The Invasion of Indo-Pacific Lionfish Off Bocas del Toro Archipelago, Panama: Are Fishers Doing Their Part?

La Invasión del Pez León del Indo-Pacífico en el Arquipiélago de Bocas del Toro, Panamá: Están los Pescadores Haciendo su Parte?

L'invasion du Poisson Lion de l'Indo-Pacifique dans l'Archipel de Bocas del Toro, Panama: Les Pêcheurs sont en Train de Faire Leur Part?

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EXTENDED ABSTRACT

Several nations throughout the Caribbean, where invasive Indo-Pacific lionfish are abundant, have created management strategies by promoting demand for this new resource (e.g., through organized removal events/derbies) in the hope of mitigating its impact on reef communities. Recent studies have shown that this specific strategy is a popular tool to reduce lionfish populations and should be encouraged across the invaded range (Barbour et al. 2011, Frazer et al. 2012, deLeon et al. 2013).

Lionfish were first reported in Panama in 2009 (Schofield 2010), and have been regarded as fairly abundant by local authorities. The archipelago of Bocas del Toro, located close to the Panamanian border with Costa Rica, comprises 9 islands, 55 cays and 200 islets. Organized derbies have occurred since the first stages of the invasion, and although these events ceased for a 1.5 year period, a reduction in lionfish abundance was detected on one reef that was continuously monitored (Figure 1). The rapid development in the following years had, however, diverted some traditional fishers to alternative occupations related to tourism activity. Local management strategies are currently limited. Few restaurants in the area offer lionfish on their menu, and others are reticent to prepare it because of its menacing, venomous spines or because it is not abundant enough to create a market. Local indigenous communities are taking a step forward on selling a considerable amount of whole fish to at least one restaurant willing to buy every amount offered, whenever available. Dive shops also eventually remove lionfish during their activities, but information on number of lionfish caught is not available in either case. The authority for aquatic resources (ARAP) is currently organizing removals (three so far) with local fishers being the more active participants. Numbers of lionfish caught are considerably decreasing at every event. However, as the invasion could still have potentially dramatic effects on local reef community structure, this study aimed to assess the current invasion status in the archipelago and bring insights for improvements of local management strategies.

This study used intensive searches of lionfish at 60 sites throughout the archipelago, during which we also recorded several parameters that might predict lionfish occurrence, such depth, wave exposure, habitat quality, removal (by diver, by fisher, none), and distance from coast. Although there were few sites with lionfish and density was low, there were still enough sites to examine the correlates of lionfish abundance. Lionfish abundance was negatively affected by removal and positively related to wave exposure and depth, indicating that access by divers and/or fishers could be a limiting factor for local control. Although lionfish abundance declined with wave exposure in a previous study (Anton et al. 2014), we believe that in our case, sites with limited access throughout the year due to bad weather and/or sea conditions could be acting as refuge for adult lionfish. These sites also had deeper reefs that are eventually accessed by divers during May - June and September - October, when the best sea conditions prevail. These time periods should be prioritized during organized derbies.

Additionally, the present study explores how qualitative data from informal interviews with locals offer a human perspective on the implications of the lionfish invasion, providing important avenues for management. Promoting consumption of lionfish among the local community and at restaurants frequented by tourists could encourage a continuous fishing effort around the Bocas del Toro archipelago. Although the sustainability of such a resource is still questionable at this stage of invasion, we do not discard the needs of community outreach initiatives such as training locals and restaurant professionals to safely prepare lionfish for consumption. Taken together, increased demand for lionfish by restaurants in tandem with continued removal could substantially increase its price in the market, helping to reduce the abundance of recently settled lionfish in the region.

KEY WORDS: Lionfish invasion, population control, resource viability

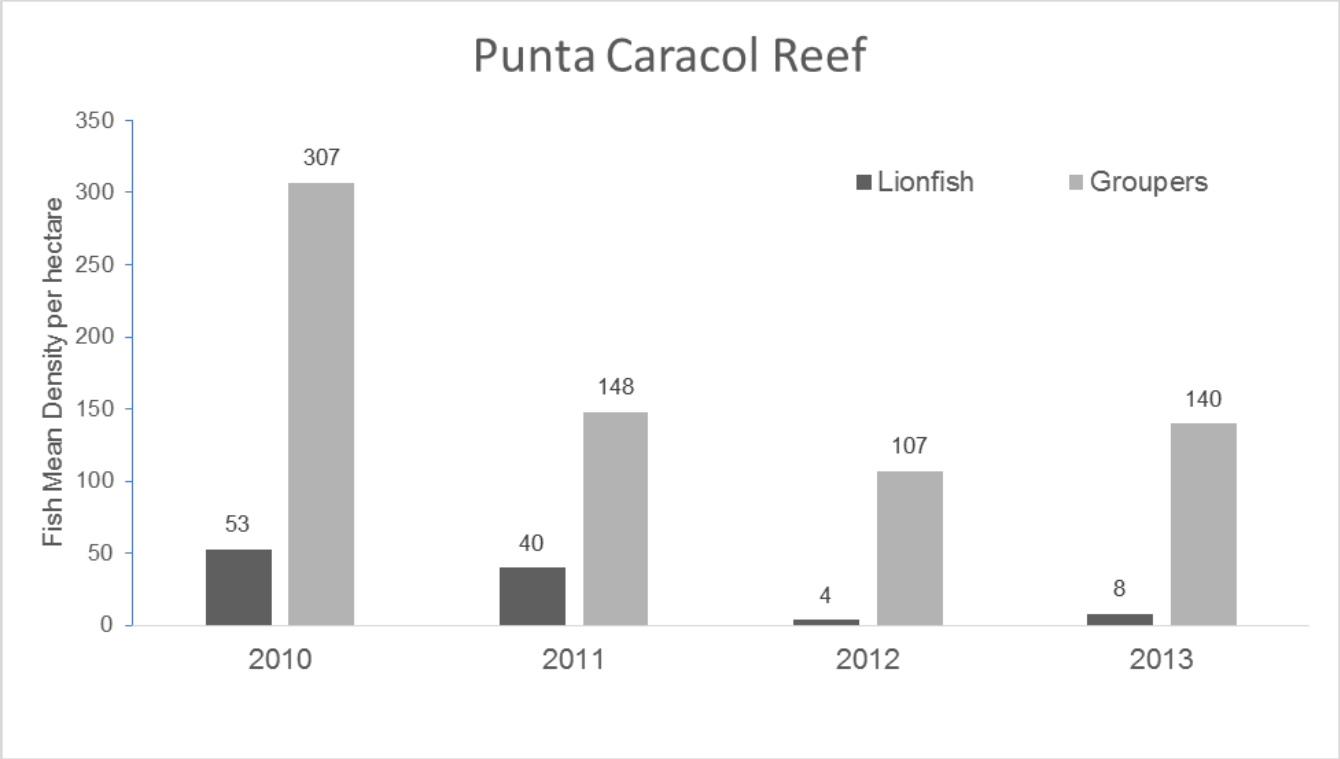

Figure 1.Mean density of lionfish and groupers assessed during a monitoring program conducted from December 2010 to December 2013 at Punta Caracol reef. Source: Tropical Conservation Consortium (tropicalcc.org)

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