Cliff Scholz: Joe, you've talked about how in a living soil you get cracks that open up, and these cracks allow the soil to breathe. Can you explain how that works?

Joe Scrimger: Part of the natural aeration system of a soil is when it dries in the summer, if it has a higher clay content, sometimes you will get a crack in the soil that you can literally put your hand into. You know, your hand will fit into that crack.

Sandy soils don't relatively do that 'cause they don't have a high clay content. But some people in the conventional world would say, "In the heavy ground you gotta put in more tile. And down here in the lighter soil you gotta irrigate it more."

Kellogg Biological Station did an irrigation experiment when I was testing for them back in the '80s with Dr. Harwood, who was the Sustainable Ag chair. He passed away just this last year, was just a super person, from Michigan State. He had me doin' plots down at KBS. And he started some long-term plots, too, that I worked with initially.

But I looked at what they were doin' on irrigation, and they were trying to figure out how much you could irrigate soil. Well, it worked really great for the first couple years. By the time they got to the third year, their yield started goin' down.

And what they figured out is that they were keeping the soil wet, consequently, the soil didn't have a chance to dry and shrink some, and get little cracks in it, even though it was lighter soil. Little cracks that let the air in. So they started losin' biology just because they were irrigating too much, and that soil started to become more anaerobic. And they documented that, but they never really printed it.

I was there. I asked the right questions at the right time, and got the answers. So what I'm sayin', there is some soil that needs to be irrigated. Don't hesitate. You're doin' a intensive vegetable operation, get some irrigation if you're on that type of soil.

There is some soil that needs to be drained. Don't hesitate. Put the tile in before, as you're a young farmer. Put the tile in, get it drained. But if you

work with the organic matter, and if you work with a more diversity of crops, you can take low soil, poor drain, and raise canary grass on that without tilin' it.

And understand how you feed the canary grass. It's a natural to low wet soils, and it'll grow on productive high soils, too. But that canary grass harvested right, most people harvest it too late. You gotta harvest it at the right time.

And sell it, and guarantee it in the market, most people want to buy alfalfa. They don't wanna buy canary grass. So you have to tell them, "No, this canary grass is different. Try it. I'll guarantee the first load. If it doesn't work, I'll take it back."

They always buy the second load. But he saved $600 an acre 'cause he didn't have to tile it. And the canary grass was starting to grow, and he wasn't putting much fertilizer on. And because this low, poorly drained ground, it's higher in organic matter and higher in nutrients. And you can touch up the deal. But canary grass functions real well in that environment. So we saved the deal.

And the other thing that I mentioned to you was building sand and getting sand to produce better than irrigated sand that hasn't been dealt with.

I'm not against the irrigation. But there's a certain cost. When they turn on the electric motors to run that irrigation, the electrical bills zoom up. You're irrigatin' a quarter of a section, a mile section with those irrigation units.

A tremendous electrical cost. If we can cut that by two-thirds, we've saved them a lotta money, too. Plus, we let the soil breathe more. And if we've inoculated the culture in the soil, we get it to grow, and we become more efficient, and then in the future we can cut that irrigation again.

Cliff Scholz: By that you mean inoculated the culture with the healthy mix of fungal and bacterial organisms—

Joe Scrimger: Yeah. I'd do that with a little poultry on the start, get the nitrogen goin'. Then go to a, like, a dairy compost that's got more straw into it, that's a medium carbon. And then in the end, go to a cheaper high

carbon, which may be leaves and grass clippings.

It's just that most leaves and grass-clipping operations don't understand composting. They just understand getting a tipping fee to receive that product. And they say they compost it and send it back out, and there's all different forms of composting. But if we're gonna have disease suppression, and if we're gonna get that high-carbon compost to work in the soil, it has to be composted properly. And if it is, it's pretty valuable stuff.

Cliff Scholz: That'll do two things. It'll add the microbes in a healthy proportion that'll generally support crops. It'll also add carbon base, to the soil that'll help to raise that organic matter content a little bit, incrementally, while giving those, microbes a little something to munch on, so to speak, while they're getting established. Is that a good way of talking about it?

Joe Scrimger: And it's high carbon. It brings up the fungal organisms. So it brings up your fungal balance and gets you those things, without havin' to raise quite as many broadleafs in the short term. But in the long term, you wanna raise the broadleafs too.

Gabe did it by skipping the compost because the amount of acres the animal does out there is really spread out in those western states.

Where here, we can do about an animal per acre. Out there it might be an animal per 20 or 30 acres. They're just more spread out. And too many farms have went just to grains and got rid of the animals. And the animals ended up in a feedlot, where a lot of the manure gets wasted. Meaning it gets put on and causes problems 'cause they're putting it out way too high of a rate.

Cliff Scholz: Here's another important one: How do you raise a higher-protein crop? You mentioned the role of phosphorus in that. And we know that nitrogen is gonna factor in also, 'cause protein is nitrogenous. But, if the feed, whatever it is, alfalfa, grain, whatever, is lower in protein, it's lower-quality feed, and that's gonna affect a farmer's bottom line because he'll have to buy more of it or pay higher prices for better feed. How can you raise higher-protein crops?

Joe Scrimger: Two pictures here. One picture is what's happened

conventionally. Another picture is those that choose to raise higher-protein crops. So what's happened conventionally over time, as we raised more wheat yield, and wheat was our largest volume of grain in the United States back in the '60s. Now it's corn.

As we raised more wheat yield, the yields went up. As we changed the genetics the yields went up more. But what they didn't note was the protein was going down and the mineral was going down. But we can supplement minerals. And why we see more soy is that's concentrated protein.

That's 44% protein, when you process the oil out of it. Or you can roast it and leave the oil in. It's much better feed that way. And the corn, the Indian corn, now we're goin' back in time, might run as high as 18% protein.

Open-pollinated corn will run in the high 12%s if you're managing it. But it'll at least be 10%, depending on your variety. Hybrid corn, if you're planting one that's really a feed grade, that's noted for feed, might be 8%. Most people are just planting corn.

They're not planting a feed grade. It's 7-8% protein. And I was into a feed store watchin' where some of the family buys show feed and buys corn. And one of the ag box stores, only were guaranteein' 6% protein in their corn.

Well, compare that to what the Indians used, theirs was 18%. Now, what kinda yield do they have to get compared to nowadays to have the similar protein per acre? It's one-third the yield. So it's not all about yield.

Well the old farmers knew you should not plant beans on over about a one-seventh of the farm per year, because they're hard on the soil. They didn't know what, they just knew it was. And they know you eventually get more disease.

When I started growin' soybeans in the '70s, and I was one of the first ones in our area. We grew navy beans before that and we continued to grow navy beans. But we started growin' soybeans. Was one of the first guys to do a quantity of them in the North Branch area. There was more farther east in the Brown City area, and I picked up on it from the Brown City conventional guys. They did really well and there was no such thing as

disease.

Now, soybeans have a page and a half of diseases that they could get, literally a list 25 on a page, and another half, and it's still growing. And so the old farmers would say, "Don't plant beans after beans and don't plant that much of your farm."

The young farmer would ask him why. And he'd say, "I don't know why, I just know you shouldn't do it. We're not into the why, we don't do it." Well, the young farmers say, "You don't know why? I'm gonna do it." He did it, and it works really well in the short term.

Beans after beans have good yield for about three years. And then it starts faltering. Then the disease starts and then there's a take-all disease that'll knock the field out. White mold, gets worse. Spray a fungicide, knocks it back.

Then it comes back worse again. Roundup Ready beans are one of the most susceptible to grow white mold. Noticed that back when they were first introduced, 'cause their weak genetics. And most of these other genetically modified things are strong in the pesticide area and weak in the nutrition.

So that was a twofold question. How do the organic farmers deal with that? So Mike Bronkema up at Zeeland, who was a Roundup Ready guy when I started with him, now focuses on an open-pollinated corn that raises over 10% protein.

And he doesn't put anything on it. And he's got 30% more protein. And the animals really like it. Well then, you don't have to raise as many beans. You see what I'm sayin'?

So you can start to put more broadleafs in your hay. And then as the soil gets better, you graze more grass. Grass in history is known as the best feed. There is a book out that I have on my shelf about soil, grass and cancer. And it was wrote in Europe back pre-1950. And they understood about the value of grass. And then as the soils got poorer and as they quit producing nitrogen, people moved away from grass 'cause it wouldn't yield high enough and it wouldn't make enough protein.

So they went to the legumes, which are naturally higher in protein, make their own nitrogen, and they do better on poorer soil. So it's made us look good while the soil was getting poorer. Where if the farm can raise grass, they've got better soil. And so the old timers used to raise grass because they had better soil.

And somehow we missed that. And I missed it too. I was a big alfalfa guy. I even combined seed and sold it to my neighbors. And, most guys wouldn't bother with that. I grew up combining seed. I understood how to do it. Clover seed, alfalfa feed, Timothy seed, all those small seeds, which are a challenge to set the combine for. I was taught early on how to do that. And I've taught other farmers.

So once you get your base feed higher in protein, you start to come up with many options. And some of that's variety, some of it's soil balance. The thing is, you only get so far with the variety. I think the example I used in the past was super-sweet sweet corn.

I've raised a couple different batches of really good sweet corn. Didn't keep good enough records. But I didn't do it just with the breeding, I did it with the breeding and the soil. What they do now is, it's all through breeding. And you get the super-sweet sweet corn.

The thing is, the corn I raised was pest and disease resistant because it truly had the sugar. And there's a thing that you have to get onto, is depth of flavor. Sugar is right up front. And that's what the super-sweet sweet corn has, and you wanna eat more and more.

If it's got depth of flavor, it'll eventually fill you up. And that's the mineral side. So that's what the phosphorus does to the system. And I did that even when my soils were lower in phosphorus, but I was high in mycorrhizae and fungal organisms. And I was able to get that depth into the sweet corn. And I used some some clay-based phosphates too, that work a little bit like lime, really slow.

So the organic farmer starts raisin' his base deal with more protein. And gettin' away from alfalfa, starting to raise higher-protein grass, starting to raise higher-protein corn. But in the long term, he may move away from

corn. And I've said, and I'll repeat it, and this is a shocker for most of agriculture: there's been more dairy farms put out of business with alfalfa and corn than most any other factor.

'Cause that's what they got narrowed down to feeding. And actually, to keep that animal gut presence, it needs more diversity for long-term herd health. Average age of a dairy cow in this state has got down to close to 40 months. They don't even make four years.

Takes two years to have the first calf. They don't even make two lactations. And nobody figures that into our efficiency equation, and that's part of the efficiency.

Right now with chickens, we are doin' the chicken flu cycle. We did the swine flu one, too. We're doin' bird flu cycle. And the price of eggs are goin' up. I tried to talk to my state rep about that, 'cause he was on the Ag Committee quite a few years ago. And I'm sayin', "We're gonna have a problem with chickens. We've got to lighten up on this confinement."

And, he couldn't get it through his head. He's a nice guy, but what has happened? Well, people are notice it now 'cause the price of eggs are goin' up. We're doin' things that some of those old timers wouldn't have did.

But the point I'm makin' is somehow they inherently knew what not to do. And they had a pretty good system. Most of them were pasturing back at that time. What they didn't know is when we went West and just plowed ground that shouldn't have been plowed.

And then plowed it every year because the price of wheat was high, and put it back to wheat again. And then summer plowed it to get rid of the weeds, meaning they worked it all summer to conserve moisture to kill the weeds, and then planted a crop.

Well, you can do that once. You can't do that repeatedly. And they did it repeatedly. But it wasn't the tillage, it was how the tillage affected the biology. And it's the life-and-death cycle of biology in the soil, specifically more so bacteria than fungal.

But if you get the bacteria populations up, and it's not a matter of improving

them 20%, it's a matter of improvin' them 500%, from where conventional agriculture is. Then you have a process of protoplasmic decay that's measurable in the soil.

And that's the glue that holds the system together. And that's the glue we get when we get the biology right. So consequently, the phosphorus can't leave the soil. It can't blow and it can't leach. And the phosphorus system will work. You have healthier plants, healthier animals, less veterinary bills, and you can even get to the point of very little veterinary bills. And we've seen that on active dairy farms.

* * *END OF TRANSCRIPT* * *