# EDI Metadata Template (2021)[[1]](#footnote-1)

## Dataset Title

Invertebrate morphometric data collected from Palmyra Atoll National Wildlife Refuge, Northern Islands: August 2009 - November 2016.

## Abstract

This data was collected from 2009-2016 as part of a wider effort to assemble quantitative food webs for the rainforests of Palmyra Atoll National Wildlife Refuge. Individuals were sampled across habitat types, and for each of these habitat types, a variety of methods were used, including individual collection during visual surveys for understory and soil collections and canopy fogging with insecticide onto collection sheets for canopy individuals. Feeding interactions shape the size and function of ecosystems and have been traditionally approached from a species-specific framework. However, establishing more generalized predictors of feeding interactions such as body size and combining them along side taxa-specific traits produces patterns closer to observed empirical data. Characterizing general patterns in food webs is important for establishing patterns across biological communities and informing us how communities may respond to external changes. The terrestrial habitats of Palmyra are heavily invertebrate dominated and as an atoll, are relatively species poor, allowing for a more detailed and complete examination of feeding interactions. Furthermore, empirical feeding data is often times unfeasible to collect for small-bodied invertebrate predators. Thus assembling an empirical food web for these small-bodied invertebrates is important for establishing general rules for these biological communities that comprise a significant portion of Earth’s biodiversity and biomass.

## Creators

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| First Name | Last Name | Organization | e-mail address | Role in project |
| Hillary | Young | University of California Santa Barbara | hillary.young@lifesci.ucsb.edu | Creator |
| John | McLaughlin | University of California Santa Barbara | johnmcla@gmail.com | Creator |
| Ana | Miller-ter Kuile | University of California Santa Barbara | ana00@ucsb.edu | Creator |

## Other personnel

|  |  |  |  |
| --- | --- | --- | --- |
| First Name | Last Name | Organization | Role in project |
| Ana | Miller-ter Kuile | University of California Santa Barbara | Associate |
| An | Bui | University of California Santa Barbara | Field and lab technician |
| Elizabeth | Forbes | University of California Santa Barbara | Field technician |
| Michelle | Lee | University of California Santa Barbara | Field and lab technician |
| Devyn | Orr | University of California Santa Barbara | Field technician |
| Rachel | Behm | University of California Santa Barbara | Lab technician |
| Taylor | Bogar | University of California Santa Barbara | Field and lab technician |
| Jasmine | Childress | University of California Santa Barbara | Field technician |
| Rodolfo | Dirzo |  | Field technician and funding PI |
| Maggie | Klope | University of California Santa Barbara | Field and lab technician |
| Kevin | Lafferty | University of California Santa Barbara | PI |
| Marisa | Morse | University of California Santa Barbara | Field and lab technician |
| Carina | Motta | University of California Santa Barbara | Field and lab technician |
| Katherine | Plummer |  | Field technician |
| David | Weber |  | Field technician |
| Kevin | Park | University of California Santa Barbara | Lab technician |
| Ronny | Young | University of California Santa Barbara | Field and lab technician |
| Cora | Johnston | University of California Santa Barbara | Field technician |
| Magalay | Espinoza | University of California Santa Barbara | Field and lab technician |
|  |  |  |  |

## Keywords

|  |  |
| --- | --- |
| LTER Controlled Vocabulary | Food webs, community patterns, community structure |

## Funding of this work:

List only the **main PI of a grant** that supported this project, starting with the main grant first. Add rows to the table if several grants were involved.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PI First Name | PI Last Name | Title of Grant | Funding Agency | Funding Identification Number |
| Hillary | Young |  | Nation Science Foundation | DEB #1457371 |
| Hillary | Young |  | National Geographic Society |  |

## Timeframe

* Begin date: August 2016
* End date: November 2016
* Data collection ongoing/completed: November 2016

## Geographic location

* Verbal description: Palmyra Atoll National Wildlife Refuge, Northern Line Islands
* North bounding coordinate: 5.883333
* West bounding coordinate: -162.083333

## Taxonomic species or groups

|  |  |
| --- | --- |
| Classification | Rank Name: Amphipoda |
| Rank Value: order |
| Classification | Rank Name: Araneae |
| Rank Value: order |
| Classification | Rank Name: Blattodea |
| Rank Value:order |
| Classification | Rank Name: Cccoidea |
| Rank Value: order |
| Classification | Rank Name: Coleoptera |
| Rank Value: order |
| Classification | Rank Name: Collembola |
| Rank Value: order |
| Classification | Rank Name: Diptera |
| Rank Value: order |
| Classification | Rank Name: Formicidae |
| Rank Value: order |
| Classification | Rank Name: Hemiptera |
| Rank Value: order |
| Classification | Rank Name: Hymenoptera |
| Rank Value: order |
| Classification | Rank Name: Lepidoptera |
| Rank Value: order |
| Classification | Rank Name: Mollusca |
| Rank Value: order |
| Classification | Rank Name: Orthoptera |
| Rank Value: order |
| Classification | Rank Name: Psocoptera |
| Rank Value: order |
| Classification | Rank Name: Thysanoptera |
| Rank Value: order |

## Methods

**Field protocol**

We sampled invertebrates at 435 sites across the atoll. Sites were stratified by canopy type, and their location was randomly selected. Invertebrates were collected at sampling sites with a variety of methods including: Canopy fogging, vegetation clippings, soil cores and black light surveys.

**Canopy fogging**

We used a pyrethrum-based insecticide (*ExciteR* 6% Pyrethrin) with a bio-diesel fuel carrier/dispersant deployed via IGEBA TF-35 portable pulse jet thermal fogger. Individual tree canopies were fogged with 2 L insecticide/carrier. Insects were collected in plastic funnels placed on the ground, the number and position varied with canopy size and shape. Insects were allowed to fall for at least 2 hours after each fog. Insects collected in funnels, were fixed in ethanol and transported back to lab for later identification.

**Vegetation clippings**

Understory plants were sampled from randomly sited 0.25 m2 plots. Prior to sampling, plots were enclosed in canvas to prevent flying insects from escaping. Within each plot all above-ground plant biomass was collected. Understory plants were separated by species and type (e.g. litter vs. live), placed in ziplocked bags and transported back to lab. Clippings of tree branches were collected with pole saws. Branch clippings were subsampled, bagged and transported back to lab. Plant tissues were placed in Berlese funnels for three days. After three days, collection vials were checked every 24 hours until no new arthropods were collected, at which point the vegetation matter was removed. A small portion of each plant clipping was processed by hand for soft-bodied arthropods that may not pass through Berlese funnels prior to desiccation (e.g. scale, larval lepidoptera, small spiders, etc).

**Soil cores**

Four soil cores, each 10 cm in diameter, were collected adjacent to each understory vegetation plot (2.5 m from the center of the plot at right angles to each other). Cores were sunk to 10 cm or the bottom of the soil matrix, whichever was shallower. Two cores were processed, on site for large invertebrates (e.g. myriapods). Two cores were bagged, returned to lab and run through Berlese funnels as above.

**Black light surveys**

Some insects (such as strong fliers) were not well sampled by fogging or branch clipping. To better sample flying insects, we used Miniature Downdraft Blacklight (UV) Traps Model 912. Traps were deployed prior to dusk and collected first thing in the morning. Traps were reset if severe adverse weather was encountered overnight or if the fan or light were not running when the trap was collected. Collected insects were fixed in ethanol for later identification. Areas without canopy (e.g. open grasslands or runways) were not surveyed with black light traps.

**Sample processing**

All individuals were pulled from scintillation vials filled with 95% ethanol and sorted down to morphospecies. Individuals were then placed under a stereomicroscope to measure body length, width, and height using a micro ruler. Body length was measured across the anterior-posterior axis, width was measured across the left-right lateral axis, and height was measured across the dorsal-ventral axis excluding appendages. To obtain an accurate measurement of body volume, individuals were assigned body shapes depending on their taxonomy. To measure mass, individuals were placed on a scale for approximately one minute to allow excess ethanol to evaporate before taking measurements. Finally, a subset of individuals from each morphospecies were sent out to respective taxonomists for identification.

## Data Table

|  |  |
| --- | --- |
| **Table name:** | Palmyra\_food\_web\_sizes |
| **Table description:** | Body size measurements of invertebrates collected from Palmyra: 2009-2016 |
| **Number of records** | 3681 |
| **Number of Columns** | 28 |

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Missing value code |
| Group | The taxonomic order that the sample belongs to |  |  |
| Collection\_Method | The method used to collect the individual from the field |  |  |
| Plant | The type of habitat the sample was collected from |  |  |
| Date\_collected | The date when the sample was collected in the field | DD/MM/YYYY |  |
| Island | The name of the island the sample was collected from |  |  |
| Site | The specific site that the sample was collected from in the field |  |  |
| Working\_Name | The working name assigned to the individual |  |  |
| Species\_Name | The working species name of the individual |  |  |
| Stage | The life stage of the sample, assigned as either an adult or juvenile |  |  |
| Sex | The sex of the sample |  |  |
| Length\_mm | Body length of the sample, measured with a micro ruler under a stereoscope |  |  |
| Width\_mm | Body width of the sample, measured with a micro ruler under a stereoscope |  |  |
| Height\_mm | Body width of the sample, measured with a micro ruler under a stereoscope |  |  |
| Shape | An assigned shape multiplier used to obtain true body volume of the sample |  |  |
| Pi | The value pi, used to calculate the body volume of a sample |  |  |
| Volume\_mm3 | Volume of the sample measured in milimeters^3 |  |  |
| Volume\_ml | Volume of the sample measured in milliliters |  |  |
| Mass\_g | Conversion of the sample volume to mass, weighed in grams |  |  |
| Mass\_mg | Conversion of the sample volume to mass, weighed in miligrams |  |  |
| Total\_Mass\_mg | Final working mass of the individual based on volume conversion, weighed in miligrams |  |  |
| Scale\_Weight\_mg | Wet weight (milligrams) of the sample after measuring on a scale |  |  |
| Scale | This column defines which scale was used to weigh the wet mass of each individual |  |  |
| Column | The column in a box where the individual was stored |  |  |
| Row | The row in a box where the individual was stored |  |  |
| Notes | Any notes or comments about an individual were placed in this column |  |  |
| Measurer | Initials of the technician that took the measurements |  |  |
| Box.Number | The box number in which the particular individual was stored in our lab |  |  |

|  |  |
| --- | --- |
| **Table name:** | Palmyra\_nodes |
| **Table description:** | Taxanomic data of individuals collected from Palmyra: 2009-2016 |
| **Number of records** | 379 |
| **Number of Columns** | 23 |

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Missing value code |
| Morphospecies | Assigned morphospecies to the sample |  |  |
| Order | Numeric order assigned to the sample |  |  |
| Present.in.Vials | Whether the sample is present in the vial |  | #N/A |
| Species\_Stage\_Name | Assigned species stage to the sample |  |  |
| Group | Assigned taxonomic group |  |  |
| Specialist | name of specialist who identified sample taxa |  |  |
| Standard\_Sorting\_Name | The working name assigned to the individual |  |  |
| Barcode\_Status | whether sample was sent for DNA bardcoding or not |  |  |
| Authority | Occupation of specialists who sorted sample identifications |  |  |
| Phylum | phylum of the sample |  |  |
| |  | | --- | | Subphylum | | subphylum of sample |  |  |
| Class | Taxonomic class of sample |  |  |
| Subclass | Taxonomic subclass |  |  |
| Superorder | Taxonomic superorder |  |  |
| Infraorder | Taxonomic infraorder of sample |  |  |
| Superfamily | Taxonomic superfamily of sample |  |  |
| Family | Taxonomic family of sample |  |  |
| Subfamily | Taxonomic subfamily of sample |  |  |
| Genus | Genus of sample |  |  |
| specific\_epithet | Assigned epithet of sample |  |  |
| subspecies | Subspecies of sample |  |  |

1. This document liberally borrows from similar documents at SBC and GCE [↑](#footnote-ref-1)