Records and metadata for deep-sea hydrothermal vent parasite, egg predator, and micropredator species reported in published literature.

Website: https://www.bco-dmo.org/dataset/879266
Data Type: Other Field Results
Version: 1
Version Date: 2022-08-25

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

Abstract
A compilation of records and metadata for deep-sea hydrothermal vent parasite, egg predator, and micropredator species reported in published literature as of July 2022.

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Coverage

Spatial Extent: **N**:49.76 **E**:70.1 **S**:-37.788 **W**:-176.568
Temporal Extent: 1979 - 2011

Methods & Sampling

Online databases were queried for records of parasite species described or reported from deep-sea hydrothermal vent ecosystems. Deep sea hydrothermal vent sites (1055-3650m depth) from N. Pacific, S. Pacific, N. Atlantic, and Indian Oceans.

All papers reporting vent parasites were read and their citations searched for mention of additional species. Data on the parasite and host were recorded from the publication, including collection metadata and taxonomic details of the host and parasite.

Data Processing Description

BCO-DMO Processing Notes:
*Converted , to ; in text to comply with database requirements.

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Data Files

File	
parasites_vent_literature.csv	(Comma Separated Values (.csv), 41.15 KB) MD5:e24ffc2ca70e453032228dbb504c15d4
Primary data file for dataset ID 879266	
parasites_vent_literature.csv	(Comma Separated Values (.csv), 41.01 KB) MD5:783903437b6d294357bd2b0ecb2a59f3
Primary data table for dataset 879266.	

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Related Publications

BURON, I. de, & MORAND, S. (2004). Deep-sea hydrothermal vent parasites: why do we not find more? Parasitology, 128(1), 1–6. https://doi.org/10.1017/s0031182003004347
Related Research

Bray, R. A., Waeschenbach, A., Dyal, P., Littlewood, D. T. J., & Morand, S. (2014). New digeneans (Opecoelidae) from hydrothermal vent fishes in the south eastern Pacific Ocean, including one new genus and five new species. Zootaxa, 3768(1), 73-87. https://doi.org/10.11646/zootaxa.3768.1.5
Related Research

Burreson, E. M., 1981, A new deep-sea leech, Bathybdella sawyeri gen. et sp. n. from thermal vent areas on the Galapagos Rift, Proc. Biol. Soc. Wash. 94: 483–491.
Related Research

Desbruyeres, D., Segonzac, M., Bright, M., & Decapoda, A. (2006). Handbook of deepsea hydrothermal vent fauna. In Denisia. https://isbnsearch.org/isbn/13978-3-85474-154-1
Related Research

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

Humes A.G. (1987) Copepods from deep-sea hydrothermal vents. Bulletin of Marine Science. 41(3):645-788
Related Research

Humes, A. G. (1984). Benthoxynus spiculifer n. gen., n. sp. (Copepoda: Siphonostomatoida) associated with Vestimentifera (Pogonophora) at a deep-water geothermal vent off the coast of Washington. Canadian Journal of Zoology, 62(12), 2594–2599. https://doi.org/10.1139/z84-380 https://doi.org/10.1139/Z84-380
Related Research

Humes, A. G., & Voight, J. R. (1997). Cholidya polypi(Copepoda: Harpacticoida: Tisbidae), a parasite of deep-sea octopuses in the North Atlantic and northeastern Pacific. Ophelia, 46(1), 65–81. https://doi.org/10.1080/00785326.1997.10432478
Related Research

Humes, A.G. & M. Dojiri. A siphonostome copepod associated with a vestimentiferan from the Galapagos Rift and the East Pacific Rise. Proceedings of the Biological Society of Washington. 93(3):697-707, figs. 1-28, tab. 1. (6-xi-1980) (1980)
Related Research

Huys, R.; Gee, J.M.; Moore, C.G. & Hamond, R. (1996) Marine and Brackish Water Harpacticoid Copepods, Part 1. Synopses of the British Fauna (New Series) 51, 1–352.
Related Research

Justine, J.-L., Cassone, J., & Petter, A. (2002). Moravecnema segonzaci gen. et sp. n. (Nematoda: Cystidicolidae) from Pachycara thermophilum (Zoarcidae), a deep-sea hydrothermal vent fish from the Mid-Atlantic Ridge. Folia Parasitologica, 49(4), 299–303. https://doi.org/10.14411/fp.2002.055
Related Research

Kato, N., Chen, C., Watanabe, H. K., Yamamoto, M., & Shimomura, M. (2022). The First Bopyrid Isopod from Hydrothermal Vents: Pleurocryptella shinkai sp. nov. (Isopoda: Epicaridea) Parasitizing Shinkaia crosnieri (Decapoda: Anomura). Zoological Science, 39(3). https://doi.org/10.2108/zs210117
Related Research

LÓPEZ-GONZÁLEZ P.J. et al. (2000) Description of Genesis vulcanoctopusi gen. et sp. nov. (Copepoda: Tisbidae) parasitic on a hydrothermal vent octopod and a reinterpretation of the life cycle of cholidyinid harpacticoids. Cahiers de Biologie Marine. 41(3):241-253
https://hdl.handle.net/http://hdl.handle.net/10261/26332
Related Research

Shields, J. D., & Segonzac, M. (2007). New Nemertean Worms (Carcinonemertidae) on Bythograeid Crabs (Decapoda: Brachyura) from Pacific Hydrothermal Vent Sites. Journal of Crustacean Biology, 27(4), 681–692. https://doi.org/10.1651/s-2794.1 https://doi.org/10.1651/S-2794.1
Related Research

TUNNICLIFFE, V., ROSE, J. M., BATES, A. E., & KELLY, N. E. (2008). Parasitization of a hydrothermal vent limpet (Lepetodrilidae, Vetigastropoda) by a highly modified copepod (Chitonophilidae, Cyclopoida). Parasitology, 135(11), 1281–1293. https://doi.org/10.1017/s0031182008004721
https://doi.org/10.1017/S0031182008004721
Related Research

Terlizzi, C., Ward, M., & Van Dover, C. (2004). Observations on parasitism in deep-sea hydrothermal vent and seep limpets. Diseases of Aquatic Organisms, 62, 17–26. https://doi.org/10.3354/dao062017
Related Research

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Related Datasets

IsRelatedTo

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]

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Parameters

Parameter	Description	Units
PARASITE_SPECIES_PUBLICATION_ID	The identifier for the parasite or other symbiont species or morphogroup in the original publication. If more than one unknown parasite or symbiont morphogroup from the same taxon was reported in a publication, distinct morphogroups are labeled with sequential numbers. Missing data identifier NR (not reported in original publication)	unitless
PARASITE_PHYLUM	The current accepted phylum of the parasite or other symbiont species from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier NR (not reported in original publication)	unitless

PARASITE_CLASS	If known, the current accepted class of the parasite or other symbiont from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier NR (not reported in original publication)	unitless
PARASITE_ORDER	If known, the current accepted order of the parasite or other symbiont species from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier NA (not applicable) or NR (not reported in original publication)	unitless
PARASITE_FAMILY	If known, the current accepted family of the parasite or other symbiont from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier NR (not reported in original publication)	unitless
PARASITE_GENUS	If known, the current accepted genus of the parasite or other symbiont from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier NR (not reported in original publication)	unitless
PARASITE_SPECIES	If known, the current accepted specific epithet of the parasite or other symbiont 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 NR (not reported in original publication)	unitless
PARASITE_GROUP_COMMON_NAME	The common name used to refer to the parasite taxonomic group in Dykman et al. (2023). These include: Acanthocephala, Copepoda, Hirudinea, Isopoda, Monogenea, Nematoda, Nemertea, Polychaeta, Trematoda.	unitless
PARASITE_SPECIES_AphiaID	Numerical identifier from World Register of Marine Species at the lowest taxonomic level that matches parasite species publication ID [accessed 2022-04-15]. Units	unitless
PARASITE_SPECIES_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 publication ID. This corresponds to Darwin Core term http://rs.tdwg.org/dwc/terms/scientificNameID.	unitless
HOST_SPECIES_PUBLICATION_ID	The identifier for the host species from the original publication. If the parasite or other symbiont was not associated with a specific host but found with a collection of hosts, the sample is described as free text. Missing data identifier NR (not reported in original publication)	unitless
HOST_PHYLUM	The current accepted phylum of the host from World Register of Marine Species [accessed 2022-04-15] Missing data identifier NA (not applicable) or NR (not reported in original publication)	unitless
HOST_CLASS	If known, the current accepted class of the host from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier NA (not applicable) or NR (not reported in original publication)	unitless
HOST_ORDER	If known, the current accepted order of the host from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier NA (not applicable) or NR (not reported in original publication)	unitless

HOST_FAMILY	If known, the current accepted family of the host from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier NA (not applicable) or NR (not reported in original publication)	unitless
HOST_GENUS	If known, the current accepted genus of the host from World Register of Marine Species [accessed 2022-04-15]. Missing data identifier NA (not applicable) or NR (not reported in original publication)	unitless
HOST_SPECIES	If known, the current accepted specific epithet of the host from World Register of Marine Species [accessed 2022-04-15]. This corresponds to Darwin Core term http://rs.tdwg.org/dwc/terms/scientificNameID. Missing data identifier NA (not applicable) or NR (not reported in original publication)	unitless
HOST_GROUP_COMMON_NAME	The common name used to refer to the host taxonomic group in Dykman et al. (2023). These include Crustacean, Fish, Mollusk, and Polychaete. Missing data identifier NA (not applicable) or NR (not reported in original publication)	unitless
HOST_SPECIES_AphiaID	Numerical identifier from World Register of Marine Species at the lowest level that matches the host publication ID. Missing data identifier NA (not applicable)	unitless
HOST_SPECIES_LSID	Machine-readable Life Science Identifier (LSID) containing the AphiaID from World Register of Marine Species at the lowest level that matches the host species publication ID. This corresponds to Darwin Core term http://rs.tdwg.org/dwc/terms/scientificNameID. Missing data identifier NA (not applicable)	unitless
OCEAN	The ocean from which the sample was collected. This conforms to the 8 ocean categories in the InterRidge Vents Database ver 3.4 https://vents-data.interridge.org/about_the_database Arctic, Indian, Mediterranean, N. Atlantic, N. Pacific, S. Atlantic, S. Pacific, Southern.	unitless
REGION	The oceanic region from which the sample was collected. This conforms to the InterRidge Vents Database ver 3.4 term “Region,” and generally indicates the regional setting of the vent field along the world plate boundaries https://vents-data.interridge.org/about_the_database. Exceptions include vent fields at intra-plate volcanoes and coastal faults. The Region tends to form part of the hierarchical vocabulary for each vent field Name Feature_ID VentField in MGDS. Missing data identifier NR (not reported in original publication)	unitless
VENT_FIELD_NAME_ID	The vent field from which the sample was collected. This corresponds to the InterRidge Vents Database ver 3.4 term “Name of vent field” https://vents-data.interridge.org/about_the_database. The Name ID uniquely identifies a vent field (assemblage of vent sites) as opposed to a vent site (e.g., Tica vent at EPR, 9°50'N vent field). Missing data identifier NR (not reported in original publication)	unitless

VENT_SITE	If known, the name of the vent site from which the sample was collected. This generally corresponds to the InterRidge Vents Database ver 3.4 term “Vent Sites” https://vents-data.interridge.org/about_the_database. These may be associated with controlled vocabularies for Feature_ID Vent in MGDS. In some cases, original publications listed site markers that are not official vent sites in the InterRidge Vent Database, in which case the reported site marker rather than the controlled vent site ID was recorded in this field. Missing data identifier NR (not reported in original publication)	unitless
COLLECTION_LATITUDE	The collection latitude in decimal degrees where the sample was collected as reported in the original publication. Missing data identifier NR (not reported in original publication)	decimal degrees
COLLECTION_LONGITUDE	The collection longitude in decimal degrees where the sample was collected as reported in the original publication. Missing data identifier NR (not reported in original publication)	decimal degrees
MAXIMUM_OR_SINGLE_REPORTED_DEPTH	The single or greatest reported depth in meters of the sample as reported in the original publication. NR (not reported in original publication)	meters
COLLECTION_YEAR	The year the specimen was collected. Missing data identifier NR (not reported in original publication)	year
COLLECTION_DATE	The date the specimen was collected in format “YYYY-MM-DD”. In some cases, only year (“YYYY”) or year and month (“YYYY-MM”) was provided in the original publication. Missing data identifier NR (not reported in original publication)	date
CRUISE_ID	The identifier for the cruise during which the specimen was collected. Missing data identifier NR (not reported in original publication)	unitless
SHIP	The ship used for the collection. Missing data identifier NR (not reported in original publication)	unitless
COLLECTION_PLATFORM_OR_INSTRUMENT	An identifier for the platform or instrument used to collect the samples, which is either a deep submergence vehicle (HOV or ROV) or a dredge. Missing data identifier NR (not reported in original publication)	unitless
DIVE_NUMBER	If applicable, the unique HOV or ROV dive number for the sample collection. Missing data identifier NA (not applicable) or NR (not reported in original publication)	unitless
HOST_TISSUE	The location or locations on the host where the parasite was encountered according to the original publication. Missing data identifier NR (not reported in original publication)	unitless
PARASITE_LIFE_STAGE	The life stage of the parasite at the time of discovery from the original publication. Missing data identifier NR (not reported in original publication)	unitless

PARASITE_CONSUMER_STRATEGY	A consumer strategy for the parasite or other symbiont at its current life stage based on definitions in Lafferty & Kuris (2002) and Lafferty et al. (2015). This dataset includes vent macroparasites and vent symbionts of three other consumer strategies (commensal, egg predator, and micropredator). A “Macroparasite” is a true parasite that has intensity-dependent pathology. A “Commensal” lives in close association with a host while not harming the host. An “Egg predator” feeds on brooded eggs on the host rather than directly on host tissue. A “Micropredator” is a predator that does not kill its prey.	unitless
CITATION_FIRST_AUTHOR_LAST_NAME	The last name of the first author on the citation that describes the sample.	unitless
CITATION_YEAR	The publication year for the citation that describes the sample.	unitless
CITATION	A full citation for the publication that describes the sample.	unitless
NOTES	Notes	unitless

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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.

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Funding

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

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