Record of lionfish sighted near Little Cayman Island in 2011 (Lionfish Invasion project)

Website: https://www.bco-dmo.org/dataset/3988
Data Type: Other Field Results
Version: 1
Version Date: 2013-07-05

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

Contributors	Affiliation	Role
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Abstract
This dataset includes dates, locations, and biological information (e.g. length) of all lionfish (Pterois volitans) that were observed during field studies at coral reefs near Little Cayman Island, Cayman Islands during the summer of 2011. This dataset includes both lionfish that were sighted (but not handled) and those that were collected.

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Coverage

Spatial Extent: **N**:19.7067 **E**:-80.01219 **S**:19.65497 **W**:-80.1036
Temporal Extent: 2011-08-04 - 2011-08-29

Dataset Description

This dataset includes dates, locations, and biological information (e.g. length) of all lionfish (*Pterois volitans*) that were observed during field studies at coral reefs near Little Cayman Island, Cayman Islands during the summer of 2011. This dataset includes both lionfish that were sighted (but not handled) and those that were collected. Lionfish that were collected are also reported in the "lionfish collections Cayman 2011" dataset.

Methods & Sampling

Information was recorded on all invasive lionfish sighted (including lionfish that were collected) during fieldwork at Little Cayman island, Cayman Islands from 04 August to 29 August 2011.

Data Processing Description

BCO-DMO Processing Notes:
- Modified parameter names to conform with BCO-DMO naming conventions.
- Added lat and lon values for each site included in the original metadata.
- Replaced blanks with 'nd' to indicate 'no data'.
- 08-Jan-2018: removed embargo from dataset.

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Data Files

File
lionfish_sightings_Cayman_2011.csv (Comma Separated Values (.csv), 7.66 KB) MD5:421d9493bdaca08f49c569cd60b5791b Primary data file for dataset ID 3988

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Parameters

Parameter	Description	Units
site	Name of the dive sight.	code
lat	Latitude of the reef site.	decimal degrees
lon	Longitude of the reef site.	decimal degrees
date_sighted	Date lionfish was first observed in mm/dd/YYYY format.	unitless
fish_id	Unique code given to each lionfish collected.	code
depth_ft	Depth where lionfish were discovered.	feet
len_tot_est	Underwater visual estimate of total body length of lionfish (centimeters).	cm
person	Person who observed individual lionfish (TK = Tye Kindinger; LT = Lillian Tuttle).	text
notes	Additional notes.	text
used_for	Which studies individual lionfish were used (if any): TK Bottle Expt = damselfish behavioral response to lionfish (Kindinger) LT Cleaner Expt = lionfish cleaner lab expt 2011 (Tuttle)	text

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Deployments

Cayman_Reef_Surveys_10-11

Website	https://www.bco-dmo.org/deployment/59048
Platform	Cayman_Islands
Start Date	2010-06-14
End Date	2011-08-29
Description	Coral reefs were surveyed/studied near the Cayman Islands during the summers of 2010 and 2011 as part of the projects "Ecological Release and Resistance at Sea: Invasion of Atlantic Coral Reefs by Pacific Lionfish" and "Mechanisms and Consequences of Fish Biodiversity Loss on Atlantic Coral Reefs Caused by Invasive Pacific Lionfish" (NSF OCE-0851162 & OCE-1233027).

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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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