“A Peek Into The Sex Lives Of Algae” Excerpt Transcript

Excerpt from July 14, 2017 episode of Science Friday.

IRA FLATOW: This is Science Friday. I'm Ira Flatow. Diatoms, they are a type of single-celled algae found all over the world. They're considered a model organism, a staple in labs studying ocean water quality. They're like the little white mice used to study human health. Well, diatoms are that for marine microbiology research. In fact, they are so well studied that some facts about diatoms seem irrefutable.

For instance, we know that they only reproduce asexually. Or so we thought, until one of those happy accidents we're always hearing about in science. My next guest caught a subset of diatoms in the act of sexual reproduction. Kimberly Halsey is Assistant Professor in the Department of Microbiology at Oregon State University. Dr. Halsey, welcome to Science Friday.

KIMBERLY HALSEY: Thank you very much.

FLATOW: Tell us how you made that serendipitous discovery.

HALSEY: So Eric Moore, graduate student working in my lab, was studying something else. He was studying how diatoms maybe share information, share carbon, share maybe vitamins. He was interested in seeing how diatoms might share these compounds with bacteria and other organisms in the ocean. And so, to do that, he needed to devise a new culturing medium. So this is the seawater-like stuff that we create a recipe for that we can grow these cells in. So he had to make this new media that could grow both the diatom that we were studying and a bacterium at the same time.

So he worked on this for a couple of months, and finally, he had this great concoction that he'd developed. And it seemed that both the diatom and the bacterium he was studying could grow in this medium, so that was a great thing. Except that after a couple of weeks, he came into my office. and he said, you know, the bacteria are growing great, but the diatoms just look really strange. So I said, well, what do you mean? What do you mean they look strange?

And he said, well, I don't know. They just get really clumpy. They look bigger than they're supposed to look. And I said, well, did look at them under the microscope? And he said, no, and he kind of looked sheepish. So we ended up looking under the microscope.

So we saw what we expected to see-- some of these cells that look like little miniature cylinders. They look like what I would call little, teeny-tiny old-fashioned hat boxes with a lid and a bottom. But we also saw these other shapes in this culture that looked like gigantic beach balls. I kind of looked at Eric, and I said, Eric, I don't know what you're growing, but you're not growing the diatom you're supposed to be growing. You've contaminated the culture, and you need to start over. And you need to clean everything and make new media and start from scratch.

This was sort of this long road to realizing that, in fact, after he repeated and repeated, it turned out that, eventually, you have to believe your data. And so we said, something else is going on here.

And that's when we realized that these organisms were undergoing the sexual pathway instead of just regular single cell division. They were undergoing sexual reproduction, and that was a shock.

FLATOW: Wow. So why would they decide to do that, versus the asexual one you've always been familiar with?

HALSEY: Well, that's the big question, why were they undergoing sex? And it was great, because we were suddenly in this position where Eric had two types of culturing medium, one in which they were always just going through regular cell division. And then, this other medium that every time he grew them in this new medium, they would go into sex.

And so he took this laborious path to try to figure out what chemicals were inducing sex, because never before has anybody ever really been able to reliably induce sex in diatoms. They can sometimes capture it in the environment, like a freak event. So what he found out was that this really common ingredient in the laboratory, ammonium, stimulates sex in these organisms.

FLATOW: And that's like fish waste, isn't it? Isn't that the waste that--

HALSEY: It is. It is like fish waste, and it's also released by the organisms that come along and eat these diatoms.

FLATOW: Do you think the finding influences how researchers study diatoms, then? What is their niche in the ecosystem?

HALSEY: So, diatoms are these amazing organisms, and I would encourage anybody that wants to google diatoms and look at them really up close and personal. They are beautiful. One of the things that makes them super unique is they have these silica cell walls, which means that they really do live in glass houses. So they are surrounded in silica. And so their place in the environment-- so remember these are plants-- they're really, really good at growing fast under low light conditions. Because of this ability, they end up making these huge blooms that contribute a massive amount of carbon to the oceanic systems. They have a huge role in the carbon cycle.

FLATOW: Kimberly Halsey is the Assistant Professor in the Department of Microbiology at Oregon State University. Thank you for taking time to be with us today, and keep us informed of your work.

HALSEY: Well, thank you very much for having me.