Annotations of video taken under dissecting microscope of Obelia feeding on a natural prey assemblages (Jellyfish predation in turbulence project)

Website: https://www.bco-dmo.org/dataset/651274
Data Type: experimental
Version:
Version Date: 2016-07-06

Project
» Influence of organism-scale turbulence on the predatory impacts of a suite of cnidarian medusae (jellyfish predation in turbulence)

Contributors	Affiliation	Role
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Table of Contents

- Dataset Description
  - Methods & Sampling
  - Data Processing Description
- Data Files
- Parameters
- Instruments
- Deployments
- Project Information
- Funding

Methods & Sampling

Feeding behavior sequences (2- 10 min) with a mixed prey assemblage were recorded at 30 or 60 Hz under a dissecting microscope with a Sony HD camcorder (1920 x 1080 pixels) to analyze individual prey encounters and captures.

For each prey encounter, the diameter of the Obelia (with and without tentacles), the length of the prey (longest dimension), the location of prey encounter (tentacle tip, center or base), timing of encounter during pulse cycle (contraction, relaxation, still) and the prey transfer time (time to transfer prey from the tentacle to the manubrium) were measured using ImageJ (NIH).

Data Processing Description

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- renamed parameters to BCO-DMO and BODC standards
- spelled out encounter locations rather than using code letters
- reduced digits to right of decimal to reflect sampling precision

[table of contents | back to top]

Data Files

File
obelia_feeding.csv (Comma Separated Values (.csv), 1.24 KB) MD5:2a75163f487a6209852ef05c4e98ec87 Primary data file for dataset ID 651274

[table of contents | back to top]

Parameters

Parameter	Description	Units
filename_avi	video filename	unitless
frame_encount	frame number of encounter	unitless
frame_transfer_start	frame number at start of prey transfer	unitless
frame_transfer_end	frame number at end of prey transfer	unitless
time_totl	total time from prey encounter to end of transfer	seconds
time_encount_transfer	time from encounter to start of prey transfer	seconds
time_transfer_totl	time from start to end of prey transfer	seconds
time_pulse_encount	time during pulse cycle of encounter: Beginning of pulse; Recovery phase; Relaxation phase	unitless
location_encount	encounter location on tentacle	unitless
prey_type	prey type	unitless
size_obelia	Obelia size	mm
size_prey	prey size	mm

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Camera
Dataset-specific Description	Sony HDR-HC9 camcorder (1920 x 1080 pixels, 30 frames s-1; Sony Electronics Inc., Fort Myers, FL, USA) with a 16 x 9 cm field-of view.
Generic Instrument Description	All types of photographic equipment including stills, video, film and digital systems.

Dataset-specific Instrument Name	
Generic Instrument Name	Microscope - Optical
Dataset-specific Description	Dissecting microscope
Generic Instrument Description	Instruments that generate enlarged images of samples using the phenomena of reflection and absorption of visible light. Includes conventional and inverted instruments. Also called a "light microscope".

[table of contents | back to top]

Deployments

FHL_Sutherland

Website	https://www.bco-dmo.org/deployment/649916
Platform	Friday_Harbor
Start Date	2012-06-01
End Date	2016-06-30

[table of contents | back to top]

Project Information

Influence of organism-scale turbulence on the predatory impacts of a suite of cnidarian medusae (jellyfish predation in turbulence)

Coverage: Friday Harbor Labs, WA

Bloom-forming jellyfish are increasing in number, frequency and magnitude, in part due to anthropogenic impacts, underscoring a need for enhanced understanding of trophic exchanges in jellyfish-dominated ecosystems. Interactions between jellyfish and their prey are driven by morphology, behavior, and unique fluid signatures that result in species-specific prey selection patterns. Fluid signatures generated by predators entrain prey, and motile prey organisms have evolved to sense and respond to these stereotyped fluid signatures. The shape and coherence of these unique fluid signatures are strongly mediated by turbulence, which is ubiquitous in the ocean. Yet, the effects of turbulence are almost always neglected in feeding studies. This three-year project will investigate the influence of turbulence on predator-prey interactions using a suite of cnidarian hydromedusae with unique morphologies, fluid signatures and prey selection patterns collected in the region of Friday Harbor Laboratory, WA.

This project seeks to establish a detailed, mechanistic understanding of the effects of turbulence on organism-scale predator-prey interactions using gelatinous zooplankton predators with contrasting predation modes. The PI will investigate prey selection under varying levels of turbulence by studying swimming behavior, wake structure, and predator-prey interactions in a laboratory turbulence generator designed for fragile plankton. The PI will also make in situ measurements of turbulence and observations of organism behavior using a Self-contained Underwater Velocimetry Apparatus (SCUVA). This is a fully submersible instrument for flow visualization, and its use will provide a cross-calibration of field and laboratory rates and behaviors. The influence of turbulence on trophic position among the different species of hydromedusae will be quantified through field studies of prey selection patterns. The proposed comparative approach using species with

distinct predation modes will provide insights applicable to other planktonic predators that can be similarly grouped.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1155084

[table of contents | back to top]