Distribution of E. lori settlers on sponge habitat from sampling in South Water Caye, Belize in 2015.

Website: https://www.bco-dmo.org/dataset/728451
Data Type: Other Field Results
Version: 1
Version Date: 2018-02-28

Project
» Collaborative Research: The Role of Larval Orientation Behavior in Determining Population Connectivity (Elacatinus Dispersal II)

Contributors	Affiliation	Role
Buston, Peter	Boston University (BU)	Principal Investigator
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Abstract
Distribution of E. lori settlers on sponge habitat from sampling in South Water Caye, Belize in 2015.

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Coverage

Spatial Extent: **Lat**:16.815333 **Lon**:-88.0815
Temporal Extent: 2015-05-05 - 2015-05-28

Dataset Description

Distribution of *E. lori* settlers on multiple sponge species and morphologies.Distribution Elacatinus lori settlers on sponge habitat.

These data were included in Figure 9 and Table 4 of:

Majoris, JE; D'Aloia CC, Francis RK, Buston PM (Accepted) Differential persistence favors habitat preferences that determine the distribution of a reef fish. Behav. Ecol.

Methods & Sampling

Divers surveyed each of the 120 tagged sponges for the presence or absence of *E. lori* settlers to test the hypothesis that habitat and/or social variables are related to the natural settler distribution (8 – 18 mm SL; Table 1). We constructed a set of generalized linear models (distribution= binomial; link = logit) in R 3.2.3 (R Core Team 2015) to investigate the relationship between the presence or absence of an *E. lori* settler on a sponge (1 or 0) and all habitat and social variables (as defined above). Each variable was treated as an alternative hypothesis for the factors that predict the distribution of settlers.

Data Processing Description

R version 3.2.3

BCO-DMO Data Processing Notes:

- dates reformatted to yyyy/mm/dd
- periods replaced with underscores in column names
- missing identifier replaced with nd

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Data Files

File
distribution.csv (Comma Separated Values (.csv), 4.41 KB) MD5:6a37395d262b0514e9780ed4b1db2d6e
Primary data file for dataset ID 728451

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Related Publications

Majoris, J. E., D'Aloia, C. C., Francis, R. K., & Buston, P. M. (2018). Differential persistence favors habitat preferences that determine the distribution of a reef fish. Behavioral Ecology, 29(2), 429–439. doi:<u>10.1093/beheco/arx189</u>
Results

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Parameters

Parameter	Description	Units
Date	Date of observation; YYYY/MM/DD	unitless
Sp_ID	Tag number from 1 - 120 use to identify sponges	unitless
Sp_depth	Depth at base of the sponge in feet	feet
Sp_depth_m	Depth at base of the sponge in meters	meters
Sp_species	Sponge species: Aplysina fistularis (Y); or Agelas conifera (B)	unitless
Sp_size	Maximum tube length of sponge	centimeters
Sp_tubes	Number of sponge tubes greater than 10 centimeters	count
Res_pres	Residents presence (1) or absence (0)	unitless
Res_n	Number of residents observed on each sponge	count
Settler_pres	Settler presence (1) or absence (0)	unitless
Settler_n	Number of settlers observed on each sponge	count

Project Information

Collaborative Research: The Role of Larval Orientation Behavior in Determining Population Connectivity (Elacatinus Dispersal II)

Coverage: Belizean Barrier Reef System

Description from NSF award abstract:
Understanding how far young fish move away from their parents is a major goal of marine ecology because this dispersal can make connections between distinct populations and thus influence population size and dynamics. Understanding the drivers of population dynamics is, in turn, essential for effective fisheries management. Marine ecologists have used two different approaches to understand how fish populations are connected: genetic methods that measure connectivity and oceanographic models that predict connectivity. There is, however, a mismatch between the predictions of oceanographic models and the observations of genetic methods. It is thought that this mismatch is caused by the behavior of the young, or larval, fish. The objective of this research is to study the orientation capabilities of larval fish in the wild throughout development and under a variety of environmental conditions to see if the gap between observations and predictions of population connectivity can be resolved. The project will have broader impacts in three key areas: integration of research and teaching by training young scientists at multiple levels; broadening participation of undergraduates from underrepresented groups; and wide dissemination of results through

development of a website with information and resources in English and Spanish.

The overall objective of the research is to investigate the role of larval orientation behavior throughout ontogeny in determining population connectivity. This will be done using the neon goby, Elacatinus lori, as a model system in Belize. The choice of study system is motivated by the fact that direct genetic methods have already been used to describe the complete dispersal kernel for this species, and these observations indicate that dispersal is less extensive than predicted by a high-resolution biophysical model; E. lori can be reared in the lab from hatching to settlement providing a reliable source of larvae of all ages for proposed experiments; and a new, proven behavioral observation platform, the Drifting In Situ Chamber (DISC), allows measurements of larval orientation behavior in open water. The project has three specific objectives: to understand ontogenetic changes in larval orientation capabilities by correlating larval orientation behavior with developmental sensory anatomy; to analyze variation in the precision of larval orientation in different environmental contexts through ontogeny; and to test alternative hypotheses for the goal of larval orientation behavior, i.e., to determine where larvae are heading as they develop.

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1459546