Cnidarian symbiont culture collection (BURRCC) collected from the Florida Keys, Bahamas, Panama, and Mexico during 2010 (SymBioSys project)

Website: https://www.bco-dmo.org/dataset/546049
Version: 2015-01-15

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

Contributors	Affiliation	Role
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Dataset Description

Summary of *Symbiodinium* cultures in the BURR Culture Collection with symbiont phylotype based on variation in the chloroplast 23S-rDNA. Collections made world-wide; cultures are maintained at the University at Buffalo. Cultures are available to researchers for a nominal charge. Contact coffroth@buffalo.edu for further information.

This dataset provides the *Symbiodinium* clade (Rowan and Powers, 1991, Science 251: 1348-1351) and variation in domain V of the chloroplast 23S rDNA (Santos et al 2003, Mar.Biotech. 5:130-140).

Methods & Sampling

Symbionts isolated from cnidarian fragments and reared in F/2 media under 40W cool-white lights at 26oC on a 14:10h light:dark cycle. Symbiont identification followed that of Santos et al. 2003, Mar.Biotech. 5:130-140.

Related Reference:

- Santos SR, Gutiérrez-Rodríguez C, Coffroth MA (2003) Phylogenetic identification of symbiotic dinoflagellates via length heteroplasmy in domain V of chloroplast large subunit (cp23S)-rDNA sequences. Mar Biotech 5: 130-140 for technique to characterize symbionts based on of chloroplast large subunit (cp23S)-rDNA.
- Rowan, R. and D. Powers (1991). A molecular genetic classification of zooxanthellae and the evolution of animal-algal symbioses. Science 251: 1348-1351 for technique to characterize symbionts at the clade level.
- BURR webpage (http://www.nsm.buffalo.edu/Bio/burr/) for details of symbiont isolation and culturing.

Data Processing Description

BCO-DMO Processing:

- original file: Coffroth_BURR Culture Collection database_Dec 2014.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

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Data Files

File
burr.csv (Comma Separated Values (.csv), 16.07 KB) MD5:8f4bac396fcdd48990c9df3957f10817 Primary data file for dataset ID 546049

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Parameters

Parameter	Description	Units
lab	laboratory identification; for mapping puposes	unitless
lat	latitude of lab; north is positive	decimal degrees
lon	londitude of lab; east is positive	decimal degrees
culture_id	Symbiodinium culture identification	unitless
clade	Symbiodinium clade	unitless
cp_23S_rDNA_genotype	variation in domain V of the chloroplast 23S rDNA	unitless

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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
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