Raw capture efficiency data of scyphomedusae from video analysis collected in Woods Hole, MA beginning in 2015.

Website: https://www.bco-dmo.org/dataset/683750
Data Type: Other Field Results
Version: 1
Version Date: 2017-03-01

Project
» RUI: Collaborative Research: What's their impact?: Quantification of medusan feeding mechanics as a tool for predicting medusan predation (Medusan Feeding Mechanics)

Contributors	Affiliation	Role
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Abstract
Raw capture efficiency data of scyphomedusae from video analysis collected in Woods Hole, MA beginning in 2015.

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Coverage

Temporal Extent: 2015 - 2015

Dataset Description

Raw capture efficiency data of scyphomedusae from video analysis.

Methods & Sampling

Medusae were video recorded with different prey assemblages. Video was analyzed by identifying encounters (defined as prey entering encounter zone occupied by tentacles) and recording the outcome of each encounter.

Data Processing Description

BCO-DMO Data Processing Notes:

-Combined multiple tables of data into one.
-"Cnidaria_species" column was added.

-"retention efficiency" and "size" columns were removed because they contained no data.
-"nd" added to blank cells.

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Data Files

File
medusae_interactions.csv (Comma Separated Values (.csv), 157.36 KB) MD5:d6bd1363ebec50aa03e79e96b59bac4e Primary data file for dataset ID 683750

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Parameters

Parameter	Description	Units
Cnidaria_species	Species of Cnidaria analyzed on video	unitless
individual	Individual ID number	unitless
food_type	Type of prey that was observed	unitless
video_id	Video ID number	unitless
time	Time interaction occurs in video; HH:MM:SS	unitless
evaded	Encounters that show the prey item evaded contact through the feeding current produced by the medusae; Each X represents a tally mark and should be counted as a single occurance of this behavior.	count
ingested	Encounters that resulted in being injested by the medusae (moved to the gastric pouches); Each X represents a tally mark and should be counted as a single occurance of this behavior.	count
tentacle_capture	Encounters that resulted in the capture of individuals on the tentacles; Each X represents a tally mark and should be counted as a single occurance of this behavior.	count
oralArm_capture	Encounters that resulted in the capture of individuals on the oral arms; Each X represents a tally mark and should be counted as a single occurance of this behavior.	count
capture_evade	Encounters that resulted in an initial capture of the individual prey items escaping by breaking contact with the medusae; Each X represents a tally mark and should be counted as a single occurance of this behavior.	count
notes	Observation notes	unitless
encounter_effeciency	All individuals that have some sort of interaction with the medusae weither through direct contact or through the feeding current.	unitless
capture_effeciency	Prey individuals making contact with the medusae within the tentacles and the oral arms and being captured by the medusae.	unitless

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Instruments

Dataset-specific Instrument Name	Camera
Generic Instrument Name	Camera
Dataset-specific Description	Medusae were recorded on video and this was analyzed to produce the data
Generic Instrument Description	All types of photographic equipment including stills, video, film and digital systems.

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Deployments

Colin_2015

Website	https://www.bco-dmo.org/deployment/683758
Platform	shoreside Massachusetts
Start Date	2015-08-01
End Date	2018-07-01

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Project Information

RUI: Collaborative Research: What's their impact?: Quantification of medusan feeding mechanics as a tool for predicting medusan predation (Medusan Feeding Mechanics)

Coverage: Woods Hole, MA

In many areas around the world jellyfish population abundances are increasing and, at times, result in destructive blooms. Their rapid growth and high feeding rates make them important predators in marine ecosystems and their effects on ecosystems and human activities have increasingly raised concerns. Unfortunately, scientists do not currently understand the factors that determine which types of prey jellyfish eat and how much prey they eat. This presents a knowledge gap of increasing importance as jellyfish undergo inexplicable population fluctuations and invade new environments. In this project the investigators will develop a robust understanding of the factors that determine who and how much jellyfish consume based on their morphology, behavior and size. This fundamental understanding of their feeding process will enable researchers to use simple jellyfish characteristics to predict the ecological impact of different types of jellyfish. This project will include the studying of a greatly understudied group, rhizostome jellyfish, which represents many of the recorded bloom events and geographic expansions. Further, these techniques are sufficiently robust to have broader use in the study of physical-biological interactions for other jellyfish species and other pelagic organisms. The principal investigators participating in this collaboration are from primarily undergraduate institutions. Student participation in the project will involve several undergraduates during each year of the award. Through summer research at the Marine Biology Laboratory, undergraduate students will become exposed to a wide range of research and become immersed in a post-graduate environment that can strongly influence their perception of the scientific profession. The trophic impacts of scyphomedusae are subjects of broad international interest and results of our research will be exchanged with a wide range of colleagues, contributing to international scientific dialogue. In addition, we will use our contacts with media (e.g. PBS Shape of Life series, Fantastic Jellies exhibit at the New England Aquarium) involved in scientific education of the general public to communicate our new findings.

The goal of this project is to quantify the variables that control the post-encounter capture process in order to be able to predict the prey selection patterns and clearance rate potential of different rowing medusae based upon their morphological characteristics and size. To achieve this goal, the PIs will use laboratory and in situ videography and optics techniques to quantify the outcome of individual interactions with prey in the lab and in

the field. Step-by-step quantification of the post-encounter capture process will enable them to quantify capture efficiencies of different prey types and determine which stages of the process were most influential in determining the outcome of the encounter. The investigators will use these quantitative observations to relate medusan morphology and nematocyst properties to capture efficiencies. This will allow them to predict prey selection patterns. These predictions will be combined with flow-based encounter models to predict clearance rate potential and prey selection of different medusan species under different prey conditions. Finally, the investigators will validate our predictions using laboratory bottle incubation studies to quantify prey selection and clearance rates of medusae fed different prey assemblages. When achieved, this study will provide marine ecologists with the critical "missing links" to be able to model and predict the ecological impact of medusae populations in a variety of environments.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1536688

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