block in discrete, pre-programmed steps. They can also be used to facilitate other temperature-sensitive reactions, including restriction enzyme digestion or rapid diagnostics. (adapted from http://serc.carleton.edu/microbelife/research_methods/genomics/pcr.html)

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Deployments

Coffroth_2010

Website	https://www.bco-dmo.org/deployment/546058
Platform	SUNY-Buffalo
Start Date	2010-01-01
End Date	2015-12-31
Description	laboratory-based research on coral symbionts

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Project Information

Ontogenic change in Cnidarian-algal symbioses: A genomic and ecologic perspective (SymBioSys)

Coverage: Florida Keys, Bahamas, Panama, Mexico

PROJECT SUMMARY:
The symbiosis between corals (Cnidaria:Hexacorallia:Scleractinia) and photosynthetic dinoflagellate symbionts (Alveolata: Dinophycea: Symbiodinium) provides the foundation and structure of the coral reef ecosystem, as well as significant contributions to global carbon and biogeochemical cycles. Given the importance of this symbiosis to the coral-algal holobiont and the reef ecosystem, understanding the mechanisms governing the establishment and long term maintenance of this symbiosis is essential. The overall aim of this project is to identify the mechanisms and selective processes that lead to the final assemblage of symbionts harbored by adult hosts. This question will be approached from two perspectives, ecologic and genomic, with the specific aims of determining (1) if different Symbiodinium strains differentially affect fitness of corals as the adult settles into a mature symbiosis (2) if competition among symbionts or environmental conditions contribute to the final host-symbiont pairing and (3) how host/symbiont transcriptomes varying as the symbiont community within a host is winnowed to the final assemblage found in the adult host. Traits that directly affect coral fitness (i.e. growth, survivorship, energy production) will be measured under different environmental conditions over the ontogeny of coral recruits that are experimentally infected with different types of Symbiodinium.

Concurrently, high throughput gene expression profiling will be used to follow changes in gene expression between host and symbiont. Together, these data will be used to validate or falsify the hypotheses that the final symbiont assemblage found in the adult host is determined by (a) host selection (b) competition among symbionts and/or (c) environmental condition.

This study pools the expertise of two labs that have focused on these aspects of the symbiosis. The Coffroth lab pioneered the studies on early ontogeny of the symbiosis and symbiont diversity and will continue to take the lead in the ecological studies. The Medina lab is at the forefront in the development and utilization of genomic technology to study transcriptomic changes during the establishment and breakdown of the symbiosis. Furthermore, the Medina lab has the coral microarrays to be used in this study and in 2009 will also have oligo arrays for two Symbiodinium species based on 454 EST data. Although several groups have initial studies of the host transcriptome, none have combined an approach that examines the host and the symbiont in a single experiment. This will be a powerful approach as it will allow the investigators to track complementary changes in gene expression between host and symbiont and relate those to turnover in the symbiont community as the final symbiont complement is established.

The data resulting form the study will bridge an important gap in our understanding of the establishment and maintenance of coral-Symbiodinium symbiosis. Understanding the mechanism(s) regulating the establishment of the symbiosis will broaden our knowledge and help to predict the response of this symbiosis to future climate conditions. As in the past, the genomic tools (arrays, ESTs) will be made readily available to researchers via array distribution at cost, microarray analysis training, or sequence data, providing valuable resources to continue exploring these systems.

In conjunction the Aquarium of Niagara, Coffroth will develop educational and outreach programs to train and disseminate information on coral reefs to local area teachers and the general public. The Medina lab will continue to produce science and environment podcasts in multiple languages (English, Spanish and Hmong) with undergraduate students at UC Merced and will continue to collaborate with the California Academy of Sciences (CAS) in their coral reef outreach efforts. Additionally, this work will result in the training and mentoring of a postdoctoral fellow, at least one graduate student and at least 2 undergraduates. Through this project these students will have the opportunity to participate in research in both a lab and field setting, learning a range of ecological, molecular and algal culturing techniques. The extensive culture collection housed at the University at Buffalo is an important resource that is available to researchers worldwide which the proposed funding will help to maintain. Our EST annotations are publicly available through our EST database (http://montastraea.psu.edu/SymBioSys/).

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0926822
NSF Division of Ocean Sciences (NSF OCE)	OCE-0424996
NSF Division of Ocean Sciences (NSF OCE)	OCE-9907319

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