Growth of larval clownfish, Amphiprion ocellaris used in predator-prey experiment (PreyEscape project)

Website: https://www.bco-dmo.org/dataset/686893
Data Type: Other Field Results
Version:
Version Date: 2017-04-04

Project
» The Drive to Survive: Copepods vs Ichthyoplankton (PreyEscape)

Contributors	Affiliation	Role
Lenz, Petra H.	University of Hawaii at Manoa (PBRC)	Principal Investigator
Hartline, Daniel K.	University of Hawaii at Manoa (PBRC)	Co-Principal Investigator
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Table of Contents

Coverage

Spatial Extent: **Lat**:21.3 **Lon**:-157.8197

Dataset Description

This dataset includes the total length and mouth gape size for larval clownfish (*Amphiprion ocellaris*) between 1 and 14 days post-hatch.

Related Reference:
Jackson, J. M. and Lenz, P. H. (2016). Predator-prey interactions in the plankton: larval fish feeding on evasive copepods. Scientific Reports, 6, 33585; doi: 10.1038/srep33585.

Methods & Sampling

All experiments were approved by the University of Hawaii's Institutional Animal Care & Use Committee (IACUC) under protocol #1045. For determination of growth, larval *Amphiprion ocellaris* were euthanized using a solution of 0.06 g/ml Ethyl 3-aminobenzoate methanesulfonate salt (MS222) (Sigma-Aldrich Inc., Saint Louis, MO, USA; catalog no. A5040-25G), preserved in a solution of 5% formalin in seawater, and measured for total length and jaw size within one week of fixation.

Total length, a metric commonly used for clownfish larvae, is the greatest straight-line distance measured between the most anterior and posterior points of the body. Measurements of fish larvae were made using a reticle calibrated with a 2.0 mm microscope micrometer at 12x for total length and 100x for mouth gape (Wild model M5A dissecting microscope). Upper jaw lengths were measured from the anterior-most point of the pre-maxilla to the posterior edge of the maxilla. Lower jaw lengths were measured from anterior-most part of

the mandible to its posterior edge. Mouth gape was determined using Pythagorean theorem, assuming that the jaws represent two sides of a right triangle and the hypotenuse is the expected mouth gape.

Data Processing Description

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions

[table of contents | back to top]

Data Files

File
clownfish_growth.csv (Comma Separated Values (.csv), 816 bytes) MD5:dcd819ead3ed6379c86defe5bd9d0e44 Primary data file for dataset ID 686893

[table of contents | back to top]

Parameters

Parameter	Description	Units
larva_age	larval age post-hatch	days
mouth_gape	size of mouth-gape: Upper jaw lengths were measured from the anterior-most point of the pre-maxilla to the posterior edge of the maxilla. Lower jaw lengths were measured from anterior-most part of the mandible to it posterior edge. Mouth gape was determined using Pythagorean theorem - assuming that the jaws represent two sides of a right triangle and the hypotenuse is the expected mouth gape.	millimeters
length_total	larval fiah length	millimeters

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	Wild model M5A dissecting microscope
Generic Instrument Name	Microscope - Optical
Dataset-specific Description	To measure fish length and mouth jaw length
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

PredatorSuccess_2016

Website	https://www.bco-dmo.org/deployment/687836
Platform	Lenz_lab
Start Date	2016-01-01
End Date	2016-12-31
Description	Larval Clownfish (Amphiprion ocellaris) studies

[table of contents | back to top]

Project Information

The Drive to Survive: Copepods vs Ichthyoplankton (PreyEscape)

Coverage: Pacific

Description from NSF award abstract:
This study will experimentally elucidate the dynamics of predator evasion by different species and life stages of copepod responding to a model larval fish predator. The PIs will use standard and high-speed videographic and cutting-edge holographic techniques. Predator-prey interactions within planktonic communities are key to understanding how energy is transferred within complex marine food webs. Of particular interest are those between the highly numerous copepods and one of their more important predators, the ichthyoplankton (the planktonic larval stages of fishes). The larvae of most fishes are planktivorous and heavily dependent on copepods for food. In general, evasion success increases with age in copepods and decreases with the age of the fish predator. How this plays out in detail is critical in determining predatory attack outcomes and the effect these have on predator and prey survival. To address this problem, different copepod developmental stages will be tested against several levels of predator competence, and the results examined for: 1) the success or failure of attacks for different combinations of predator and prey age class; 2) the kinematics (reaction latencies and trajectory orientation) for escape attempts, successful and unsuccessful, for different age classes of copepod; 3) the hydrodynamic cues generated by different ages and attack strategies of the predator and the sensitivity of different prey stages to these cues; and 4) the success or failure of the predatory approach and attack strategies at each prey stage. The data obtained will be used to inform key issues of zooplankton population dynamics. For the prey these include: predator-evasion capabilities and importance of detection ability, reaction speed, escape speed, escape orientation, and trajectory irregularity; for the predator they are: capabilities and importance of mouth gape size, stealthiness, hydrodynamic disturbance production, and lunge kinematics.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1235549

[table of contents | back to top]