Parasite taxonomic and life cycle information from literature

Website: https://www.bco-dmo.org/dataset/879253
Data Type: Other Field Results
Version: 2
Version Date: 2023-05-11

Project
» Trajectories in functional diversity after disturbance at vents on the East Pacific Rise (EPR Functional Diversity)
» RUI: Collaborative: The Predictive Nature of Microbial Biofilms for Cuing Larval Settlement at Deep-Sea Hydrothermal Vents (Vent Settlement Cues)

Contributors	Affiliation	Role
Dykman, Lauren	Woods Hole Oceanographic Institution (WHOI)	Principal Investigator, Contact
Soenen, Karen	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager
York, Amber D.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Aggregated summary table of metazoan parasite species from atoll lagoon sandflats (Vidal-Martínez et al. 2012, Vidal-Martínez et al. 2017, McLaughlin 2018, González-Solís et al. 2019, Soler-Jiménez et al. 2019), kelp forests (Morton et al. 2021), and deep-sea hydrothermal vents included in analyses in Dykman et al. (2023). The summary table also includes taxonomic and life cycle information for each parasite species compiled from literature, and rationale for inclusion or exclusion from analyses in Dykman et al. (2023).

Table of Contents

Coverage

Spatial Extent: **N**:34.394 **E**:-104.292 **S**:5.884 **W**:-162.078

Methods & Sampling

This dataset reports taxonomy, rationale for life history trait assignments based on literature, and rationale for inclusion or exclusion from certain diversity analyses for between-ecosystem comparative analyses in Dykman et al. (2023).

This is a summary table aggregating parasite species and morphogroups from three published dissection datasets: intertidal lagoon sand flats of Palmyra Atoll (5.884° latitude, -162.078° longitude) (Vidal-Martínez et al. 2012, Vidal-Martínez et al. 2017, McLaughlin 2018, González-Solís et al. 2019, Soler-Jiménez et al. 2019); kelp forests on the coast of Santa Barbara, California (34.394° latitude, -119.730° longitude) (Morton et al. 2021); and deep-sea hydrothermal vents at 9°50’N on the East Pacific Rise (9.840° latitude, -104.292° longitude) (Dykman et al. 2022). Subsetting procedures for the three dissection data sets that resulted in the final species list are provided on Zenodo.

Data Processing Description

BCO-DMO Processing Notes:
*Added Notes field
* Replaced , with ; to comply with database requirements
* Dataset version 1 primary data file (version data 2022-08-25) replaced with version 2 (2023-05-11). The change is due to "Two parasite morphospecies names were updated based on new genetic information."

* File "PARASITES_VENT_SPECIES_LIST_LIFE_CYCLES.xlsx" (submitted to bcodmo on 2023-05-11) loaded as a data table into the BCO-DMO data system. Values "NO" "NR" and "NA" were identified as missing data values but preserved as strings within the data table instead of becoming blank (null) values to indicate no data. No modifications were made to the column names or values.
* In this version 2, two parasite species name rows were removed because they were combined with other morphospecies names based on new genetic information.

[table of contents | back to top]

Data Files

File
parasites_vent_species_list_life_cycles.csv (Comma Separated Values (.csv), 165.85 KB) MD5:eedfb915cb69cd6ca0ca9be67bca68f5 Primary data table for dataset 879253 version 2.

[table of contents | back to top]

Related Publications

Dykman, L. N., Tepolt, C. K., Kuris, A. M., Solow, A. R., & Mullineaux, L. S. (2023). Parasite diversity at isolated, disturbed hydrothermal vents. Proceedings of the Royal Society B: Biological Sciences, 290(2000). https://doi.org/10.1098/rspb.2023.0877
Results

González-Solís, D., Soler-Jiménez, L. C., Aguirre-Macedo, M. L., Mclaughlin, J. P., Shaw, J. C., James, A. K., Hechinger, R. F., Kuris, A. M., Lafferty, K. D., & Vidal-Martínez, V. M. (2019). Parasitic nematodes of marine fishes from Palmyra Atoll, East Indo-Pacific, including a new species of Spinitectus (Nematoda, Cystidicolidae). ZooKeys, 892, 1–26. https://doi.org/10.3897/zookeys.892.38447
https://doi.org/doi:10.3897/zookeys.892.38447
Related Research

McLaughlin, J. P. (2018). The food web for the sand flats at Palmyra Atoll. UC Santa Barbara. ProQuest ID: McLaughlin_ucsb_0035D_14095. Merritt ID: ark:/13030/m54z06th. Retrieved from https://escholarship.org/uc/item/45p5j103
Related Research

Morton, D. N., Antonino, C. Y., Broughton, F. J., Dykman, L. N., Kuris, A. M., & Lafferty, K. D. (2021). A food web including parasites for kelp forests of the Santa Barbara Channel, California. Scientific Data, 8(1). https://doi.org/10.1038/s41597-021-00880-4
References

Soler-Jiménez, L. C., Morales-Serna, F. N., Aguirre-Macedo, Ma. L., Mclaughlin, J. P., Jaramillo, A. G., Shaw, J. C., James, A. K., Hechinger, R. F., Kuris, A. M., Lafferty, K. D., & Vidal-Martínez, V. M. (2019). Parasitic copepods (Crustacea, Hexanauplia) on fishes from the lagoon flats of Palmyra Atoll, Central Pacific. ZooKeys, 833, 85–106. https://doi.org/10.3897/zookeys.833.30835
Related Research

Vidal-Martinez, V. M., Soler-Jimenez, L. C., Aguirre-Macedo, Ma. L., Mclaughlin, J., Jaramillo, A., Shaw, J., James, A., Hechinger, R., Kuris, A., & Lafferty, K. (2017). Monogenea of fishes from the lagoon flats of Palmyra Atoll in the Central Pacific. ZooKeys, 713, 1–23. https://doi.org/10.3897/zookeys.713.14732

Related Research

Vidal-Martínez, V. M., Aguirre-Macedo, M. L., McLaughlin, J. P., Hechinger, R. F., Jaramillo, A. G., Shaw, J. C., James, A. K., Kuris, A. M., & Lafferty, K. D. (2012). Digenean metacercariae of fishes from the lagoon flats of Palmyra Atoll, Eastern Indo-Pacific. Journal of Helminthology, 86(4), 493–509. https://doi.org/10.1017/s0022149x11000526 https://doi.org/10.1017/S0022149X11000526
Related Research

[table of contents | back to top]

Related Datasets

References

Dykman, L., Mullineaux, L., Tepolt, C., Kuris, A. (2023) **Dissection data for metazoan parasites and other symbionts from vent-endemic host species collected from the 9°50'N deep-sea hydrothermal vent field.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2023-05-11 doi:10.26008/1912/bco-dmo.879118.2 [view at BCO-DMO]
Relationship Description: Some of the source of the species are from this related "vent dissection" data set.

[table of contents | back to top]

Parameters

Parameter	Description	Units
PARASITE_SPECIES_NAME	The name used to uniquely identify a parasite species or morphogroup consistent with their species names in Vidal-Martínez et al. (2012), Vidal-Martínez et al. (2017), McLaughlin (2018), González-Solís et al. (2019), Soler-Jiménez et al. (2019), Morton et al. (2021), and Dykman et al. (2022).	unitless
ECOSYSTEM	The ecosystem where the parasite species was found including Atoll lagoon sandflat (Vidal-Martínez et al. 2012, Vidal-Martínez et al. 2017, McLaughlin 2018, González-Solís et al. 2019, Soler-Jiménez et al. 2019), Kelp forest (Morton et al. 2021), and Vent (Dykman et al. 2022).	unitless
DATA_SOURCE	A citation for the dataset in which the parasite species or morphogroup was reported.	unitless
HOST_GROUP_COMMON_NAME_SIMPLE	The simplified taxonomic group of the host, either Fish or Invertebrate, consistent with the grouping for analyses in Dykman et al. (2023).	unitless
PARASITE_PHYLUM	The current accepted phylum of the parasite species or morphogroup from World Register of Marine Species [accessed 2022-04-15].	unitless
PARASITE_CLASS	If known, the current accepted class of the parasite species or morphogroup from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier: NA (unknown).	unitless
PARASITE_ORDER	If known, the current accepted order of the parasite species or morphogroup from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier: NA (unknown).	unitless

PARASITE_FAMILY	If known, the current accepted family of the parasite species or morphogroup from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier: NA (unknown).	unitless
PARASITE_GENUS	If known, the current accepted genus of the parasite species or morphogroup from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier: NA (unknown).	unitless
PARASITE_SPECIES	If known, the current accepted specific epithet of the parasite species or morphogroup from World Register of Marine Species [accessed 2022-04-15]. This corresponds to the Darwin Core term specificEpithet http://rs.tdwg.org/dwc/terms/specificEpithet. Missing data identifier: NA (unknown).	unitless
PARASITE_GROUP_COMMON_NAME	The common name used to refer to the parasite taxonomic group in Dykman et al. (2023). These include: Acanthocephala, Cestoda, Copepoda, Isopoda, Monogenea, Nematoda, Rhizocephala, Trematoda.	unitless
PARASITE_SPECIES_NAME_AphiaID	Numerical identifier from World Register of Marine Species that matches the lowest known taxonomic level of the parasite species or morphogroup name.	unitless
PARASITE_SPECIES_NAME_LSID	Machine-readable Life Science Identifier (LSID) containing the AphiaID from World Register of Marine Species that matches the lowest known taxonomic level of the parasite species or morphogroup name. This corresponds to Darwin Core term http://rs.tdwg.org/dwc/terms/scientificNameID.	unitless
PARASITE_COUNT	An aggregated count of individuals in a given parasite species or morphogroup included in the analyses in Dykman et al. (2023) pooled across all host individuals and species.	unitless
EXCLUDED_FROM_ANAYSES	Whether the parasite species or morphogroup was excluded from any analyses in Dykman et al. (2023), and, if so, which ones. NA indicates the parasite morphogroup was included in all analyses. Missing data identifier: NA (not applicable).	unitless
RATIONALE_FOR_EXCLUSION	If a parasite species or morphogroup was excluded from some analyses, a detailed explanation as to why it was excluded. Missing data identifier: NA (not applicable).	unitless
PARASITE_LIFE_STAGE	The life stage of the parasite or other symbiont. “Adult” indicates the specimen is in the adult sexually reproductive stage and has mature, developed reproductive organs; “Adult, immature” indicates it is in its adult stage but is immature and has not yet developed reproductive organs; “Larva” is the non-reproductive nematode life stage found in intermediate hosts; “Cystacanth” is the encysting acanthocephalan life stage found in intermediate hosts; “Metacestode” is the encysting cestode life stage found in intermediate hosts; “Metacercaria” is the encysting trematode life stage found in the second intermediate host; “Sporocyst” is the asexual cloning trematode life stage found in the first intermediate host.	unitless
PARASITE_LIFE_CYCLE	The life cycle category of the parasite used in the analyses of Dykman et al. (2023). “Direct” means the parasite species uses one host species to complete its life cycle and “Indirect” means the parasite species uses more than one host species to complete its life cycle.	unitless

LIFE_CYCLE_RATIONALE	Reasoning for the parasite life cycle assignment. Missing data identifier: NA (not applicable) or NR (not reported in original publication).	unitless
LIFE_CYCLE_CITATION	Citation for the parasite life cycle assignment. If there was not enough information on the parasite's taxonomy to make an educated life cycle assignment, the life cycle was assumed based on the most common life cycle in the higher parasite taxon, and this field is filled with "Assumed".	unitless

[table of contents | back to top]

Project Information

Trajectories in functional diversity after disturbance at vents on the East Pacific Rise (EPR Functional Diversity)

Coverage: East Pacific Rise

NSF Award Abstract:
Hydrothermal vents support oases of life in the deep sea and are inhabited by unusual organisms that use chemical energy instead of photosynthesis as the basis of their food web. However, because the vents occur in geologically active areas of the seafloor, entire communities can be eradicated by catastrophic natural disturbances such as eruptions. The main objectives of this project are to quantify how quickly these communities recover from catastrophic disturbance and to determine what processes influence their resilience. The project focuses on both the structure (species diversity) and function (trait diversity) of the communities. The investigators will examine vents on an active segment of the East Pacific Rise where eruptive disturbance occurs on decadal time scales. These activities will create an unprecedented long-term (>14-year) quantitative time-series of colonist species composition and function. The application of trait-based analysis to the question of biological succession at vents has the potential to change the way we think about resilience in other patchy, transient and regionally-connected ecosystems. By considering how traits change over time, the researchers can untangle which species-level characteristics most influence abundance and distribution. The project objectives have broad significance with the growing potential for human-caused disturbances at deep-sea vents through deep-sea mining. Additional impacts include strengthening participation of under-represented minorities in marine science and contributing to international database development for functional traits of deep-sea vent species.

The unique, chemosynthesis-fueled fauna inhabiting deep-sea hydrothermal vents are subject to tectonic and eruptive disturbance that can eradicate entire communities. The main objectives of this project are to quantify how quickly these communities recover from catastrophic disturbance and to determine what processes influence their resilience. The focus is on vents on an active segment of the East Pacific Rise where eruptive disturbance occurs on decadal time scales. Field data on colonization and larval supply are used to characterize not only species succession but also the trajectory of functional diversity after a recent (2006) eruption. A new, promising approach to the colonization studies comes from incorporating trait-based analysis of functional diversity. Functional trait analysis is increasingly recognized in terrestrial and freshwater systems as a tool to holistically answer ecological questions, but trait analysis has not been often applied to marine systems. By considering how traits of incoming colonists change over time, the investigators can untangle which species-level factors most influence abundance and distribution. This project will create an unprecedented long-term (>14-year) quantitative time-series of colonist species composition and function. It includes multiple vent sites to encompass the full diversity of habitat conditions, and assesses both local processes and regional connectivity through larval supply. Field observations at individual sites contribute to broader questions when placed in the context of metacommunity theory. In this theoretical framework, field data such as this can be used to answer such questions as how the eradication of the vent community at a particular site affects the persistence of the metacommunity overall, and which vent sites contribute most to regional biodiversity.

RUI: Collaborative: The Predictive Nature of Microbial Biofilms for Cuing Larval Settlement at

Deep-Sea Hydrothermal Vents (Vent Settlement Cues)

Coverage: East Pacific Rise, 9 North hydrothermal vents

NSF Award Abstract:
Over four decades of research have shown that tiny free-swimming offspring of the unique inhabitants of hydrothermal vents can disperse effectively between their specialized habitats. Yet, we know almost nothing about how these larval animals complete the journey by locating and settling down in suitable locations. This question remains one of the key unresolved puzzles in the ecology of the deep sea and is becoming increasingly important to solve as hydrothermal vents are becoming threatened by human impacts. The investigators suggest that the films of bacteria that first form at vents are good signposts for settlement of larvae because they indicate that the hydrothermal vents are suitable for life. This project uses a combined program of field experiments, cutting-edge molecular biology techniques, and shipboard experiments with hydrothermal-vent larvae and cultured bacterial films. The project also connects undergraduate research interns at a primarily undergraduate institution (Western Washington University) with undergraduate research interns at two research institutions (Rutgers and Woods Hole Oceanographic Institution) while working on the project at sea together. Finally, the team is producing a science-in-action documentary filled with ocean science and exploration intended for television distribution and museum screenings. The investigators are using footage of the deep-sea vents, shipboard and diving operations, and laboratory work to create a documentary that highlights the foundation of scientific research—hypothesis-driven research, the application of the scientific method, and the importance of critical thinking—all in the framework of the study of an exciting, but threatened, ecosystem.

Hydrothermal vents are particularly tractable systems in which to study questions about the roles of biofilms in larval settlement because biofilms at vents are relatively low-complexity; vent animals are strictly dependent on vent microbes, often through symbiotic partnerships acquired after settlement; and environmental variations are present within the range of a common larval pool. Moreover, decades of research on settlement in model organisms give us good insight into biofilm cues; there is solid foundational understanding about colonization patterns at vents; we now have excellent tools to collect, identify, and culture vent larvae and microbes; and modern environmental "-omics" techniques are a good tool to characterize biological cues produced by biofilms. The project provides an unprecedented, quantitative look into the role of microbial biofilms in structuring larval settlement at hydrothermal vents, achieved only through the close collaboration of microbial and larval ecologists. The combined field program of short-term settlement experiments, microbial "-omics" work, and subsequent shipboard settlement experiments allows the investigative team to use field experiments to statistically model the factors that best predict larval settlement in the field, then test those predictions with shipboard experiments that decouple covarying conditions. This extensive characterization of putative larval settlement cues and their relationship to colonization success in heterogeneous vent habitat niches will contribute to a broader understanding of colonization success across diverse marine ecosystems. Understanding the role that the initial settlement of larvae plays in the recovery and resilience of hydrothermal-vent ecosystems is critical to developing informed management plans for deep-sea mining.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1829773
NSF Division of Ocean Sciences (NSF OCE)	OCE-1947735

[table of contents | back to top]