Farms, Food and You

Waste Solutions: Vermicomposting

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Dee Shore (00:06):

Waste management is an important and oftentimes costly aspect of farming and agribusiness. It's estimated that 20% or more of produce remains unharvested in fields, which means lost potential income. Leftovers from food processing sometimes wind up in landfills. And then there's the challenge of managing manure from livestock operations.

I'm Dee Shore, and in this and the next episode of Farms, Food and You, we'll explore ways that North Carolina State University's College of Agriculture and Life Sciences is helping farmers and food, feed, and fiber processors turn wastes into valuable byproducts.

The focus of this episode is vermicomposting, the practice of using earthworms and microorganisms to convert organic material, from manure to fruits and veggies to paper and cotton, into a soil amendment often called black gold. And anyone can do it.

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Dee Shore (01:15):

NC State's Rhonda Sherman is affectionately known as the worm queen. Over the past 28 years, she has earned a reputation as one of the world's leading vermicomposting experts, and she's passionate about the benefits of the practice.

Rhonda Sherman (01:32):

For plants, it helps seeds to germinate more quickly, and the plants grow bigger and healthier and have greater yield of whatever that plant produces. And also vermicompost can suppress disease and insect attacks and parasitic nematodes.

Dee Shore (01:55):

Vermicomposting also benefits soil health.

Rhonda Sherman (01:59):

It adds organic matter, and it provides nutrients that are available to plants. Instead of just putting nutrients in the soil, they've been transformed by the earthworms to make them available for plants to use them. It helps soil to absorb and retain water. It breaks up clay soils. It improves the soil structure and increases the cation exchange capacity. So it helps form soil aggregates, and enhances soil fertility, and reduces the bulk density. It improves soil aeration and increases soil microbial populations, and there's more from there.

Dee Shore (02:48):

This means that vermicomposting can turn what's often seen as waste into a valuable byproduct, useful in many endeavors.

Rhonda Sherman (02:58):

If you manufacture vermicompost and sell it, you can sell it for between $200 and $1,000 per cubic yard. Whereas regular compost, you could only sell for up to $30 per yard. All you need is up to 20% by volume vermicompost mixed into soil to have the effects on plants that I described and to suppress plant pests and diseases. Anybody can use it. Vineyards just have amazing results using vermicompost. And so farms, organic farmers, nurseries, turfgrass, golf courses, you name it, they can all use vermicompost.

Dee Shore (03:49):

Right now, Sherman estimates that there are two dozen or more commercial vermicomposting operations in North Carolina. She describes Life Cycle Organics in Franklin, a mountain town in the far western part of the state.

Rhonda Sherman (04:06):

It was like 2016 or ’17 that I gave a presentation at the local Cooperative Extension office, where I talked about vermicomposting. And one of the men in attendance he went home and told his two sons, “We’re going to start a worm farm. And so in 2017, Keith, Ben and Josh Walker in Franklin, started this vermicomposting operation. And they’re feeding the worms composted vegetable scraps and forestry products. And they designed and built their own 28-foot-long bin by five-feet wide. It produced 16 cubic yards of material, and they populated it with at least 150 pounds of worms. And they’ve been very successful, and they’re especially doing well on Amazon. You can look for Life Cycle Organics, and they’re producing about 300 gallons a week of this wonderful vermicompost. I’m really impressed with what they’ve done.

Dee Shore (05:18):

And vermicomposting isn’t just for those wanting to create new businesses.

Rhonda Sherman (05:23):

You can do it at home. You can do it in classrooms. You can do it in a variety of businesses, anybody who produces food. So think of the businesses that have lunchrooms and Air Force bases and hospitals and restaurants and prisons, and all sorts of people who either produce food waste or paper waste or manure are doing vermicomposting on a really large scale, too.

Dee Shore (05:59):

To get started at home, you need a small bin, something like the 14-gallon plastic storage bins you can get from the big box stores, and about a pound of earthworms.

Rhonda Sherman (06:12):

And you learn earthworm husbandry. That’s the most important thing. You don’t want to say, “I want to go big,” and go out and buy 10 or 100 pounds of worms. There’s 1,000 worms in a pound. And so if you don’t know how to raise worms, then you need to practice. So it’s best to start with a pound of worms.

Dee Shore (06:35):

Sherman specializes in both composting and vermicomposting, and she stresses that the two are very different processes. Composting is slower, and it heats the pile up to temperatures that can kill the

worms. In vermicomposting, you don't need to turn the waste materials you want to decompose. Another thing to note, not all earthworms are the same, and you have to be sure you're using the right kind.

Rhonda Sherman (07:07):

Of the 9,000 species of earthworms, scientists have divided them into three different groups, according to where they live and what they eat. So anecic earthworms will create vertical burrows in the soil, and they'll eat the soil, and they'll come out sometimes to grab some leaf litter and take it underneath and eat it. And then you have the endogeic earthworms, and they make horizontal burrows, and they only eat soil, and they always live in the soil. And then the epigeic earthworms, they live on top of the soil. So it's hard for people to wrap their minds around this, but they are earthworms, but they're not living in the earth. So what they're doing is consuming leaves and manure. So if you're walking in a field and you see a cow patty, any worms in it, those are the epigeic earthworms. So they like rich organic matter that's decomposing.

I give about 50 lectures a year. Just groups around the world ask me to speak about vermicomposting, and I'm always very careful to get it across to people that there are these different types of earthworms, and they're all earthworms. Not all of them live underground like we think. Because otherwise, people have preconceived notions about earthworms, and to start vermicomposting, they might just fill a bin with soil and put some worms in, and "Oh, a worm is a worm. Hey, they like soil. Here we go!" And it's not at all.

Dee Shore (08:59):

To reiterate, what you want is an epigeic earthworm, and Sherman recommends one species in particular.

Rhonda Sherman (09:07):

You really have to get the correct species of earthworms. You'd be aiming for *Eisenia fetida,* or the most common name it has is red wiggler. You'd want that, but you would want organic material to be in that bin, not soil.

Dee Shore (09:27):

And what constitutes organic material?

Rhonda Sherman (09:30):

As far as what the earthworms eat, that's organic material. And that doesn't mean that, oh, certified organic. It does not mean that at all. It means anything that is alive or was once living, that it came from a living being. They love livestock manure, except for chicken manure, that's too high in ammonia and nitrogen. But any type of livestock manure you can think of, they will consume. And they would consume agricultural crop residues and leaves and paper and food waste.

Dee Shore (10:11):

If you'd like to learn more about vermicomposting, whether it's to biodegrade your food scraps for a garden soil amendment or to launch a commercial-scale business, Sherman has a wealth of information to offer. In addition to a compost learning lab in Raleigh, where she demonstrates vermicomposting practices, she offers free publications, how-to videos, podcasts and more.

Rhonda Sherman (10:36):

I have a free extension publication called Worms Can Recycle Your Garbage. It's on my website, composting.ces.ncsu.edu, along with videos, and the vermicomposting videos, they're very popular. But you start with that one pound, and then if you do want to expand from there, I have all sorts of resources on my website. You can click on for businesses, farms, institutions and municipalities. And I have a much longer publication called Raising Earthworms Successfully, and that's another free publication on my website.

Rhonda Sherman (11:20):

But also, I have a book that a publisher actually contacted me and said, "We don't see anything on the market about larger-scale vermicomposting," and so it's called the "Worm Farmer's Handbook: Mid- to Large-Scale Vermicomposting for Farms, Businesses, Municipalities, Schools and Institutions." And in this book, I describe in detail how to get started and what to do. And I also describe about two dozen operations around the world that are doing various scales of vermicompost, and it includes some millionaires and they've become millionaires from vermicomposting.

Another resource is this annual vermiculture conference. I've been holding it for the past 20 years. About 35 countries have attended my conference in just about every state, and it's the only annual conference in the world on large-scale vermicomposting.

Dee Shore (12:23):

As Sherman explains, vermicomposting is a great way to reduce waste, divert organic material from landfills, and restore health to degraded soils. Happy vermicomposting.

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Dee Shore (12:43):

Thanks for listening today, and we hope you'll join us again for the next episode of Farms, Food and You. To learn more about the College of Agriculture and Life Sciences and our podcast, visit go.ncsu.edu/farms. While you're there, share your thoughts. We'd love to get your ideas and to hear what topics you'd like for us to explore in the future.

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