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Ediacaran Fossils Podcast and Scientist Interview

Dickinsonia rex, Funisia dorothea

In this podcast, journey back in time to learn about Ediacaran Fauna, a diverse group of organisms that lived in the world's oceans about 580 million years ago.

Transcript

Ari: From the Encyclopedia of Life, this is: One Species at a Time. I'm Ari Daniel Shapiro. 560 million years ago, the Earth was a very, very different place.

Droser: If you were to be diving in the sea, there would have been basically sort of a green scum – if you can imagine pond scum – on the bottom of the seafloor.

Ari: That's Mary Droser. She's a paleontologist at the University of California Riverside.

Droser: So it would've been slimy and gucky, not something you probably would've wanted to have stepped in. And living on top of that, then, would've been a very complex ecosystem, and a variety of organisms including some fronds.

Ari: You got this scum underwater and then occasionally there'd be a frond or a –

Droser: Oh, no they were densely packed fronds. I imagine it kind of like diving in the California kelp forests taking out everything with a skeleton.

Ari: But these fronds weren't plants. Strangely enough, they were…animals. And that's what makes the Ediacaran period – this time in Earth's history – so special. It was the dawn of large animals. Large meaning visible with the naked eye. Jim Gehling is a paleontologist at the South Australian Museum in Adelaide.

Gehling: It's really the greatest revolution in life since its origin. When large life happened, when multi-celled creatures evolved, they were so successful that very rapidly they spread

around the oceans. And that's how life is. When something works, it works well. And from then on, life never looks back.

Ari: In other words, it wasn't just those densely packed fronds of *Funisia dorothea* making a home out of the Ediacaran slimebed. There were other multi-celled animals, too. And each one was weirder than the next. Take *Dikinsonia rex*, which looked just like a bathmat. No mouth, no eyes.

Gehling: It actually just lay on the slimy lawn on the seafloor, and rotted away the organic material underneath it, and absorbed it through its skin. And it could grow on the seafloor because there was nothing to eat it.

Ari: That's key to the success of the Ediacaran organisms. For millions of years, these soft-bodied creatures didn't have any predators. And they flourished as a result.

Droser and Gehling are masters at bringing these ancient ecosystems back to life, figuratively. They do a lot of work in southern Australia near the Flinders Ranges. Every summer, they turn over these huge slabs of sandstone lying on the ground, and look for fossils underneath. When they find them, it's like looking directly at the ancient seafloor.

Gehling: It is the most delightful work that you can imagine. Now, there is also the long and tedious process of cleaning the rocks, but it's all worthwhile.

Droser: You spend all day lying on these beds, working on these fossils, mapping these fossils and as you do this, you, you put yourself into their ecosystem, you imagine this world. That's about where my head is at.

Ari: It's possible to find Ediacaran fossils outside of Australia too. One such place is here, in Hingham, Massachusetts just outside of Boston on the coast.

Droser: Usually we're in the middle of nowhere and this is definitely not in the middle of nowhere.

Ari: On a chilly winter morning, Droser and a couple others stood in a vast parking lot. Bed, Bath & Beyond and Old Navy stores hulked on the far side of the asphalt. But it was the jagged shore that they were here to see. Dick Bailey – a geologist at Northeastern University – led the team along the shoreline.

Bailey: We're going to look at rocks that are about, I think, around 580 million years old. They underlie the entire city of Boston. The rocks contain some unusual round fossils that we call the doughnuts because we haven't named them yet officially.

Ari: The group reached an outcropping right on the water. Diagonal shards of rock jutted upwards. Before long, Droser was handling a small slab that contained a few raisin-sized dimples. Sure enough, they looked like little doughnuts.

Droser: You know, it's the original Dunkin' Donuts, right?

Ari: Droser's pretty sure these doughnuts are fossils of an Ediacaran life form. But beyond that, it's anybody's guess.

Droser: I don't presume to imagine what they were because I think we have no idea what any of these things are with very, very very, few exceptions.

Ari: It takes time to work out this prehistoric puzzle of how Ediacaran life thrived and perished on Earth.

Droser: These organisms did in fact evolve after the biggest climate perturbation that this planet has ever seen. And these organisms all went extinct possibly at the same time. And so why we look to the past, why we look at fossils in part is understanding the biological response to environmental change on our planet. To see what happens, what happens to life, who goes extinct, what determines who goes extinct, and how does the extinction play out?

Ari: These questions are important because climate change, it's happening again. Right now. From the fossil site, you can see the Boston skyline reflecting the morning sun. It's about as urban a scene as you can imagine. And yet, in Mary Droser's hand and underneath her feet are rocks that are 580 million years old. Rocks that might just hold a clue about our future. Our series, One Species at a Time, is produced by Atlantic Public Media in Woods Hole, Massachusetts. For the Encyclopedia of Life, I'm Ari Daniel Shapiro.

Meet the Scientist

Meet Mary Droser, the scientist featured in the Ediacaran Fauna Fossil podcast:

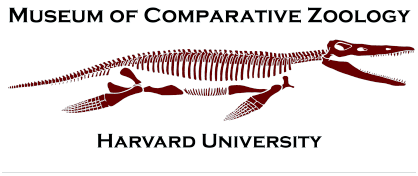
Where do you work?
Department of Earth Sciences at the University of California, Riverside.

What do you study?
I am a evolutionary paleoecologist working on the role of ecology in the evolution of life on this planet.

What are three titles you would give yourself?
Paleontologist, mother, community activist.

What do you like to do when you are not working?
I love what I do for a living and much of what I do, I would choose to do even if it were not my job. When I am not doing paleontology, I spend as much time as I can in or at the ocean, diving, boogie boarding, reading a book on the beach. I love to goof off, particularly outside, with my kids and family and I spend a bunch of my time working on issues that are important to me - sometimes, political, sometimes educational, sometimes community-wide.

What do you like most about science?
Doing science is like solving puzzles. There are meaningful, intellectually challenging problems that can only be solved doing science. Science has, and will continue to, solve some of the biggest issues facing society today be they, climate change, earthquakes, disease and so on.



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