

Lionfish Prey Consumption in St. Croix, US Virgin Islands

Pez León Presa Consumo en St. Croix, U.S. Virgin Islands

Poisson-lion de Proies Consommation à St. Croix, Iles Vierges

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ABSTRACT

In 2008 the first confirmed lionfish was removed from St. Croix, US Virgin Islands. Currently, the lionfish populations in the US Virgin Islands are well established and have spread down the Lesser Antilles toward South America. This study investigated potential temporal and spatial changes in prey consumption by lionfish culled from reefs surrounding St. Croix, VI. After observing gut contents of 542 lionfish in 2011 that were collected from the west end of St. Croix and 86 lionfish from the northeast end in 2013, results indicated that lionfish preferred the same top three prey items, regardless of location.

KEY WORDS: Lionfish, prey, Caribbean, St. Croix, VI

INTRODUCTION

By 2010, the Indo-Pacific lionfish (*Pterois volitans*) had quickly invaded and established abundant populations throughout the northwest Atlantic Ocean, Gulf of Mexico and Caribbean Sea (Schofield, 2010). In St. Croix, VI, the first confirmed lionfish was removed from the Frederiksted Pier on the west end in November 2008. Within three years (2008–2011) lionfish were well established on reefs surrounding the island (Castillo and Reale-Munroe, 2012). The rapid establishment of abundant populations of lionfish results in increased pressure on local marine organisms as they are preyed upon.

As lionfish densities increased, massive losses in biodiversity and reductions in native fish populations have been observed. Several studies have shown that predation by lionfish cause significant reductions in biomass of native fish species (Côté et al. 2013, Green et al. 2012, Green et al. 2011, Côté and Maljkovic 2010). For instance, a 79 - 94% reduction in small fish abundances in 5 - 8 weeks, respectively have been observed on reefs in the Bahamas (Albins & Hixon 2008, Albins 2013). With dense lionfish populations heavily preying on marine organisms, local extinctions will likely arise. This study explored potential diet preferences based on gut contents of lionfish culled from different areas surrounding St. Croix. We were specifically interested in exploring which prey populations would be most affected by direct predation by lionfish. Our objectives were to compare gut contents of lionfish from two different study sites, in two different years to determine diet based on geographical and temporal distribution.

METHODS

Lionfish were culled from the west end of St. Croix (Lat: 17.727941°, Lon: -64.896210°) in 2011 and the northeast (Lat: 17.786841°, Lon: -64.620737°) in waters surrounding Buck Island Reef National Monument in 2013. Removals occurred between the hours of 08:00 - 11:00 AM by trained divers using pole spears or de-tuned spear guns and stored in containment units until brought to the surface. Once lionfish were brought to the surface, they were stored on ice for same-day dissection. Lionfish were removed from depths ranging from 9 - 21 m (30 - 70 ft) on hardbottom, patch reefs and fringing reef habitat types at both study site locations. Standard dissection techniques outlined in (Green et al. 2012) were used for determining gut contents.

RESULTS

A total of 628 lionfish were dissected, 542 from the west end in 2011 and 86 from the northeast in 2013. The 2011 gut content dataset revealed the following: 33% digested material, 31% unidentifiable vertebrate, 13% shrimp (Crustacea), 9% Damselfish (Pomacentridae), 9% empty stomach, 4% Wrasse (Labridae), 1% Squirrelfish (Holocentridae) and 1% Chromis (Pomacentridae). The 2013 dataset was as follows: 54% vertebrate, 16% digested material, 9% shrimp (Crustacea), 5% Damselfish (Pomacentridae), 4% Wrasse (Labridae), 4% empty stomach, 3% Slippery Dick (Labridae), 3% Goby (Gobiidae), 2% Parrotfish (Scaridae) and 1% Snapper (Lutjanidae). Both datasets revealed that the top three discernable prey were, shrimp, damselfish and wrasse.

CONCLUSIONS

The question remains if lionfish exhibit a dietary preference or if the results are a reflection of prey abundance in habitat types where lionfish are found. Results suggest that although lionfish are generalists, shrimp, damselfish and wrasse populations will be greatly affected by direct predation. Diminished populations of native marine organisms will likely cause cascading effects. Damselfish are herbivorous reef fish. Herbivores keep algae in check, a process known to be important for coral reef health. Lionfish will directly compete for food resources. Wrasse are also prey for other native species, such as Nassau grouper and mutton snapper. Lionfish also prey on juvenile grouper and snapper, confounding the decline in native fish populations. Abundant populations of lionfish will continue to have detrimental effects on native populations of fish, the local fishing industry, and the ecology of our coral habitats.

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