Day vs. night Calcinus hermit crab abundance on Millepora coral from Virgin Islands National Park in the Great Lameshure Bay, St. John, US Virgin Island from 2010-2011 (St. John LTREB project)

Website: https://www.bco-dmo.org/dataset/523481
Version: 2014-08-15

Project
» LTREB Long-term coral reef community dynamics in St. John, USVI: 1987-2019 (St. John LTREB)

Program
» Long Term Research in Environmental Biology (LTREB)

Contributors	Affiliation	Role
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Coverage

Spatial Extent: **N**:18.3182 **E**:-64.7228 **S**:18.3116 **W**:-64.7242
Temporal Extent: 2010 - 2011

Dataset Description

The study was conducted in St. John within the Virgin Islands National Park (VINP). The majority of our analyses focused on the shallow fringing reefs of Great Lameshur Bay and was completed in 2010 and 2011. Surveys in July and August 2010 focused on the natural history of the association by evaluating *Millepora* spp. for colony size and population density of *C. tibicen*. Surveys were repeated between June 2011 and August 2011 and expanded to the north and east shores of St. John to test the generality of the observations initially made in 2010. In 2011, manipulative experiments were conducted to test the functional basis of the *Millepora-Calcinus* association and evaluate whether it could be described as a commensalism.

These data were published in Brown D, Edmunds PJ. (2013)

Original submitted excel file in data file section.

Methods & Sampling

Abundance of *Calcinus tibicen* on *Millepora* spp.: Surveys in 2010 were performed during the day at Tektite and Yawzi Point in Great Lameshur Bay. At each site, 25-m transects were placed parallel to the 2-6 m depth contour and *Millepora* spp. colonies within 1 m of either side of the transect were censused for size and abundance of *C. tibicen*. The benthos was also searched for *C. tibicen* to determine the extent to which they occurred on surfaces other than *Millepora* spp. *Millepora* spp. was scored for size and presence of *C. tibicen.* The sizes of *C. tibicen* were estimated indirectly through the sizes of the gastropod shells they occupy.

Nocturnal surveys: Surveys were completed at night in 2011 to test the possibility that *C. tibicen* leave *Millepora* spp. after dark. This portion of the study was motivated by the strong likelihood that *C. tibicen* is an omnivorous detritivore and, therefore, eventually would have to leave their *Millepora* spp. to forage. Presumably, this behavior might best be accomplished at night when they could escape visual fish predators.

Site fidelity: Hermit crabs were collected and grouped by the colony from which they were collected, and their Millepora spp. colonies marked so that tagged crabs could be returned to the same colony. Site fidelity was expressed as the percentage of tagged hermit crabs remaining on each colony over the census period. Results table.

Behavioral response: To evaluate the capacity for *C. tibicen* to find *Millepora* spp., two experiments were conducted. First, a displacement experiment was conducted in 2010 and 2011, in which C. tibicen were removed from *Millepora* spp. colonies during the day, placed on adjacent algal turf, and observed for 5 min to determine whether they returned to the same *Millepora* spp. Second, a laboratory experiment was conducted in 2011 in which *C. tibicen* were placed in a Y-maze and presented with a choice of *Millepora* spp. versus seawater.

Results of Y-Maze Choice:
Millepora: 29
Other: 14
Total: 4

Predator avoidance: To gain insight into the mechanistic basis of the *Millepora- Calcinus* association, a tethering experiment was conducted in which the losses of secured *C. tibicen* were determined on *Millepora* spp. versus sand/algal turf.

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Data Files

File	
day_night.csv Primary data file for dataset ID 523481	(Comma Separated Values (.csv), 409 bytes) MD5:bb06db95dde3695341705a8c292347f0
Millepora_Calcinus_Data_for_2012_CoralReefs_BCODMO filename: Millepora_Calcinus_Data%20_for_2012_CoralReefs_BCODMO.xls Original excel file for dataset 523358, 523441, 523481, 523451. This file has been reworked and put into the BCO-DMO system for improved interoperability.	(Octet Stream, 240.00 KB) MD5:5165db393eb498d22f76fdb6916524ce

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Related Publications

Brown, D., & Edmunds, P. J. (2012). The hermit crab Calcinus tibicen lives commensally on Millepora spp. in St. John, United States Virgin Islands. Coral Reefs, 32(1), 127–135. https://doi.org/10.1007/s00338-012-0948-2
Results

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Related Datasets

IsRelatedTo

Edmunds, P. J. (2014) **Calcinus hermit crab abundance and Millepora coral size from Virgin Islands National Park in the Great Lameshure Bay, St. John, US Virgin Island from 2010-2011 (St. John LTREB project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2014-08-14) Version Date 2014-08-14 http://lod.bco-dmo.org/id/dataset/523358 [view at BCO-DMO]
Relationship Description: Calcinus hermit crab abundance and Millepora coral size from Virgin Islands National Park in the Great Lameshure Bay, St. John, US Virgin Island from 2010-2011

Edmunds, P. J. (2014) **Calcinus hermit crabs responses after displacement from Millepora coral from Virgin Islands National Park in the Great Lameshure Bay, St. John, US Virgin Island from 2010-2011 (St. John LTREB project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2014-08-15) Version Date 2014-08-15 http://lod.bco-dmo.org/id/dataset/523441 [view at BCO-DMO]
Relationship Description: Calcinus hermit crabs responses after displacement from Millepora coral from Virgin Islands National Park in the Great Lameshure Bay, St. John, US Virgin Island from 2010-2011

Edmunds, P. J. (2014) **Thethered Calcinus hermit crabs remaining on sand vs. Millepora coral from Virgin Islands National Park in the Great Lameshure Bay, St. John, US Virgin Island from 2010-2011 (St. John LTREB project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2014-08-15) Version Date 2014-08-15 http://lod.bco-dmo.org/id/dataset/523451 [view at BCO-DMO]
Relationship Description: Day vs. night Calcinus hermit crab abundance on Millepora coral from Virgin Islands National Park in the Great Lameshure Bay, St. John, US Virgin Island from 2010-2011

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Parameters

Parameter	Description	Units
site	location of the Millepora colony	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
colony	colony id number: running count of colonies sampled	unitless
count_5pm	the total number of crabs found on each Millepora colony at 5pm	individuals
count_10pm	the total number of crabs found on the same Millepora colonies at 10pm	individuals

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Deployments

Edmunds_VINP

Website	https://www.bco-dmo.org/deployment/523357
Platform	Virgin Islands National Park
Start Date	1987-01-01
End Date	2016-09-01
Description	Studies of corals and hermit crabs

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Project Information

LTREB Long-term coral reef community dynamics in St. John, USVI: 1987-2019 (St. John LTREB)

Website: http://coralreefs.csun.edu/

Coverage: St. John, U.S. Virgin Islands; California State University Northridge

Long Term Research in Environmental Biology (LTREB) in US Virgin Islands:

From the NSF award abstract:
In an era of growing human pressures on natural resources, there is a critical need to understand how major ecosystems will respond, the extent to which resource management can lessen the implications of these responses, and the likely state of these ecosystems in the future. Time-series analyses of community structure provide a vital tool in meeting these needs and promise a profound understanding of community change. This study focuses on coral reef ecosystems; an existing time-series analysis of the coral community structure on the reefs of St. John, US Virgin Islands, will be expanded to 27 years of continuous data in annual increments. Expansion of the core time-series data will be used to address five questions: (1) To what extent is the ecology at a small spatial scale (1-2 km) representative of regional scale events (10's of km)? (2) What are the effects of declining coral cover in modifying the genetic population structure of the coral host and its algal symbionts? (3) What are the roles of pre- versus post-settlement events in determining the population dynamics of small corals? (4) What role do physical forcing agents (other than temperature) play in driving the population dynamics of juvenile corals? and (5) How are populations of other, non-coral invertebrates responding to decadal-scale declines in coral cover? Ecological methods identical to those used over the last two decades will be supplemented by molecular genetic tools to understand the extent to which declining coral cover is affecting the genetic diversity of the corals remaining. An information management program will be implemented to create broad access by the scientific community to the entire data set.

The importance of this study lies in the extreme longevity of the data describing coral reefs in a unique ecological context, and the immense potential that these data possess for understanding both the patterns of comprehensive community change (i.e., involving corals, other invertebrates, and genetic diversity), and the processes driving them. Importantly, as this project is closely integrated with resource management within the VI National Park, as well as larger efforts to study coral reefs in the US through the NSF Moorea Coral Reef LTER, it has a strong potential to have scientific and management implications that extend further than the location of the study.

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Program Information

Long Term Research in Environmental Biology (LTREB)

Website: https://www.nsf.gov/funding/opportunities/ltreb-long-term-research-environmental-biology

Long Term Research in Environmental Biology (LTREB)

Supports research for a period of 10 years or longer to generate an extended time series of data with a focus on evolutionary biology, ecology and ecosystem science.

Synopsis
The Long Term Research in Environmental Biology (LTREB) Program supports the generation of extended time series of data to address important questions in evolutionary biology, ecology, and ecosystem science. Research areas include, but are not limited to, the effects of natural selection or other evolutionary processes on populations, communities, or ecosystems; the effects of interspecific interactions that vary over time and space; population or community dynamics for organisms that have extended life spans and long turnover times; feedbacks between ecological and evolutionary processes; pools of materials such as nutrients in soils that turn over at intermediate to longer time scales; and external forcing functions such as climatic cycles that operate over long return intervals.

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Funding

Funding Source	Award
NSF Division of Environmental Biology (NSF DEB)	DEB-0841441
NSF Division of Environmental Biology (NSF DEB)	DEB-0343570

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