Aligned mtDNA haplotype data from the Belizean Barrier Reef in 2012.

Website: https://www.bco-dmo.org/dataset/738694
Data Type: Other Field Results
Version: 1
Version Date: 2018-06-18

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

Contributors	Affiliation	Role
Buston, Peter	Boston University (BU)	Principal Investigator, Contact
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Coverage

Spatial Extent: **Lat**:16.789722 **Lon**:-88.075833
Temporal Extent: 2012 - 2012

Dataset Description

Aligned mtDNA haplotype data from the Belizean Barrier Reef in 2012.

Methods & Sampling

We collected tissue samples from 300 *Elacatinus lori* individuals at ten locations across the Belize barrier reef for population genetic analyses. We marked the location of each collection site with a Garmin GPSMAP 76Cx unit. Individuals were caught with slurp guns and we took a small clip from the caudal fin using scissors. All tissue samples were store in 95% EtOH. Genetic data were collected based on standard DNA extractions (DNEasy kits, Qiagen), and PCRs. Further details on all methods can be found in D'Aloia et al. (2014), *Molecular Ecology*.

Data Processing Description

Mitochondrial cytb sequences were processed in CODONCODE ALIGNER V.4.0.4. We joined forward and reverse contigs, then aligned them using the ClustalW algorithm. We retained 960 bp of high-quality sequence.

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Related Publications

D'Aloia, C. C., Bogdanowicz, S. M., Harrison, R. G., & Buston, P. M. (2014). Seascape continuity plays an important role in determining patterns of spatial genetic structure in a coral reef fish. Molecular Ecology, 23(12), 2902–2913. doi:10.1111/mec.12782
Methods

cytochrome b KF928971 - Identical Protein Groups - NCBI. (n.d.). Retrieved from https://www.ncbi.nlm.nih.gov/ipg/?term=KF928971
Results

cytochrome b KF929020 - Identical Protein Groups - NCBI. (n.d.). Retrieved from https://www.ncbi.nlm.nih.gov/ipg/?term=KF929020
Results

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Parameters

Parameters for this dataset have not yet been identified

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Instruments

Dataset-specific Instrument Name	Garmin GPSMAP 76Cx unit
Generic Instrument Name	GPS receiver
Dataset-specific Description	Used to mark site locations
Generic Instrument Description	Acquires satellite signals and tracks your location. This term has been deprecated. Use instead: https://www.bco-dmo.org/instrument/560

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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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