Chlorophyll-a and phaeophytin analyzed by fluorometry from samples collected on R/V Challenger in the Long Island Sound in 2007

Website: https://www.bco-dmo.org/dataset/3655
Version: 14 May 2012
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Project
» Testing hypotheses about diversity, gene flow, and effective population size in marine planktonic ciliates (CiliateDivGenePop)

Contributors	Affiliation	Role
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Dataset Description

Chlorophyll-a and phaeophytin data analyzed by fluorometry for samples taken from Long Island Sound in June 2007.

Methods & Sampling

Samples were collected from 6 stations on 01 June 2007 during the LIS0507 cruise. Sampling occurred at stations designed to capture the area where water exiting the Connecticut River forms a shallow plume of low-salinity water. 100 ml samples were collected on glass fiber filters and extracted in acetone (7 ml).

Data Processing Description

Calibration information: linear calibration factor (CF) = 0.0011, acidification coefficient (AF) = 1.97.

BCO-DMO made the following modifications to the dataset: format of parameter names was changed to conform to BCO-DMO conventions; blanks were replaced with 'nd'; removed sample date from the sample ID column; lat and lon values were converted from degrees/decimal minutes to decimal degrees; lon value of sample 267 was changed from 072 49.583 to 072 19.583 (presumed to be a typographical error).

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Data Files

File
chlorophyll_a.csv (Comma Separated Values (.csv), 1.70 KB) MD5:abb5017fdd395ffc70f7f2bda4d49144 Primary data file for dataset ID 3655

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Parameters

Parameter	Description	Units
year	Year the sample was collected, in YYYY format.	dimensionless
month_gmt	Month the sample was collected.	dimensionless
day_gmt	Day the sample was collected, in DD format.	dimensionless
yrday_gmt	Sequential day of the year on which the sample was collected.	dimensionless
sample_tube	ID number of the sample tube. Column originally named 'Tube ID'.	dimensionless
sample	Unique identifier of the sample. Column originally named 'Sample ID'.	dimensionless
vol_filt	Volume of sample filtered, in liters.	Liters
Fo	Fluorescence value before acidification. Units are arbitrary (fluorometer response).	N/A
Fa	Fluorescence value after acidification. Units are arbitrary (fluorometer response).	N/A
chl_a_fluor	Chlorophyll-a measured in micrograms/liter.	ug/L
phaeo	Pheophytin (phaeophytin) measured in micrograms/liter.	ug/L
phaeo_to_chl	Ratio of phaeo to chl_a_fluor multiplied by 100.	N/A
lat	Latitude in decimal degrees where the sample was collected. Values have been converted from degrees and decimal-minutes to decimal degrees.	decimal degrees
lon	Longitude in decimal degrees where the sample was collected. Negative indicates West. Values have been converted from degrees and decimal-minutes to decimal degrees.	decimal degrees

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Instruments

Dataset-specific Instrument Name	Fluorometer
Generic Instrument Name	Fluorometer
Dataset-specific Description	A TD-700 laboratory fluorometer was used. More information on this instrument is available in its datasheet.
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

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Deployments

LIS0507

Website	https://www.bco-dmo.org/deployment/58821
Platform	R/V Challenger
Start Date	2007-06-01
End Date	2007-06-01
Description	Samples were collected at 6 stations in the estuary of Long Island Sound where water exiting the Connecticut River forms a shallow plume of low-salinity water. The cruise occurred on a small boat operated by UConn (known as R/V Challenger).

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Project Information

Testing hypotheses about diversity, gene flow, and effective population size in marine planktonic ciliates (CiliateDivGenePop)

Website: http://microzooplankton.uconn.edu

Coverage: Coastal Northwest Atlantic, from Long Island Sound to Maine

The microbial ecologist Tom Fenchel recently said, “The decoupling of molecular and classical (including experimental) approaches to environmental microbiology has not been fruitful and it represents one of the most important challenges for the field in the coming years.” (Fenchel 2005). Classical approaches center on the centuries-old tradition of describing individual species via meticulous observation and analysis to generate monographs, such as is done for plants and animals. Unfortunately, the rush to new molecular techniques has sometimes ignored this tradition, with claims about new lineages never seen before and reports of staggering diversity of microbial eukaryotes based on environmental DNA samples not backed up by even the most elementary microscopic observations.

In the face of this disconnect between the traditional and the molecular, we propose a marriage of the two approaches in the study of marine ciliate diversity and gene flow. Our own data show that in some clades of planktonic ciliates (Strombidiidae) there is indeed a high level of molecular diversity underlying a relatively small

number of morphospecies. In other clades (some choreotrichs), the opposite appears to be true, with morphological heterogeneity underlain by apparently clonal lines, based on molecular data. Currently, we do not understand what sustains diversity in some clades; nor do we know why other clades show low diversity. But this problem is amenable to both experimental and observational approaches.

This proposal uses a two-pronged approach, combining molecular (clone libraries, DGGE,FISH) and traditional (light microscopy) techniques to address three broad questions:
i. What are the most important physical and biological factors that affect distribution and diversity of planktonic marine ciliates?
ii. What is the effective population size for marine ciliate populations, and how does this compare to census population sizes?
iii. How well do traditional morphological descriptions of ciliate species fare when compared with molecular characterizations?

Using a combination of molecular and microscopy methods, we will address these questions in coastal planktonic ciliates. Analyses of the resulting data will yield insights into the nature of ciliate species and patterns of gene flow within the North Atlantic.

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Funding

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