

Episode 10 - Worm Composting with Don Smith



FULL EPISODE TRANSCRIPT

With your host

Hayley Weatherburn

Episode 10: The Magic of Worm Composting with Don Smith

Welcome to **Thriving with Nature**, a podcast that gives you the tools you need to live a modern lifestyle that helps regenerate our planet. And now your host, Hayley Weatherburn.

Hayley: Welcome Thrivers to another episode here at Thriving with Nature. I have a very special guest for you all today. We have Don Smith. He is a teacher. I actually first was introduced to him (when) I did the Soil Advocacy Training at Kiss the Ground just recently. And he has a plethora of knowledge when it comes to soil, microbes, worms, all the good stuff. And so, Don has kindly come on to share some of his information with all of you, Thrivers, out there. I'm going to read his professional biography. He's a Speaker-Teacher at the Kiss the Ground. (He is a) student of Regenerative Agriculture and Regenerative Lifestyles. His talks are engaging, inspiring and filled with viable solutions to the world's largest problems. Welcome, Don.

Don: Wow. Thank you. Thanks for having me.

Hayley: It's so awesome that you're here. You're such an inspiration during the Soil Advocacy Training that we just finished. I think it was seven weeks. Every time we had our Q and A's with you, you had so much wisdom and knowledge and passion about all things soil and all those tiny little microbes and worms. Yeah, it's such an honor to have you here.

Don: Yeah. Well, you know me. I never pass up an opportunity to speak about worms and microbes.

Hayley: So, I wanted (you) to introduce (to) the listeners a little bit about why you're so passionate about soil and all things inside it and worms as well.

Don: Okay. Well, soil is amazing. it's basically, the most important thing I think for people to get that they don't really understand is that it actually holds carbon. And everybody's talking about 'we've got too much carbon in the atmosphere.' And there's all kinds of ideas about how to get it out of the atmosphere. We're going to get these giant vacuum cleaning (to) suck them clean. We're going to spread iron shavings in the ocean. We're going to launch big umbrellas up into space to shade the sun. Like all these crazy high-tech ideas. And the reality is that we can actually use nature's 500 million years of testing and research and development called photosynthesis and actually move that carbon out of the air into the soil. And actually store it there if we start taking care of our soil instead of treating it like dirt. Because that's basically what we do. We've been treating our soil like dirt and it's a living organism. It's the skin of the earth and it's just as alive as you and I. And, we depend on it for our sustenance and why are

we trying to poison it? It's ridiculous. So anyway, I get excited about soil [I know] because it's a solution to climate change that must be part of a solution to climate change that most people are unaware of and we have to raise the awareness. And that's what I'm super excited about. It's getting people to go, 'Oh my God, soil could save us.'

Hayley: Exactly. And I think that's what I got out of the Soil Advocacy Training. We start off feeling helpless with this climate change. And then, once everything that you and Finian shared, it gave us hope that actually if we just sit back and nurture this living organism of soil that not only can we help heal ourselves through how it's going to re-put in better nutrients to the vegetables, but also suck down that carbon in such a natural way. I know it's so funny you hear about people, 'let's build a machine that can suck in my carbon,' when the trees can do that.

Don: Right, right. Yeah, it's pretty fascinating that they're trying to engineer their way out of it when we actually can fix it already with just following natural principles. Yeah, it's super exciting.

Hayley: Yeah. Something you said that I might get you just to explain for those people who haven't maybe listened to a couple of the podcasts before, because, obviously, throughout the advocacy training, I've been sharing a little bit about what I've learnt. But you mentioned that you kind of differentiated soil and dirt and so some people might not know that there's actually a huge difference. Why is soil different to dirt?

Don: Yeah. We kind of go through that in our class a little bit. It's just when we talk about dirt, dirt is dead. There's no organic matter in it and there's no living or dead organic matter left. It's just really the sand, soil and clay, which are the base components of soil that everybody thinks of. And then, you've got the air and water. But the really important part is this organic matter. And so, typically, we've done such a bad job of taking care of our soil that we turn a lot of it to dirt. We've removed almost all the organic matter. Most of the farming, at least in California, is down to about 1% soil organic matter. And it's hard to get less. We have managed to do that. It's harder to get less than that just because some of it is really hard to get rid of. But we've done such a good job because soils have had 10-20% soil organic matter which is crazy high. But we've depleted that dramatically. So, we've basically been stealing from the piggy bank. We've done that with water. We've done it with soil. And we could actually be farming in a way that builds that soil organic matter level and takes dirt and turns it back into functioning soil again.

Hayley: Yeah. So, it's such a differentiation as I started tilling because I've always loved nature and I've always had some pots and plants in my house, but I didn't know that there was life inside the soil and how that could actually differentiate whether your plant lives or dies. Cause you could (be) thinking you're putting your plant in such a beautiful

soil, but it's actually dirt with a bit of water in it. And wondering why it dies. This is such a key thing. And so, the organic matter you told us, you talked about there's amazing living, the soil food web, amazing living organisms: bacteria, fungi. Can you list sort of what life is inside the soil?

Don: Well, sure. I mean it's mostly things you can't see. I mean you can talk about earthworms and things that you can see, but it's all the little things that you can't see. So, in a teaspoon of soil, they'll say there's more living organisms than there are humans on the planet. And (in) a teaspoon of healthy soil, there's mycelium or fungi, I should say, forms of mushroom strands. There's all kinds of microbes whether it's archaea or bacteria or nematodes or amoeba, ciliates, protozoa, all kinds of fun little things. That if you have a microscope, you'll get scared because some of these things are wild-looking. It's really fascinating [alien] to see what's actually living. Yeah, they do. I mean you see things that you're like, 'Oh my God'. And what's even crazier is that stuff living inside you, too. It's like we have all these little crazy things that we couldn't live without either. They're really important in the soil and we don't want to be killing them because they perform vital functions such as producing enzymes and other sorts of sticky substances that help glue sand, soil and clay particles together, making aggregates. They also make minerals that help both the plants. So, if you don't have that living microbiome in the soil, then plants aren't going to get all the nutrients that they need. And so that's kind of the thing. And you need the source, this organic matter. It's either living or dead, but it's also food for other microorganisms and on up the food chain as you well.

Hayley: Exactly. I was going to say that's something that I learned is plants cannot absorb nutrients straight from the soil, right? You told us that it's that microbe world and universe that helps shift and change or that will turn the soil nutrients into plants, soluble nutrients so the plants can actually get the nutrients, right? So, it's such a key.

Don: Yeah, there's some really crazy stuff out there as to how a nutrient actually gets into a plant. And there's people that are saying, 'Oh, well yeah. I can do this hydroponically, or I can just pour a nutrient solution on the plants (and it) will soak it up.' It's true. They will. But the question is how healthy will the plant be? Is it able to absorb all the nutrients? Just because you put it out there, can it actually get into the plant? Is it really in a plant available form or does it need some microbe to help that transition? And what they find is that you can only get to a certain level of plant health if you don't have all this biology present. And that's the really important part. We haven't been able to simulate what nature's spent, you know, hundreds of millions of years figuring out. We still are so primitive and trying to figure out, 'Oh, we can do it better.' [Yeah.] Yeah. That's the hubris of man. I always say, man.

Hayley: Exactly. Well, it's interesting. This brings me to the precipice of what I wanted to talk about today is the **vermicomposting or worm composting**. Because as humans, rather than trying to be chemists and trying to work at how we can get it into

the plant, like you said in the beginning, if we nurture this soil life in a way so that it just doesn't function the way it is, the plants will be healthy. And one of the things I think, for me, is discovering some sort of worm composting. And it sort of solved two problems for me. I'm trying to become more zero waste here in my house. And the biggest waste, like I have recycling, I have paper, I have plastic and I have all that recycling. But the biggest waste that was coming from me was my food waste, from my salads and all my food. And so, I was like, how can I solve two (or) a few problems more than one? And I thought about vermicomposting because I can use the waste and I want to build a veggie garden, but I want to have really good soil. I live here in Bali, Indonesia. I can't always guarantee that the compost I get from the local garden place hasn't been built with products that have had chemicals or things put on it. I can't really know that just because of where I am. [Right.] And so, the worm composting sort of came in and it was a complete blank space in my brain of how to do it. And so, YouTube was a great source to start with. I started off with, I'm just going to share my screen. Oh, actually, now before I do that, what I learned was that there's earthworms, I have the red wigglers. I know there's different types of worms, I think, in composting. [Yeah.] And so, the worms themselves, how do they connect? What piece do they play in this soil food web in regards to their relationship to the microbes and what they do inside the soil? That's probably a key part here before I go and show you pictures.

Don: Yeah, sure. There's different forms of earthworms. There's literally thousands of different species of earthworms and they live at different levels in the soil. Some are up on the surface layer and that's usually what people have for composting worms. [Okay.] *Eisenia fetida* and *Andrei ei*, I can't remember how to pronounce it right, [okay] but those are the two main ones that people use. But really, in the soil, there's other ones that go much deeper and all of them are key. And what we find currently in most of our farming operations where we're applying lots of chemicals, both as fertilizers and as insecticides, herbicides, fungicides, etc. are killing off the microbial population, which is really what the earthworms are eating. So, it's important, like earthworms are a sign of a really good soil house. So, if you have a really healthy soil and you take a square foot of earth, you should find, this is like USDA statistics for how healthy is your soil, you should find at least 25 earthworms in there. And I go out into organic fields all the time and I take a shovel and I can't find this single earth [wow] which is pretty sad cause that's where we're growing our food. And you would think that this farmland that's organic would be, at least have 10 earthworms a square foot but literally you can't find one. And then, when you go to conventional non-organic, you definitely can't find any. And that's really shocking when you look at the scale of what we're doing. So, they feed on the microbes. They will definitely feed, if you look at where plants and plant roots are, around the roots of plants, you have a lot more microbes because they're pumping out the exudates in the form of sugars which the microbes are thriving on and trading nutrients for. That's where you'll find most of your earthworms. They're not there eating the roots. They're there feeding on the microbes. But the most important part of that is that as they eat these things, their poop is amazing. So, what goes in the front end of earthworm and what comes out the other end (are) completely different substances. And they've shown so many different tests where the poop is not only, it's like a plant

growth hormone, but it also acts as a protectant (where) it stops all kinds of other pathogens that might be harming a plant. [Wow.] So, they've done amazing work with just taking a simple extract. So, they put some vermicompost in water, very little vermi compost and mix it in with a lot of water. And then, that super diluted stuff and they put that on as a seed drench before the seeds go into the ground. And then those seeds, as soon as they sprout, whatever amazing bacteria, whatever properties it has, somehow it protects that plant from getting all kinds of diseases. And they've done it where they've introduced diseases and the plant wasn't affected by it. And the ones that weren't treated were affected by it. There's a lot of amazing research. But anyone that's used to moving vermicompost on plant seeds, it's like all of a sudden the plant goes nuts. Like, you put some down; water them; and in a week you can tell like, 'Oh my God, this thing all of a sudden just started growing like crazy.' But can you imagine if your soil was teeming with earthworm which is what it's supposed to be doing? I mean, you're supposed to have tons of them per acre [wow] and it's like that's nature's tilling machine, right? It's doing all sorts of things. It's creating all these pathways in the soil, for air and water. I mean, they're just, they're amazing. And that's why Darwin was like a giddy with earthworms and it's easy to get that way once you see how important they are in the ecosystem.

Hayley: Yeah, I can certainly feel (it). it's funny I never thought I'd be excited about worms. It's definitely not (or) it wasn't in my plan in my life and being excited about worms. And now I'm just, I'm proudly showing my bathtub of worms to whoever wants to listen. So, for me, I put my vegetables on there. And so, you're saying those worms will eat the microbes that are on the rotting food? So, they're not necessarily eating the food? Is that sort of how (it works)?

Don: That's what I've been told. And I've seen all sorts of science, it says that. But having said that, I've also observed, because I've fed a large amount of worms in my life. I have observed certain things that certainly look like the worm is definitely making a trail through that melon. And it's hard to believe that it was just eating the microbes cause there's a path that looks exactly like the worm. [Yeah.] So it's like, 'Ah-huh. Not totally convinced that they're only eating microbes, but they could be. [Yeah.] I mean somehow they're processing the rest of the food as if it were soil or something. But, I have seen tracks through carrots and melons and stuff. [Wow.] it's kind of interesting. But generally speaking, they are mowing down on the microbial population.

Hayley: And so, because I noticed it when I started learning about this and I had my little bucket system that I created because you can create something. This is why I love it. It's the fact that you can kind of create life in soil just in an apartment, on a balcony. And it's a great way to compost if you don't have a compost. It's a great option for people who don't have much space I think. [Yeah.] But I noticed when I started pouring the tea, I had some pots up along my wall where the soil was just compact and dead. And so, I started to water that. I obviously covered the soil. That was the first problem. And then, the second was to start inserting the worm tea that comes from these

composts. And now, the plants are vibrant. The soil has started to become less compact. And so, there's microbes in that worm tea, right?

Don: Yeah. Well, I should clarify it cause some people get really hung up on tea versus leachate versus extract.

Hayley: Okay, yes.

Don: But it depends. So, without having seniors, sometimes that stuff can smell bad and sometimes so it can be what is called the leachate, the stuff that drips out the bottom. [Yep.] It could be considered (or) it can be dangerous. A lot of times, it's perfect; it's really clean; and it doesn't smell and it's wonderful. I've put it under the microscope numerous times. It does not have the actual leachate. It does not have much microbial life in it. [Interesting.] Microbial life is actually highest up towards the surface where the worms are feeding which is really interesting. So, the finished stuff down at the bottom tends to get very dense and compacted. It's loaded with nutrients. So, I don't think it doesn't have nutrients [okay], but it's biological life is less than up where the food is freshest if you think of it that way. Anyway, the bottom line is you're putting on nutrients and microbes when you're doing that. There are some microbes and everything's going to do better when there's some nutrition available. [Yeah.] And then when that happens, those plants are growing better. They're photosynthesizing more. They're producing exudates, feeding the soil food web. They're feeding the microbes. Even if your vermicompost didn't have a lot of mic(robos) or the leachate that you poured in didn't have a lot of microbes, it doesn't matter. Because once you get food out there and nutrients out there, all you need is one bacteria overnight, (it) can become a billion if conditions are right. [Wow] I mean that's how fast these things multiply.

Hayley: That's amazing.

Don: Yeah. You're seeing the results of whatever you're doing. Whether it's getting microbes or not, it's still producing amazing results.

Hayley: Okay. Yeah, it is. That's the thing. And I'm jumping ahead. I wanted to talk about this, now obviously, it's called leachate. I've been calling it worm tea.

Don: A lot of people do so it just depends on who your teachers were and what the stuff that drips out in the bottom is considered leachate. Tea is actually something you have to brew. [Right.] And then, if you make something called an extract, you can take the finished vermicompost; add a bunch of water to it; and then, if you're not going to brew it, meaning that you're actually putting air, aerating it, etc., but you just mix it up immediately and then you pour it out. [Okay.] So, that would be considered like an extract, if you will.

Hayley: Right. Well, what I've been doing, I'm jumping ahead again. I'm going to come back. But what I have been doing is I've been aerating the leachate for a while. Would that attract the microbes? Good microbes?

Don: I couldn't say without knowing [right], without seeing it under the microscope. That's what I have to say.

Hayley: Yeah. Yeah. Okay. So, there's an amazing documentary. if you haven't watched it called the *Biggest Little Farm*. I'm sure you've seen it, Don. [Yes.] It was like, I just love it. I've seen it a couple of times. And in that, one of the very first things they did was build a state of the art, [yeah] worm farm, worming compost where they had like a huge meters-long, foot-long, depending from where you are in the world. Like I don't know how big it was but it was huge.

Don: It was 40-feet long, which is about [wow] 12 meters, maybe 13 meters. (It) would be approximately 13 meters.

Hayley: Wow. Yeah. And it would have had, I don't know, millions of worms inside there. And then from there, they were then creating or (doing) aerating. Now, I'm confused.

Don: They were making tea. Yes. They were making tea so they were taking that vermi compost and then putting it into a big industrial brewer, tea brewer.

Hayley: Ah, so not necessarily the leachate but the actual casting.

Don: Yes. The actual compost that comes out the bottom. That's a big flow-through system. [Yes.] So, flow-through means that you put food on the top and you harvest it from the bottom. [Right.] Whereas, I don't know what type of system that you have. There's many different types of worm-systems. [Okay.] Most commercial people use a flow through, well, I shouldn't say that. Some use a flow-through system where you feed it on top and you harvest from the bottom and others do wind rows, where they're literally, they just put a pile of food down in a long row and the worms live in that big pile. And they can keep feeding one side of it and then the worms will move to the side basically. And then, they can harvest off the side that hasn't been fed for awhile. [Yeah.] there's many different ways to do it. But I'm a big fan of the flow through system, but it's a lot of infrastructure.

Hayley: Yeah. It's not the kind of thing that mom and dad can do in their apartment.

Don: Yeah. Well, actually in Australia, either Australia or New Zealand, that has a really nice bin that you can do that is a flow-through system. [Oh, wow.] They cost like \$400 or something, but it's actually a pretty slick setup.

Hayley: Do you know what the system is?

Don: I have to Google it.

Hayley: That's fine. We can Google. I'll look, Google Australia worm farm. I'll vote that it's from Australia.

Don: It's, yeah, it's either Australia or New Zealand. I just remember (that) shipping was expensive because it's not made in the States.

Hayley: Right. Oh, right. Okay. Wow. I'm learning so much already. I bring up the Biggest Little Farm because this soil was highly, highly compact and the very first thing that they did was they integrated (it). And to me, they were spraying a trillion, gazillion microbes all over from this tea that they had brewed [right] into their irrigation system (in) which my understanding was, I guess, it's the nutrients would have been coming in as well as the microbes that would have been growing through that.

Don: Yeah. I believe they were also using compost. So, it's kind of a mix of where you have compost, which typically has more microbes in the finished vermicompost. But you're still getting nutrients, trace nutrients, and then also all the cool stuff that happens in the worm poop which would be like plant growth hormones and all sorts of things that help plants stay healthy, all kinds of crazy compounds that get formed in that process. And then, when you put that out via the tea, you're basically inoculating; you're enabling all kinds of cool stuff to happen; and waking things up that might've been dormant or increasing more spaces and water infiltration as things improve by getting better nutrients out there.

Hayley: Yeah. Wow. Yeah. It's so fascinating. It's just really exciting. So, of course, it excited me. And so, I built my first one which I'll show you. Let me just share my screen.

Don: So, you built one. You didn't buy one.

Hayley: I built it myself. Actually, that's the bath [oh, wow] but let's go to the bucket system. So, these three buckets.

Don: Oh, that's simple. Yeah.

Hayley: Yeah. And I drilled holes in the bottom and then also along the side, you can see, cause to make sure they didn't completely suffocate them. [Important.] And I thought, from what I would understand and underneath at the bottom of this, I would have something that would catch the leachate. [Okay.] And so, I had the worms. I managed it (from) my friend who has a worm in Imaski town. That's her farm. She gave me some worms. And so, I put that there and I actually put it a bit with, at the time, a little bit of compost soil just so there was some nice stuff. And then, I started putting the food on top of that. But I think I need to have some kind of bedding. It's funny (that) I watched Geoff Lawton and then, I also watched Costa. He's another guy in Australia. I don't know if you've ever heard of Costa. He works in Garden Australia. He looks like a big garden man. [Okay]. And both of them were doing a bathtub, one at the time. One included bedding for the worms which was like a carbon source of like that tread a newspaper or...

Don: A cardboard or something.

Hayley: A cardboard or something. And then, that's supposed to be where the worms sleep. And then there was Geoff Lawton (where) he literally just put a cow manure. And then, he literally put the worms on top of that. And then, he would put the food on top of that. So, it was different. So, what I found is some of the worms would actually crawl out from the bottom and sort of hang out near where the leachate would come out. [Yeah.] And then, some of them weren't necessarily crawling up. And I was also concerned about (this). If you have too much of the food substance, the scraps, the worms would get too anaerobic or acidic potentially and the worms didn't like that either. Can you comment on the sort of layers that are important inside the worm farm?

Don: Sure. It's really (important). So, I've rescued so many people's worm bins and seen really scary looking stuff and that's now gut awful. And it was just [yeah] really important when you feed your worms, one, you have to figure out how much they eat and it takes a while to get used to it, you know? So, there's a bunch of people that say, 'Oh, they eat their body weight a day,' which is not true. At best, they're eating about 25% of their body weight. So, if you have a pound of worms, they might eat four ounces. Sorry, I should be doing it in kilos, right?

Hayley: Well, we have listeners from everywhere so...

Don: In a kilo of worms, you're going to have to feed them 250 grams of food a day. And do you have to feed them every day? No. You could feed them every other day or every three days as long as there's enough food. The problem is if you try and say, 'Oh, I'm going to put in four weeks' worth of food.' Then, your food's going to rot before the worms can consume it. And once your food starts rotting, it could go anaerobic and start producing things that are toxic to the worm, like some types of alcohols or anything that smells bad. If your worm bin smells bad, something's wrong. It should never (smell bad).

It should always smell good, like literally smell good. [Right, okay.] And it's one of those things like it should smell like really amazing soil. And if you have a bad, smelling thing, you need to probably add carbon to it, which would be newspaper, charcoal, brown leaves, but anything that would be able to absorb that. And because basically you went anaerobic and you need to introduce (it). You need to turn it, meaning, you need to get some oxygen in it and you probably need to add carbon because you had too much moisture. It got too dense. (It) started to ferment. And so, that's typically what happens. And now, till the worms.

Hayley: Yeah, I was going to say, yeah, that's one thing I've noticed how it doesn't smell. I'm plant-based so I don't even have dairy or meat which I think is one of the main reasons (why it doesn't smell.)

Don: Most people would tell you not to put those into [any way] your worm bin. They can be composted but most people say don't do that. But generally, the main things you don't want in there are glass, plastic and metal.

Hayley: What are the, maybe, three key things that a worm bin needs to have so that the worms are happy in there?

Don: Temperature is great. It's important. Moisture content is important and light. So, worms do not like light so you want to keep it in the shade, preferably covered so that they're not exposed to any sunlight. Because they don't really like sunlight. And moisture is really important. They like something that is pretty darn moist like moister than you think. [Okay.] So, (it's) approximately 80%. If you had a sponge and it was completely loaded with water, when you pick it up by the edge, water is going to pour out. That's like 100% saturation. That would be too wet. You don't want it that wet. But if you have a sponge and you squeeze it and no water comes out, that's too dry. If definitely you can squeeze water out, that's more like 80%. So, you want water to squeeze out. If you were feeding it a mixture of food and you squeeze that handful of food, you would actually want some moisture to come out. Now, what I used as a food source when I was doing a large bin was a combination. I would get juice waste from the local juicer (from a) juice bar, right? They throw out like 50-pound bags of the most nutritious food around, right? [Wow.] It's organic. It's everything. Pineapple, beets, kale, ginger. I mean all kinds of (food). By the way, worms don't really like ginger, but the microbes eat everything down to fiber. But generally speaking, everything that was in there was just amazing worm food. And then, I mixed that with old, I had another community garden nearby that had aged manure. Like literally, it had been cooked for a while. So, it was like 160 degrees for a long time and then, they put it through a shredder. This was like horse manure and stable waste. And this was an amazing product. And I've mixed that with juice waste. It was like the perfect warm food. I had so many worms that when you opened the lids to my worm bin, it sounded like opening, I don't know if you guys have rice krispies down there, (oh, yeah), when you pour milk on cereal and it goes snap, crackle, pop. That's how many worms (there are). It's like you

lift it and you can hear the worms. There's that many. [Wow.] You would stick your fingers in there and literally the whole surface would move.

Hayley: Wow, that's amazing.

Don: Like that's how many I have. It was robust. And to maintain that though, you have to keep (it) perfect. You've got to keep the conditions just right. And for the average home person, you're not going to have that perfect situation but you can create it. Like you said, you had some compost. So, if you don't have the perfect food waste set up, and by the way, I'd recommend putting all your food scraps in the freezer, just one of your freezer drawers or get a bucket that you can put in the freezer. And then, you just throw all your food scraps in the freezer instead of keeping them on your counter. And this'll stop them from fermenting. It freezes them. And then, when you thaw it out, they're already broken down because you broke down a bunch of the cell structures when they froze. So then, the food's much easier to (be digested.) You just put it out there and it's much more readily digestible for the worms. And it's easier to work with once it's thawed out. But you can put in just about anything. It'll eventually break down. But like I said, if you have juice waste and coffee grounds, 'Oh my God.'

Hayley: They love that.

Don: The coffee grounds, not too much cause it's acidic [okay] but definitely, they definitely get a buzz on coffee grounds. (It's) even better if you grow mushrooms on your coffee grounds. Then, you take that myceliated coffee ground which doesn't have caffeine anymore in it and the worms go nuts for that stuff. It's amazing. But that's a whole, another level.

Hayley: Yeah. And so, the worms are ultimately helping this turn into sort of plant soluble castings and the nutrients will be so rich from their poop. And that's what's really great for putting on your gardens, right?

Don: Exactly.

Hayley: And so, the biodiversity of the food you're feeding them is also really good to provide more diverse nutrients into the castings, right?

Don: Sure. Exactly. It's just like everything else. The more diverse it is, the better. So, if you can get a lot of different sources of food. It's like one of the classic books. It's called, *Worms Eat My Garbage* and you can feed worms of all kinds. The woman who wrote that is deceased, but she was really sweet and her name is Mary Appelhof. [Awesome.] But there's a lot of worm books out there. And if you ever really get into worms, you can go to the *North American Vermiculture Conference* which is usually in North Carolina

hosted by a Dr. Rhonda Sherman. And I think this will be like their 21st year or something. [Wow.] That's where the big scale Vermi-composters go.

Hayley: Wow. That's amazing. Now, you mentioned temperature, moisture and light. You didn't sort of comment on what the ideal temperature is.

Don: Oh, right, right. So, worms don't generally like anything over a hundred degrees, which would be about 40 degrees C.

Hayley: Of course. Yeah, definitely. Yeah.

Don: Somewhere in that. [Yeah.] It's amazing. They really thrive in a warm (area), like you can get up to, you know, 30, maybe 34 C, I think. That's about right. [Yeah]. And they'll thrive and wow. You have a cat in the background.

Hayley: I do. Yes, I do.

Don: Anyway, I've studied this. Even in the wintertime, because of what I was feeding had enough nitrogen in it, I would put on my food a couple inches that would be like five centimeters thick. And it would actually start to get warm through the thermophilic process. That's the microbes making it heat up. And the worms would love that. So, in the winter time when it was almost, well it wouldn't be freezing but it was getting close, it was cold like 5 degrees Celsius or something like that. Even then, the worms were doing fine cause the food kept them warm. But they don't like freezing and they don't like it too hot. [Right.] So, you don't want to keep your worm bin in the sun. In the winter time, you might need to protect it.

Hayley: I have a funny story about keeping your worm bin too hot. I got really excited when I finally got my bath tub cause I wanted to upgrade. I realized I think I had too much food for the worms just using those buckets systems. I felt like I had too much. And so, I decided to get a bathtub and I thought I'm going to give them the freshest, best bedding ever and all these kinds of stuff. And what I ended up doing is I actually put fresh horse manure, a whole heap of it. And then I checked it about 12 hours later the next day and I was wondering why none of my worms had moved from their original position inside the nice cool castings that they had been in. And I felt the rest of the bin was extremely hot. [Yes.] I think the fresh horse manure was starting to get extremely hot and I was like, 'Oh my God, I'm cooking my worms.' [Yeah.] And so, I had to go in and rescue all my worms and get all the horse poo, the fresh horse poo out. And I had already composted horse poo, the cooler stuff, [yes] and re-bedded it. And they're much happier now, I can say.

Don: Yeah. And that's why you noticed, I said I was using aged, aged manure. It had been aged and then already gotten up to temperature and then, put through a starter and cool back off. But yeah, you can definitely cook, you can create an environment that's too nitrogen rich and it'll overheat. And the worms will not like that because there's so much nitrogen. They're like, 'Nope, that's not for me.' [Yeah]. It'll actually smell if it smells like you smell that ammonia [yeah] smell? That's usually a sign that it's going to be too hot.

Hayley: Yeah. Well, they're definitely much happier and I'm glad I checked it 12 hours later. And you know, that observation is such a key thing. We're coming to the end. I just wanted to talk just a little bit more. For people at home, if they want to start a place, like start a farm, so that they can get rid of their food scraps or not have food scraps going off to waste. Cause as we know, I think it's the second most contributed to climate change. It's the methane coming from the food scraps. They're inside the tip that could be composted, right? So, if they want to contribute to being part of that and also start to build some nutrient-rich castings and have some leachate, what do you suggest someone does? Like, what's the best thing that someone can do to just get started doing a little worm farms?

Don: I would do anything to get educated on it. Like Mary Appelhof's book is like 10 bucks, right? [Okay.] You can watch YouTube videos for free. [Yeah.] There's tons of great vermicomposting websites out there. There's, yeah, I mean that would be the simplest ways. I mean, it's so easy. None of it's hard to do. And if you go to your local community garden or somewhere, you can find somebody that already has some worms so you could find some worms. You can buy them. But I just caution people, it takes a little bit of skill. It sounds silly, but like you don't want to kill your worms. I've seen so many worms where people buy five pounds or 10 pounds of worms and it's their first time doing it which is way too many. [Yeah.] Don't start big, start small. And, they multiply by the way. So, just don't go out and go buy a bunch and then kill them because you don't know what you're doing. It's easier to find somebody that you can learn from or spend a little bit of time getting educated. It is having a pet. They're great. The good part, I mean, I have this whole reason why worms are awesome. But like, you can name them things and you know, like that one's Pat. They're hermaphrodites. So, you have to come up with names that, you know, can be male or female. [Yeah.] And then, when one of them dies, you don't know, right? So, you don't ever get sad because they don't make any noise. They don't bark. They don't meow. They do, you know, go to the bathroom, but you don't have to clean up their litter or anything.

Hayley: In fact, you're excited by their going to the bathroom.

Don: Yeah. And so, you know, there's just all sorts of things. You don't have to take them for walks or anything. So it's just they do make good pets, but they are something that you do have to pay attention to. And, if you're going away on a two-week vacation,

you can set it up so that there'll be fine for two weeks. Not a problem. But you know, it's like having a pet.

Hayley: Yeah, exactly. And I've found (out that) as long as every couple of days, I'm making sure I've just lifted up the lid and have a look and put my hands in the soil. And, are they moving? Are they going around? Are they eating? Is the food (okay?) It is something that's constantly you have to have in the back of mind that I've found so far is my novice worm composting grower, vermicomposter. But yeah, they're actually quite, quite easy, I guess, compared to any other pets.

Don: Yes. Definitely.

Hayley: That's awesome. And one last question I forgot to ask was the bedding. Is that a really important thing to have in your worms? Do they need a bed?

Don: Yeah. Oh, well, there's two. Like if you're talking about bedding at the bottom, some people make sure that there's no moisture buildup at the bottom or there's a drain or something. Usually, like large scale vermicompost, they don't really want moist, excess moisture dripping out the bottom. So, they make sure that they get their mix right. And then, there shouldn't be a lot of moisture coming out the bottom anyway if you're doing it right. But the bedding is generally supposed to be up at the top and that prevents a lot of the little flying bugs and things that could become a problem because it's hard for them to get down to the food. So, the bedding sort of shelters the worms. It keeps the light off the worms. It provides a kind of a barricade if it will for all the little naps and things. And so, you can have four to six inches of shredded newspaper on top or you can get, well, there you go. You could keep it covered with some cardboard. But, yeah. So, bedding is not mandatory. Like when I did my larger scale one, there was no, what you'd call bedding. All the food acted as the bedding really. And my mix was so good that it didn't attract flies or anything because it had this aged, aged compost and juice scraps. And it was beautiful. It was the perfect food mix which you can't do in a home one. That's a little harder to get because of space.

Hayley: Yeah. That's a bit harder. Okay. So, it's just always researching. But I definitely encourage people. It's been an awesome experience just to have my worms and I'm very excited about them. And Don, I just want to thank you so much for sharing all your wisdom. It's so funny. I really wanted to keep talking. There's so much going on. But there's obviously, we've all got to get things (done). We'll get on with our lives to keep going on. But I just want to thank you so much for your time. If anyone's interested in joining the *Soil Advocacy Training* where Don's one of the teachers, he's phenomenal with Finian at *Kiss the Ground*. I 100% recommend it if you're interested in (joining). If these conversations excited you, then *7 Weeks with Don and Finian* is just phenomenal about what you will learn on the Soil Advocacy Training. Did you want to add anything, Don?

Don: I'll just say, thanks, Haley. I'm really grateful that you're going forward with your training and getting out and doing great stuff in vermicomposting and getting more educated and sharing your knowledge. It's awesome.

Hayley: Yeah. Thank you. It is. It's really good.

Don: Just stay healthy, you know, that's what's all going around the world right now. Stay healthy.

Hayley: Now's the best time to start building your vegetable gardens and staying inside [exactly] and making yourself more self-sufficient. I did a podcast, I think two weeks ago, on how it's teaching us to become more self-reliant. So, I think it's a great time to get started.

Don: Yeah, definitely.

Hayley: Yeah. Thank you so much, Don. Thank you so much Thrivers for listening to this podcast. Thank you.

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