

# Summary of *Dosidicus gigas* size, sex, and maturity from an R/V BIP XII cruise in the Guaymas Basin, Gulf of California in 2013 (Jumbo Squid El Nino Response project)

**Website:** <https://www.bco-dmo.org/dataset/614736>

**Version:** 29 Sept 2015

**Version Date:** 2015-09-29

## Project

» [Adaptable life history strategy of a migratory large predator in response to El Nino and climate change](#)  
(Jumbo Squid El Nino Response)

Contributors	Affiliation	Role
<a href="#">Gilly, William</a>	Stanford University	Principal Investigator
<a href="#">Rauch, Shannon</a>	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

## Table of Contents

- [Dataset Description](#)
  - [Methods & Sampling](#)
  - [Data Processing Description](#)
- [Data Files](#)
- [Parameters](#)
- [Deployments](#)
- [Project Information](#)
- [Funding](#)

## Dataset Description

Summary of *Dosidicus gigas* size, sex, and maturity from BIPXII cruise in October 2013 in the Central Gulf of California, Mexico, Santa Rosalia (27.3N, 112.1W) to Bahia Las Animas (28.9N, 113.3W) to Guaymas (27.8N, 111.3W).

## Methods & Sampling

Squid were captured during rod-and-reel jigging sessions using weighted, luminescent jigs (8–50 cm length) fished at depths from 200 m to the surface. Measurements were made on the research vessel within 1–2 hours of capture. Length was measured with a flexible tape, generally to the nearest 0.5 cm. Mass was weighed with a digital hanging scale to the nearest 0.1 kg. Sex and maturity were visually determined following criteria for Stages 1–5 (Lipinski & Underhill, 1995): Stage I–II = immature, Stage III = maturing, Stage IV–V = mature. (See also Hoving et al. 2013.) CTD data from these sampling sites are also available and have been deposited with BCO-DMO.

## References:

Lipinski MR, Underhill LG. 1995. Sexual maturation in squid: quantum or continuum. South African Journal of Marine Science, 15, 207–223. doi:[10.2989/02577619509504844](https://doi.org/10.2989/02577619509504844)

Hoving H.-J, Gilly WF, Markaida U, Benoit-Bird KJ, West-Brown Z, Daniel P, Field JC, Parassenti L, Liu B, Campos B. 2013. Extreme plasticity in life-history strategy allows a migratory predator (*Dosidicus gigas*) to cope with a changing climate. Global Change Biology 19:2089–2103. doi:[10.1111/gcb.12198](https://doi.org/10.1111/gcb.12198)

## Data Processing Description

Summary data have been reduced from the raw data recorded for every squid sampled. Raw data can be

provided in spreadsheet format by the PI on request.

BCO-DMO data processing:

- modified parameter names to conform with BCO-DMO naming conventions;
- changed positive degrees west longitude to negative degrees east;
- added min/max columns based on the existing range columns;
- re-formatted range columns;
- replaced "-" with "nd" to indicate "no data".

[ [table of contents](#) | [back to top](#) ]

---

## Data Files

File
<b>squid_summary.csv</b> (Comma Separated Values (.csv), 2.39 KB) MD5:adcc13e564e98756e1b17646b751ee6a Primary data file for dataset ID 614736

[ [table of contents](#) | [back to top](#) ]

---

## Parameters

Parameter	Description	Units
date	Date of sampling (GMT).	mm/dd/yyyy
day_or_night	Indicates if sampling was done during local day or night.	text
lat	Latitude of sampling. Positive = North.	decimal degrees
lon	Longitude of sampling. Positive = East.	decimal degrees
jig_station	Jigging station; cross-referenced to CTD cast locations.	text
N	Number of squid sampled.	integer
DML_mean	Mean dorsal mantle length (DML).	centimeters (cm)
DML_sd	Standard deviation of mean dorsal mantle length (DML).	centimeters (cm)
DML_range	Range of dorsal mantle length (DML).	centimeters (cm)
DML_min	Minimum dorsal mantle length (DML).	centimeters (cm)
DML_max	Maximum dorsal mantle length (DML).	centimeters (cm)

mass_mean	Mean mass.	kilograms (kg)
mass_sd	Standard deviation of mean mass.	kilograms (kg)
mass_range	Range of mass.	kilograms (kg)
mass_min	Minimum mass.	kilograms (kg)
mass_max	Maximum mass.	kilograms (kg)
maturity_mean	Mean sexual maturity state (1-5).	Sexual maturity state 1-5
maturity_sd	Standard deviation of mean sexual maturity state.	Sexual maturity state 1-5
maturity_range	Range of sexual maturity state.	Sexual maturity state 1-5
maturity_min	Minimum sexual maturity state.	Sexual maturity state 1-5
maturity_max	Maximum sexual maturity state.	Sexual maturity state 1-5
female_pcmt	Percent female.	percentage (%)
female_mature	?	fraction
male_pcmt	Percent male.	percentage (%)
male_mature	?	fraction

[ [table of contents](#) | [back to top](#) ]

---

## Deployments

### BIPXII\_10\_2013

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/520503">https://www.bco-dmo.org/deployment/520503</a>
<b>Platform</b>	R/V BIP XII
<b>Start Date</b>	2013-10-20
<b>End Date</b>	2013-10-25
<b>Description</b>	Central Gulf of California, Mexico: Santa Rosalia (27.3N 112.1W) to Bahia Las Animas (28.9N 113.3W to Guaymas (27.8N 111.3W)

## Project Information

### Adaptable life history strategy of a migratory large predator in response to El Nino and climate change (Jumbo Squid El Nino Response)

**Coverage:** Gulf of California and Monterey Bay

*Description from NSF award abstract:*

This project will examine the response of *Dosidicus gigas* (Humboldt squid) to an El Niño event in 2009-2010 that was accompanied by a collapse of the commercial fishery for this squid in the Guaymas Basin within the Gulf of California. This large squid is a major predator of great ecological and economic importance in the Gulf of California, the California Current, and Peru Current systems. In early 2010, these squid abandoned their normal coastal-shelf habitats in the Guaymas Basin and instead were found in the Salsipuedes Basin to the north, an area buffered from the effects of El Niño by the upwelling of colder water. The commercial fishery also relocated to this region and large squid were not found in the Guaymas Basin from 2010-2012, instead animals that matured at an unusually small size and young age were abundant. A return to the large size-at-maturity condition has still not occurred, despite the apparent return of normal oceanographic conditions.

The El Niño of 2009-2010 presented an unforeseen opportunity to reveal an important feature of adaptability of *Dosidicus gigas* to an acute climatic anomaly, namely a large decrease in size and age at maturity. Now these investigators will have the opportunity to document recovery to the normal large size-at-maturity condition. The specific aims of this project are:

- 1) continue a program of acoustic surveys and direct sampling of squid that has already been established in the Gulf of California in order to assess distribution, biomass, life history strategy diet, and migratory and foraging behaviors relative to pre-El Niño conditions and
- 2) conduct analogous surveys in Monterey Bay, California in conjunction with long-term remote operated vehicle surveys of squid abundance.

The data from these studies will provide a comparison of recovery in the two different squid populations and yield valuable insights into what ecological effects an area is expected to experience with an invasion of either small or large Humboldt squid. As long-term climate change progresses, squid of both forms may expand northward into the California Current System.

Related Project: [Hypoxia and the ecology, behavior and physiology of jumbo squid, \*Dosidicus gigas\*](#)

## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1338973</a>