Cliff Scholz: Joe, you've told us about a couple of farmers down in Ohio called the Spray brothers and the results they got in erosion and runoff control. I think our audience would love to hear about that.

Joe Scrimger: I met Rex Spray probably back in the early '80s. He came up and spoke at one of the Michigan programs. Later on I went down to Ohio Ecological Food and Farm Associations, toured his farm. But in the meantime, I talked to him on the phone 'cause my dad, way back when, was on the Soil Conservation Committee.

I went to meetings, but I never sat on the committee. Where Rex Spray was on the committee for, I think it's Knox County, Ohio, on the way to Wooster. Pretty productive area, but rolling land. And, they did soil conservation, minimum-tillage yield contest. And they measured erosion and they measured yield.

Rex, at that time, was a certified organic farmer. He was doin' pretty well in his marketing, one of the first guys to really have, a marketing system. A lot of his production sold as food, certified organic food.

So he was planting different varieties of corn because he was planting varieties that were known for nutrition. But some of these varieties responded better to this slow-release fertilizer concept. But Rex was not a no-tiller, he was a minimum-tiller.

He used conservation tillage, disk, and a field cultivator. Maybe a chisel plow every now and then. So he mainly mixed the residue into the surface of the soil.

And there's a book called *The Ploughman's Folly* that a lot of people talk about. Even the current no-tillers talk about *The Ploughman's Folly* by Edward Faulkner. And I read that book way back when, and I switched. The most expensive piece of equipment on my farm was the rollover plow, meaning it would plow both ways. It had eight bottoms on the back of it, four one way, four the other way. You just turn around and go back. I set that aside and went and bought a chisel plow, even though I didn't have money, after I read that book. Edward Faulkner was an extension agent from Ohio.

Well, Rex Spray read that, too, earlier on. And he had got his tillage figured

out, and the residue, and the decay. But when he entered these contest first, he did well, but he was quite a ways off the top. But what they noticed is he was doin' tillage and he was havin' less erosion than the no-till guys.

Well, he worked himself all the way up to the top yield of corn in Ohio, a very progressive county, using 0-0-0 for fertilizer. I mean, he didn't put any fertilizer on. He had used some things in the past like humates and whatever. And he had a little manure. He didn't have a lotta cattle. But he did a good rotation. Did his clover cover crops. But he managed this residue, and he was watchin' his tillage. He didn't work the soil wet. Very, very cautious.

So by the time he got to first place, there was only one no-till farmer that beat him on erosion. And that guy was no-tilling into alfalfa sod, and Rex wasn't. Rex had a rotation. So alfalfa sod, we know that holds things together better. But Rex was maybe working up a wheat stubble or whatever.

Rex got it figured out early on and it was a very profitable farm. Now we're on the next generation. Rex Spray family's still there. But it's two brothers, Rex and Glen. Very, very good farmers.

But tilling, and there's a lot of people in the Soil Conservation, and USDA, and some of the new regenerative farmers are suggesting that tillage is the problem.

Tillage can be a problem. And we do want to till less. But tillage is not the problem. If it was, we'd have to fire those earthworms. 'Cause those earthworms, in theory, if they're in proper numbers per square foot, they will till about one-seventh of your soil per year.

So every seven years they till it for free, one full cycle. And it's tillage, the way they do it. They're moving residue down, and holes, and whatever. So, they're tilling. And I have to bring it to those farmers' attention.

But the bigger thing, after I saw what Rex did, I saw so many other examples. And one of 'em I'll show at this program that I'm doin' end of the month is on how we build up blow sand that wouldn't produce anymore, that Saginaw Valley farmers, some of the most progressive farmers in the

world, give up on, burned it out, set it aside. And we brought that back into production organically over a six, seven-year period. And made it produce better than some of the irrigated ground.

And we did it with tillage. If tillage was the problem that the USDA suggests, that would be a mathematical impossibility to happen. And I don't mean to keep reverting back to that, but that's how I look at things.

At the Michigan AgriBusiness program, one of the Soil Conservation speakers talked about the Dust Bowl. Back in the '80s, I drove into Imlay City and the streetlights were on at midday because there was a cloud of black soil from the Imlay City muck blowing into town.

Why they get called the Dust Bowl is on the start, they spring up in certain spots. So there was a dust bowl literally starting at the soil, like a little tornado that keeps gettin' bigger and is sucking up dust.

But these were huge. These were not a little miniature tornado. These were huge dust bowl deals. They were happening north of Marlette on the light ground. They were happening on the Imlay City muck. And they were happenin' on both sides of North Branch.

The key was, I grew up in that area. I knew all those farmers. And I figured out why it happened on some farms and it didn't happen on other farms early on. But if the weather hits right, we still have that potential to happen, even in the Thumb.

Cliff Scholz: So you're saying we might go along for a few years and not see any big problems, but then we get a real wet year, or a real dry year, or just badly timed rains, and all of a sudden these underlying problems can show up. But really, they were there all along.

Joe Scrimger: In the same way that the last few years there hasn't been a problem in Lake Erie, but all those conditions are there. We just haven't had the right weather combination. Which what it takes is early spring rains, after the have applied all the fertilizer, to put that into the water system. And then the algae grows.

And the spring rains have held off. Some of that's become more stable and

it hasn't been as bad. The problem's there.

Cliff Scholz: Overall what I hear you saying is that there's a number of things that are causing erosion and runoff, not just tillage. Too much fertilizer and chemicals will damage the soil and its ability to handle these kinds of weather impacts. But, over-tillage is a factor, and it is very common.

So, is it the depth of the tillage or the frequency of the tillage that matters? Or the timing of the tillage relative to rain events or soil moisture content? What are the big pieces that people should be aware of if they want to use tillage in a way that works better with their soil biology?

Joe Scrimger: Cliff, you're doin' a pretty good job of hitting the points, so all of the above and we can go on.

Cliff Scholz: Okay, it's all those things--

Joe Scrimger: All those things. So yes, depth. As farmers, now this deal of moldboard plowing, which a lot more conservation tillage and no till has done now, but still farmers still moldboard plow. I saw a field today that had just been moldboard plowed two or three days ago.

And that's where you invert the soil. Amish farms tend to still moldboard plow, but they don't have, quote, "high horsepower." They don't plow as deep. Amish farms usually always function better. They don't function perfectly in all cases, but they do function better. They don't plow as often and they don't plow as deep.

What happened on the, quote, "English farms" was that as they got more horsepower and as more nitrogen caused more compaction, specifically down deep at seven, eight, nine inches, they went from plowing five, six inches, which was common back in the '60s, to plowin' seven, eight inches, to plowing eight or nine inches to take out the lower layers of compaction.

Every time they did that, they were starting to create another layer lower. You see what I'm gettin' at? So then the plows got bigger so they could plow deeper. But it didn't work. In the short term it alleviated some compaction and caused other.

But it's not the moldboard plow. It's plowing too often, too deep. And if you got a wide rotation of, say, five different crops, and moldboard plow one or two of 'em not too deep, probably won't have much negative effect.

If you got corn and soybeans or corn, soybeans, and sugar beets, and are plowing deep for the sugar beets, which a lotta guys in the valley are, and plowing deep after corn to bury the residue instead of manage, they—they're burying what they call “the trash”.

That's the leftover corn stalks. I call it surface tillage to manage the residue back into the system. The residue will decay the best close to the surface or in the top three inches mix. You get it deeper than that, and some of it starts to not decay properly.

But there's some exceptions. Alfalfa, because it's got this really big root, and this root can be the size of my thumb and it can go down five foot, so a lot of cases it'll go through the compacted layer. But because of the nitrogen and the nitrogen nodules on that root, you can moldboard plow that and mix it. And then, even the green stuff on top because it's alfalfa, it's high protein, high nitrogen, it always relatively decays properly.

But if you can picture corn stalks are high carbon. And they have a tremendous mass of roots underneath 'em. And it's all high carbon, very little nitrogen. If you plow that down too deep it can't access enough nitrogen to decay properly. And if it decays improperly, you don't get conversion.

So here's a real key that happens on the muck, happened on the sand, happens on good soil. If it goes too deep and doesn't decay properly in the presence of some oxygen, it decays anaerobically. And that material that was supposed to be building organic matter, and it's sort of a carbon but it's not the end carbon. Vegetable matter that's higher in carbon converts to ash versus converting to humus.

And so the ultimate ash is potash out of a stove, it's wood that's been burned up. But that process can happen in the soil. So you lose that organic matter from those residues if they're put down too deep and don't decay properly. But the confusing thing is, ash is still high in minerals. So

the soil test picks up the minerals and thinks you're great. And it doesn't watch the organic matter.

Organic matter is important to track, but you can't catch the change in one or two years. You gotta go ten years or so to catch the changes. And you have to have records.

So if it's there as ash, in the short term it looks, it's got minerals. And it looks like organic matter, and in some cases is tested as organic matter. But ash doesn't function like humus. Humus functions as a sponge. See what I'm sayin'?

Cliff Scholz: Oh yeah. Sometimes you can get by with adding a little actual ash to your soil if it's biologically active. Those minerals can be built into the biology of the soil.

But I wouldn't count on it if I were working with a biologically inactive soil. I would avoid it.

This is me as a gardener just goin', "Hm, I got Joe Scrimger here. I should ask about gardening practice."

Joe Scrimger: You've got it, though.

Cliff Scholz: Oh.

Joe Scrimger: You're in the ballgame, yeah.

* * *END OF TRANSCRIPT* * *