Caribbean's native predators unable to stop aggressive lionfish population growth

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Credit: Abel Valdivia

"Ocean predator" conjures up images of sharks and barracudas, but the voracious red lionfish is out-eating them all in the Caribbean – and Mother Nature appears unable to control its impact on local reef fish. That leaves human intervention as the most promising solution to the problem of this highly invasive species, said researchers at the

University of North Carolina at Chapel Hill.

"Lionfish are here to stay, and it appears that the only way to control them is by fishing them," said John Bruno, professor of biology in UNC's College of Arts and Sciences and lead investigator of the study. The research has important implications not just for Caribbean reefs, but for the North Carolina coast, where growing numbers of lionfish now threaten local fish populations.

"Native predators do not influence invasion success of Pacific lionfish on Caribbean reefs" was published July 11 by the journal *PLOS ONE*.

Lionfish, native to the Indo-Pacific region, have long been popular aquarium occupants, with their striking stripes and soft, waving fins. They also have venomous spines, making them unpleasant fare for predators, including humans—though once the spines are carefully removed, lionfish are generally considered safe to eat, Bruno said.

They have become big marine news as the latest invasive species to threaten existing wildlife populations. Bruno likened their extraordinary success to that of ball pythons, now eating their way through Florida Everglades fauna, with few predators other than alligators and humans.

"When I began diving 10 years ago, lionfish were a rare and mysterious species seen deep within coral crevices in the Pacific Ocean," said Serena Hackerott, lead author and master's student in marine sciences, also in UNC's College of Arts and Sciences. "They can now been seen across the Caribbean, hovering above the reefs throughout the day and gathering in groups of up to ten or more on a single coral head."

The international research team looked at whether native reef predators such as sharks and groupers could help control the population growth of red lionfish in the Caribbean, either by eating them or out-competing

them for prey. They also wanted to evaluate scientifically whether, as some speculate, that overfishing of reef predators had allowed the lionfish population to grow unchecked.

The team surveyed 71 reefs, in three different regions of the Caribbean, over three years. Their results indicate there is no relationship between the density of lionfish and that of native predators, suggesting that, "interactions with native predators do not influence" the number of lionfish in those areas, the study said.

The researchers did find that lionfish populations were lower in protected reefs, attributing that to targeted removal by reef managers, rather than consumption by large fishes in the protected areas. Hackerott noted that during 2013 reef surveys, there appeared to be fewer lionfish on popular dive sites in Belize, where divers and reef managers remove lionfish daily.

The researchers support restoration of large-reef predators as a way to achieve better balance and biodiversity, but they are not optimistic that this would affect the burgeoning lionfish population.

"Active and direct management, perhaps in the form of sustained culling, appears to be essential to curbing local lionfish abundance and efforts to promote such activities should be encouraged," the study concluded.

More information: dx.plos.org/10.1371/journal.pone.0068259

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