

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 (Competition and Predation across Latitude)

Website: <https://www.bco-dmo.org/dataset/883700>

Data Type: Other Field Results, document

Version: 1

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Project

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

Contributors	Affiliation	Role
Freestone, Amy L.	Temple University (Temple)	Principal Investigator
Ruiz, Gregory E.	Smithsonian Environmental Research Center (SERC)	Co-Principal Investigator
Torchin, Mark E.	Smithsonian Tropical Research Institute (STRI)	Co-Principal Investigator
López, Diana Paola	Temple University (Temple)	Student, Contact
Newman, Sawyer	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract

Trait data captured from literature sources, field observations (2015-2018) and measurements of sessile marine invertebrates from 12 coastal sites across a geographic gradient spanning the sub-arctic to the tropics. Invertebrates observed were from an experiment that manipulated predation for three and 12 months.

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Coverage

Spatial Extent: N:55.4726 E:-79.5218 S:8.9128 W:-131.797

Temporal Extent: 2015-06-16 - 2018-09-12

Methods & Sampling

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.

Sampling and analytical procedures:

For field measurements of organic and water content, an average of five individuals per taxa were collected and used for 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.

Data Processing Description

BCO-DMO Processing Notes:

- Converted numbers in scientific notation to standard form

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Data Files

File
all_traits.csv (Comma Separated Values (.csv), 21.71 KB) MD5:d43ae6819dc7cbdfb739ed2e628aea7b Primary data file for dataset ID 883700

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Related Publications

López, D. P., & Freestone, A. L. (2022). Biotic interactions shape trait assembly of marine communities across time and latitude. *Proceedings of the Royal Society B: Biological Sciences*, 289(1989).

<https://doi.org/10.1098/rspb.2022.1838>

Results

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Parameters

Parameter	Description	Units
Region	Region where each taxon was collected. Value is one of: Alaska, Panama, Mexico, or California.	unitless
MorphName	Lower taxonomic information (~genus/species, if available) based on best available information in the field.	unitless
MorphTaXa	Family or higher taxonomic information.	unitless
InvStatus	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.	hours
Eggs	Number of eggs produced by an individual.	eggs
Egg_size	Egg size - diameter of egg size.	micrometers
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
Sociab	Sociability structure categorized as colonial (0) or solitary (1).	unitless
Growth_form	Growth form categorized as encrusting, erect, arborescent, massive, runner, stolonate. Value is one of: encrus, erect, arbo, massi, run, or 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 (Competition and Predation across Latitude)

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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