You're listening to Fungi Town and this is episode 16: The Great Lakes.

[Fungi Town Theme Music]

[0:00:15]
Welcome to Fungi Town, where we swim with spores, fish for fungi, and contemplate cures. I'm your host and mayor of Fungi Town, Jen Parrilli. Today, we're going to talk to Dr. Andrew Miller from the University of Illinois and Dr. Robert Cichewicz from the University of Oklahoma about an amazing discovery at the bottom of the Great Lakes.

[0:00:40]
If you're unfamiliar with the Great Lakes, they are a cluster of five freshwater lakes located at the northern border of the United States and Canada. By area, they are the largest group of freshwater lakes on the planet, covering about 94,000 square miles. That's about the size of the UK. The deep basins of the lakes were carved out thousands of years ago by glaciers and then filled with water when the ice melted. The lakes are connected not only to each other, but to the Atlantic Ocean by way of the St. Lawrence River.

These fresh water lakes are important not only because of the great cities in Ontario, Michigan, Indiana, Illinois and Wisconsin that sit on their shores. They are a major source of commerce and drinking water. The Great Lakes also have a significant effect on the climate of the area, making it cooler in the summer and warmer in the winter.

Now that's all nice to know, but what do the Great Lakes have to do with fungi? After all, most of us think of fungi poking their mushrooms up out of the soil or sprouting from fallen trees, not in the water. But if you listened to episode 13 about the chytrid fungus, you might remember that the spores of that fungus have flagella, a little tail that allows them to be mobile in the water. Dr. Stajich and his students from the Fungus Olympics episode also work with fungi that have flagella.

So we know that some types of fungi can swim. But infecting frogs and salamanders in a shallow stream is a bit different than colonizing enormous bodies of water. Can fungi really live in the Great Lakes and if so, what are they doing there? And honestly, why do we care? After the break, we'll get the answers to those questions and more.

[0:02:32] **Break:**

It's that time of year again. Yes, that's right, whether you love them or loathe them, the holidays are just a few short weeks away. Lucky for you, I've got the perfect solution for all of the fungi friends on your list. It's LichenLandscapes.com. Where you can peruse Haley's beautiful collection of lichen

prints. Pick one up for your professor, your group leader, or your foraging partner. And while you're there, LichenLandscapes.com has a great selection of cards. Each set features a gorgeous, hand-drawn illustration of a different lichen. They make perfect gifts too, or treat yourself to a set. They make great thank-you cards! And now, Lichen Landscapes and Fungi Town have a holiday surprise for you! You can get 10% off of your entire order when you enter the promo code "FungiTown." Not only will you save 10% for yourself, you'll also be giving back to the podcast because a percentage of your order will go to support the show. So get your holiday shopping under way at LichenLandscapes.com. What are you waiting for?

[0:03:35]
Welcome back. Before the break, I briefly went over some basic facts about the large bodies of water on the Canada/US border called The Great Lakes. I also wondered, is this a place where fungi can live? You might remember Dr. Miller from the Halloween episode where we talked about the Jack-O-Lantern mushroom. He's back and he's brought his colleague to tell us about a recent amazing discovery.

[0:03:59]
> My name is Dr. Andrew Miller. I'm the Mycologist at the University of Illinois, the Prairie Research Institute at the Illinois Natural History Survey. I'm also the Director of the Herbarium and Fungarium here at the U of I.
>
> And I'm Robert Cichewicz at the University of Oklahoma. I'm a professor in the department of chemistry and biochemistry, and I do natural products drug discovery.

[0:04:22]
So it looks like most of your research involves finding fungi that produce some kind of a compound or enzyme that might have applications for human health.

> RC: That is correct. We get most of our funding from the National Institutes of Health, and their primary mission is to improve the health and welfare of people across the United States. That is, as the primary driver, we have a responsibility to help and find these molecules that nature provides. We've been working on fungi since 2005 here at OU, looking at different drug discovery applications of the secondary metabolites or natural products that they make.

[0:05:06]
So does natural products research, is it mostly focused on medicines, or are there other applications that are being looked at?

> RC: Yeah, so natural products has undergone a bit of kind of an evolution if you want to say that. Around, early in the natural products where it became a much more ingrained academic field, there was just this sense of awe that holy cow, look at this. There's this sponge that makes this compound and no one ever dreamed of this organic chemistry skeleton that they were

looking at. And this plant made this, and this microbe made that. And people were just in awe of all the amazing chemistry, the architecture of the molecules. And that's all good and fine, but then over time people realized well, okay, we can keep finding new and amazing structures forever, it seems like. What are they good for? And that's where we are today. And I think that's actually a good thing.

[0:06:08]

I'm excited to learn about the Great Lakes research. I listened to the Michigan Radio interview with you, and then I've read a couple of other articles about your discovery.

RC: Wonderful. Well, we're glad to talk to you about them. It's gotten a lot more public interest than I think I ever imagined.

[0:06:32]

Yeah, I find it really surprising. I know that fungi are everywhere, but I don't often think about them being in bodies of water. And I think that most of my listeners probably won't, that won't have occurred to them either, so I think it'll be really exciting for them to get an idea more of how diverse fungi are in their environments.

RC: Uh-huh. Yeah, absolutely.

[0:06:68]

I was reading the paper that you published in April about your discovery of the fungi in the Great Lakes. And it says that you found 465 different fungi in Michigan and Lake Superior. How many of those were newly-identified species?

DM: Well, that's a great question. It's hard to answer for a couple of reasons. We did a cultural-dependent method, which basically means that we took these sediments at the bottom of the Great Lakes and spread them out on agar medium to get the fungi to grow. So we didn't really like, walk out into nature and pick up a stick and say, oh hey, here's this specimen. We found it growing live in its natural habitat, right. We actually sort of just took the spores and grew them up in the lab and so we only know them from the lab. So it's a little difficult to compare since you sort of have apples and oranges. The other thing is, also that we sequence all these for the ITS region, a short barcode region for fungi. And just because they're not in GenBank, which has a whole large number of fungal sequences in GenBank, doesn't mean that they're new, just because you don't find them in GenBank. It just means that maybe someone hasn't sequenced them before. The short answer is probably about a dozen or so is probably new, but it could be over half of those 465 species that really are new. We just don't know. It would take a long time to study all those.

[0:08:30]

Just for the sake of my listeners, just to be clear, you didn't go down there and find a bunch of mushrooms. You went down there and took some soil, and then came back to the lab with the soil and went through the sediment to see what you could find, right?

DM: Yeah, absolutely. Yep, that's right. All we found was - for the cultural studies - is we found what we believe were viable spores that we were able to bring up and culture in the lab. And then for the culture-independent study, we did a whole bunch of Next-Gen sequencing which is a fancy way of saying we went out and found a lot of fungal DNA at the bottom. Not even necessarily structures, but just DNA there.

[0:09:08]

Did you expect to find so many?

DM: We expected to find a fair number. It's hard to go anywhere on earth and not find a new species of fungi. You really have to work hard not to find them. They just seem to be everywhere. But I didn't think that numbers would be quite that high. I didn't think that we would find so much diversity that wasn't found in some of the public sequence databases.

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So was it just Michigan and Superior, or did you sample other lakes?

DM: I think we got a few samples from Lake Huron as well, but the majority was really Lake Michigan. That's where we had the best sampling at.

[0:09:42]

So I think that when I talked to you earlier, Dr. Miller, you mentioned that some of these might have been terrestrial fungi that spores somehow washed into the lake, or ended up in the lake somehow. Do you know about how many of what you found might have followed that path, that were terrestrial and maybe just kinda got washed into the water?

DM: Right, yeah, exactly. That's kind of one of our hypotheses is a lot of these things, or some of them were at least immigrants that they went ahead and sporulated on land and then the spores just kind of got washed into the water, and over time they just settled down to the bottom of the sediments and we brought them back up again, and gave them a really nice environment to live in with oxygen and a nice warm environment and they decided to start growing. But as we sequenced them and started to identify these things, I would say probably about a third, around a third of them might be terrestrial. It's really kind of hard to say, but we were finding things that are quite common like, a *Coprinus* and *Pholiotus* and things like that that, you know, aren't really aquatic fungi. They grow on terrestrial, on land. And some rusts as well that we know occur on plants that aren't aquatic plants. So we had a pretty good idea that yeah, some of these things were not aquatic. But on the other, on the flip side, we actually only found out of the 465 taxa we cultured, there was only two taxa we found that had been previously recorded from Lake Michigan, which was interesting. Everything else had never been reported from there before. That was really kind of an interesting discovery that we did find so much. We estimated about 28% of what we had found included about freshwater species. But you know, those numbers aren't hard and fast.

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Is there a particular group, say Ascomycetes or Basidiomycetes that you found more of than others?

DM: Yeah. Yeah, exactly. So we kind of did this little chart thing with different colors for different things. And what we turned out was in the cultural method we found a lot more mushrooms than what we had found for the other major groups, which was interesting. But then when we did our culture-independent, our Next-Gen sequencing we found DNA from a whole lot of other things, not necessarily mushrooms, but some of the larger groups were mostly Ascomycetes that we ended up finding in the culture-independent study.

[0:12:18]

In the paper that I was talking about that you published in April, it mentions that you used culture-dependent and culture-independent methods. Can you talk a little bit about what the difference is between the two?

DM: Yeah, sure. Like I was saying earlier about the culture-dependent methods, basically what we were doing was creating a lot of different media for the fungi to grow on. So a bunch of these different agar plates. And some of it's like cornmeal agar, or potato dextrose agar, you're basically just giving the fungi a bunch of nutrients to grow on in a nice, warm environment. So that's different than the culture-independent method which doesn't rely on cultures at all. What we're basically doing there is taking the sediment samples, extracting the whole community DNA, so all the DNA from that using fungal-specific primers, and then just pulling out what fungal DNA we find in those samples. So in one aspect we have a fungal culture to work with where natural products people like Dr. C can go and actually use that. In the other one all we basically have is just short strands of DNA. So, I like the culture-dependent method much better.

[0:13:33]

I know there are a lot of fungi out there that have been found in the wild, if you will, but haven't been successfully cultured in a lab. So, is that culture-independent method probably a good way for you to be able to work with those?

DM: Right. Exactly. Yeah. So that's what a lot of people are doing is they're sequencing those things from the soil, from trees, from wood, from plants, the leaves and roots and stems. And they're using these culture-independent methods. And my guess is about maybe 60% of fungi will culture, where the other 40% won't culture. They just won't grow in culture for one reason or another. And that's really the only way we can study some of these things is through culture-independent methods, just looking at their DNA. But maybe never even seeing the actual mushroom or the actual organism itself. All we have is just a short strand DNA that we think is different than all the other strands of DNA we've looked at.

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So if you've got this like, soup that you've pulled up from the bottom of the lake, and you're doing the culture-independent, and you've got all this DNA, how do you know what's DNA

from a leaf, what's DNA from a fungus, what's DNA from a different fungus? How do you sort out what pieces of DNA you've got?

DM: Right, so there's two ways we do that. First we use fungal-specific primers which aren't always perfect, but they pretty much match to the DNA of fungi. So they're not going to amplify any plant DNA, or protozoan DNA, or animal DNA. You're hoping what you're only going to get at the end is just products of fungal DNA that you go and then sequence. And then the other aspect is these sequences are all housed in a lot of different databases, but primarily in GenBank, at the NCBI database in Washington, D.C. So you can take these short strands of sequences and search against what's in the database that's already been named from a known. So that's what you end up with in the culture-independent method is a whole bunch of strands of DNA that are unknowns, and you want to make them knowns. You want to put names on them. So you search against the database and you look at the percent overlap and the percent identity, how closely matched these things are that have names. And then you apply that name to that short stretch of DNA. It's kind of like a who's your daddy for fungi, I guess.

[0:15:54]

And so if you've got a piece of DNA that you've tried to compare to the database and you don't find, what do you do then?

DM: Yeah, so one of two things. It means that that species has been described before, and it's just never been sequenced, and that sequence has not been deposited in that database. Or number two, the other alternative is that it's a new species to science, and that's kind of hard to tease out which one it is. It's hard to tell which one of those two we have. It takes a lot more work from there. You can't just say if it's not in the database it's new to science and then go and describe it as a new species. It doesn't really work that way, although many people do it.

[0:16:38]

So it sounds like we need to get more info into the GenBank.

DM: Yeah, so an interesting thing I just actually read earlier this week was the United Kingdom, that's one of their goals. They want to get a whole genome sequence for every organism that occurs in the UK. And I think it's like 66,000 species. So at least they can say, okay, within the UK we have all the DNA sequenced for all the organisms, including animals, plants, and fungi. So they can get a hold on what it is they have genetically in their country. So that would be something really cool that I think we should do here in the US as well.

[0:17:19]

Yeah, it sounds like it would be a big collaboration with a lot of different researchers.

DM: Yeah, absolutely. But what a fun project. That would be really cool.

Yeah, I'd work on it.

DM: Awesome.

[0:17:32]

In February, you did an interview with Michigan radio, I think I mentioned earlier that I listened to that, and you talked about growing fungi on Cheerios. Aside from being a pretty cost-effective growth medium, what makes it...? Why do the fungi like it? What makes them attracted to the Cheerios?

RC: Well, I think that part of the story in the background that goes into it is that we as a natural products discovery lab are always trying to create a system that is as reproducible as possible. Meaning you bring a fungus into the lab, you get it to kill a particular cancer cell, you want it to have and repeat that same capability again and again so our chemists can get the molecules, identify, and describe them. Well, we were running into some problems early on in the lab where we would grow a fungus, it would show a certain activity, we'd regrow it, we weren't getting that activity, and that becomes a huge problem from following up on any lead. And what we think is going on there that is a lot of standard media that are out there that you can buy from microbiological supply warehouses and whatnot, there's some inconsistencies in them. Although they may tell you exactly how much sugar they put into there, they put a potato, for a potato dextrose broth. Well, that potato may have come from Idaho one time, Michigan another time, somewhere further out west another time, and every time you're getting slightly different micronutrient composition. So it's reasonable that the fungi would not grow the same. They can be rather sensitive at least in terms of secondary metabolites to what are these trace elements that are in the media. So we started exploring, what would be some other very consistent types of food sources that the fungi could use and basically it became investigation of every aisle in the Walmart. So just every week kind of targeting an aisle like okay, this week we're looking at vegetables and this week we're looking at dried beans. And this week... And it just kept going and going through it. And so eventually when we got to cereals and exploring cereals, we happened to have a box of cereal, Cheerios tried out, and the fungi, they grew very well. We had this nice lush growth of the fungi across the surface of the Cheerios. All of our test strains that we were using, they all grew on it. That was another thing. So we wanted to try to limit the number of food sources we use, and Cheerios look like okay, this is promising from that regard. We also were interested in them because they are consistent. That is, it's a General Mills flagship brand product. They aren't going to screw around with the recipe as far as, I think they'd be a fool. We see what new Coke did to Coke. I hope they don't screw around with Cheerios. So we saw a lot of long-term potential with this. And then also perhaps a more technical side of it, the Cheerios actually gave us a lot more surface area for fungal growth. So if you think about all these little donut shapes, instead of having a flat surface of fungi growing, they can grow around the entire circumference of that donut shape. And so we were getting way better yields out of the Cheerios than any other product as well. So combining all those things together and Cheerios just turn out to be one heck of a food for fungi.

[0:21:03]

Cool. Do they have a preference? Like honey nut Cheerio, pumpkin spice?

RC: Yeah, that's always the follow-up question. So, actually, (Laughs), the funny thing is, out of all the things that we've done as a lab, this is the one thing I'm coming to find that we're known for, is that everybody's, oh, you're the Cheerios people. Yeah, we're the Cheerios... We've done a few other things, but yes, we're the Cheerios people. But to answer your question, this summer, in fact, I was at a meeting and a student came up to me and said, oh, we tested this Cheerio, this Cheerio type, and this Cheerio type. We're seeing these different growth patterns and you know, that's awesome, keep going with it, have fun. We just stick with the plain General Mills Cheerios. Those things are here to stay. I don't want to get into some sort of other Cheerio that's going to disappear from the market in five years. I like Cheerios. They work great. I will say however, generic Cheerios do not. They fall apart much more quickly. So it turns into just a monolayer that the fungi end up growing on. So it's got to be brand name Cheerios.

[0:22:13]

Interesting. Maybe you can get a grant from General Mills.

RC: I've sent them a few emails, and I've gotten zero responses from them. So I'm guessing they may not like the idea of the public associating fungi and Cheerios, and mold, all messed up in people's heads. But yes, that would be awesome. If you know anybody, give them a ring.

[0:22:36]

Sticking with the original Cheerios flavor sounds like a wise decision. And it makes sense to me that different vegetables might be more inconsistent because of the soils they were on, or the nutrients they got. But it sounds like Cheerios are pretty consistent. Like a Cheerio is a Cheerio.

RC: It is. And I think what also works for us is that yes, it starts off as a plant product, so you would assume those same inconsistencies. But Cheerios, they fortify their cereal a lot. So basically they're making them a vitamin and mineral source for people. So if you look at the back of it it's like, they just jack up the levels of all these things, so basically you're obliterating any of that background discrepancy you might have. So they're high in iron, potassium, and all these other trace metals and things that the fungi love and need and that way it makes things consistent for us.

[0:23:27]

Okay, yeah. Great idea. I think that people kind of latch onto the Cheerios thing because everybody can relate. I'm pretty sure everybody has had Cheerios at some point.

RC: Yes, and we've got some awesome pictures of moldy Cheerios.

[0:23:45]

Also in that same interview you mentioned that you found a fungi that might have applications for Ewing's sarcoma.

RC: Yes.

But the radio interview didn't mention which fungi that was. Also, I was just curious how that might translate into a treatment for the disease.

RC: Okay. So yes, the fungus that you're referring to is an *Alternaria* species, and like Andy had said, it's easy to take the DNA sequence and get a blast result, and figure out okay, it looks like this. We have not gone further to identify it and verify it from a morphological perspective that is in fact a particular species. But we're pretty confident that it is an *Alternaria*. So I'd say it's an *Alternaria* species, probably a known species, based on our blast results. But at any rate, that particular organism, that fungal isolate, it makes a molecule, it turns out that's known as Altertoxin. And Altertoxin, despite its scary name, which it's really unfortunate. A lot of compounds got called these scary toxin names in fungi because as people started working on molds and stuff they were thinking, well, you know, molds are growing on things and they're toxic to everything, and they're just bad for you. So there are so many toxin named molecules. So it turns out Altertoxin, in the grand scheme of things is not one of the compounds you really need to be scared of. Yeah, it can kill, but it's pretty high doses you need to get to. But at any rate it turns out that these Ewing sarcoma cells, so this is a form of bone cancer that affects the young pediatric type patients. Right now, it's the second most common bone cancer found in kids. There are about 250 cases a year in the United States. Now, there are some drugs that Ewing is responsive to, but it has a high recurrence rate. And the drugs that are given have a lot of side effects that don't necessarily manifest themselves now, but later in life. Basically you're giving kids mutagens to kill cancer now, and then when they get into their 30's and 40's they're getting new cancer because of the mutagens you gave them to stop the original cancer. So, eventually they get killed by cancer. And so we're looking for, what are some ways that we can approach this that are much more targeted, specific, wipe out the cancer and do less damage to the child. So that's where this molecule came from. We screen against lots of different cancer cell types with a great collaborator. Her name is Dr. Susan Mooberry. She works at the University of Texas – San Antonio. And she has a cell screen there that we use. And in this cell screen she detected this particular extract and allowed us to pull out the Altertoxin from it. It looks pretty promising. It appears to be incredibly selective for Ewing cells. There's some people down in Texas right now who are trying to figure out mechanistically why Ewing sarcoma cells are so susceptible to it. But I have to say, everything that we've seen so far looks incredibly promising for this molecule. It really targets down on the Ewing cells, and you know, we'll see where this goes. I remain hopeful that this could actually translate into either that molecule itself ultimately being developed, or will lead to a new biological insight that will allow for a drug discovery to continue.

[0:27:14]

I was mostly curious about how you decided to explore that as an option, explore the lakes as an option. And I was really surprised at how many different types of fungi you found.

RC: I think the world is just full of fungi that we have just barely scratched the surface on. There's just so many different types, and now with us having this great fortune to be looking

across the United States, we may be able to get a picture of, well, what does a fungus, this classic idea of what a species is, what does it really look like across this area? And can we even... Will it help us ultimately define what a species is or is not? And Andy's much more knowledgeable in this area. But I will say that I find it all fascinating that it's very clear to point to a human and recognize that it's *Homo sapien*, and it's very easy to point to other birds and mammals and things like that and go, you are that. But a fungus is kind of this, almost organism in the ether. It is and it isn't. You find another isolate and maybe it was from 1,000 miles away. But it looks really similar but it's making different natural products. What are you? Are you the same or aren't you the same? And until we figure out a way to put fungi on a psychiatrist's couch and pick their minds, we're just going to be left guessing. So the mystery is fun.

[0:28:51]
It's time for de-funked, a segment where I debunk fungi myths and misconceptions. Today's misconception deals not only with fungal research, but with scientific research in general. I want you to try a short exercise with me. First, close your eyes (unless you happen to be driving) and think of the word 'scientist.' Now, picture what a scientist looks like. Is your scientist male or female? Are they wearing a lab coat? Are they in a big laboratory surrounded by beakers and instruments? Well, what if I told you that the next time you picture a scientist, you could be picturing yourself!

Citizen science has been on the rise as more and more researchers are reaching out to the public to get them involved. Think about it this way. Say you're a scientist studying Monarch butterflies and you want to learn about their behavior all along their migration path. Well, you can hire a huge staff and send them out across the country OR you can equip the people already living along the migration path with the info and supplies they need to collect the data for you. And if you're a teacher or a camp counselor, what better way to get your students in touch with nature than to have them go out and look for butterflies? Citizen science helps scientists gather information more efficiently and helps citizens get excited about science.

As an example of citizen science, one of Fungi Town's citizens, Leslie Masson, heard my Halloween episode and got in touch to let me know that she discovered a foolproof way to tell chanterelles from jack-o-lanterns. She's part of the mushroom and lichen dyers group I covered in episode nine and she's been doing some experiments of her own. I'll update the show notes for episode nine with her findings, but when I told Dr. Chee-o-vich her story, he was very excited. And it turns out that he's got a citizen science project of his own.

[0:30:50]
RC: Actually I've got to say, I love your story about this because one of the things that's drawn me into the whole citizen science area is the realization that scientists today, especially in the United States, it feels and looks like a very elitist group of people in white lab coats behind

closed doors doing all sorts of whatnot at a bench. When the whole background and development of the fields of science as we know them today started basically as amateur home scientists working in their labs that they built. Granted, a lot of those people were people of privilege, but nonetheless, they were not organized in working the way we do. That was real citizen science. And it's wonderful to hear that people are playing around with dyes and testing out things, and conducting their own experiments. That's beautiful.

[0:31:47]

So I think as scientists, you know, we go through our undergrad, we go through our graduate studies, and we're taught how to do science. We're taught the procedures and things like that and so I think when you get some people playing around with these things who haven't gone through that training, they maybe think of stuff that we don't think of because we're kind of trained to think a certain way.

RC: That's absolutely true. We're also taught to think that, okay, we've got a laboratory manual and I've got to follow this recipe. And that's not how science works. It's about discovering new stuff, not reproducing all the time these results that we know are going to be inevitable. Just case in point, think of someone like Charles Darwin, one of the most impactful scientists the world's ever seen. And this guy was doing observational science, basically. That tells me that anybody can make observations and come up with great insight into what's going on in the world. But you've got to take the time, you've got to feel the freedom to be able to do it.

[0:32:59]

As far as this citizen science aspect, are you still, like are you still running that part of the project? Is there a way that people can get involved?

RC: Oh yeah, absolutely. WhatsInYourBackyard.org. It's all one phrase. It has been a beautiful program. We've had over 20,000 people sign up for the program, and this fall we released a curriculum guide. So we've got a lot of teachers and classrooms that are signing up and getting involved in the program. The collection is growing right now at a rate of approximately 7,000 to 9,000 new isolates a year. And so we're starting to map out, you know, where fungi exist into the United States. In fact we're working with Andy on one particular organism right now, trying to look at distribution in the chemistry and how does that change as you go across and entire continent. So it's just turning out to be an incredibly fun project.

Cool. Yeah, I'm a huge fan of citizen science. So whenever I hear about it, I'm happy to spread...

RC: Well, go on the website, go to the submission form, just pop in your name and information and we'll get a kit out to you in a few days.

[0:34:05]

After our interview, I went to WhatsInYourBackyard.org. In a few short days, I got a kit with a soil scoop, instructions, and a postage-paid envelope. I can't wait until it stops raining so I can send my sample in.

[0:34:19]
That wraps up episode 16 of Fungi Town. Thanks to Dr. Miller and Dr. Cichewicz for sharing their remarkable discovery with us and to Rowen Cannon for providing transcription of the episode. You can access transcriptions by going to the fungitown.org website and clicking on the transcriptions tab. Thanks also go to Leslie Masson for reaching out and sharing her Jack-o-lantern results. I love that she reached out and got engaged with the show!

[0:34:46]
Fungi Town is written, edited, and produced by me - Jen Parrilli and hosted by Podbean. The theme song is by local Athens band Shehehe. You can find all of their awesome songs on their BandCamp page at Shehehe.bandcamp.com. Episodes of Fungi Town are released about every other week. Be sure to subscribe so you don't miss the next episode, where we talk about flying saltshakers of death! You can join the conversation and share your fungi photos with Fungi Town on Facebook, Instagram, and Twitter @fungitownpod. Now you can explore the lighter side of Fungi Town on YouTube, where you'll find my attempt at cooking with corn smut, and unboxing videos of cool fungi-related toys and taste-testing of fungi products. If you like this podcast, please subscribe and leave me a review on iTunes. This goes a long way toward helping more people find their way to Fungi Town. Thanks for listening!