

# Settlement events and survivorship of six bar wrasse cohorts in the lagoons surrounding the island of Moorea, French Polynesia from 1996-1997 (CDD\_in\_Reef\_Fish project)

**Website:** <https://www.bco-dmo.org/dataset/727143>

**Data Type:** Other Field Results

**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
<a href="#">Shima, Jeffrey</a>	Victoria University of Wellington	Principal Investigator, Contact
<a href="#">Osenberg, Craig</a>	University of Georgia (UGA)	Co-Principal Investigator
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## Abstract

Settlement events and survivorship of six bar wrasse cohorts in the lagoons surrounding the island of Moorea, French Polynesia from 1996-1997. Fieldwork was conducted in the lagoons surrounding the island of Moorea, French Polynesia and focused on the six bar wrasse (*Thalassoma hardwicke*). Researchers made 480 observations of settlement events (i.e., pulses of settlement to individual sites) and monitored survivorship of six bar wrasse cohorts formed by these events.

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## Coverage

**Spatial Extent:** Lat:-17.5 Lon:-149.8333333

**Temporal Extent:** 1996-05 - 1997-06

## Dataset Description

Spatio-temporal exploration of covariation among densities, environmental characteristics and strength of density-dependent mortality of reef fish, *Thalassoma hardwicke*.

## Related Datasets:

- Reef Locations: <https://www.bco-dmo.org/dataset/645257>

## Methods & Sampling

Fieldwork was conducted in the lagoons surrounding the island of Moorea, French Polynesia and focused on the six bar wrasse (*Thalassoma hardwicke*). Researchers made 480 observations of settlement events (i.e., pulses of settlement to individual sites) and monitored survivorship of six bar wrasse cohorts formed by these events. These were made during and after three periods of heavy settlement in May 1996, May 1997, and June 1997, using 192 patch reefs. Patch reefs were originally selected in two categories: (1) those with damselfish (*Stegastes nigricans*) territories composed primarily of algal turf ( $n = 96$  reefs, surveyed during all three settlement periods), or (2) those lacking damselfish territories and composed primarily of living coral (*Porites lobata*;  $n = 96$  reefs, surveyed during May and June of 1997 only). Other than this difference, all reefs were selected to be relatively similar in size, rugosity, and distance from nearest neighbors (described in Shima 2001).

Researchers censused reefs daily during periods of heavy settlement, and every third day during other times for densities of (1) settlers (and these cohorts were then followed through time), (2) older conspecifics, (3) heterospecific labrids and scarids, and (4) resident piscivores. Censuses were continued for 90 d following each settlement event. At the end of the study in each year, we recorded the densities and sizes (aerial coverage) of fine-branching corals (*Pocillopora* spp.) on each reef.

## Data Processing Description

### BCO-DMO Processing:

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

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## Data Files

File
<b>ShimaOsenberg_2003.csv</b> (Comma Separated Values (.csv), 19.69 KB) MD5:4edb4dea5d2fc3b71ccd055b674bcdac
Primary data file for dataset ID 727143

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## Related Publications

Shima, J. S. (1999). Variability in relative importance of determinants of reef fish recruitment. *Ecology Letters*, 2(5), 304–310. doi:[10.1046/j.1461-0248.1999.00089.x](https://doi.org/10.1046/j.1461-0248.1999.00089.x)

*Methods*

Shima, J. S. (2001). Regulation of local populations of a coral reef fish via joint effects of density- and number-dependent mortality. *Oecologia*, 126(1), 58–65. doi:[10.1007/s004420000486](https://doi.org/10.1007/s004420000486)

*General*

Shima, J. S. 1999a. An evaluation of the processes that influence variability in abundance of a coral reef fish. Dissertation. University of California-Santa Barbara, California, USA.

*General*

Shima, J. S., & Osenberg, C. W. (2003). CRYPTIC DENSITY DEPENDENCE: EFFECTS OF COVARIATION BETWEEN DENSITY AND SITE QUALITY IN REEF FISH. *Ecology*, 84(1), 46–52. doi:10.1890/0012-9658(2003)084[0046:cddeoc]2.0.co;2 [https://doi.org/10.1890/0012-9658\(2003\)084\[0046:CDDEOC\]2.0.CO;2](https://doi.org/10.1890/0012-9658(2003)084[0046:CDDEOC]2.0.CO;2)

*General*

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## Parameters

Parameter	Description	Units
OBS1	a numeric identifier of 480 observations of settlement; survivorship; and associated environmental data	unitless
REEF	Reef number identifier for 192 reefs in total (96 comprised mostly of <i>Stegasted nigricans</i> and 96 primarily composed of living coral; <i>Porites lobata</i> ).	unitless
SITE	Site identifier (8 anchorages distributed across the north shore of Moorea). Specific site coordinates can be found in the data set Reef Locations at <a href="https://www.bco-dmo.org/dataset/645257">https://www.bco-dmo.org/dataset/645257</a> .	unitless
PULSE	Settlement pulse identifier (i.e. periods of heavy settlement that occurred in May 1996=M96; May 1997=M97 or June 1997=J97)	unitless
HABITAT	primary substrate (D=damselfish <i>Stegastes nigricans</i> algal turf; C = living coral <i>Porites lobata</i> ); the combination of 'Habitat' and 'Reef' give unique spatial identifiers	unitless
POC	Cumulative aerial coverage of living <i>Pocillopora</i> spp. corals on reef	square meters (m <sup>2</sup> )
SETD	density of survivors of <i>Thalassoma hardwicke</i> from focal settlement cohort; 90d after end of settlement pulse	number per reef
RECD	cumulative density of new settlers of <i>Thalassoma hardwicke</i> appearing over 5 consecutive days centered around new moons	number of fish per meter square per reef
OLDER_TH	time-averaged density of older <i>Thalassoma hardwicke</i>	number of fish per meter square per reef
HETEROSP	time-averaged density of other small labrids and scarids resident on reef	number of fish per meter square per reef
PRED	time-averaged density of potential predators associated with reef	number of fish per meter square per reef

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## Instruments

<b>Dataset-specific Instrument Name</b>	Dive Gear
<b>Generic Instrument Name</b>	Diving Mask and Snorkel
<b>Dataset-specific Description</b>	Dive Gear
<b>Generic Instrument Description</b>	A diving mask (also half mask, dive mask or scuba mask) is an item of diving equipment that allows underwater divers, including, scuba divers, free-divers, and snorkelers to see clearly underwater. Snorkel: A breathing apparatus for swimmers and surface divers that allows swimming or continuous use of a face mask without lifting the head to breathe, consisting of a tube that curves out of the mouth and extends above the surface of the water.

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## Deployments

### Osenberg\_et\_al\_Moorea

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/644752">https://www.bco-dmo.org/deployment/644752</a>
<b>Platform</b>	Osenberg et al Moorea
<b>Start Date</b>	2003-05-19
<b>End Date</b>	2015-07-12

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## 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](#)).

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## Funding

<b>Funding Source</b>	<b>Award</b>
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0242312</a>

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