Southern California sites surveyed for Ficopomatus enigmaticus in Orange and Los Angeles Counties, California, USA, from August to October 2015

Website: https://www.bco-dmo.org/dataset/682794
Data Type: Other Field Results
Version: 1
Version Date: 2017-02-22

Project
» Feeding by the ciliated larvae of marine invertebrates: effects of diverse particle capture mechanisms on feeding performance (Ciliated Larvae Feeding)

Contributors	Affiliation	Role
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Abstract
Southern California sites surveyed for Ficopomatus enigmaticus in Orange and Los Angeles Counties, California, USA, from August to October 2015.

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Coverage

Spatial Extent: **N**:33.9666 **E**:-117.9044 **S**:33.616 **W**:-118.4535

Temporal Extent: 2015-08-30 - 2015-10-02

Dataset Description

Sites surveyed for invasive annelid Ficopomatus enigmaticus in southern California in summer and fall of 2015, along with water temperature and salinity at those sites, and substrate characterization.

Acquisition Description

See complete methodolgy in:
Pernet, B., et al. 2016. Establishment of the reef-forming tubeworm Ficopomatus enigmaticus (Fauvel, 1923) (Annelida: Serpulidae) in southern California. BioInvasions Records, Volume 5, Issue 1: 13–19. doi:10.3391/bir.2016.5.1.03.

In brief (extracted from above):
54 intertidal sites were surveyed in Los Angeles and Orange Counties from August-October 2015.All sites were relatively wave-protected, and all had hard substrate that seemed likely to be suitable for colonization by Ficopomatus enigmaticus. Surveys were carried out at or near the time of predicted low tide. At each site, we characterized substrate type, measured water temperature (with an alcohol or digital thermometer) and salinity (with a calibrated refractometer), and searched the area for ~5 min for the presence of serpulids. The tubes of F. enigmaticus are very distinctive and were easily identifiable in the field. We characterized populations of F. enigmaticus at each site as "sparse" when primarily isolated individuals were identified, and "abundant" when worms were found in large aggregations. Samples of F. enigmaticus were collected from some sites and either fixed in 5% formalin in seawater and then preserved in 70% ethanol, or preserved directly in 95% ethanol. All samples were deposited in the polychaete collection of the Natural History Museum of Los Angeles County.

Processing Description

BCO-DMO Processing:
- modified parameter names to conform with BCO-DMO naming conventions;
- converted date format to yyyy-mm-dd ;
- replaced "--" with "nd";
- replaced commas with semi-colons.

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Related Publications

Pernet, B., Barton, M., Fitzhugh, K., Harris, L., Lizárraga, D., Ohl, R., & Whitcraft, C. (2016). Establishment of the reef-forming tubeworm Ficopomatus enigmaticus (Fauvel, 1923) (Annelida: Serpulidae) in southern California. BioInvasions Records, 5(1), 13–19. doi:10.3391/bir.2016.5.1.03

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Parameters

Parameter	Description	Units
site	Site number	unitless
site_name	Site name	unitless
lat	Latitude of site	decimal degrees
lon	Longitude of site	decimal degrees
date_sampled	Date of sampling formatted as yyyy-mm-dd	unitless
intertidal_substratum	Description of the intertidal substratum	unitless
temp	Water temperature	degrees Celsius
sal	Water salinity	psu
ficopomatus_presence	Presence of Ficopomatus enigmaticus (Y/N)	unitless

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Instruments

Dataset-specific Instrument Name	alcohol or digital thermometer
Generic Instrument Name	Water Temperature Sensor
Dataset-specific Description	At each site, water temperature was measured with an alcohol or digital thermometer.
Generic Instrument Description	General term for an instrument that measures the temperature of the water with which it is in contact (thermometer).

Dataset-specific Instrument Name	refractometer
Generic Instrument Name	Refractometer
Dataset-specific Description	At each site, salinity was measured with a calibrated refractometer.
Generic Instrument Description	A refractometer is a laboratory or field device for the measurement of an index of refraction (refractometry). The index of refraction is calculated from Snell's law and can be calculated from the composition of the material using the Gladstone-Dale relation. In optics the refractive index (or index of refraction) n of a substance (optical medium) is a dimensionless number that describes how light, or any other radiation, propagates through that medium.

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Deployments

Pernet_2015

Website	https://www.bco-dmo.org/deployment/682813
Platform	Intertidal_SoCal
Start Date	2015-08-30
End Date	2015-10-02
Description	Intertidal sites surveyed for invasive annelid Ficopomatus enigmaticus in southern California in 2015.

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Project Information

Feeding by the ciliated larvae of marine invertebrates: effects of diverse particle capture mechanisms on feeding performance (Ciliated Larvae Feeding)

Website: http://www.csulb.edu/colleges/cnsm/depts/biology/invertebrate_reproduction/

Coverage: coastal northeastern Pacific (California, Washington)

Description from NSF award abstract: Many marine invertebrate larvae must feed to fuel development through metamorphosis to the juvenile stage. These feeding larvae capture suspended food particles in diverse ways. Laboratory evidence suggests that different larval feeding mechanisms may affect performance depending on particle types. For example, larvae of echinoderms feed by ciliary reversal, a mechanism that apparently limits clearance rates on small particles (10 um). Because the concentration of suspended food particles can constrain larval growth in natural waters, and because the size distribution of natural particles varies over space and time, maximum clearance rates imposed by a particular feeding mechanism may restrict larval growth rates and development. As a result, the planktonic period of suspension-feeding larvae would be extended and larval mortality (due to predation, or advection from suitable adult habitat) increased, leading to lower recruitment. In this way, performance constraints associated with particular larval feeding mechanisms could strongly affect population dynamics. Such effects are missing from population-dynamic models of benthic invertebrates, largely because they are not well understood. Toward this end, controlled comparisons are needed of the feeding capabilities of ciliated larvae that differ in feeding mechanism. The present study will examine the feeding capabilities of larvae that gather food using one of three particle capture mechanisms (ciliary reversal, opposed band, or a "mixed" strategy of opposed band feeding and encounter feeding on large particles), and for larvae with

distinct body forms (e.g., within opposed band feeding, trochophores vs. veligers). Three main hypotheses will be tested. (1) Larvae that differ in particle capture mechanisms/body form will also differ in either maximum clearance rates, or in the size spectrum of particles cleared at high rates. Laboratory experiments will involve artificial particles, varying only in size. (2) Hypothesized differences in (1) also hold for natural particles. Experiments will test semi-natural prey communities. (3) Larvae with different feeding mechanisms will perform best in specific feeding environments (e.g., those dominated by small particles versus large particles). Larval growth rates will be tested in experimentally manipulated, semi-natural food regimes. Yielding explicit, planned comparisons of larval performance as a function of feeding mechanism, larval body form, and particle type, this research would improve understanding of the importance of larval feeding mechanism in the population dynamics of marine invertebrates. This study is relevant to many compelling questions in reproductive biology, ecology and evolution, such as: how do seasonal changes in the types of particulate food affect the performance of larvae with particular feeding mechanisms; how might such linkages be related to the evolution of seasonal reproductive patterns in various taxa of marine invertebrates; and how might human-mediated shifts in ocean temperature and chemistry (predicted to alter the size spectrum of potential food particles) affect performance of larvae with particular feeding mechanisms?

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1060801

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