Marine bryozoan aggregation experiments in shallow seagrass habitats in St. Teresa, Florida, USA in May 2017

Website: https://www.bco-dmo.org/dataset/893115
Data Type: Other Field Results
Version: 1
Version Date: 2023-04-04

Project
» Consequences of kin structure in benthic marine systems (Marine kin structure)

Contributors	Affiliation	Role
Burgess, Scott	Florida State University (FSU)	Principal Investigator, Contact
Bueno, Marília M.	Florida State University (FSU)	Scientist
Powell, Jackson	Florida State University (FSU)	Student
Heyl, Taylor	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
This dataset is part of an integrated series of experiments to study how dispersal affects the density and relatedness of neighbors, and how the density and relatedness of neighbors in turn affect fitness. Spatial aggregation at settlement in a marine bryozoan was empirically estimated in shallow (less than 2 meters) seagrass habitats near the Florida State University Coastal and Marine Laboratory (FSUCML) in St. Teresa, Florida, USA (29 540 N; 84 300 W). Larvae neither actively preferred nor avoided conspecific settlement.

Table of Contents

- Coverage
- Dataset Description
  - Methods & Sampling
  - Data Processing Description
- Data Files
- Related Publications
- Related Datasets
- Parameters
- Project Information
- Funding

Coverage

Spatial Extent: **Lat**:29.9 **Lon**:-84.5
Temporal Extent: 2017-05-08 - 2017-05-25

Methods & Sampling

This dataset is part of an integrated series of experiments to study how dispersal affects the density and relatedness of neighbors in relation to fitness in a marine bryozoan. Spatial aggregation at settlement in the field was empirically estimated in shallow seagrass habitats near the Florida State University Coastal and Marine Laboratory (FSUCML) in St. Teresa, Florida, USA (29° 54' N, 84° 30' W). Six backing panels were suspended 1 meter below the surface of the floating boat dock at the FSUCML. Panels were separated by approximately 1 meter. On each panel, a roughened acetate sheet was attached on the underside (facing downwards). Each acetate sheet had a 15 x 15 centimeter square marked in the center of it (referred to as the settlement plate) and the number and spatial location of settlers within the square were recorded. Six settlement plates were deployed on six occasions, and four settlement plates were deployed on one occasion, between 8th May to 25th May 2017 (a total of 40 settlement plates. On each deployment, plates were in the water for three days. Upon retrieval, settlement plates were photographed in the laboratory in planar view with a ruler for scale. On two deployments, settlers on four settlement plates were also marked by drawing a circle around the settler

and then re-deployed back into the water for another three days. After the additional three days, these settlement plates were photographed again and the location of new settlers was recorded.

Data Processing Description

BCO-DMO Processing Description:
- Adjusted field/parameter names to comply with BCO-DMO naming conventions
- Converted date columns to format (YYYY-MM-DD)

[table of contents | back to top]

Data Files

File	
aggregation_in_the_field.csv	(Comma Separated Values (.csv), 72.88 KB) MD5:f82f57048624177a13afdd445deee4ab
Primary data file for dataset 893115, Version 1.	

[table of contents | back to top]

Related Publications

Burgess, S. C., Powell, J., & Bueno, M. (2022). Dispersal, kin aggregation, and the fitness consequences of not spreading sibling larvae. Ecology, 104(1). Portico. https://doi.org/10.1002/ecy.3858
Results

[table of contents | back to top]

Related Datasets

IsRelatedTo

Burgess, S., Powell, J., Bueno, M. M. (2023) **Aggregation kin versus nonkin experiments in marine bryozoans from shallow seagrass habitats in St. Teresa, Florida, USA in June 2017.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-04-04 doi:10.26008/1912/bco-dmo.893150.1 [view at BCO-DMO]

Burgess, S., Powell, J., Bueno, M. M. (2023) **Dispersal distance in a marine bryozoan in shallow seagrass habitats in St. Teresa, Florida, USA, between October and December 2017.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-04-03 doi:10.26008/1912/bco-dmo.893092.1 [view at BCO-DMO]

Burgess, S., Powell, J., Bueno, M. M. (2023) **Microsatellite genotypes of marine bryozoan from shallow seagrass habitats in St. Teresa, Florida, USA in June 2017.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-04-05 doi:10.26008/1912/bco-dmo.893165.1 [view at BCO-DMO]

Burgess, S., Powell, J., Bueno, M. M. (2023) **Postsettlement performance in kin groups from shallow seagrass habitats in St. Teresa, Florida, USA in November and December 2017.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-04-04 doi:10.26008/1912/bco-dmo.893158.1 [view at BCO-DMO]

[table of contents | back to top]

Parameters

Parameter	Description	Units
D_Date	Date on which settlement plates were deployed	unitless
R_Date	Date on which settlement plates were retrieved	unitless
D_Group	Sequential number for each deployment group	unitless
Plate_ID	Unique identifier for each settlement plate	unitless
Deployment	1 = settlement plates deployed for 3 days; 2 = settlement plates placed back into the water after 3 days and collected again after another 3 days (capturing larvae that settled between day 4 and 6)	unitless
Point	Unique identifier for each settler	unitless
Raw_X	The distance from the left side of the image	millimeters (mm)
Raw_Y	The distance from the bottom side of the image	millimeters (mm)
True_X	The distance from the left side of the focal settlement area	millimeters (mm)
True_Y	The distance from the bottom side of the focal settlement area	millimeters (mm)

[table of contents | back to top]

Project Information

Consequences of kin structure in benthic marine systems (Marine kin structure)

Coverage: Gulf of Mexico

NSF Award Abstract:
In marine systems, the production, dispersal, and recruitment of larvae are crucial processes that rebuild depleted adult stocks, facilitate changes in species geographic ranges, and modify the potential for adaptation under environmental stress. Traditionally, the tiny larvae of bottom-associated adults were thought to disperse far from their parents and from each other, making interactions among kin improbable. However, emerging evidence is challenging this view: larval dispersal does not always disrupt kin associations at settlement, and a large fraction of invertebrate diversity on the seafloor contains species in which most larvae disperse short distances. Limited dispersal increases the potential for interactions among kin, which has important consequences for individual fitness across many generations, and therefore the productivity of populations and the potential for adaptation. But when these consequences occur, and how exactly they manifest, remains largely unexplained. The key challenge now is to explain and predict when kin associations are likely to occur, and when they are likely to have positive or negative ecological consequences. Therefore, the key questions addressed by this research are: 1) how and when do kin associations arise and persist, and 2) what are the

consequences of living with kin for survival, growth, and reproduction. This concept-driven research combines genomic approaches with experimental approaches in lab and field settings using an experimentally-tractable and representative invertebrate species. The project trains and mentors PhD students and a postdoctoral scholar at Florida State University (FSU). Field and laboratory activities are developed and incorporated into K–12 education programs and outreach opportunities at FSU.

The spatial proximity of relatives has fundamentally important consequences at multiple levels of biological organization. These consequences are likely to be particularly important in a large range of benthic marine systems, where competition, facilitation, and mating depend strongly on the proximity and number of neighbors. However, explaining and predicting the occurrence, magnitude, and direction of such effects remains challenging. Emerging evidence suggest that the ecological consequences of kin structure are unlikely to have a straight-forward relationship with dispersal potential. Therefore, it is crucial to discover new reasons for when kinship structure occurs and why it could have positive, negative, or neutral ecological consequences. This research aims to provide a new understanding of how dispersal and post-settlement processes generate spatial kin structure, how population density and relatedness influence post-settlement fitness, and how the relatedness of mating partners influences the number and fitness of their offspring (inbreeding and outbreeding). The research combines genomic approaches, experimental progeny arrays, and manipulative experiments in field and lab settings to test several hypotheses that are broadly applicable across species. By focusing on an experimentally tractable species to test broadly applicable hypotheses, the project achieves generality and a level of integration that has been difficult to achieve in previous work.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1948788

[table of contents | back to top]