

**Reed:** Welcome back listeners to another episode of: “What’s New in the Deep Blue”, as always I’m your host Reed Thompson, and today we will be discussing invasive marine species. With the increase in globalization and the relocation of species to new ecosystems, we have seen a number of introduced species that completely dominate the landscape of the ecosystem that they were introduced in. Today we will be focusing on the invasive lionfish in the Caribbean, Atlantic, and Gulf Coast. With me today I have Dr. Lety (Leh-tee) Santillana (Sahn-tee-yah-nah), a highly regarded Marine Ecologist, and Dr. Emma Fleck, a well publicised case study researcher. (you guys can change your titles how you want) Go ahead and introduce yourselves to our listeners out there.

**Emma:** Hi Reed! Thanks for having us on the show! I’m Dr. Fleck and have been studying the lionfish for 13 years in Florida. Dr. Santillana and I are actually close friends, we have spent many days out at sea together!

**Lety:** Hi everyone, again, thank you, Reed, for hosting us. I’m Dr. Santillana and I am a Marine ecologist at Eckerd College in Florida. I have been researching lionfish for a very long time now.

**Reed:** So, for myself and all our listeners, why don’t you summarize the situation regarding lionfish in the Gulf Equatorial region.

**Emma:** Lionfish are a bit of a fatal attraction, beautiful but very deadly for many other marine species around them. But keep in mind throughout this podcast, audience, that lionfish are venomous not poisonous and have a great taste! Lionfish started in the caribbean and have roared across the Atlantic. They do incredibly well in many environments and eat almost anything....

**Reed:** So, it sounds like these lionfish have spread out rapidly over a short period of time. Where did they come from, and how have they spread?

**Lety:** The Red lionfish, the species we are discussing today, is native to the Indo-Pacific waters. There are various theories on how they could have been introduced but scientists believe it happened during Hurricane Andrew in 1992 off the coast of Florida. Since then, red lionfish have spread as far north as Rhode Island and as far south as *South American* countries like Brazil, with invasions all throughout the Caribbean Islands.

**Emma:** Some populations have spread out naturally but, many people believe 10 lionfish were released off of the coast of Florida and reproduced quickly. Lionfish are estimated to populate a million square miles of ocean in a 10 year span. Lionfish can live in a variety of environments living as low as 300m. They are also slow movers and look like seaweed which can serve as camouflage.

**Reed:** To have spread so far, from just 10 fish! Now, earlier, you say they eat almost everything, how has this impacted the reefs?

**Lety:** So, two studies from 2008 and 2012 found that red lionfish are causing a mass decline in the survivability of coral reef fishes. In between 2004 and 2010, we saw a huge spike in lionfish populations and this coincided with a massive decline in the native fish populations. These lionfish do not discriminate! They eat all kinds of fish, including ecologically important ones like parrotfish which can be problematic. Parrot fish are vital for coral reefs since they feed on algae that colonizes on corals and therefore help mitigate algal blooms. To make matters worse, coral reef fishes don't typically recognize lionfish as predators so their curiosity may also be a cause for their decline. Also, it was thought that lionfish only affected smaller fishes, but over time larger fishes started declining as well. Scientists believe that lionfish feed on the young of larger fish which means that red lionfish are affecting all levels of coral reefs.

**Reed:** Man these lionfish really have no morals! Now does anything prey on them?

**Emma:** Unfortunately not very many things eat lionfish. There is an exciting study out that looks at groupers, a large fish that eats lionfish. Lionfish were found in the bellies of groupers so scientists decided to look more into it. A study team was able to capitalize on a 20 year long fishing ban in a small section in the Bahamas. You see, groupers are highly fished and fishing really lowers their population size. So a low population size of groupers may not show anyone if they affect the lionfish population or not, even if they can eat them doesn't mean they will help control the population. During this fishing ban groupers groups populations soared. After 5 years into the ban the scientists evaluated the situation and saw a significant correlation with groupers populations increasing and lionfish populations decreasing.

**Reed:** So, we are overfishing the only obvious predators. Does that mean they are expanding uncontrollably?

**Lety:** Exactly! Red lionfish have absolutely no natural predators on the Atlantic Coast. Large predators in these areas either don't recognize this fish as prey or they are not able to survive the venomous strike of the lionfish. Lionfish can also reproduce and invade incredibly fast via larval dispersal--this just means that ocean currents can distribute the larva of this species to other regions relatively fast.

**Reed:** So, do we have any methods of trying to reduce the populations of these detrimental fish?

**Emma:** Yes, some locations run lionfish derbies where people have competitions to catch the most lionfish. People go out with traps and spears to try and catch as many lionfish as possible. These not only help control the lionfish populations but bring in

profits to the communities and awareness of invasive species. Some organizations or events they discussed related to lionfish hunting include the Grenada Annual Dive Fest, Sandals Foundation, Ocean Encounters, The Diveshop Curacao (cura - sow), and the Cayman United Lionfish League.

**Reed:** I know personally that the fishing laws surrounding lionfish are particularly lax in Florida. The only regulation is that you have a fishing license to use a fishing rod, or the proper training to spearfish. You can even spearfish for lionfish in conservation zones if you have the proper permission and licensing by the organisations who runs them. So, it sounds like we already have solutions to this problem. Are these successful?

**Lety:** This side of lionfish research is a bit understudied. It has been hard trying to evaluate how successful these strategies are. However, a 2011 study focused on evaluating lionfish removals modeled various scenarios and they found that about 157-293 lionfish would have to be removed per YEAR in order to decrease the population. Unfortunately, most of the successful removal methods are very costly. Many scientists believe that the best and easiest way of eradicating lionfish is through the creation of a fishery. But, we do worry this may cause more problems in the future.

**Reed:** Yes, Fisheries have been a discussion on this podcast in the past. They certainly have both benefits and disadvantages.

**Lety:** Yes, like any fishery, it could lead to bycatching of native species or destruction of the reefs themselves. We definitely need to focus on studying this aspect a lot more, just in general red lionfish need to be studied more under this context.

**Reed:** So, are we containing them now, or are lionfish populations continuing to spread out?

**Emma:** Lionfish are continuing to spread. Recently lionfish have been found in Brazil, a country with no setup to prevent the lionfish population from growing. As Dr. Santillana mentioned earlier there are a lot of ways these fish are reproducing and spreading this may be dire for local fish populations.

**Reed:** So, can we do anything personally to decrease these populations?

**Emma:** Eat lionfish! There are even lionfish cook books out there!

**Reed:** Eat them! You were saying lionfish are venomous though!

**Lety:** Yeah, it is true, lionfish have needle-sharp venomous spines that they use to rapidly strike prey. These spines can definitely be dangerous to us too, which makes some removal strategies quite risky. Yet, they are completely harmless once those are removed, so eating them is totally fine. They are actually quite delicious!

Podcast Script: Lionfish Invasions

**Reed:** Well, you learn something new everyday. Is there anywhere our viewers can donate to to help these causes?

**Emma:** Yes! If you don't want to derby or eat lionfish you can donate to Ocean Conservancy and Sailors of the Sea.

**Reed:** Alright, well unfortunately that is all we have time for today. Thank you Dr. Fleck and Dr. Santillana for joining me on today's episode of "What's New in the Deep Blue"

**Emma and Lety:** Thanks for having us!

**Reed:** And thank you to all our sponsors and patrons who generous donations allow us to bring this podcast to you every week. For more information on this topic, or others we have discussed in the past, or to become patron yourself, visit our website at:

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