Persistence of E. lori settlers on sponge habitat in South Water Caye, Belize during 2015.

Website: https://www.bco-dmo.org/dataset/728458
Data Type: Other Field Results
Version: 1
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Project
» Collaborative Research: The Role of Larval Orientation Behavior in Determining Population Connectivity (Elacatinus Dispersal II)

Contributors	Affiliation	Role
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Abstract
Persistence of E. lori settlers on sponge habitat in South Water Caye, Belize during 2015.

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Coverage

Spatial Extent: **Lat**:16.815333 **Lon**:-88.0815
Temporal Extent: 2015-07-28 - 2015-08-23

Dataset Description

Persistence of *E. lori* settlers seeded onto 120 tagged tubes sponges on the fore reef off South Water Caye.

These data were included in Figure 6 and Table 3 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

Settlers were seeded onto sponges along the transect to test the hypothesis that the distribution of *E. lori* settlers is the result of variation in their persistence (i.e., defined here as the time a settler spent on a sponge as a result of mortality and/or movement) across settlement habitats. For each of the 120 tagged sponges, divers recorded the presence or absence of the seeded settler every other day for two weeks (n = 7 observations/settler). New settlers that arrived from the water column and individuals from elsewhere that moved to tagged sponges were identified using differences in size and pigmentation (Figure 3), removed from the sponge, and measured to confirm size (SL). Following completion of the first two-week trial, a second trial

was carried out using the same sponges, but with a new group of 120 *E. lori* 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
persistence.csv (Comma Separated Values (.csv), 41.93 KB) MD5:aea058933c418e328f48f34b3a9c6f05 Primary data file for dataset ID 728458

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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:10.1093/beheco/arx189
Results

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Parameters

Parameter	Description	Units
Date	Date of observation; YYYY/MM/DD	unitless
Trial	Data was collected during trial 1 or 2	unitless
Sp_ID	Tag number from 1 - 120 use to identify sponges	unitless
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

Sp_depth	Depth at base of the sponge in feet	feet
sp_depth_m	Depth at base of the sponge in meters	meters
Start_size	The standard length of each settler seeded onto sponge at the start of the persistence experiment	millimeters
End_size	The standard length of each seeded settler that persisted to the end of the experiment	millimeters
Start	Starting time of interval	days
Stop	Ending time of interval	days
Event_time	Indicates weather and event (i.e. settler disappearance) occurred (1) or did not occur (0) during the interval between observations.	unitless
Time	Time (days post seeding) that settlers experience an event (disappearance) or are censored	days
Event	Indicates whether an event (i.e. settler disappearance) occurred (1) or did not occur (0) at any time during the trial.	unitless
Seed_pres	Seeded settler presence (1) or absence (0)	unitless
Res_pres	Residents presence (1) or absence (0)	unitless
Lag_res_pres	Resident presence (1) or absence (0) during previous interval	unitless
Res_n	Number of residents observed on each sponge	count
Lag_res_n	Number of residents during the previous interval	count
New_set_pres	New settler presence (1) or absence (0) on a tagged sponge (i.e. individuals <10mm with minimal pigmentation that settled to the sponge from the water column)	unitless
New_set_n	Number of new settlers observed on a tagged sponge	count

Ps_pres	Post-settler presence (1) or absence (0) on a tagged sponge (i.e. E. lori individuals greater than or equal to 10mm but less than or equal to 18mm standard length that moved to the sponge from elsewhere on the reef)	unitless
Ps_n	Number of post-settlers observed on a tagged sponge	count

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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.

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Funding

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

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