Geolocation, abundance, and morphology data from Carrie Bow Caye in the Belizean Barrier Reef.

Website: https://www.bco-dmo.org/dataset/705432
Data Type: Other Field Results
Version: 1
Version Date: 2017-06-14

Project
» An Integrative Investigation of Population Connectivity Using a Coral Reef Fish (Elacatinus Dispersal I)

Contributors	Affiliation	Role
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Abstract
Geolocation, abundance, and morphology data from Carrie Bow Caye in the Belizean Barrier Reef.

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Coverage

Spatial Extent: **N**:16.81 **E**:-88.0746 **S**:16.7995 **W**:-88.0997
Temporal Extent: 2006-07-30 - 2006-08-24

Dataset Description

Geolocation, abundance, and morphology data from Carrie Bow Caye. Geographic coordinates for this dataset can be found here: https://www.bco-dmo.org/dataset/704783.

Methods & Sampling

We surveyed a 100 m wide by 300 m long transect of reef around Carrie Bow Cay by SCUBA to map the distribution of the Aplysina fistularis and Elacatinus lori populations. GPS data were collected with a Garmin GPSMAP 76Cx unit in an underwater housing made by Sound Ocean Systems. Waypoints are accurate within 5 m. At each sponge, we recorded: depth at base of sponge (in meters, using dive computers), number of tubes per sponge, length (nearest cm, using a tape measure) and width (nearest cm, using a tape measure) of each sponge tube. We also counted the number of fish per sponge, and categorized fish into one of two life history stages: resident ≥ 18 mm standard length (SL) or settler < 18 mm SL. Divers were trained to visually identify settlers versus residents after measuring a subset of individuals with calipers. We expect accuracy to be high, as this categorization was correlated with a life history transition: settlers tend to live on the outside of sponges, and residents live on the inside of sponges. Further details on methods can be found in D'Aloia et al. (2011), Coral Reefs.

Data Processing Description

BCO-DMO Data Processing Notes:

-reformatted column names to comply with naming standards
-replaced spaces with underscores

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Data Files

File
eloridata.csv (Comma Separated Values (.csv), 48.26 KB) MD5:108a9d481b0501fd2b3a8c65d6026526 Primary data file for dataset ID 705432

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Related Publications

D'Aloia, C. C., Majoris, J. E., & Buston, P. M. (2011). Predictors of the distribution and abundance of a tube sponge and its resident goby. Coral Reefs, 30(3). doi:10.1007/s00338-011-0755-1
Methods

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Parameters

Parameter	Description	Units
date	Date sample was taken; YYYY/MM/DD	unitless
lunar_day	Lunar day sample was taken	unitless
waypoint_ID	PI issued location ID; Each sponge is at a different location	unitless
depth	Depth at the base of the sponge	meters
reef_zone	Description of the reef zone where sample was taken	unitless
sponge_tubes	Number of tubes per sponge	count
Fish_1_0	Fish are (1) present or (0) absent from the sponge	unitless
fish_n	Number of fish per sponge	count
residents_1_0	Residents are (1) present or (0) absent from the sponge	unitless
residents_n	Number of residents per sponge	count
settlers_1_0	Settlers are (1) present or (0) absent from the sponge	unitless
settlers_n	Number of settlers per sponge	count
pairs_1_0	Pairs are (1) present or (0) absent from the sponge	unitless
tube_length	Length of the sponge tube	centimeters
tube_width	Widthe of the sponge tube	centimeters

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Deployments

Belize_2010

Website	https://www.bco-dmo.org/deployment/704795
Platform	lab Buston
Description	Buston lab expeditions to Belize beginning in 2010.

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Project Information

An Integrative Investigation of Population Connectivity Using a Coral Reef Fish (Elacatinus Dispersal I)

Website: http://people.bu.edu/buston/lab/Welcome.html

Coverage: Belizean Barrier Reef System (16.803 degrees North 88.096 degrees West)

Understanding the patterns, causes and consequences of larval dispersal is a major goal of 21st century marine ecology. Patterns of dispersal determine the rates of larval exchange, or connectivity, between populations. Both physical factors (e.g., water movement) and biological factors (e.g., larval behavior) cause variation in population connectivity. Population connectivity, in turn, has major consequences for all aspects of an organism's biology, from individual behavior to metapopulation dynamics, and from evolution within metapopulations to the origin and extinction of species. Further, understanding population connectivity is critical for the design of effective networks of marine reserves, creation of vital tools in conservation, and the development of sustainable fisheries.

Over the last decade, three methods, each of which tells something slightly different, have emerged as leading contenders to provide the greatest insights into population connectivity. First, coupled biophysical models make assumptions regarding water flow, larval behavior and ecology, to predict population connectivity. Second, indirect genetic methods use spatial distributions of allele frequencies to infer population connectivity. Third, direct genetic methods use parentage analyses, tracing recruits to specific adults, to measure population connectivity. Despite advances, lack of integration means that we do not know the predictive skill of biophysical models, or the extent to which patterns of dispersal predict spatial genetic structure. The overall objective of this proposal is to conduct an integrated investigation of population connectivity, using all three methods in one tractable system: the neon goby, Elacatinus lori, on the Belizean Barrier Reef. There are three motives for this choice of study system: i) fourteen highly polymorphic microsatellite loci have been developed, facilitating the assignment of recruits to parents using parentage analyses and the measurement of dispersal; ii) the physical oceanography of the Belizean Barrier Reef is well-studied, facilitating the development and testing of coupled biophysical models; and, iii) E. lori has a relatively small biogeographic range, facilitating analysis of the spatial distribution of allele frequencies throughout its range.

Broader Impacts. The grant will support one postdoc and two graduate students who will be trained in scientific diving, marine fieldwork, population genetics, biophysical modeling, and mathematical modeling, and will gain collaborative research experience. PIs will incorporate research findings in their courses, which cover all these topics. The grant will also broaden participation of under-represented groups by supporting six undergraduates from groups traditionally underrepresented in STEM fields. In each year of the project there will be an All Participants meeting to reinforce the network of participants. A project website will be developed, in English and Spanish, on the theme of larval dispersal and population connectivity. This will include a resource for K-12 marine science educators developed in collaboration with a marine science educator. All PIs will ensure that results are broadly disseminated to the scientific community and general public via appropriate forms of media.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1260424

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