Results of an investigation of parasite communities infecting lionfish (Pterois volitans) in their native range, Guam and the Philippines, and in their invaded range, the Bahamas and the Cayman Islands

Website: https://www.bco-dmo.org/dataset/3894
Data Type: Other Field Results
Version: 1
Version Date: 2013-04-03

Project
» Ecological Release and Resistance at Sea: Invasion of Atlantic Coral Reefs by Pacific Lionfish (Lionfish Invasion)

Contributors	Affiliation	Role
Hixon, Mark	Oregon State University (OSU)	Principal Investigator
Sikkel, Paul C.	Arkansas State University	Scientist
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Abstract
Results of an investigation of parasite communities infecting lionfish (Pterois volitans) in their native range, Guam and the Philippines, and in their invaded range, the Bahamas and the Cayman Islands.

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Coverage

Spatial Extent: **N**:23.807317 **E**:123.21908 **S**:9.12427 **W**:-76.13253
Temporal Extent: 2010 - 2011

Dataset Description

Results of an investigation of the parasite communities infecting lionfish (*Pterois volitans*) at two sites in their native range, Guam and the Philippines, and at two sites in their invaded range, the Bahamas and the Cayman Islands.

Related Publications:
Sikkel, P.C., L.J. Tuttle, K. Cure, A.I. Dove, J. Passarelli, J.T. McIlwain, and M.A. Hixon. In preparation. Enemy release hypothesis tested: native Pacific lionfish (*Pterois volitans*) have more parasites than invasive Atlantic lionfish. (To be submitted to Biological Invasions).
Tuttle, L.J., P.C. Sikkel, E.A. Williams, L. Bunkley-Williams, A.I. Dove, and M.A. Hixon. In preparation. Invasive lionfish (*Pterois volitans*) have fewer parasites than native piscivorous fishes found on the same Atlantic reefs. (To be submitted to Marine Ecology Progress Series).

Acquisition Description

Dissections and sampling were performed of the gills, external surface, and gastrointestinal tract of lionfish and several ecologically similar species at each location, focusing on macroparasitic fauna (trematodes, cestodes, nematodes, monogeneans, copepods, etc.).

Description of values in 'parasite' column:
gut_digenean = dignean parasites found in the gastrointestinal tract of the host.
gut_cestode = cestode parasites found in the gastrointestinal tract of the host.
gut_nematode = nematode parasites found in the gastrointestinal tract of the host.
gut_didymozoid = didymozoid parasites found in the gastrointestinal tract of the host.
gut_acanthocephalan = acanthocephalan parasites found in the gastrointestinal tract of the host.
gut_metazoan = metazoan parasites found in the gastrointestinal tract of the host.
gut_other = all other (unidentified) parasites found in the gastrointestinal tract of the host.
heart_didymozoid = didymozoid parasites found in the host heart.
gill_monogenean = monogenean parasites found in the anterior two gill arches of each side of the host.
gill_copepod = copepod parasites found in the anterior two gill arches of each side of the host.
gill_isopod = isopod parasites found in the anterior two gill arches of each side of the host.
gill_other = all other (unidentified) parasites found in the anterior two gill arches of each side of

the host.
skin_didymozoid = didymozoid parasites found on the external surface of the host, as sampled by a freshwater bath in the ectoparasites dislodge via osmotic pressure.
skin_monogenean = monogenean parasites found on the external surface of the host, as sampled by a freshwater bath in the ectoparasites dislodge via osmotic pressure.
skin_copepod = copepod parasites found on the external surface of the host, as sampled by a freshwater bath in the ectoparasites dislodge via osmotic pressure.
skin_isopod = isopod parasites found on the external surface of the host, as sampled by a freshwater bath in the ectoparasites dislodge via osmotic pressure.
skin_other = all other (unidentified) parasites found on the external surface of the host, as sampled by a freshwater bath in the ectoparasites dislodge via osmotic pressure.

Processing Description

BCO-DMO Processing Notes:
-Modified parameter names to conform with BCO-DMO naming conventions.
-Added lat and lon for each site from the metadata provided.
-Replaced blanks with 'nd' to indicate 'no data'.
-Removed parentheses and commas from the site column.
-Changed blank site names to 'unknown'.
- 09-Jan-2018: removed embargo on dataset.

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Parameters

Parameter	Description	Units
location	Regional location where trial was conducted (Lee Stocking Island, Little Cayman, or the Philippines).	text
site	Name of reef on which fish was collected.	text
lat	Latitude of site.	decimal degrees
lon	Longitude of site.	decimal degrees
species	Host species.	text
fish_id	Specific identification code for individual of host species. (Originally called 'Specimen ID').	dimensionless
len_tot	Total length in centimeters of the host.	cm
weight	Mass in kilograms of the host.	kg
date	Date on which trial was conducted.	dimensionless
month	2-digit month during which trial was conducted.	mm (01 to 12)
year	4-digit year during which trial was conducted.	YYYY
parasite	Name and location of the parasite found in or on the host. See 'Acquisition Description' for detailed descriptions.	text
abundance	Total number of the specified parasites found on or in the host.	integer
notes	Other noteworthy observations.	text

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Project Information

Ecological Release and Resistance at Sea: Invasion of Atlantic Coral Reefs by Pacific Lionfish (Lionfish Invasion)

Website: http://hixon.science.oregonstate.edu/content/highlight-lionfish-invasion

Coverage: Bahamas; Cayman Islands; Mariana Islands; Philippines

Invasive species are increasingly introduced by human activities to new regions of the world where those species have never existed previously. In the absence of natural enemies (predators, competitors, and diseases) from their homeland, invasives may have strong negative effects on invaded ecosystems, especially systems with fewer species ("ecological release"), and may even drive native species extinct. However, if native natural enemies can somehow control the invaders ("ecological resistance"), then ecological disruption can be prevented or at least moderated. Most of the many invasive species in the sea have been seaweeds and invertebrates, and the few documented invasive marine fishes have not caused major problems. However, this situation has recently changed in a stunning and ominous way. In the early 1990s, lionfish (Pterois volitans) from the Pacific Ocean were accidentally or intentionally released from aquaria to the ocean in the vicinity of Florida. Camouflaged by shape and color, protected by venomous spines, consuming native coral-reef fishes voraciously, and reproducing rapidly, lionfish have subsequently undergone a population explosion. They now range from the mid-Atlantic coast of the US to the Caribbean, including the Bahamas. Native Atlantic fishes have never before encountered this spiny, stealthy, efficient predator and seldom take evasive action. In fact, the investigator has documented that a single lionfish is capable of reducing the abundance of small fish on a small coral patch reef by nearly 80% in just 5 weeks. There is great concern that invasive lionfish may severely reduce the abundance of native coral-reef fishes important as food for humans (e.g., grouper and snapper in their juvenile stages) as well as species that normally maintain the integrity of coral reefs (e.g., grazing parrotfishes that can prevent seaweeds from smothering corals). There are far more species of coral-reef fish in the Pacific than the Atlantic, so this invasion may represent a case of extreme ecological release with minor ecological resistance. Dr. Hixon and colleagues will study the mechanisms of ecological release in lionfish, as well as examine potential sources of ecological resistance in the heavily invaded Bahamas. Because very little is known about the ecology and behavior of lionfish in their native Pacific range, he will also conduct comparative studies in both oceans, which may provide clues regarding the extreme success of this invasion. In the Bahamas, the investigator will document the direct and indirect effects on native species of the ecological release of lionfish, both as a predator and as a competitor. These studies will be conducted at various scales of time and space, from short-term experiments on small patch reefs, to long-term experiments and observations on large reefs. Whereas direct effects involve mostly changes in the abundance of native species, indirect effects can be highly variable. For example, lionfish may actually indirectly benefit some native species by either consuming or outcompeting the competitors of those natives. The project will explore possible ecological resistance to the invasion by determining whether any native Bahamian species are effective natural enemies of lionfish, including predators, parasites, and competitors of both juvenile and adult lionfish. Comparative studies of natural enemies, as well as lionfish ecology and behavior, in both the Atlantic and the Pacific may provide clues regarding the explosive spread of lionfish in the Atlantic. Regarding broader impacts, this basic research will provide information valuable to coral-reef and fisheries managers fighting the lionfish invasion in the US, the Bahamas, and the greater Caribbean, especially if sources of native ecological resistance are identified. The study will fund the PhD research of U.S. graduate students, as well as involve assistance and participation by a broad variety of undergraduates and reef/fisheries managers, including women, minorities, native Bahamians, and native Pacific islanders. Participation in this project will promote education in marine ecology and conservation biology directly via Dr. Hixon's and graduate students' teaching and outreach activities, and indirectly via the experiences of undergraduate field assistants and various associates.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0851162

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