Emergence trap sampling of gnathiid isopods at Lizard Island, GBR, Australia from 2016-2018

Website: https://www.bco-dmo.org/dataset/886999
Data Type: Other Field Results
Version: 1
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Project
» Beyond Cleaning and Symbiosis: Ecology of 'Ticks of the Sea' on Coral Reefs (Gnathiid isopod ecology)

Contributors	Affiliation	Role
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Abstract
This dataset contains abundance data for Gnathiid isopods, as well as collection metadata. These data were collected as part of a long-term monitoring study of fish-parasitic gnathiid isopods on shallow patch reefs at Lizard Island, Great Barrier Reef, Australia. The data cover the period from 2000 to 2018. Gnathiid isopods, which spend most of their life free-living, were collected using 1-meter square by 1-meter high pyramid-shaped emergence traps placed randomly on the substrate. The total soak time for the traps was approximately 24 hours, divided into day vs night periods. Some of the patch reefs had cleaner fish, which are known predators of gnathiid isopods, removed over the course of the study (removal) while for others, cleaner fish remained (control).

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Coverage

Location: Patch reefs in the lagoon, and off Casaurina Beach, near Lizard Island Research Station, Great Barrier Reef, Australia. Depth was 4-5m
Spatial Extent: **Lat**:-14.6645 **Lon**:145.4651
Temporal Extent: 2016-07-01 - 2018-12-01

Methods & Sampling

These data were collected as part of a long-term monitoring study of 12 patch reefs off Lizard Island Research Station, GBR (14°40′S, 145°28′E), from July 2016 to October 2018. These reefs were part of a cleaner wrasse (*Labroides dimidiatus*) removal study initiated in September 2000. For these data, only the Lagoon site was used, and *L. dimidiatus* were removed from six reefs (removals), approximately every three months, and left undisturbed on six (control) reefs.

Gnathiid abundance was estimated using 1-meter squared (m2) emergence traps. During all years, traps were set for three consecutive days at the Lagoon site, except for August 2017 (1 day). Traps were moved every 24 hours. Sampling was conducted around the full moon because gnathiid emergence at this site is highest at times of full and new moon. When an additional site (Casuarina Beach) was sampled as part of another study, the sampling order of each site was determined randomly (4 days before or after the full moon) when only the Lagoon reefs were sampled, this occurred after the full moon. In this study, only the Lagoon site was analyzed, with a maximum of 180 samples per sampling trip.

We obtained both a day sample and a night sample from each trap within a 24-hour period. Traps were positioned such that they would not cause damage to or be damaged by the reef. Thirty traps were positioned haphazardly across all reefs beginning at sunrise, with 2–3 per reef and the number depending on reef size. Sampling bottles were replaced with new ones at sunset each day to obtain daytime and nighttime samples. Samples from traps that were damaged or dislodged were excluded. Samples were processed by filtering the contents of the sampling jar through a mesh-lined funnel. Contents were sorted and gnathiids were counted under a dissecting scope.

The data presented here are part of a long-term study that began before the funding period of this project. During 2016 and 2017, sites experienced mass-bleaching events.

Data Processing Description

We are contributing raw data entered in EXCEL spreadsheets. The data were used as part of a larger study that extends beyond the reporting period for this project. See "Results Publications" for more information.

BCO-DMO Curation Notes

- Opened "Gnathiid isopod abundance April 2016 to OCtober 2018 for NSF.csv" in excel to remove all commas from column headers that were preventing the import into the BCO-DMO system
- Save file as "Gnathiid isopod abundance April 2016 to OCtober 2018 for NSF_dm_cleanup.csv" and reuploaded to the submission
- Imported "Gnathiid isopod abundance April 2016 to OCtober 2018 for NSF_dm_cleanup.csv" into the BCO-DMO system
- Adjusted field/parameter names to comply with BCO-DMO naming conventions
- Converted dates in column "Fullmoondate" to format (YYYY-MM-DD)
- Removed “Month” and “Year” columns because they were redundant with “Monthyear” column
- Reformatted "Mothyear column to YYYY-MM
- Exported file as "886999_v1_isopod_abundance.csv"

Taxonomic names checked using the World Register of Marine Species Taxa Match tool on 2025-04-15. All names matched a known name exactly.

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Data Files

File	
886999_v1_isopod_abundance.csv	(Comma Separated Values (.csv), 139.01 KB) MD5:bbf52fea1e42d30a4fdc8fd55c2e8d03
Primary data file for dataset ID 886999, version 1	

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Related Publications

Sikkel, P. C., Richardson, M. A., Sun, D., Narvaez, P., Feeney, W. E., & Grutter, A. S. (2019). Changes in

abundance of fish-parasitic gnathiid isopods associated with warm-water bleaching events on the northern Great Barrier Reef. Coral Reefs, 38(4), 721–730. https://doi.org/10.1007/s00338-019-01835-3
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Parameters

Parameter	Description	Units
Area_sampled_identifier	Unique identifier for the area sampled under trap	unitless
Sampling_date_identifier	Identifier for sampling date: trip and day sampled combination	unitless
Sampling_trip_number	Sampling_trip_number	unitless
Trap_identity	Trap identity	unitless
Monthyear	Month and year of sampling effort	unitless
Site	Sample site at Lizard Island, Great Barrier Reef	unitless
Reef_identity	Reef identity at Lagoon at Lizard Island, Great Barrier Reef	unitless
Cleaner_presence_treatment	Cleaner presence treatment (control = yes cleaner, removal = no cleaner)	unitless
Daynight	Day or night sampling period	unitless
Vial_identity	Identity of sampling vial	unitless
Isopod_count	Gnathiid isopod (Gnathiidae) count per trap	unitless
Time_of_day	Time of day trapping began	unitless
Soaktime	Soaktime (amount of time trap was deployed in minutes)	unitless
Fullmoondate	Date of the full moon	unitless
Lunation_number	Number of the full moon	unitless
Fullmoondate_number	Date converted to a number	unitless
Day_sampled	Day sampled (of lunar period 3.5 being the full moon day, 4 the next day and so on)	unitless

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Instruments

Dataset-specific Instrument Name	Emergence trap
Generic Instrument Name	Fish Cage
Dataset-specific Description	The emergence traps used for this study were constructed by our team.
Generic Instrument Description	Used to catch fish.

Dataset-specific Instrument Name	Dissecting scope
Generic Instrument Name	Microscope - Optical
Dataset-specific Description	Samples were processed by filtering the contents of the sampling jar through a mesh-lined funnel. Contents were sorted and gnathiids were counted under a dissecting scope.
Generic Instrument Description	Instruments that generate enlarged images of samples using the phenomena of reflection and absorption of visible light. Includes conventional and inverted instruments. Also called a "light microscope".

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Project Information

Beyond Cleaning and Symbiosis: Ecology of 'Ticks of the Sea' on Coral Reefs (Gnathiid isopod ecology)

Coverage: Eastern Caribbean, Philippines, Australia

NSF Award Abstract:
Most research on the complex biological interactions that inhabit coral reefs has focused on larger organisms that are easily observed by divers. However, marine scientists are increasingly aware of the importance of the tiny organisms that make up the "smaller majority." This includes parasites, organisms that feed on other organisms without killing them, which may make up as many as 80% of the species on coral reefs. Among the most important parasitic organisms on coral reefs are gnathiid isopods, so-called 'ticks of the sea', that share many similarities with blood-feeding ticks and other arthropods on land. Like ticks and mosquitoes, gnathiids transmit malaria-like blood parasites. In high numbers, they can remove enough blood to kill adult fish, but even a single gnathiid can kill a juvenile fish. Thus, gnathiids may have a significant effect on coral reef communities through their effects on coral reef fishes. This project will use an integrative interdisciplinary approach involving field and laboratory observations and experiments, and molecular tools. In addition to contributing to our understanding of life in our oceans, this research will provide continued support for U.S. Doctoral and Masters students and will create valuable research opportunities for undergraduates from multiple institutions. The project will further build on the investigators existing relationships with resource managers, local divers, fishers, and boat operators, as well as K-12 schools and environmental education programs, and will contribute to local economies. A major goal of our outreach efforts will include an exhibit featuring our research at Coral World Ocean Park on St. Thomas, participation in Virgin Islands radio programs, and hosting high school students from South Carolina Governor's School.

The overall goal this investigation is to understand the ecology of fish-parasite interactions on coral reef and associated ecosystems. This project focuses on fish-parasitic gnathiid isopods, the most common ectoparasites of coral reef fishes that are best known for their role in cleaning symbiosis, as the major food item of cleaner fishes. However, their abundance, host range, role as micropredator, disease vector, and potential prey item for other species, as well as their strong association with the benthos suggests the

potential for much stronger community impacts. The goals for this project are to: 1) characterize the factors influencing local gnathiid isopod density by examining the role of fish-hosts, benthic cover, gnathiid predators including cleaners, and gnathiid conspecific attraction; 2) determine and quantify variation in host exploitation and the effects of gnathiid density on larval fish-host recruitment. To accomplish the first objective, the investigators will trap gnathiids from the substrate at sites in the Caribbean, Australia, and the Philippines. Variables associated with benthic habitat as well as local fish communities will be quantified and compared with local gnathiid abundance. Laboratory experiments will be conducted to determine the effects of different host species on gnathiid growth and reproduction and to determine the role of conspecific attraction in the formation of aggregations. Predators of gnathiids will be identified through examination of gut contents and through laboratory feeding studies. To accomplish the second objective, patterns of host-exploitation will be determined by DNA barcoding of blood meals from wild-caught gnathiids and results compared with the availability of different host species. To determine the effects of gnathiids on early life history stages of coral reef fishes, gnathiid abundance will be manipulated on small artificial patch reefs onto which newly-settled reef fishes will be transplanted.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1536794

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