The Effects of Lionfish, *Pterois volitans*, on Spiny Lobster, *Palinurus argus*, condo displacement

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Introduction

Lionfish are an invasive species from the Indo-Pacific they were first sighted in The Bahamas in 2004. Since their invasion in The Bahamas, their population has grown exponentially, they now inhabit reefs throughout the entire Caribbean. Lionfish have been so successful for numerous reasons such as their ability to consume anything that fits inside of their mouths. They are habitat generalists and are able to live in depths ranging from 1 meter to a thousand feet. Additionally, they are prolific breeders and have the potential to lay up to 2 million eggs per year, and they have few natural predators in the Caribbean, with the exception of humans (Morris et al. 2009).

The Caribbean spiny lobster is The Bahamas main marine export and lobster fisheries. Henderson and Cote in 2011, observed that when lionfish were present in fishing condos, structures used to aggregate lobsters, there were fewer lobsters. Because of the lobster fisheries, economic significance to the Caribbean, the spring 2013 Brand School Lionfish Research team investigated the potential displacement of lobster by lionfish from fishing condos. This semester, the effects lionfish of lobster displacement was further examined by comparing lobster interactions to a native predator, the graysby. The graysby was chosen because it is also abundant in the area, has similar feeding and habits as the lionfish.

Methods

Social Science

To better understand the effects of the lionfish invasion on lobster displacement, local fishermen were interviewed, because they have a wealth of knowledge and personal experience.

Field Work

The mean abundance of lobster and lionfish on reefs were recorded on patch reefs surrounding Cape Eleuthera, (N=46). These surveys contribute to an ongoing abundance study started in 2003.

Lab Work

Interactions between the lobster and lionfish/graysby were recorded. Video footage was analyzed from four hours of the day: dusk, dawn, mid-day and mid-night. The footage was then analyzed second by second noting behavior and location relative to the condo for each species.

Aim

To investigate the potential displacement of lobster from condos by the invasive lionfish in comparison to a native species.

Results

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**Results**

**Have you noticed a decrease in your Lobster catch since the Lionfish invasion?**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lobster Control</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>+ Invasion</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>+ Native</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Results**

**Would You Fish For Lionfish?**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
</tr>
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<td>+ Invasive</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

In answer to the aim of this study, the invasive lionfish did cause lobster displacement from condos. However, similar results were observed in the graysby trials. Interestingly, graysby spent very little time evading the lobster post interaction in comparison to the lionfish. These results suggest a more discordant relationship between lobster and lionfish than between lobster and graysby. Patch reef surveys indicate that population decline is not responsible for lower lobster abundance in condos. Increased lionfish abundance and dissonant behavior between lionfish and lobster suggest that lionfish are causing lobster displacement from condos.

The findings of this study have significant implications for the socioeconomics of countries dependent on the lobster industry, particularly The Bahamas. Thus, future studies should explore lobster displacement from condos further perhaps through shelter choice experiments and in-water observations. The development of the lionfish market should be a priority as it would help negate the environmental and economic impacts of the invasive fish. The results from social science interviews suggest fishermen are still unwilling to fish for lionfish. Perhaps with more education and outreach these opinions can be changed.

**Citations**


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