

You're listening to Fungi Town, and this is episode 01: Welcome.

[Fungi Town theme music]

[0:00:21.0] Welcome to Fungi Town, where we delve into the world of mushrooms, mold, and fungus. I'm the Mayor of Fungi Town, Jen Parrilli, and today we'll take the first steps on our journey through this mysterious kingdom.

[0:00:33.6] **So, when I say fungus, what do you think of?**

Um, something that lives on dead matter and like, breaks it down.

[0:00:46.1] **Do you know what a fungus is?**

What he said.

[0:00:50.9] **What do you think a fungus is?**

A mushroom.

[0:00:55.0] **What do you think of when I say the word fungus? First thing that comes to mind?**

There's a fungus among us.

Chinese black mushrooms, just because that's something I cooked with.

I think of white fungus as a thickener in Chinese food because we just had some at Chinatown for Chinese New Years.

[0:01:15.9] So what exactly is a fungus? When most people hear the word fungus – by the way, fungus is the singular form of the word fungi, which is plural – they think of mushrooms on pizza, or the green fuzz growing on that leftover Chinese food that's been in the fridge just a bit too long. And while those are certainly good examples of fungi, that's not the whole story. The truth is that fungi are all around us. They live not only in the forest sprouting out of old tree trunks and old logs, but their spores can be found floating unseen in the air. They live underground, in bugs, in foods, in animals, the ocean, there are even fungi that live, usually quite peacefully, in our bodies. But what makes a fungus a fungus?

First of all, a fungus is not a plant. In fact, they're more closely related to animals than they are to plants. What's the difference between fungi and plants? For starters, fungi don't get their energy from the sun. They don't photosynthesize the way plants do. They are heterotrophs, which means they can't make their own food. They have to get it from somewhere else. And a fungus will keep growing and growing as long as it has enough food. The cell walls of plants are made of cellulose, and are usually square or rectangular. Did you ever look at an onion skin under a microscope in high school? That's what gives the plant support. That's why they don't need bones to stand upright. Fungi, on the other hand, have something called *Chitin* in their cell walls. And their cells have different shapes, but they're mostly long and thin. Chitin, by the way, is the same substance that makes insect exoskeletons so rigid.

Most fungi reproduce by making spores, instead of pollen, the way plants do. Fungi don't have leaves or flowers. In fact, the mushrooms that we see poking up out of the ground are only a small part of the fungus. Most of the organism is hidden underground or inside of a tree trunk, or a log. Those are just some of the characteristics that set fungi apart. After a quick break, we'll take a trip through the average home to see what fungi we can find.

[0:03:30.]

[Fungi Town theme music]

Do you have an interesting story about fungi that you'd like to share? Do you work with fungi and want to talk about your research? Maybe you have a unique product that's made with fungi. If so, Fungi Town wants to hear from you. Find us at FungiTown.org, that's F-u-n-g-i-T-o-w-n dot o-r-g, email at [FungiTownPod \[at\] gmail \[dot\] com](mailto:FungiTownPod@gmail.com), or comment on any of our social media accounts @FungiTownPod.

[Music fades]

[0:03:58.3] Before the break, I mentioned that fungi are all around us. To better understand that, let's try a little exercise. Close your eyes and imagine you're at home, sitting in a chair in your living room. Next to you on a small table sits a plate of tacos and a shot of tequila. Lean over and take a bite of that taco.

[Crunch]

Does it have lettuce, tomato? Most plants grow much better when they partner with fungi, and some can't live without it. Fungi can help the plant's roots find more nutrients. But fungi can be harmful to plants, too. Nearly every crop has at least one natural fungal pathogen. What else is in your taco? Maybe some ground beef?

[Cow Moos]

The fastest living thing on Earth isn't a cheetah. It's a fungus called the Hat Thrower fungus. The Hat Thrower launches its spores so fast that the spores feel an impressive 20,000 Gs of force. By comparison, an astronaut will feel about three during launch. That fungus, and others, infects cows and other livestock, causing a number of serious, and not so serious diseases. Now let's wash that beefy mouthful down with some tequila.

[Sound of liquid being poured]

Tequila, as you probably know, is made from agave. What you might not know is that the agave plant is pollinated by bats.

[bats chirping]

The fungus *Pseudogymnoascus destructans* causes the disease known as White Nose Syndrome. It's a major problem in North America, and it's killing off bats by the millions. Put simply, the fungus

wakes bats from hibernation before their food source is available. So the bats wake up and they can't find food, so they starve. If the bats are gone, so is the agave, and so is the tequila. Go ahead and put down that shot glass, and let's wander over to the kitchen.

[Footsteps]

The kitchen, as you might expect, is a good place to find fungi. Check the refrigerator. You might be storing some creminis, or some portobellos, but what about cheese? Cheese, bread, tofu, tempeh, soy sauce, yogurt, kombucha, some meat substitutes, beer, and even champagne are all made with fungi. An ingredient found in a lot of foods, citric acid, is produced not from citrus, as you might expect, but from a fungus called *Aspergillus niger*. Is there any old bread in your fridge? Perhaps it's gotten moldy? That green fuzzy lump could be *Penicillium* fungi. Can you guess what important antibiotic was derived from *Penicillium*? Since we're on the topic of medicines, let's leave the kitchen and go down the hallway into the bathroom.

[Footsteps]

Open the medicine cabinet. There are several medications that come from fungi, from big name pharmaceuticals to herbal remedies. If you have high cholesterol you might be taking Lovastatin. That comes from a fungus. If you've been prescribed Cyclosporin, an immune system drug, that comes from fungus, too. But just like the cow your beef taco came from, humans can get fungal infections, too. Feeling a bit itchy?

[Sounds of scratching]

Maybe you've got a little bit of athlete's foot, or maybe a ringworm or dandruff? These are all really common, and are caused by skin eating fungi called dermatophytes. Let's close the medicine cabinet and continue our walk through the house.

[Footsteps]

Our next stop is the bedroom.

[Funky jazz plays]

I bet you can guess what I'm going to talk about now. That's right. Sex. When it comes to sex, fungi get crazy. Fungi aren't gender binary. When two fungi meet, they're just compatible, or they're not. Sometimes fungi just mate with themselves, or they go all asexual with it, and reproduce anyway. In regards to human sex, some cultures use fungi as aphrodisiacs. I've even heard of one that can supposedly cause a woman to have an orgasm just with its scent. And, well, let's not dance around the fact that a lot of mushrooms look like penises. That's just a smidgen of fungi. Just a tiny taste of what the fungal kingdom has to offer.

[0:08:36.0] But there are a lot of misconceptions people have about fungi.

[De-funked theme music]

So I'd like to introduce you to a segment I like to call De-funked, where I clear the air of some funky mushroom myths.

[background cafe sounds]

I remember a conversation I had a while ago. I was, as usual, proclaiming my love for fungi, specifically for eating them. One lady at the table had the opposite opinion. "I don't like mushrooms," she said, "they're slimy and gross, and they grow on cow patties." Huh? Yeah, I've seen a fungus or two in a cow pasture, but what about all the logs and soils I've seen them growing out of? Surely the mushrooms we eat aren't grown on animal dung. But if that's not the case, how do mushroom farmers grow mushrooms? To answer that question, I took a field trip to the Sparta Mushroom Farm in Sparta, Georgia, to talk to a real mushroom farmer.

[0:09:32.6] **So, I'm here at Sparta Mushrooms, and I'm talking to:**

Kevin Frazier.

[0:09:38.7] **And what's your job here at the mushroom farm?**

KF: I'm the farm manager.

[0:09:43.0] **And what kind of mushrooms do you grow here?**

KF: Here we grow Oyster, Shiitake, and Lion's Mane.

[0:09:48.0] **Cool. About how many mushrooms do you produce? Like, how much?**

KF: It varies, depending on how many we make in a week. But we're making roughly on average around 1,000 bags a week, five pound blocks a week. So we're getting a few hundred pounds a week. It just sort of depends. It fluctuates a bit throughout the year.

[0:10:11.4] Before we started our tour I wanted to know, what was it about mushrooms that made Kevin want to get into mushroom farming?

KF: I had a customer, a gardening customer of mine who hired someone to kill a bunch of kudzu. And he left town and came back, and it was all dead. And he said great, what did you do? And the guy told him I just sprayed a bunch of kerosene all over the kudzu on your hillside. It's probably not going to grow back, and maybe not anything else, either. And nothing did grow back for about four or five years. And I just through reading mushroom books and all about it, I knew that mushrooms, Oyster mushrooms were supposed to be able to disassemble hydrocarbons. So hydrogen-carbon bonds, petroleum products, oil spills, gasoline, kerosene. Kerosene being the one that I was trying to remedy at the time.

[0:11:02.4] Kevin was in touch with a mushroom farmer who had given him some leftover growth material to experiment with. He took it out at night to the kerosene damaged area, he put down a layer of the growth material, then some straw, then some wood chips, and sprayed water on it all. After about a week he started to see mushrooms growing, and after that...

KF: Within about six months I started to see the weeds growing back for the first time in four or five years. So at that point I was kind of hooked.

[0:11:36.9] We're standing in the doorway of what used to be a furniture manufacturing facility. It's a big, mostly empty warehouse except for three large, silver hoop houses in the center of the room. He leads me to the one on the right. It's lit from fluorescent lights mounted in the ceiling, and I can hear fans. Several tall racks fill the room, and on each sits rows of brown and white blocks, roughly square shaped, some wrapped in plastic and some bare. Each block is less than a foot square, and there are thousands of them. Many have clusters of mushrooms sprouting out of the top. It's pretty comfortable in here, and the air smells like mushrooms, the kind you find in the store.

[0:12:17.2] **What are they growing on? What's this brown block?**

KF: So, all the ones that we grow here are grown on oak sawdust. We're a certified organic farm, so we use certified organic wheat bran as a supplement, and a little bit of gypsum, and water, just to hydrate. And mix it all up in a big soil mixer out front.

[0:12:35.6] The mushrooms I see growing out of the blocks are pretty small, but they're adorable, and I kind of want to pick them and eat them now. But, I guess they're not ready yet.

KF: So, it just kind of depends. We'll let those get about, you know, baseball sized caps a lot of times, and then we'll pick them. But it's really the cap margin here. It starts out really curled under, like on the newer ones you see that are just like little balls, and you can't even see a gill yet. And then once that starts to unfurl, it'll have a pretty deep curve, incurved margin. And by the time that starts to flatten out, just before the last little bit of that curl is gone, we'll go ahead and pick them.

[0:13:20.8] As Kevin mentioned before, they're growing some Shiitake mushrooms, and some Lion's Mane mushrooms, and a variety of Oyster mushrooms called Blue Oysters. What I want to know is, if I'm out hiking in the woods, am I likely to see any of these?

[0:13:36.6] **So I know the Lion's Manes grow wild in Georgia. What about the Shiitakes and the Oysters?**

KF: So we do have, like you're saying, the Pearl Oyster will grow native to here. These Blues I believe are more of a European species. Or it's the same species, but the strains vary throughout the world. So I think that's European one, but so I'm not entirely sure. But we do have a Pearl Oyster that comes out. It's a lighter, kind of creamy white color. The taste is pretty comparable.

[0:14:07.2] **And that's probably what I've seen growing around, like in the park and stuff like that?**

KF: Probably so around here. And then the Lion's Mane does grow native to the area. But Shiitake is an Asian variety, so you wouldn't actually find this one in the wild anywhere in the States.

[0:14:25.0] **So it's maybe in Japan?**

KF: Right.

[0:14:29.1] The next thing I want to know is, how long before I can eat some mushrooms?

KF: So on the Shiitake it will take 60 days to incubate. So we'll inoculate the sawdust, seal the bag, put it in the incubator for 60 days, and then 60 days to the day we bring it in here, give the block a thump on the floor, and pull the whole thing out of the bag and set it on the rack here. And a week later it'll be ready to harvest.

[0:15:00.8] So we're in the growth room now, but before these mushroom blocks get into the growth room, there's a step before that.

[0:15:08.1] **So this is the incubation room?**

KF: This is the incubation room, or one of them. The next one over, the back three-fourths is also incubation space.

[0:15:19.9] This room is a lot like the growth room, except it's about ten degrees warmer. And on the racks, instead of chunks of material with mushrooms growing out of them, there are blocks inside of sealed plastic bags. Some of them are bark brown, like potting soil, and some of them have nickel sized white spots where the mushroom fungus is starting to grow.

[0:15:44.8] **So is there a name for the chunk? The chunk of sawdust and Mycelium?**

KF: We usually just call them blocks.

[0:15:52.3] **Okay. I didn't know if there was like a cool, secret, mushroom farmer name for them?**

KF: No, it's just the sawdust, and wheat bran are what you could consider a bulk substrate. So in our situation it's always sawdust. Other people's bulk substrate would be maybe straw or some other material, corn husks or corn stalks.

[0:16:14.1] So while the mushrooms at the Sparta Farm are mostly grown on sawdust, I want to know if I stumbled across one in the wild, what would I find it growing on?

[0:16:23.0] **So in the wild these mushrooms are all like wood eating mushrooms, right?**

KF: Correct. So they're all going to grow on the Shiitake, Lion's Mane, and Oyster I've seen grow on Maple and Oak primarily. The Oysters you'd see around here, these parts like Tulip Poplar, that sort of thing.

[0:16:46.4] Okay smart guy, what about if I want to grow mushrooms at home?

KF: You can grow on coffee grounds, which anyone can get at a coffee shop, or for free, you know, in small quantities. You can grow on straw, like bales of straw. So you can kind of find substrates to grow mushrooms on.

[0:17:09.0] Okay, so the sawdust mixture is inoculated, and then it's put into the growth room, and then the mushrooms grow, and then they get picked. And what happens next?

[0:17:20.0] **I think a lot of people have seen Shiitakes and Oysters in the grocery store. So they're probably kind of familiar with cooking those. But with the Lion's Mane, you don't see those guys around as much.**

KF: Right.

[0:17:33.5] **Do you just kind of use them the same way you would the Oysters and the Shiitakes?**

KF: So I like to get a mild flavored oil and use that for the bulk of cooking oil to cook them in and chop them up into little bits, and sauté them with a little pat of butter for, you know, the butter flavor. But they're sort of a sponge, so if you cook them in all butter, it would take up like a stick for a quarter pound of mushrooms. I just add a little pat for flavor, some sea salt and shallots, sauté along with them, and then at the end I like to do some fresh squeezed lemon juice and sour cream. And it's this sort of creamy, seafood-y, meaty thing.

[0:18:13.6] **You're making me hungry.**

KF: Yeah, so, onions or garlic will work. But shallots, if you can find them, I think they're the best.

[0:18:23.6] Oh man, that'll teach me to conduct an interview on an empty stomach. Well, that wraps up episode one of Fungi Town. Special thanks to Kevin Frazier for the tour of Sparta Mushrooms. Go to their website at SpartaMushrooms.com to learn about the farm's history and find mushroom recipes. I'd also like to thank Doug Parsons for giving advice and encouragement to this podcast newbie. You can find his podcast, America Adapts at AmericaAdapts.org. Thanks to the folks at Podcast Movement, without whom I might never have launched this episode. And special thanks to the friends and family who shared their thoughts with me on what a fungus is.

[0:19:01.8]

[Fungi Town theme music]

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[Music fades]