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Resilient ranching workshop: field session 5, cheatgrass and crested wheat

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BEGIN TRANSCRIPTION
00:00:00:20 - 00:00:32:00
Unknown
You don't get a copy, you move on to us. Right across the street? Yeah, probably. We actually have the minerals on this. We just don't have the biology for this. But, Nicole can talk about the biology, and then we have the plant tissue test. So, again, this is the t shirt. So you guys are going to I'm just going to you're going to have to share with your.

00:00:32:02 - 00:01:01:12
Unknown
Neighbor information so that we can share. Sure, sure. So see we can do it Steve. We can do an email list and, you know, email stuff, right? Yeah. I find me or Steve will get your email address me up for you. And then he does my. Okay. Steve with Steve right here. Steve. All right. Tell us a little bit.

00:01:01:13 - 00:01:23:09
Unknown
You've talked a little bit about this past year. Is there anything you want to add? Well, this is a field that I've been trying to kickstart for a number of years. You know the history, right? One second. If you guys can all like tuna in the Steve or his 12 hour days and yesterday. Yeah. And I've got mine.

00:01:23:12 - 00:01:28:01
Unknown
It's in my head.

00:01:28:04 - 00:01:54:15
Unknown
All right, so, Steve, just going to tell us a little bit about the history. Okay. Yeah. This was a field that was conventionally farmed for a number of years. Lots of cultivation. When we showed up in 91. It had been plowed 2 or 3 years before, and it just full of rocks and a great big hole dug over here, which my young son and I picked up and threw the rocks in.

00:01:54:18 - 00:02:23:16
Unknown
Anyway, that second year over here, I like just that real lightly. And planted oats and alfalfa and we got a real good snow. First part of April and it was amazing. Crop came up. But June showed up hot and dry, and there was no there was no, surviving of any of the plants. So it's been a struggle to get anything grown here.

00:02:23:19 - 00:02:47:08
Unknown
What's been interesting? There's always been there's been a succession of different types of weeds here. You know, one year it'll be kosher, one year it'll be mustard. Another year it was purely kept gum, weed. Russian thistle. I don't know if I said that. And of course, cheatgrass. Two years ago, I planted a cover crop here in.

00:02:47:10 - 00:03:24:00
Unknown
The last part of April. And we got a whole bunch of snow and rain in May. That right after that, I thought, hot dog, we're going to get some going here. Well, the only thing it grew was we had we had cheatgrass of maybe a foot and a half tall. Just a bumper crop. So, anyway, we've been well, after hearing Nicole speak at, a few events, you know, it it, dawned on me what we're missing here is addressing what's happening underneath the ground.

00:03:24:00 - 00:03:53:05
Unknown
And biology. So. And that, led me to, buying some compost from Dave West and making a slurry. We've applied slurry here. Last year, this year, we, you know, we applied slurry to the whole field with some control strips, and planted to cover crop, which was, again, a failure. And this year we scaled things back.

00:03:53:05 - 00:04:19:23
Unknown
So we've got some meter square test plots that we applied compost the slurry to. It's pretty incredible what's happening there. And as you can see, there's some success here with what I planted. I planted three days in a row here the end of May. When we had some different grazing happening here. I don't know if you can see a line going up here.

00:04:19:26 - 00:04:40:10
Unknown
There's a difference between the cheatgrass on the left hand side as opposed to the right hand side. So we grazed that the left hand side real hard and then moved into this piece in the middle. And stripped it with, with my yearlings and planted here.

00:04:40:12 - 00:05:09:22
Unknown
And then, planted in that, that piece that's to the right there that we had grazed. So this piece had the most success. And, I think it was

because there wasn't as much competition here. I don't know that for sure, but, I don't think I'm using the right type of drill. I've got an Atchison no Tilled drill without Coulter's on the front and press wheels on the back.

00:05:09:24 - 00:05:40:16
Unknown
I think it's important to have both of them. So in the far field, very little success. Very little came up over there. And I think it was definitely because of the competition. So so soil seed to soil contact is important. Absolutely. So what's your elevation and range? Well, rainfall. Right now we're on a 12 month running average.

00:05:40:16 - 00:06:08:18
Unknown
Or 20in, if you can believe that. But that's just because in May, we had four inches and we've had a couple inches in June, a couple inches of July. We're usually about six, 16, 16 is their average on a 12 month running average. So you hear us from southern Colorado. So for a lot of us, I mean yesterday was all southern Colorado folks.

00:06:08:18 - 00:06:31:01
Unknown
And, and it was like, this is the best year we've had since, what, 80 something greater than Pepsi said it was the best year they've had since 85. This is the best year we've had since we've been back. And I just to kind of put it in perspective, we have had a lot of drought. Yeah. I would like to introduce Patrick O'Neill.

00:06:31:04 - 00:06:52:08
Unknown
The other thing that we've done is we've sprayed high fungal compost on this. And this is our control strip right here. One of our control strips. There's another one over there that we did. We did that last year in our terrible year. We have terrible, terrible year. We didn't really see any response. This year we concentrated those trials.

00:06:52:08 - 00:07:15:19
Unknown
We made them much, much smaller. We made them squares, actually. And then we have to control all the way around. So it's very obvious. But we did get a response this year and we'll see that. But Patrick, the reason why I want Patrick to talk about this is because it was a really a very ground up approach to applying this high fungal compost and the entire approach.

00:07:15:22 - 00:07:35:04
Unknown
And, we've tried it with, on several different operations throughout the Plains this year and last year. Is there anyone here? Tuckers are here that they've tried some of it. Yesterday we had, I don't know, 4 or 5 guys here that had have been working on it. But Patrick, could you just explain the effort a little bit?

00:07:35:07 - 00:08:04:04
Unknown
Sure. So, guys, Patrick O'Neill, I have a consulting company called Soil Health Services, and and my, my primary role is working with farmers and ranchers and figuring out what's going on with their systems. And can they be turned better? As a as a sideline. I'm also a supervisor on a soil and water conservation district in Alamosa County called Mosquito Conservation District for decades as an agronomist.

00:08:04:09 - 00:08:48:02
Unknown
And so scientists have been looking for, ways of figuring out can we get more fungi under our landscapes? A lady named Doctor Elaine Ingram years ago said all you need is fungi. And this was an throughout the year 2000. And from about that period to 2015, tried and failed to find commercially available, compost materials that could supply something unique that was highly fungal and for for decades, we've been struggling and failing at getting something highly fungal to take and, to really, allow our systems to turn into something other.

00:08:48:04 - 00:09:13:10
Unknown
In 2015, I met Doctor David Johnson, who's based in Las Cruces, New Mexico State University, and he had been doing a number of years of work looking at different kinds of compost and different composting methods that could allow for high fungal compost to be made. And he happened upon and developed a system that was a static pile compost, not not, actively turned compost.

00:09:13:10 - 00:09:40:07
Unknown
So this is, passively aerated, high moisture, becomes fungal dominant. But it's also intentionally a farmer compost because there's composting worms introduced into it. And he spent his time going around the world literally sharing, here's what I did in my backyard. And here's what here's how I figured out, what you could try yourselves. And he spent years just spreading the word.

00:09:40:10 - 00:10:17:16
Unknown
And for years everybody said, wow, that sounds amazing. And nobody ever did it. Incredibly, few people went home and did it. And so, I heard him present on, on this high fungal compost, having been applied to plots in arid Las Cruces on irrigated lands. And he saw phenomenal results. And in soil carbon accretions and microbial diversity and plant productivity, with what seemed like minuscule amounts of additions of compost relative to standard windrow type compost that we've seen used for decades and not give the same result.

00:10:17:18 - 00:10:40:12
Unknown
So it sounded like pixie dust sounded too good to be true, but the more I interacted with Doctor Johnson, the more I realized he probably wasn't blowing smoke. And maybe something to this. So we had an opportunity,

within the San Luis Valley through CSU extension to invite in Doctor Johnson to give a presentation to our our general farmer and rancher crowd.

00:10:40:14 - 00:11:07:07
Unknown
And he kind of gave his presentation and said, here's what's possible. And everybody just blinked real hard and said, and, maybe not, not here, not here. Yeah. Too cold. It's to this too that it's too dry. Whatever. And so, after that, we had an opportunity through our solar water conservation district to circulate in our, in our community and say, oh, we heard what he had to say.

00:11:07:10 - 00:11:30:06
Unknown
What if it what if even a sliver of it could happen? What if it's possible? And so we got participation from a number of different farmers and ranchers in our region, and even a little bit outside of our region who are intrigued by the idea. And they put money in a pot so that we could bake the UN unknowing West into trying out, making a bigger a big pile of compost.

00:11:30:06 - 00:11:55:08
Unknown
Because Dave and Kelly have running a commercial composting operation for 20 years now or more, making good quality compost, but kind of in a traditional way, windrow type compost. And, Dave was in the audience and, and heard heard the word from Doctor Johnson and was curious too. And really intrigued about making a super high quality, what we hope to become a super high quality compost that finished highly fungal.

00:11:55:10 - 00:12:22:25
Unknown
And so, our conservation district contracted with, with Dave to make this material that nobody anywhere that we knew. And we asked Doctor Johnson, has anybody done this at the scale that you're proposing? And he said, nobody I know. And so, Dave and Kelly were, were really innovative and, and intrepid in, in trying this out because we live in a place where it gets -38, -40 in the middle of winter.

00:12:22:27 - 00:12:51:18
Unknown
And this is a 60 to 70% moisture material. So we, we, we knew we were dealing with something that could easily turn into an ice cube. And it was something that as a biological process, we didn't want to become ice. So we were real thoughtful. And they made a structure that would enable the through, from start to finish, about a year or year in a bit to get a high fungal compost, and which finished as a Vermont compost.

00:12:51:20 - 00:13:24:17
Unknown
So Dave and Kelly, I don't know if you want to add anything at this moment about what hell you went through to get that, but, or, or whatever else. Well, practice is very, very similar to me, do I, I, I told him no,

about half a dozen. Yeah. He kept sending bigger guys to visit with folks. Finally, we came up with an idea that has worked real well for for making this fungus on.

00:13:24:19 - 00:13:46:29
Unknown
I couldn't speak more highly of a person to work with on the fact that he's better known as a great advisor and he's been very instrumental in the whole process. We took that compost and those initial, effectively, people who put money in a pot to say, get this thing going. We took that material out to their farms and ranches and spread it.

00:13:46:29 - 00:14:09:22
Unknown
And we our first step was, was using the same method and the same rates that Doctor Dave Johnson had used on his test flights and those cruises. So we took 400 pounds of spinach compost per acre and applied it, and then we watched and saw what happened so that the bulk of that compost got applied spring of 2020.

00:14:09:24 - 00:14:41:23
Unknown
And then we watched through the season on these different crops, on these different pastures. What what was the result both on productivity and on the soil, community and soil carbon and structure? Do we have differences in aggregation and generally more often than not, even on, hard work potato ground, which was common in the San Luis Valley and, and we had notable yield responses just in year one from the initial edition.

00:14:41:23 - 00:15:10:23
Unknown
And we had really interesting, microbial responses, higher fungal content in these, in these hard pressed potato soils, on pasture lands and on, on headlands, cover crops that were going to be used for grazing or hay. We also saw a notable increase in productivity. Generally were ranging between 14 and 20% increase in yields between the pastures and the cover crop, and cover crops and potatoes.

00:15:10:25 - 00:15:41:27
Unknown
And then, we had a, a few of these same individuals and more from the community who used compost extract. So this idea of taking this solid or this compost material and then running it through water and then putting the water out in the field that's been infused. I had a few people who applied it to pivots and five pastures and just basically watched and saw we didn't have anything in any replicated trials or anything controlled.

00:15:41:29 - 00:16:14:15
Unknown
It was just that we noticed anything or not. And Dave got most of that feedback and so promising number, the people that did it last year came back and said, let's do that again. And so this year, we had funding that came from from a foundation that was really interested in this idea to continue on that tracking, to see that initial input of compost, would

that signal carry through one application into multiple years, or did it just flash out in the first year and then then you're back to what you worth.

00:16:14:21 - 00:16:33:13
Unknown
So we'll find out over time through the conservation district. If if that's the case, compost extract Dave's applied compost extract to many more acres this year. And we've got some side by side that will be able to track this year. So that's sort of the the arc of of that project and where it's got to, to, to date.

00:16:33:16 - 00:16:54:20
Unknown
And in the process, we've had a chance to interact with Annie or over these years, she got excited about this idea and said, let's try it on range and let's try it and this way or that way. And she she basically got the compost, made the extract, and then, yesterday was the first time I ever saw what happened.

00:16:54:22 - 00:17:17:25
Unknown
So, there, you'll see it. You'll see what happens is the first time we've seen what happens here. That's exciting. Yeah. I just want to say that it's been amazing work with and Dave West. It's been really cool to see your ingenuity at the site. I mean, it's he's such a great example of an inventor. So I encourage everybody to go see it.

00:17:17:29 - 00:17:46:15
Unknown
We also did, the metagenomics with David Johnson. So we kind of know, you know, we have the best numbers that we're going to get on the compost heap because it's quite expensive. Yeah. To to run that. So, so. It's been a great a great trial. We have trials going in Bergen County, Carson County. My family's in Saint County.

00:17:46:18 - 00:18:06:16
Unknown
We've got what it probably, probably came for you guys, Pueblo County at my place. Oh, this is that's the again in Pueblo County. We've got some in El Paso. So it's, you know, the word's getting out and we're trying it in different environments. So we have some of them are also putting up a non irrigated.

00:18:06:23 - 00:18:28:06
Unknown
I'm mostly non irrigated. This is a non irrigated. You mean you mean rangeland any. Yeah. A lot of what we are working on is is go back. Oh okay. Yeah. Yeah. Right. Like would you very much put it on my rangeland. You put it you put it on didn't you. All right. We have not been included.

00:18:28:08 - 00:18:54:02
Unknown

They go left out, they forgot you. Yeah. So. Yeah. So. So we'll we'll see some. Nancy wants to say something. No, I just wanted to ask you. Nicole asked earlier. The ratio, like the mix ratio was that. Was that what you were trying to find out? Yes. You're asking Steve. Yeah. So here are here we did.

00:18:54:04 - 00:19:18:24
Unknown
We did. We did it last year. But we didn't see any results. So we did the extract with water and I'm sorry that I did. Patrick, do you remember the solution right now? What you have you or this from last year? Last year we put 12 pounds of compost into 20 gallons water, and it sounds like you diluted that further.

00:19:18:27 - 00:19:40:10
Unknown
You put it out. Yeah. Yeah. And I don't remember what that tension is. We haven't written down. And then this year you did something different. We just did a straight just the straight concentrate. So the the recipe that Jose gave me, I did the training for the same concentrate. So we're going to, we're going to scale that. We're going to be working with the concentrations.

00:19:40:12 - 00:19:59:27
Unknown
But last year it was like we didn't see anything. We're just going straight concentrate. And that's kind of what I had time to do. So yeah, and probably what was relayed was the, 3 pounds and ten gallons. Yeah. That sounds about right. Yeah, 3 pounds an acre and a 3 pounds an acre deluded into ten gallons.

00:19:59:27 - 00:20:25:09
Unknown
I don't think gallons carried out fully. Yeah. Of the compost or the extra. So, so I think there was mention today of tea. This is not tea. Okay. The tea, something else. Compost that was mentioned today of compost. So we're talking about a quality of compost that is something probably nonstandard in the market. So this is a high fungal compost.

00:20:25:11 - 00:20:54:10
Unknown
The use rates are intentionally, low. It's a, a compost. We're not looking at tons to the acre. We're not that's not the realm we're dealing with. When we did the application that spring 2020, we were dealing with 400 pounds of finished compost, finished idly, fungal firmer compost per acre, applied. When we're talking about the extract, we're talking about even smaller amount of that solid.

00:20:54:12 - 00:21:22:03
Unknown
Yeah. So we were looking at 3 pounds of finished highly fungal vermin compost taken into a water bath. And that water was then effectively the carrier or whatever was it was able to infuse into the water was what

made it out of the field. So we're not looking at a true we're not looking at inoculating the field with, with some new bunch of microbes.

00:21:22:06 - 00:21:50:13
Unknown
Because the microbes are pretty hardy. They're pretty stable on the media that they've been growing on. They're not just waiting to fly off, but they have been producing all those enzymes and metabolites in the and they're being the poo and whatever else that they've been living and dying in. That stuff is part of that signal. They can wash out into the water, into the soil to wake up whatever may be.

00:21:50:13 - 00:22:13:02
Unknown
They're and give that quorum sensing idea of, hey, there's enough of whatever, that it's safe for the natives to come back. It's safe for the mycorrhizae to sprout again, because they're it's likely going to be something there that will support them, too. So those are the things that we're we're working with. We're not we're not trying to reset the microbiome native to this location.

00:22:13:06 - 00:22:34:26
Unknown
We're trying to awaken what's here with that extract and using a tool to wash the compost. So they've built an extractor. Other people use buckets and they have like the conveyor belt extractor kind of thing or, well, sort of the if you go to a five gallon bucket in the there, you just take the council, put it in water.

00:22:34:26 - 00:23:04:04
Unknown
That's not going native, and you're throwing it up and then taking whatever is not solid out of that and then getting it out. Okay. So you're just doing it in a bucket format. However your scale is. Well, what we did is those, Garden flower picture things. We, poured some of that in, and then we take water out of our stock tank and filled that up and started pouring that on our our test area.

00:23:04:06 - 00:23:26:18
Unknown
Found out that it floods every hole. So I opened up some new holes at the park to talk at night and just poured it on. And that's how we did it. Yeah, and it was pretty much a swag, but it's working. So I'm gonna I'm gonna shift things just a little bit. We, made a video and it's on the CSU ranch management website.

00:23:26:18 - 00:23:59:12
Unknown
It's a video with Patrick and David Johnson. You know, talking about the process and the biology, all of it. And then I would invite I mean, I don't want to invite anyone, but the operation is really very, very cool. And, it's probably the you is here, down in the Sandwich Valley. So, anyway, I encourage folks to kind of look at what they get, get on our website and look at that video and you'll learn a ton.

00:23:59:14 - 00:24:27:09
Unknown
Thank you so much for, for time. I really appreciate it. And then we're going to we're going to shift in a cool now. So. So the average producer size that I work with or I was working with, I'm no longer consulting but was 10,000 acres. So in cropping this is been a fairly common practice in Australia anyway since about 2001 to do these extracts.

00:24:27:11 - 00:24:46:07
Unknown
So I feel a little bit like you guys are reinventing the wheel when there's some really neat, simple stuff out there that's already been figured out. So if you need some help, I can link you to some of these cropping guys and just save you a little bit of the messing about. Like we don't want people with block stuff is a pain.

00:24:46:10 - 00:25:05:12
Unknown
I've blocked a lot of machinery in my life. I don't want to do it anymore. But there's some very simple stuff and and it doesn't have to be expensive, right? You can do your own Johnson Sue, or your own vim accounts are really, really cheap. You, Yeah. So I really my commitment is that we we close the loops.

00:25:05:12 - 00:25:29:24
Unknown
So most producers I work with now have nearly fully closed the loops. They might still use a little bit of trace element, but an intensive cropping we're not bringing we're not spending a lot of money. So figuring out what your limiting factor is is important. Figuring out where you are right now is important. So if we look at these kind of structures and looking at what you're standing on, do you think we're on a bacterial dominated or a fungal dominated soil?

00:25:29:26 - 00:25:53:04
Unknown
Very. And you can see this this effect on this face is what we call slaking. So you get rain falling on this and you get that smoothing out so that soil stop breathing, soil stops breathing. We get a signal for a person loves it. So I was not breathing very bacterial. Delicious. All right. Low organic matter. You notice the root systems in here?

00:25:53:04 - 00:26:13:23
Unknown
Did you put, you did a seed treatment, though, didn't you? So the seed has been treated. Yeah. So why on earth would we need to be adding biology at all? Like, why is there not? Why is the plant not doing it? Why is the plant not stimulating all the fungi and the bacteria in the bread is there and the things it needs is not enough.

00:26:13:23 - 00:26:31:14
Unknown

Organic matter. Yes, hello. Organic matter. It could be doing what to the plan? Well, it's not giving it any organic matter up to the plant. Yeah. What's the effect of low organic matter on a plant? Well, nutrition. Water, low water.

00:26:31:16 - 00:26:55:22
Unknown
For the seedling to take it out because of the microbes, deliver it to. Yes. Not enough microbes in the garden. Perhaps. Perhaps so when we have low organic matter. I want you to get this. This is just a normal temperature probe for, for cooking. All right. Very simple. I lose them all the time. So I just have to go to, like, cafes and stores and buy them.

00:26:55:25 - 00:27:17:25
Unknown
Stop measuring. And what you'll find is when we have low organic matter, it's so stressful to these plants. All right, so a cloud will come over, the temperature drops, nighttime temperature drops a whole lot. Middle of the day skyrockets. And it's incredibly stressful to these plants. So how is it that the plants are feeding microbiology. What are they doing.

00:27:17:27 - 00:27:40:09
Unknown
It exudates. Right. So oh of all the sunlight energy that they're capturing, they turn that into carbon hydrogen, oxygen, carbohydrates, sugar. They could be as much as 20 to 40% depending on the plant, that they're pumping out those roots to stimulate this stomach. Right. So to get their immune system to work, to get nutrients in water, it all happens outside their bodies.

00:27:40:11 - 00:28:03:02
Unknown
But if they have stress and their brix is low. So we can measure that with a refractometer, they won't share the sugars. They're barely holding themselves together. They're not going to be helping anybody else when they're stressed. Okay. So when we have low organic matter, measured the temperature, these stores are pretty cool because we've had quite a bit of rainfall as well.

00:28:03:04 - 00:28:28:17
Unknown
But this is where having a neighbor who's doing a really bad job is awesome. So if my neighbors were happy about this, they had 40 sheep on two acres and they rotated from left to right. So they were rotationally grazing. Delightful. So I could jump the fence and I can measure, I don't know what it is in Fahrenheit, maybe 20 degrees difference between my property and their property.

00:28:28:17 - 00:28:50:23
Unknown
Early spring, warmer, moist soils, warmer in the middle of summer. My soil is cooler. It's like being in a Strobel house. Right? We're holding on to that. And there's a lag and temperature in soil. Okay, so I call it

the smug test, right? Test the neighbors. What's happening with temperature? What's happening with water infiltration? How well are we allowing water to move through these systems?

00:28:50:25 - 00:29:14:04
Unknown
But it's the plant microbial interface that's building that structure okay. So when we see structurally the soils like this very bacterial who can do well in this is these guys. If you have a look at their root systems, they're not helping anybody in this process. Right. They're not building a load of organic matter. You'll see the root systems in here really fine.

00:29:14:10 - 00:29:29:13
Unknown
So they talk about when people first came into Kansas and Nebraska, and they broke that ground in with the plow, you could hear it a mile away because it sounded like someone cracking a bullwhip. So we recreate that sound today.

00:29:29:15 - 00:29:53:21
Unknown
Okay, so. This whole root system is falling apart. Okay? This whole soil system is falling apart. These grounds and not look like this. When Europeans first came in and they calculate you guys have lost between 30 to 60% of your soil carbon, which is 30 to 60% of your water holding capacity, to 60 to 60% of nutrient availability as well.

00:29:53:26 - 00:30:10:29
Unknown
Okay. And that's just been washed or blown away. And it happened very, very quickly when people came into these landscapes, I don't know what the stocking rates were in some of these areas, but I've been on ranches where they had 10,000 sheep and you're like, what are they eating? Yeah. And those sheep, those numbers of sheep didn't last.

00:30:11:01 - 00:30:31:24
Unknown
I don't know how long they lasted. You guys are no. Yeah. And so with that process, they took a lot of those trace elements, a lot of the nutrients and the organic matter has gone away. Right. So soils should have that lovely dark brown top soil should be, quite dark brown. That chocolate cake should have that crumb structure.

00:30:31:26 - 00:30:55:06
Unknown
When you're looking at cattle, you want to whip that face. So I actually put some water on the face and have a look. Do you see, is there like an obvious difference between dark and light. No, no. All right. And I think we have a soil test for here. I think the organic matter levels are actually higher than I would have expected, especially on a sandy soil.

00:30:55:08 - 00:31:19:03
Unknown

So if you have, do you got those of you that have this, it's the very top one. And the organic matter is the about the six rows. So it's 2.1% organic matter. It's good cheatgrass. This is actually 2021 that they have. Oh they have the new ones. Oh that'd be even better okay I have the older ones but oh what is it.

00:31:19:06 - 00:31:29:08
Unknown
What's the organic matter in 2021.

00:31:29:11 - 00:31:53:16
Unknown
1.9%. 1.9 okay. So if we were thinking about carbon because everyone's talking about carbon so hot right now carbon's to. Yeah. So hot. All right. So your carbon then would be probably around 0.9% in these soils. Now we don't have historic data for here. But I want you to imagine they went through Australia before the sheep arrived. There was actually a scientist to soil scientists that measured soil organic matter and carbon.

00:31:53:18 - 00:32:12:20
Unknown
And he found some of those soils were as high as 30% carbon. You come back now, they're like 2% or half a per cent. They say within three years of the sheep arriving, that soil blew away. We have no idea what Australia look like. Right. And so in brittle landscapes change can be really fast. And so it's not even in our memory.

00:32:12:23 - 00:32:33:21
Unknown
I found a really cool painting of Fort Bragg. I think it was and everyone's like, oh, look at the fort. So pretty. All I saw these huge erosion gullies right in front of it, like someone had drawn these eroding gullies of how quickly that soil flushed away, because they would have been overgrazing with horses and now that we have overgrazed with horses, any of you.

00:32:33:23 - 00:32:51:24
Unknown
And so one way you can have a look and see me building or losing carbon is to go and dig in an area that you haven't been actively managing. So maybe it's underneath a fence line or on the side of the road and just see, is the color the same or is this paler or is this darker? If this was paleo, what's happening?

00:32:51:26 - 00:33:09:10
Unknown
It was using Cabernet. Right. So it's a good exercise to do. I was on a ranch recently. And they couldn't get a shovel in the ground. And they're like, well, it's summer in Wyoming. Of course, you can't get a shovel in the ground. So, we dug under the fence line. It was like a knife through butter.

00:33:09:13 - 00:33:29:10

Unknown
And his infiltration was six times faster under the fence line. And he's holistic grazing. For 35 years, they've never dug a hole, never dug a hole to have a look. So I think people are managing for above ground. Yeah, I'm ready to come back in not realizing if you're not getting root recovery every time you come back into soon, this is what's happening to your root systems.

00:33:29:12 - 00:33:49:13
Unknown
Right? And so most of most, if I look at where 80% of the roots are in here, it's probably it's hard to tell because it's really not much roots. But we would say that probably 80% of those roots, and that's not the soil surface that is is probably in that top end. So I want you to listen very carefully.

00:33:49:13 - 00:34:09:27
Unknown
This is the Australian accent. You're an inch from a drought. Might. Right. Very different from the New Zealand accent. Pointed out the record that so that inch of a drought, we've seen some ranches that have half an inch. Right. Where are you in terms of being able to even access water? In the minute that water moves past, that's gone.

00:34:10:00 - 00:34:33:04
Unknown
Right. Especially in these systems that have very low mycorrhizal. One way we can see is a plant forming mycorrhizal relationships of these rhizome sheets. Okay. And I want you to take a look at that. This is where the soils sticking to the root systems, it's starting the soil development process. So even though we feel like sometimes I cover crops of failure, if it's started doing this.

00:34:33:04 - 00:34:50:25
Unknown
You're building soil now, right? We're getting that aggregate structure. We're feeding microbiology for that round with a lens. So you can have a look at some of that aggregate. Some other versions of the plants.

00:34:50:27 - 00:35:18:03
Unknown
So you want to be digging holes and taking a look at this. If I got little naked roots that can't. Well. That's cool. What is it? Damselfly. A dragon anyway. Easily described it. Naked roots. Naked roots. It is. So, what we find is. And and you'll see, cheatgrass will have naked roots. So.

00:35:18:05 - 00:35:41:16
Unknown
So the way to see it is actually the is to, is to actually pour water over these root systems. And you want to see what soil sticks to it. Right. Is that soil actually sticking or does it just wash away. And it was really interesting. We had a woman who was working for the NRCs last workshop, and she did for her forage project in 1978.

00:35:41:16 - 00:36:05:23
Unknown
She did that. The plant identification thing that you guys do for rangeland, right. And what she remembered was identifying these plants, and she couldn't get the soil off the roots. Like she just literally couldn't get the soil off. That's a really good sign. Like it's the soil washes off easily. It's not forming these relationships. And she's like, in my lifetime, we now have naked roots.

00:36:05:29 - 00:36:30:18
Unknown
Every time she digs a hole, that's all. You see, the soil just washes off. And so you see that with the cheatgrass, the soil just washes off. Okay. So there's nothing. Now that plant can't buffer itself. So I want you to think of the riser sheath. Is the difference between stress and health okay. Because that rhizome sheath can be as much as two units difference.

00:36:30:19 - 00:36:50:08
Unknown
So your soil could be seven pH. There could be five. It could be acidic. But that riser sheath buffers it by two units. So it's experiencing seven. It's in that sweet spot for nutrient uptake. Right. So we're dealing with alkali soils that might be like ten and a half 11. And we're still getting that at nine and a half.

00:36:50:10 - 00:37:10:05
Unknown
Right. So the plants can survive. And we're doing that with that with that seed dressing. So we're putting these compost extracts on seed and then drilling into alkali areas and seeing plants strike right. The minute they strike they've got that riser sheath. They've got that defense. The temperature can be significantly different. They will not just take up heavy metals.

00:37:10:08 - 00:37:30:17
Unknown
Some of you have heavy metals in your soil system. If you have naked roots. So just going to take it up and we're going to see it show up in the animals. I've got a couple cases really high aluminum in cattle. And when we have a look naked plant roots the plants just taking up that aluminum and it's passing to the animals and we end up with reproduction issues or whatever.

00:37:30:24 - 00:37:53:23
Unknown
Right. So we want to see those roots covered no matter what. Can you explain striking a strike? You guys have a dumb word like germination or something. We call that striking. All right, so as seed was strike, I do apologize. You have a new word that's so much cooler. Yeah. So you say, So do you want to dig up that, sunflower?

00:37:53:23 - 00:38:22:20

Unknown
If you don't mind, we might need a shovel. Yeah. Do you want to hear? That. That's a proper shovel. Okay. So we want different types of root architecture. They are feeding different types of microbiology with the broken half violence. The inmates stand point of view, and I this the base saturation and everything on this here. It's all about perfect.

00:38:22:23 - 00:38:46:27
Unknown
So for me this soil is way loaded with potassium. All right. So it's loaded with potassium. So anytime we see a soil really loaded with potassium you're going to get broadleaf weeds. Okay. That could be you could think of some flowers a weed I don't, I like it, but, Oh you want that 3 to 5. We want 3 to 5.

00:38:46:27 - 00:39:04:07
Unknown
That's right. I didn't see that I was looking. Yeah. So I like where the calcium is. I love where the magnesium is. That's gorgeous in terms of nutrients in the soil but very high potassium. So what we see and, we see this in the meadows is a lot of bindweed. Some of you might find a lot of dandelions.

00:39:04:10 - 00:39:28:20
Unknown
Right. And we there's a lot we can do for high potassium, like unless you're in a hayfield and you're removing that all the time, like you're going to have high potassium that you deal with. But what you could do is grow, like, really high potassium loving crops like corn, sorghum, Sudan. Hemp, marijuana. Right. Marijuana is going to love the high potassium soils.

00:39:28:20 - 00:39:42:27
Unknown
Okay. Are you going to get big, huge crops. So Tessa Ames also grows crops. Wow.

00:39:43:00 - 00:40:05:28
Unknown
See that? This is what I love, love, love sunflowers. Okay. So see, they have a taproot and they also have this big fibrous roots. So they're doing some amazing stuff that opening up soil. Now, Floyd, where are you with Floyd? Floyd? Who you, from? Florrie Floyd from Kansas. So you were just telling me you had a compaction issue?

00:40:06:00 - 00:40:28:08
Unknown
Yeah. And so you put down the drill, so you seeded, you did the rip and drip. So I talk about ripping and dripping in my book that you you're going to put some biologicals down if you're putting any machinery into the ground. And what did you see. What did you do. Well, we made a tremendous difference, in the grip penetration and the compaction in the crops from our field across the road like she's talking about.

00:40:28:08 - 00:40:49:14
Unknown
I mean, there's probably a foot difference in height, color, drought tolerance. So what did you drip you put I put a I put a gallon of a product called boost, which is three and a half pounds of sugar. Sugar cane molasses in one gallon of, liquid calcium. Liquid calcium, 10% cow soluble ketchup. All right. So sometimes if the.

00:40:49:14 - 00:41:06:14
Unknown
So by doing that, you're a addressed a mineral imbalance. And in microbial imbalance. And we've opened that soil up. Now the plants can do the job. You don't have to do it again right. Don't do it again. One other thing I didn't tell you is we do all this in a living cover crop and a living cover crop are all going into that fractured soul.

00:41:06:15 - 00:41:28:22
Unknown
Yeah, with the calcium and the sugar. And it's all holding it apart. Beautiful. All right, so then we can allow, once we set that system up, the plants are the ones that build the soil. And you can step away, like, stop micromanaging. It's like helicopter parenting, right? Just if we set this plant up, it's going to do its job that sunflower is doing an absolutely magnificent job.

00:41:28:24 - 00:41:57:26
Unknown
They did some work in Saskatchewan, I think looking at root mass and they looked at, conventional wheat and how many out with a pounds of roots in the soil. And they found it had 2,900 pounds an acre of root material. That's awesome. Right? 2,900 pounds. It's heaps. They then measured a fescue grassland and cattle grazing, 36,600 pounds of root material per acre under the soil.

00:41:57:28 - 00:42:24:09
Unknown
I don't think we're even touching the 2,000 pounds with this one. Right. Okay, so you think of all that organic material every time you graze, you're getting then pulsing in that shedding of organic material to stimulate that microbiology. But equivalently, you've got these root exudates coming out and starting to build aggregate structure. Oh I love you. Okay. So being able to do these is really powerful.

00:42:24:09 - 00:42:45:19
Unknown
Before I'm even digging holes, I'm seeing like what's what's what's on the ground cover. What's these what are these species trying to tell me? So what kind of indicators can we see from some of these species? This camel, false camel from a species. Yeah. Doesn't smell oh. So animal. All right. Another low organic matter indicator. What? What are the other species we see around here?

00:42:45:22 - 00:43:13:05
Unknown

Tell us about the pigweed. What do they tell pigweed? Yeah. Can someone dig up a pigweed? Oh, here's one. All right. We're all interested in pig. Pig weights. Okay. Pigweed is a non mycorrhizal. So those of you not familiar with the term micro means root no micro means fungus. Rhizome means root. So, this fungus lives in and on 90% of plant species and has done for about 420 million years.

00:43:13:05 - 00:43:36:24
Unknown
Right. It's the most important relationship on the planet. Even more important than my relationship with my dog. Like, really is we, my Aussie? Oh I know, oh, I'm shocked myself I said that. Don't don't tell her. So the reason the reason plants can even come off the land and live the way they do is because of their relationship with the fungus.

00:43:36:24 - 00:43:55:07
Unknown
So the fungus is amazing at getting nutrients of minerals in a rock. It can break down rocks. And before plants came up above the ground, they were fungi that was high as 12ft. And they covered the whole planet and they dominated planet Earth. That was the that was the era of fungi. And then plants were like, hey dude, we can get sugar from the sun.

00:43:55:07 - 00:44:13:27
Unknown
Do you want to like, hang out? You can give me your minerals and I'll give you sugar, all right? And they formed this relationship that's enabled us to breathe air and be on this planet. Awesome. Some plant species never form that relationship. And the reason they did it is either they were living in water. So sedges and rushes, they don't have the relationship.

00:44:14:04 - 00:44:49:26
Unknown
They were parasites. So things like, Indian paintbrush or orchids don't have that relationship. Some of the mistletoe, they don't have a relationship. Some, brassicas. Amaranth. This tree in a podium. So beets, rhubarb, pigweed, Lamb's quarters, kosher, Russian thistle. Don't have this relationship. And the reason that they didn't need it is that they grew and high nutrient environments, and they didn't need the mycorrhizae to get their nutrient.

00:44:49:28 - 00:45:08:27
Unknown
So what's the high nutrient there could be here. Nitrogen. So it's one of our nitrate weeds. Right. So it could be a nitrate weed. They also like very high potassium. So if there's lots and lots of potassium lots of phosphorus a lot of fertilization, you'll see these guys. Right. So it's not so much that we're cultivating or anything like that that will see them.

00:45:08:27 - 00:45:26:05
Unknown

It's that you cultivated, you chopped up the mycorrhizae. And these guys are like a window for me. Right? The mycorrhizal species are not going to do so well. So what you see is we walk out to look at the trial as a lot of the species that are flourishing. What's this one?

00:45:26:07 - 00:45:48:26
Unknown
So what what what family is this one in? So it's a flex reed flex flex pay. So it's a it's in the brassica family. Non mycorrhizal. So as we walk across you're going to see that the most happiest plants that are in here and non mycorrhizal plants okay. The fungi is not except for the sunflower. Sunflower is very mycorrhizal.

00:45:48:28 - 00:46:12:16
Unknown
Oh. It's a very mycorrhizal. And in fact it's used commercially to grow mycorrhizae. And same with sorghum Sudan corn a lot of your C4. So your like your warm season grasses are really, really good mycorrhizal inoculate. But you see how clean its roots are. So he said he has trouble growing cover crops out here but he's getting a little bit.

00:46:12:16 - 00:46:31:06
Unknown
You would basically say that because this is a bacterial dominated and very bacteria dominated. So fungal dominate. I've got the very same thing I'm dealing with at home right now is establishing perennial grass and creating pastures out of cropland because of the reverting back to and how to get that soil to where that it's going to grow grass.

00:46:31:08 - 00:47:00:15
Unknown
That's right. And so it's a very common issue we see as people are trying to get species that need equal balances of bacteria or even more fungal, and we're trying to establish them in a bacterial soil. You just going to work really hard to do that. So the way to overcome it is the seed dressings. And by getting really fungal seed dressings and even doing a fungal inoculate spray, these guys do another trial that's out in the meadow that we haven't really done the testing, but visually there's no difference right?

00:47:00:17 - 00:47:26:04
Unknown
This is where context is important, you know, and people think, oh well, this went really well in New Mexico because it's so it's going to work in Alberta. No, you need to figure out what is it that your soil situation needs. And in this case definitely some fungal diversity. So trying to establish annuals in here you'll struggle. So what we find is we can do 2 or 3 years of an annual crop, an annual cover crop to start moving the dial towards more fungal.

00:47:26:06 - 00:47:46:29
Unknown
Right. And that's what the sunflower is going to do. That's what your legumes will do. What you see in here is very poor legume strike, right.

There's a couple peas and a little bit of vetch, but they're little and they're kind of struggling a little bit. Okay. So legumes are big fungal feeders except for lupines. Lupines is the odd man out because lupines is the only non mycorrhizal like you.

00:47:47:06 - 00:48:09:05
Unknown
Okay. The rest of them are very. Yeah. Still peas. So. So we'll see as we walk out here they are all supporting fungal development. So the more legume we can see. I actually, I'm seeing a lot of people struggle with legumes. And I had a guy recently rang me to complain because he's become probably 60% legume or legume dominated.

00:48:09:07 - 00:48:30:19
Unknown
I told him it's a first world problem to complain to somebody else, right. But it's it's due to microbial and mineral dynamics that we're not getting the legumes. Right. So if all you see is lupines and sweet clover, it's not a good. That's not saying that you've got good. But isn't is it a good mycorrhizae. It is.

00:48:30:19 - 00:48:46:20
Unknown
It's a repair plant. So it's saying there's been a disturbance here. It's helping to repair that disturbance. But if you see a whole lot of it, I'm not going to go. Yeah. You're doing a great job. It's helping you. So go ahead and planted it. Go ahead and plant it because it's cheap but put it in with other things as well.

00:48:46:20 - 00:49:13:23
Unknown
I'm just saying when people are seeing wilding itself, but it's just telling you that that soils in the spots where it's just dominated. Yeah. And that's fine. It's, it's, it's doing its thing because we, we put it in ourselves. And I see us. And so when we're trying to renovate a pastor, it's not recommended to use non-natives, but if we're trying to transition it.

00:49:13:25 - 00:49:39:07
Unknown
Yeah, I personally love I don't know, but yeah. What are your thoughts on that? It's a two part. So one, we follow an executive order. Yes. For lighting, natives. Yeah. So, it's just to promote that. Yeah, but I mean, I've seen, you know, diversity is the key to me. And you got to get that there.

00:49:39:09 - 00:50:10:27
Unknown
Is there a good native that you. I mean, like, if you're getting eclipse funds or whatever, is there a good native pea like we've used with the idiom out East? Yeah. Utah sweetness. Yeah. That's commercially available. Okay. Let's try. Yeah. Stragglers if you can get it. And I mean, I can see struggling. Yeah. But see anytime someone complains about

the price of something, I'm like, you grow it, you grow it, and you have you sell it.

00:50:11:01 - 00:50:30:27
Unknown
All right, so I've got a guy that I met in Australia who, started to grow native grass seed and just mixed native grass seeds, selling it for $600 a pound. Yeah, because he couldn't buy the stuff. And now everyone's jumping on board and jump on board. Right. Who's buying people. They're buying because they. Well, everybody. Because no one could buy it.

00:50:30:27 - 00:50:54:10
Unknown
And what he's doing to ship soil is incredible. So yeah I know. So I have one other question. Back to the team agreements. So this year we've seen a, huge I'm seeing as I don't know if the other guys out in southeast Colorado are seeing this, but we have a lot of the podium views. But is that because of the drought from last year and that last night.

00:50:54:12 - 00:51:16:27
Unknown
Yes. Yeah. Yeah. So it's just it's a little, well, how is related. How is that what she says? But if she says goes for this one, goes for good lamb's quarters. Oh. Oh okay. Can can I don't let in speaking. Can you grab me a whole little guys, grab me a whole lot of leaves of, oaks leaves the most.

00:51:16:27 - 00:51:38:15
Unknown
It's just the leaves. Leaves? Yeah, yeah, yeah. So I need a good sample. You want some fresh? So this is the question you were asking before. How do you know if you're going to take action on something like this? So, one thing you can do is use your refractometer, and a few of you have got refractometer with you, so feel free to sample, an interesting plant like you want to.

00:51:38:18 - 00:51:56:29
Unknown
The problem with, pigweed is it squeezes through the bottom of the this. And we had yesterday, we had a different press. Somebody broke it, but we got another press down to pick it. You do? Yeah. Those.

00:51:57:01 - 00:52:18:17
Unknown
Vice grips. Yeah. They broke yesterday. Thank God I didn't do it. You might have been blamed if you were to get me for everything. Yeah. So all we need is a couple of drips, and if the if it's so hard and you can't get a sample out that plants probably stress, right. So we don't sample stress plants, we don't sample ones that are full of insect damage.

00:52:18:20 - 00:52:36:07
Unknown
We don't sample in the this beginning to sickness and die like that makes sense doesn't it? So what we want to see in our grass type plants is we

want this to be ten a 12 or above, and it should be a blurry line. And so when I look through this, it's eight and a half, which is not bad, right?

00:52:36:07 - 00:52:58:10
Unknown
I've seen I've seen a lot worse. So it's not unusual to see. Oh it's at like 3 or 4. They are not pumping sugars out of the ground. They're not feeding. Microbiology and it around the oaks. Or is it right. That's right. You should try to Kelly. Yeah. It's not. Oh my apologies. Good. Good catch. Grind stuff. Grind plant.

00:52:58:13 - 00:53:18:18
Unknown
All right. And then what you want to do is you want to measure the plant that you're seeing encroaching. So we want to measure that, pigweed. All right? And you always want to see the weed is lower than the grass, the species trying to grow. And what I normally find is the weed is higher than your preferred species.

00:53:18:18 - 00:53:40:08
Unknown
That's when you might want to take an action, because it means they're setting it up for next year to be more of the same, or another type of weed weed species. So we have a plant called doc. I don't know if you guys have doc. And the first year that we arrived at my farm, my ex was like, hey, we getting all this, doc?

00:53:40:08 - 00:53:58:05
Unknown
It it must have been early in our relationship because he said we should spray it. I was like, he listens, buddy. Anyway, I went, no, let's go and check it. So we we tested the Brix on the doc and the Brix on the grass, and the grasses were running at eight, which is okay, but the Brix in the doc was three.

00:53:58:06 - 00:54:17:15
Unknown
So I was like, just leave it alone. And within six weeks it of throwing up a seed head like this that that big and died. All right. The grass is winning the game. Whoever's brix as high as is sending more sugars out, feeding more microbiology and dominating this environment. So if the pigweed is higher, it's going to push those grasses out okay.

00:54:17:15 - 00:54:35:07
Unknown
And it will because this is dominated. And the only reason may be that the brix is eight is because of the seed dressing. I think if we'd had no seed dressing you would be much, much lower. Okay. Make sense. We can try and I know it's just going to squish through doing a grab some samples of the pig.

00:54:35:10 - 00:54:52:13
Unknown

We think we'd about the turnips. Yeah we do the turnips and I maybe one that's not that will be stressed if you get an update. That almost looks just so. No I need a bit more than that. All right. So you want to fill these? We have one that I was using yesterday, the one that got broken.

00:54:52:16 - 00:55:17:18
Unknown
We're going to try and find someone who can make these. So we, we designed like these were designed originally for avocados and grapes because I really had to get sap out. And I think maybe Colorado. All right. So these are an industrial press to get material out, but this spinny thing got broken there, I think. We think it was, like, you know, minds of ice cubes.

00:55:17:21 - 00:55:36:17
Unknown
Oh, so rip these into, like, one inch links. You're not going to roll it. So what were we measuring? Is the sap not the intracellular fluid, not what's inside the cell. So that's a very different type of sugar. We want to measure the sap so you can roll it. And it can artificially put yourself up by about six unit or six degrees.

00:55:36:19 - 00:55:55:07
Unknown
So I've had a lot of smug farmers like yeah I'm 16 and I know you're not right. So if you roll it you're going to push it up. I mean really roll it and get all the mushy. So we're not going to do that. If you want to roll it, that's fine. Just don't compare yourself to others and have it as your own measurement.

00:55:55:07 - 00:56:16:01
Unknown
So I want to fill that hole. You think? Why? I'm sure you can find some. Yeah. No shortage, but the stuff you want to leave and not the leaves in a. Yeah. Another stock. So we're talking about grass should be above 12. Legumes should be about 14. Alfalfa is a special group of its own. Should be above 16 degrees brix.

00:56:16:07 - 00:56:44:28
Unknown
Right. How about like red or the red clover would be 14. So what we're noticing it's really interesting. If you have any roundup ready alfalfa, go and measure this yourself. I want you to measure your alfalfa and then measure and alfalfa. That's not Roundup Ready. And take a look. And what we're seeing on every sample we've done so far, which is only three but three different farms, the Roundup Ready is running at half the brix of the conventional, which is fascinating.

00:56:44:28 - 00:57:10:00
Unknown
So they've done something to manipulate it. So it's not feeding microbiology. Just you talked about glyphosate compilation and how it fits into this because because as we go to one day class. You're not even

going to tell us to go say it's bad. No, no, no, no, because I have methods for glyphosate. And for that with that refractometer go.

00:57:10:02 - 00:57:32:24
Unknown
Do you if you do, you have the if Brix chart in your book. Yeah. It kind of gives the recommendations. I think I do that just as a general rule because like things like a lettuce should be six. Yeah. Like so there's some things that are kind of weird. So there's a Brix chat. John, Joanne, John. At High Brix Gardens don't drink.

00:57:32:27 - 00:58:00:18
Unknown
Yeah. Just look it up on the internet that that chats there. Oh I'm getting set. By Jove. Very excited about that. Oh, very squishy. It's not even snap. It's like sticky mush mush. You know, I know we're out and we like your positivity. Take that. Maybe. So you want to make sure it covers the whole foundation of those aliens.

00:58:00:20 - 00:58:25:26
Unknown
Look like they're, So yeah, take one of these into the grocery store and tastes like kale taste. Do you want one of us to work on that? Yeah. I need an adult. Definitely. Swab. I'll break it. No. Yeah, it's nearly there. Like, it only needs a tiny drop on the end, because I don't want people to really know what pussy I am.

00:58:25:28 - 00:58:46:27
Unknown
So go and measure the stuff in the grocery store. I don't have things on my hands. And what you'll find is that the stuff in the grocery store is running at five and below, if not three. If it's a shop line and it's a three, it's full of nitrates. Don't eat it. It's bad for you. But we did this one season and just going into the grocery store, my family went on strike.

00:58:46:27 - 00:59:04:28
Unknown
I wasn't there to buy stuff from the grocery store anymore and I had to grow my own vegetables. Yeah. Did you say under three? So a three and a shop line is nitrates. So if you are cutting for hay, go out and measure that. If it's a three shop line below, do not cut for hay what you can do instead is spray something that's going to convert those nitrates.

00:59:05:01 - 00:59:29:20
Unknown
It could be two gallons of milk and we can measure that in 40 minutes. It could be a little bit a humic. Could be a little bit of molasses is going to help convert those sugars convert the nitrates into ammonia. Just need some carbon. So you're talking about high nitrate. High nitrate grass feed okay. But even like even vegetable growers I work with, they might do a spray like that before they harvest acid or milk or something.

00:59:29:22 - 00:59:49:03

Unknown
Here, acid would be all right. You might guess it can stain some things. So if it was vegetables, don't using the gas. I'm talking about feed for feed for calves. Yeah. To leak two gallons of milk and you can measure it in 40 minutes and you'll see that brix come right up. And we've seen that bricks triple after a single application in 40 minutes.

00:59:49:05 - 01:00:13:11
Unknown
And what was super interesting is the bricks in the things like the thistles drop from 18 bricks to 6 in 40 minutes. So just by putting some kind of biological stimulant we switched who's winning the game of life? And then the following season that that ranch, it didn't have any thistles and didn't have any nightshade was what the problem was.

01:00:13:11 - 01:00:34:29
Unknown
What did you apply? Two gallons of milk? I don't know any milk you want. Not 2%. It's not milk. But any kind of milk. So, powdered milk. I've got one guy who was getting cheap, destroyed, chocolate milk powder. And he was using that. So we got sugar and chocolate and milk, and that was fine until he said of feeding his calves.

01:00:34:29 - 01:00:58:27
Unknown
Don't do that. Don't feed your calves chocolate milk, boy, because it's dark. I don't do a good word for it. Don't do it. That's. Maybe that's sacrilege to put chocolate milk. Do anything with chocolate except want it out. Just with this, we just put it on a backpack thing on a bike. But whatever he got any sprayer?

01:00:59:00 - 01:01:15:20
Unknown
Yeah, you could do it in your garden. Like, if you're lettuces, you can, you know, when there's nitrates, because it makes you less. It's bitter. Right? You can taste nitrates. Yeah. Yeah, yeah. So you could just do this in a spray pack around the garden if you've got low breaks in the garden. So cucumbers are better because you get high nitrates.

01:01:15:20 - 01:01:40:21
Unknown
Yeah. Spraying with milk. Spraying with milk or spraying soil. The plant foliar. Foliar. Yeah. And so in that plant that carbon enters it and it converts that nitrate to ammonia. We now got complete proteins. Yummy. It will also reduce your insect incidence. Right. So the insects at work on sorghum Sudan. Can you add that milk to water to give you a little more volume.

01:01:40:21 - 01:02:02:08
Unknown
Right. Oh you're going to have to. Yeah. Yeah. You wouldn't be able to use you're going to dilute it because you wouldn't have to spray two gallons. I don't know many machines that would do that. Did we manage to get a brix on that. Oh, there's dripping in no, that's not going to work.

Okay. So what I'd like us to do is as we walk across, we're going to look at where these guys have been doing their high fungal compost.

01:02:02:08 - 01:02:06:26
Unknown
I want you to look at what kind of species do you grow? What a growing what what do you think they're trying to tell you?

END TRANSCRIPTION