Field conditions during grazing experiments in Kaneohe Bay, HI during 2012-2013 (EAGER: Copepod nauplii project)

Website: https://www.bco-dmo.org/dataset/637695
Data Type: Other Field Results
Version: 1
Version Date: 2016-02-02

Project
» New molecular methods for studying copepod nauplii in the field (EAGER: Copepod nauplii)

Contributors	Affiliation	Role
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Abstract
Environmental conditions in the field during each paired naupliar grazing and community grazing dilution experiment. Copepod nauplii can be a dominant component of the microzooplankton, and are present year-round in subtropical ecosystems. However, little is known about species-level differences in grazing rates and trophic impacts across the naupliar assemblage. Our goals were to measure ingestion by two species of mid-stage (N3-N4) copepod nauplii in a subtropical embayment, evaluate species' differences in prey preferences, and estimate the trophic impact of naupliar grazing by each species.

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Coverage

Spatial Extent: **Lat**:21.4322 **Lon**:-157.7797
Temporal Extent: 2013-05-27 - 2013-06-05

Acquisition Description

Five combined bottle incubation and seawater dilution experiments were performed over a two-week period where the in-situ 2-35 µm total cell biomass ranged from 37 – 158 µg C L-1. Both Parvocalanus crassirostris and Bestiolina similis grazed a range of prey types and sizes, and shifted their selectivity of prey groups over the two-week period. In general, P. crassirostris grazed on a wider spectrum of prey than B. similis, which avoided the smallest potential prey (2-5 µm) across all dates. Both species had similar

overall grazing rates as well as high daily carbon rations (at times >100%), and selected for the largest cells when they were more abundant. The trophic impact of each species was driven largely by in situ nauplius abundance, which was higher for P. crassirostris, from 0.8 to 8.9 nauplii L-1, than for B. similis, which ranged from 0.2 to 0.8 nauplii L-1. Our results suggest that the two species overlap in their potential prey, however, P. crassirostris appears to target a wider variety of prey, with B. similis preferring larger cells.

Processing Description

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date, reference information
- renamed parameters to BCO-DMO standard
- reformatted date from d-Mon-yy to yyyy-mm-dd
- transformed table rows and columns
- added lat/lon columns

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Related Publications

Jungbluth, M. J., Selph, K. E., Lenz, P. H., & Goetze, E. (2017). Incubation duration effects on copepod naupliar grazing estimates. Journal of Experimental Marine Biology and Ecology, 494, 54–62. doi:10.1016/j.jembe.2017.05.005
Results

Jungbluth, M., Selph, K., Lenz, P., & Goetze, E. (2017). Species-specific grazing and significant trophic impacts by two species of copepod nauplii, Parvocalanus crassirostris and Bestiolina similis. Marine Ecology Progress Series, 572, 57–76. doi:10.3354/meps12139
Results

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Related Datasets

IsSupplementTo

Goetze, E., Lenz, P., Selph, K. E. (2021) **Flow cytometry results for naupliar grazing laboratory experiments conducted from 2012-2013 (EAGER: Copepod nauplii project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2016-02-04 doi:10.26008/1912/bco-dmo.637720.1 [view at BCO-DMO]

Goetze, E., Lenz, P., Selph, K. E. (2021) **Metadata for field dilution experiments to measure community microzooplankton grazing rates in Kaneohe Bay, HI from 2012-2013 (EAGER: Copepod nauplii project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2016-02-04 doi:10.26008/1912/bco-dmo.637670.1 [view at BCO-DMO]

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Parameters

Parameter	Description	Units
date_local	local date	yyyy-mm-dd
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
irradiance	solar irradiance as measured at HIMB	uE/sec/m^2
wind_spd	wind speed	knots
wind_dir	wind direction: N=north; S=south; E=east; W=west	unitless
sal	salinity at 2 meters depth	PSU
temp	water temperature	degees Celsius
chl_a	chlorophyll	micrograms/liter
chl_std_err	chlorophyll standard error	micrograms/liter

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Photosynthetically Available Radiation Sensor
Generic Instrument Description	A PAR sensor measures photosynthetically available (or active) radiation. The sensor measures photon flux density (photons per second per square meter) within the visible wavelength range (typically 400 to 700 nanometers). PAR gives an indication of the total energy available to plants for photosynthesis. This instrument name is used when specific type, make and model are not known.

Dataset-specific Instrument Name	
Generic Instrument Name	Anemometer
Generic Instrument Description	An anemometer is a device for measuring the velocity or the pressure of the wind. It is commonly used to measure wind speed. Aboard research vessels, it is often mounted with other meteorological instruments and sensors.

Dataset-specific Instrument Name	
Generic Instrument Name	Fluorometer
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.

Dataset-specific Instrument Name	
Generic Instrument Name	Water Temperature Sensor
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	
Generic Instrument Name	Flow Cytometer
Generic Instrument Description	Flow cytometers (FC or FCM) are automated instruments that quantitate properties of single cells, one cell at a time. They can measure cell size, cell granularity, the amounts of cell components such as total DNA, newly synthesized DNA, gene expression as the amount messenger RNA for a particular gene, amounts of specific surface receptors, amounts of intracellular proteins, or transient signalling events in living cells. (from: http://www.bio.umass.edu/micro/immunology/facs542/facswhat.htm)

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Deployments

Goetze_2012-2013

Website	https://www.bco-dmo.org/deployment/637678
Platform	lab UHawaii_SOEST
Start Date	2012-03-16
End Date	2013-06-05
Description	microzooplankton studies

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Project Information

New molecular methods for studying copepod nauplii in the field (EAGER: Copepod nauplii)

Coverage: Kaneohe Bay, Oahu, Hawaii

Description from NSF Award Abstract:
The most abundant metazoans in the open sea are often the earliest developmental stages of copepods, their nauplii. Nauplii remain under-studied due to the limitations of conventional techniques and an historical emphasis on studying the larger mesozooplankton. However, there is increasing recognition that nauplii play important roles in food web dynamics, and considerable evidence that nauplii may be important trophic intermediaries between microbial and classical food webs due to their high abundance, high weight-specific ingestion rates, and ability to feed on relatively small particles. This team of investigators is developing a novel molecular approach to studying diverse populations of nauplii in mixed field samples based on quantitative Polymerase Chain Reaction (qPCR). They propose to complete development and validation of this qPCR-based technique for enumeration of nauplii, and evaluate its utility in the field. The specific objectives of this research are to identify and reduce technical and biological sources of error in the methodology, determine the accuracy of the method across a range of environmental conditions, and complete one paired field experiment that compares the grazing impact of naupliar and protozoan micro-grazers in a model subtropical coastal ecosystem.

Note: This project is funded by an NSF EAGER award.

Related publications:
Jungbluth, M.J., Goetze, E., and Lenz, P.H. 2013. Measuring copepod naupliar abundance in a subtropical bay using quantitative PCR. Marine Biology, 160: 3125-3141. doi: 10.1007/s00227-013-2300-y

Jungbluth, M.J., and Lenz, P.H. 2013. Copepod diversity in a subtropical bay based on a fragment of the mitochondrial COI gene. Journal of Plankton Research, 35(3): 630-643. doi: 10.1093/plankt/fbt015

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1255697

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