Attack rates and handling time of prey based on prey density at Moorea, French Polynesia on May 2008 (CDD_in_Reef_Fish project)

Website: https://www.bco-dmo.org/dataset/726813
Data Type: experimental
Version: 1
Version Date: 2017-10-05

Project
» Cryptic density dependence: the effects of spatial, ontogenetic, and individual variation in reef fish
(CDD_in_Reef_Fish)

Contributors	Affiliation	Role
Geange, Shane	Victoria University of Wellington	Principal Investigator, Contact
Shima, Jeffrey	Victoria University of Wellington	Co-Principal Investigator
Stier, Adrian	University of California-Santa Barbara (UCSB)	Co-Principal Investigator
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Abstract
This dataset is part of a manipulative experiment to investigate how nudibranchs and sea hares alter cyanobaterica production through a trophic cascade. This research was conducted in 2008 at the Gump Biological Research Station, Moorea, French Polynesia.

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Coverage

Spatial Extent: **Lat**:-17.5 **Lon**:-149.8333333
Temporal Extent: 2008-05-08

Dataset Description

This dataset is part of a manipulative experiment to investigate how nudibranchs and sea hares alter cyanobaterica production through a trophic cascade. This particular dataset looks into attack rates and handling time of prey based on prey density. This research was conducted in 2008 at the Gump Biological Research Station, Moorea, French Polynesia. For additional data, please see files listed in Related Datasets.

Related Dataset

- Geange_and_Stier_2010 Charismatic Microfauna Functional Response: https://www.bco-dmo.org/dataset/726813 (current page)
- Geange_and_Stier_2010 Charismatic Microfauna Sea Hare Size: https://www.bco-dmo.org/dataset/726832
- Geange_and_Stier_2010 Charismatic Microfauna Trophic Cascade: https://www.bco-dmo.org/dataset/726851

Methods & Sampling

All experiments were conducted in plastic containers (190 mm x 190 mm x 90 mm; W x L x H). To allow the exchange of fresh seawater, approx. 80% of the surface area of the lids, and two opposing sides of containers were cut away and covered with 0.5 mm mesh screening. Containers were placed within large (2,670 l) outdoor flow-through seawater tanks (10 containers per tank). In each experiment, sea hares (*Stylocheilus striatus*), nudibranchs (*Gymnodoris ceylonica*), and cyanobacteria (*Lyngbya* spp.) were collected from the field. Prior to experiments, nudibranchs were starved for 3 days, and cyanobacteria were rinsed with filtered seawater, which removed associated flora or fauna.

Nine density treatments (1, 2, 3, 4, 5, 6, 7, 8 or 9 sea hares: mean length 20.0 mm ± 3.8 SD) were randomly assigned to 18 containers (n = 2 per treatment), each containing one adult nudibranch (mean length 36.2 mm ± 5.6 SD). The number of sea hares eaten was recorded after 1 day (24 h).

Data Processing Description

Although this dataset does not contain any processed/analyzed data, this data was used to calculate both attack rates and handling time as follows. Attack rates and handling time were estimated using a Holling Type II functional response. Because prey organisms were not replaced as they were consumed, attack rate and handling time were estimated using Roger's 'random predator equation.'

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- date converted from dd-Mon-yy (eg, 8-May-08) to yyyymmdd (eg. 20080508)

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Data Files

File
GeangeandStier_2010_Charismaticmicrofauna_FunctionalResponse.csv (Comma Separated Values (.csv), 603 bytes) MD5:4699db9f15ae148a5123e4affe4e3af5 Primary data file for dataset ID 726813

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Related Publications

Geange, S. W., & Stier, A. C. (2010). Charismatic microfauna alter cyanobacterial production through a trophic cascade. Coral Reefs, 29(2), 393–397. doi:10.1007/s00338-010-0606-5
General

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Parameters

Parameter	Description	Units
Date	Date of Experiment (yyyymmdd)	unitless
OBS	Name of observers (SWG (Shane Geange) ACS (Adrian Stier)	unitless
rep	Experimental run (1 or 2)	unitless
bin	Unique container ID	unitless
initial_num	Initial number of sea hares at the start of the experiment in each container	unitless
number_eaten	Number of sea hares eaten during the experiment	unitless
Notes	Additional notes	unitless

Deployments

Osenberg_et_al_Moorea

Website	https://www.bco-dmo.org/deployment/644752
Platform	Osenberg et al Moorea
Start Date	2003-05-19
End Date	2015-07-12

Project Information

Cryptic density dependence: the effects of spatial, ontogenetic, and individual variation in reef fish (CDD_in_Reef_Fish)

Coverage: Moorea, French Polynesia (-17.48, -149.82)

Description from NSF award abstract:
Ecologists have long been interested in the factors that drive spatial and temporal variability in population density and structure. In marine reef systems, attention has focused on the role of settlement-the transition of pelagic larvae to a benthic stage-and on density-dependent processes affecting recently settled juveniles. Recent data suggest that co-variance in settlement and subsequent density-dependent survival can obscure the patterns of density dependence at larger scales, a phenomenon called cryptic density dependence. This research will explore the mechanisms that underlie the spatial covariance of settlement and site quality - a process that has received little attention in the standard paradigm. These mechanistic studies of cryptic density dependence will facilitate the development of new frameworks for fish population dynamics that incorporate larval ecology, habitat quality, density dependence, life history, and the patterns and implications of spatial covariance among these factors. More generally, the work provides a specific empirical context, and a general theoretical treatment, of cryptic heterogeneity (hidden individual variation in demographic rates).

Note: Drs. Craig W. Osenberg and Ben Bolker were at the University of Florida at the time the NSF award was granted. Dr. Osenberg moved to the University of Georgia during the summer of 2014 (current contact information). Dr. Bolker moved to McMaster University in 2010 (current contact information).

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0242312