

Trait data captured from literature sources, field observations and measurements of sessile marine invertebrates from coastal sites across a geographic gradient spanning the sub-arctic to the tropics from 2015 to 2017.

Website: <https://www.bco-dmo.org/dataset/850202>

Data Type: Other Field Results

Version: 1

Version Date: 2021-04-23

Project

» [Community Effects of Competition and Predation across Latitude and Implications for Species Invasions](#)
(Comm Effects of Competition and Predation)

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|---------------------------------|---|------------------------|
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Abstract

Trait data captured from literature sources, field observations (2015 to 2017) and measurements of sessile marine invertebrates from coastal sites across a geographic gradient spanning the sub-arctic to the tropics.

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Coverage

Spatial Extent: N:55.47257 E:-79.52183 S:8.91758 W:-131.79698

Temporal Extent: 2015-12 - 2017-06

Dataset Description

These data were used for the publication Lopez and Freestone (2020).

Acquisition Description

Location: Ketchikan, AK, San Francisco, CA, La Paz, Mexico, and Panama City, Panama

Methodology: Traits were collected from field measurements, observations, or literature sources. For field

measurements, an average of five individuals per taxa were photographed for color, structural defense, and growth form determination. All other traits except water content and organic content were collected from the literature. A brief description of the sampling procedure for determining water content and organic content is in the following section below.

For more information about the field data see dataset "Community composition separated by native and cryptogenic, and introduced species of each community" <https://www.bco-dmo.org/dataset/850190>.

Sampling and analytical procedures: For field measurements of organic and water content, an average of five individuals per taxa were collected and used dry weights (DW) and ash free dry weights (AFDW) to calculate water content as $[(1-(DW/WW)) \times 100]$ and organic content as $[(1-(AFDW/DW)) \times 100]$. We then calculated a single mean trait value per taxa to be included in the trait table.

Processing Description

BCO-DMO Data Manager Processing Notes:

- * Imported file Trait_data.csv into the BCO-DMO data system
- * removed underscores in taxonomic names in column MorphName.
- * Taxonomic names matched to accepted taxonomic names using the World Register of Marine Species taxa match tool on 2021-04-26. Names were not changed in this dataset. Misspelled and unaccepted synonyms are present in the data. A species list including the matches accepted names, aphiaIDs, and LSIDs attached to this dataset as a supplemental file. For more information see <https://www.marinespecies.org/aphia.php?p=match>

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Related Publications

López, D. P., & Freestone, A. L. (2020). History of co-occurrence shapes predation effects on functional diversity and structure at low latitudes. *Functional Ecology*, 35(2), 535–545. doi:[10.1111/1365-2435.13725](https://doi.org/10.1111/1365-2435.13725)

Results

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Related Datasets

IsRelatedTo

Freestone, A., Torchin, M., Lopez, D. P., Bonfim, M., Jurgens, L., Repetto, M. F., Schloder, C., Ruiz, G. (2021) **Community composition (relative abundance) separated by native and cryptogenic, and introduced species of each community from coastal sites across a geographic gradient spanning the sub-arctic to the tropics from 2015-2017**. Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-04-23 doi:[10.26008/1912/bco-dmo.850190.1](https://doi.org/10.26008/1912/bco-dmo.850190.1) [[view at BCO-DMO](#)]

Relationship Description: Field data referenced in this trait dataset.

Welcome to NEMESIS! National Estuarine and Marine Exotic Species Information System (NEMESIS). Marine Invasions Research, Smithsonian Environmental Research Center. (n.d.).

<https://invasions.si.edu/nemesis/>.

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Parameters

| Parameter | Description | Units |
|-------------|---|------------------|
| Region | Region where each taxon was collected (Alaska, Panama, Mexico, California) | unitless |
| MorphName | Lower taxonomic information (~genus/species, if available) based on best available information in the field | unitless |
| Status | Invasion status: native, cryptogenic, introduced | unitless |
| Org_cont | Organic content: mean of at least five individuals, calculated as $[(1 - (AFDW/DW)) \times 100]$ (AFDW: Ashfree dry weight, DW: Dry weight) | unitless |
| Wat_cont | Water Content: mean of at least five individuals, calculated as $[(1 - (DW/WW)) \times 100]$ (DW: Dry weight, WW: Wet weight) | unitless |
| Sex_rep | Sexual reproduction categorized as hermaphroditic (herm), gonochoristic (gono), simultaneous (simul) | unitless |
| Fert_type | Fertilization type categorized as oviparous (ovi), ovoviviparous (ovo), viviparous (vivi) | unitless |
| Asex_rep | Asexual reproduction defined as capable of asexual reproduction yes (1) or no (0) | unitless |
| Lar_life | Larval life duration: maximum hours of pelagic life before settling (Number of hours) | unitless |
| Eggs | Number of eggs produced by an individual (Total number) | unitless |
| Egg_size | Egg size - diameter of egg size | micrometers (um) |
| Lar_dev | Larval development type categorized as simultaneous (both), lecithotrophic (leci), or planktotrophic (plank) | unitless |
| Feed_struc | Feeding structure: whether the morphospecies has (1) or doesn't have (0) feeding appendages such as ciri, tentacles, or other appendages | unitless |
| Struc_defe | Structural defense: whether the morphospecies has a calcified structure (CalcStr), an uncalcified structure used for protection (NCalcStr), or no structure (NStr) at all | unitless |
| Sociability | Sociability structure categorized as colonial or solitary | unitless |
| Growth_form | Growth form categorized as encrusting, erect, arborescent, massive, runner, stolonate (values: encrus, erect, arbo, massi, run, stol) | unitless |
| Color | Color categorized as bright, dull, dark, transparent, white | unitless |

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Project Information

Community Effects of Competition and Predation across Latitude and Implications for Species Invasions (Comm Effects of Competition and Predation)

Coverage: Eastern Pacific in four coastal regions: Ketchikan, Alaska; San Francisco, California; La Paz, Mexico; and Panama City, Panama

Description from NSF award abstract:

Global patterns of biodiversity demonstrate that most of the species on earth occur in the tropics, with

strikingly fewer species occurring in higher-latitude regions. Biologists predict that this global pattern of species diversity is likely shaped by three ecological interactions between species. Yet few detailed experimental data exist that demonstrate how species interactions influence natural communities from the tropics to the arctic. Therefore, a significant opportunity exists to transform our understanding of how these fundamental species interactions shape patterns of biodiversity across the globe. Furthermore, these species interactions have the strong potential to limit potentially harmful biological invasions by non-native species, which are often transported by human activities that can breach historical dispersal barriers, such as ocean basins and continents. Biological invasions can cause undesired ecological and economic effects and are considered one of the primary drivers of global change. Through extensive field research on marine ecosystems along the Pacific Coast of North and Central America, from the tropics to the subarctic, this project will study ecological factors that shape global patterns of diversity and limit biological invasions.

Biologists have long theorized that the latitudinal diversity gradient may be shaped by stronger species interactions, such as competition and predation, occurring in the tropics than at higher latitudes. Prior research suggests that predation pressure is indeed stronger at lower latitudes, but it is unclear how interactive effects of predation and competition structure communities to maintain these diversity patterns in ecological time. This project represents an international research program to expand ecological understanding of species interactions across latitude. The objectives are to determine the relative influences of two primary species interactions, competition and predation, on patterns of species diversity, community assembly and sensitivity to species invasion. Field research will employ a large-scale experimental approach that focuses on sessile marine invertebrate communities across 47 degrees of latitude (over 7000 km). Experiments will manipulate levels of predation and competition for one year and will be conducted in four regions, ranging from the subarctic to the tropics: Alaska, California, Mexico, and Panama. Communities of sessile marine invertebrates, composed of both native and non-native species, will be examined iteratively under different predation and competition regimes to evaluate community dynamics. The relative importance of a suite of factors, including environmental conditions and recruitment rates, to interaction outcomes will be evaluated.

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Funding

| Funding Source | Award |
|--|-----------------------------|
| NSF Division of Ocean Sciences (NSF OCE) | OCE-1434528 |

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