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Coral Reefs Podcast and Scientist Interview
Acroporidae

Coral reefs are bustling cities of marine life, until rising ocean temperatures turn them into ghost towns. Can reefs spring back from devastating bleaching events? Ari Daniel Shapiro and researcher Dr. Randi Rotjan of the New England Aquarium, journey to the remote Phoenix Islands to find out.

Transcript

Ari: This is One Species at a Time, the story of Earth's biodiversity, one organism at a time. I'm Ari Daniel Shapiro.

This time we're talking about coral reefs. Randi Rotjan is a coral reef biologist with the New England Aquarium.

Rotjan: You know, a colleague describes them as sea monsters because they're both animal, vegetable and mineral at the same time.

Ari: Lemme explain. Corals are made up of a bunch of teeny tiny animals called polyps – little stalks with tentacles sticking out the top.

Rotjan: Each one of these polyps looks a little bit like an anemone.

Ari: Right. Then there are these small plants called algae.

Rotjan: This plant-like algae is living inside the tissues of the coral animal.

Ari: The algae take sunlight and turn it into food, just like plants do, but in corals, the polyps also get to eat this food. Most polyps can't even survive without the algae. So the polyps – the animal part – get food, the algae – the plant part – get a home, …

Rotjan: And together they build a skeleton.

Ari: A hard mineral skeleton. These skeletons are giant and look like the rocks and boulders and fans and spines you probably imagine when you think of a coral. You know what, coral reefs are like little cities.

Rotjan: That's right, that's exactly right. Corals build little cities.

Ari: Little, colorful cities for fish to live in, and eels to live in, and turtles to swim through, and starfish to grow on. Corals – especially one group of corals called the acroporids – create 3-dimensional space underwater.

Rotjan: Which you can swim through, and around, and especially if you're a fish and there are territories and habitats. So there's a lot of complexity. It can surround you. Every layer you look, you see a whole, equally complex layer unfold. As you swim down, you'll see all of the nooks and crannies and bumps that the coral city is creating, and you'll be able to see some of the more detailed apartments.

Ari: Little apartments and little buildings created by the corals over thousands of years.

Rotjan: As you look closer still, you'll be able to start seeing the residents of the city: you'll begin to see the fishes and a lot of the invertebrates, and how they're interacting with each other, and how their bustling daily lives look in this city.

Ari: And, if you'd gone to the Phoenix Islands – that's in the middle of the Pacific Ocean – and looked at the reefs there before 2002, that's exactly what you would've seen. Bustling, busy, alive. But then…

Rotjan: There was a very, very large temperature event in 2002/2003: seven months of extremely high ocean temperatures. Tropical corals don't do well above 86, 87 degrees Fahrenheit and the corals in the Phoenix Islands reached about 95 degrees Fahrenheit for seven months.

Ari: And in that kind of heat, something happens to corals, called bleaching.

Rotjan: Bleaching is corals turning white. The algae leave, the corals can no longer get all the carbon from their algae, and they basically slowly starve to death. It's like a relationship where, you know, one half of the team is no longer there.

Ari: When corals bleach and die, those little cities teeming with life, they change. It's like no one's around to keep the buildings up and it all just…collapses and decays. And that's exactly what things looked like on the Phoenix Island reefs in 2005 after the heat wave passed.

Rotjan: It was a ghost town, it was a standing, dead graveyard of corals: ghosts of their former glory. A ton of dead acroporid skeletons. They really were dead in place, and it becomes weaker and weaker. And then it can crumble when a storm comes. And all of that city that they had together once built just eventually slowly breaks down without the live coral and the algae to keep it going.

Ari: It's possible that climate change may be triggering even more coral bleaching events worldwide. Should we be worried about the coral? Maybe, but it's hard to say because no one knows just how tough corals are. That's why Rotjan is studying the isolated Phoenix Island corals in the middle of the ocean, literally.

Rotjan: In the absolute middle of nowhere.

Ari: These corals don't have to worry about things like overfishing, pollution and disease like most corals do. So in 2009 Rotjan made a trip to the Phoenix Islands to study the corals there. Corals without any real stress since they bleached 6 years earlier. And what she saw amazed her.

Rotjan: These reefs are well on their way to recovery. In other words, the Phoenix Islands might be rising from their ashes. In some areas, there are 95% coral cover again. In some areas, there are baby corals everywhere you look. And we saw fast-growing corals very quickly reclaiming the space. And so they're building new cities and we're able to see it everywhere, everywhere we looked. What's clear from the Phoenix Islands is that coral reefs can show signs of recovery even after a really major bleaching event, massive death when they're not thwarted by a thousand things coming at them all at once.

Ari: If we could start to remove those thousand things – the overfishing, the pollution, the disease – one by one, take away these other threats – corals everywhere could rebuild their underwater cities and all those residents of the reefs could move back in.

Meet the Scientist

Meet Dr. Randi Rotjan, the scientist featured in the Coral Reef podcast:

Where do you work?
The New England Aquarium in Boston,MA, USA

What do you study?
I am an ecologist working in marine ecosystems on questions involving symbiosis, food webs and trophodynamics, fish-coral interactions, and conservation biology.

What three titles would you give yourself?
Ecologist, marine biologist, conservation scientist.

What do you like to do when you are not in your lab?
I spend as much time outside as possible.

What do you like most about science?
I am fascinated by the natural world and have always had questions about the way the world works. Becoming a scientist has enabled me to formalize those questions and explore them for a living.

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