Bull Session 10.26.22

**Holly Stoltz:** [00:00:00] Tonight we're going to discuss composting and vermicast and I have three ranchers on that have been very successful at doing this.

We have Steve Charter. From, Shepherd area, I would say. Right steve? Mihail from the B Bar over in Big Timber and Eric LeFeldt from Lavi na. And since Eric has to probably leave us before our, the time is done, we'll have him start. So Eric, if you need like, screen share or anything like that, I do believe I turned it on, so if you wanna do pictures, if not, it's not a big deal.

But we'll go ahead and start with you and thanks everybody for showing up that,

**Eric LeFeldt:** that would've been a great idea had I thought longer about this and done pictures. That's a good idea. Thanks for having and talking about the whole process. I'll do some history about it. The reason how I got started on our operation was my father was on the Board of Livestock [00:01:00] and he went to the.

On a tour in Western Montana, and I'm pretty sure it was the man that was on the dairy end at that time in The Bitterroot. And he was composting and he did on his outfit and told my father, When you drove by it, it smells so good, you could almost eat it. And I thought that was just not something we needed here.

That's too, too far out there. And when we're lambing, we will have a mortality rate with ewes and I had a coulee that I had named Dead Sheep Coulee and just, it was just a predator issue. One year 40 Ravens showed up and it was just a, it was a problem we had to fix. So we cal ved 60 to a hundred head of heifers here in the barns.

And so every year we've got a nice manure pile and we've just started putting the dead ewes in. And then I'll tell you the exact days it takes, but 60 days are gone. As long as we can keep the oxygen out and we, we can keep a few [00:02:00] of our own animals away, it works beautiful. It really cleans up everything, and, and it's gone.

We don't do that with any of our lost in our lambs. Just more predator issues. And I, and I've never tried a cow. I know it works the same. I just try to get them to the mountains and let the bears eat them. But yeah, it's a pretty simple process. As long as you can push some manure up, some feed and some straw and bury 'em and make sure they're completely covered, give them, give 'em about a foot coverage, they're gonna disappear.

It is a practice used in about every feed, large feed lot in the west. was talk talking with some folks that were on the feed lot background, our calves feed, my heifers and breed and they were, they were in a feed lot in Nebraska and that's what they would do there. Push a little bit extra feet in some manure, cover 'em.

I said, it's amazing they're gone in two months. I do, I really I really do think it works extremely well. It might be something we need to start looking do on our [00:03:00] cattle. Just having got there. I don't know what else? Tell anybody I'm hoping for questions or anything right now, at the moment.

**Holly Stoltz:** Okay, thanks Eric. So Steve, if you wanna just really quick, Eric, if you can stay on for like a half hour, Is that all right? Oh, you bet. Absolutely. You bet. Okay. So we'll just kind of run through everybody and they can kind of tell you their process and then we can come back for questions. So Steve, do you wanna go next?

**Steve Charter:** Yeah, so oh, I'm gonna, there we go really quick. Okay. Yeah we'll Holly took some slides when she was here and we'll, we'll talk about those as we go. Okay. So we, we do verma cast, which is basically worm manure. And it, our, our motivation's a little different from Eric. So Eric's composting basically to get rid of you know, the dead, the dead sheep. But our main motivation is making [00:04:00] a soil amendment to stimulate the microbes in the soil.

And vermicast is you know, one of the, one of the best soil stimulants. And so what we're trying to do in regenerative agriculture is bring those microbe. Back to the soil that were originally there and then through a lot of our practices of various practices, the, the soil life is diminished.

So one way you can , jumpstart that is with a adding those microbes back to the soil. And there's lots of kind of different ways you can do it. But Verma cast is probably one of the best. And it's also it's not rocket science Exactly. It's not easy, but you basically take kinda whatever organic material you have and and feed it to the worms.

And then the worms turn that into a kind of an amazing diverse microbes and So we in, in feeding them, the slide with the apples kind of [00:05:00] remind me what you want in your feed is a really diverse just diversity in the feed because you, you know, that's what we're trying to get into our soil is, is that same diversity and like, so if you just, like you, you can make pretty darn good vermicast just with manure, but it's gonna be pretty high bacterial ratio of your microorganisms.

And, and for some things that might be just exactly what you want, but o other things, you want that ratio of fungi, you higher. And so some crops and things, you know, you want it really high in fungi and, and with say, pasture you want a pretty good balance of, of fungi and bacteria. And the way you get it more fungal is you put in like more carbon rich things like wood chips, leaves, things like that.

And those things are [00:06:00] hard to break down and about. The only thing that will break it down is fungi. So if you incorporate the, those higher carbons, then you can you can bring up that fungal ratio, I guess. See this is a picture of the That's our active worm bed. And now there's lots of different ways to do it.

And, you know, there's a lot of real fancy ways they do it indoors with these kind of tables. And the vermicast comes out the bottom. Ours is a little cruder where it's the pit's about two feet deep and then we feed on the top. And and then there's a, maybe go to another picture. I think there's a picture.

This is the active, and then that's the the finished vermicast bed. And I think that next slide is a of that bucket. Yeah. So the, so , the finished vermicast cast. You know, you wanna get as many worms out of it as possible [00:07:00] because you, you wanna keep your worms. So on that bed that's pretty well finished, we quit feeding it.

And then we took these buckets with holes in them and, and just dug them down into the, to the bed and then put really rich feed into there. And then the, the worms would move in there, and then we'd take the buckets out and put those worms into the, into the active bed. The other thing we do, we send off you know, every so often we get it tested and it comes back the, you know, what's all in there?

The protozoa and the. fungus and the bacteria, and it'll give you those ratios and, and numbers. And our tests have been pretty, pretty good. Well, some of 'em been really good and but a test is just, you know, you, you're dealing with a living product [00:08:00] and so like you test it. And that's true of when that was tested.

But you know, once that's harvested not necessarily gonna stay the same. Exactly. And so one of our hardest things we've kind of dealt with is if we're selling a product that's been through the trummel and there's a slide of that somewhere, , so that's that's the trummel.

And there's couple different ways you can use the Verma cast. And one that's been probably most people are doing around here is they will take the, the vermicast that's been through the T trumble, that's really fine. And then they will mix that like with their cover crop seeds and then drill that right into the soil.

And that's a real good way to use it because the, those seeds, when they decide to germinate, that [00:09:00] vermicast is right there with them. And those seeds can sense their, you know, they sense their environment. And so When these seeds start to come alive and they kind of sense that they're in this really rich microbial atmosphere, then, they're kind of turning on all those switches that say, Yeah, the conditions are good.

We're gonna germinate, we're gonna grow. And so getting that, that verma cast right there in with the seed is a very kind of efficient way to do it. And, and another way to do it that's probably more economical yet that you, where you wouldn't have to use as much Verma cast is to inoculate the seeds with a, a liquid extract.

And the drawback is then you gotta dry it out again to get it to go through the seeder. But that's another really good way to do it. But every time you kind of do anything with [00:10:00] a living organism you know, there's chances you'll damage it. And so in some ways, the unprocessed vermicast right out of the bed, that's really almost the best.

And then you, you can just apply that directly to the soil, but it doesn't go very far that way. You know, if you've got a high value crop you know, you could probably afford to just put it right on the soil. But I, you know, in the, in kind of semi arid range land or something like that, it definitely, you know, was, it is just not gonna go very far.

So the other way, and, and we've kind of done all these things, is. Make it into a liquid extract and then spray it on. And that's another good way to do it. And we've, we've done that on, you know, our just semi arid range land. It's always not that easy to just directly say, Well, I did [00:11:00] this and this happened because we're always doing multiple things and it's always a little hard to tell Exactly, what you give credit to.

But you know, we, we have seen some really good results. But I, I guess my general feeling on semi arid Range land is it's probably not really economical in the sense that it's gonna pay you back in like a few years. And so I'm, I'm always trying to think as well, if you sprayed on it, extract, you know, you're, it's time and labor and diesel and, and so like, even if you doubled your production on grassland, you know, it's really not, not that much in a sense.

So what, what my kind of thoughts are, and we've been experimenting with this, and again, it's, you know, it's not that easy to measure the results, but just [00:12:00] like, you know, we use our cows as a tool in our grazing, well, you can also use the animals to spread that those microbes from the vermicast

so, We've been actually either putting it on our water like a gunny sack, just like a teabag and giving it to the cattle that way. Or we've been doing this kind of mineral mix where we use biochar and vermicast and humate , and some probiotics, prebiotics, and . Quite a few, a bunch of other stuff too.

All those things of, of kind of using that biology of the rumen and, you know, there's people, I'm not the o you know, people have been doing this for quite a while especially doing it in higher rainfall areas, they've really gotten some pretty spectacular results. And you just in semi arid range lands, you don't see that Quite as fast, Oh, and those are, those are the apples and there's a cider mill in town and mostly we get [00:13:00] the, you know, after they've squeeze the cider out of it. But every once in a while they'll just have a extra apples or maybe they've gone soft or something.

But it, it's amazing what you can pick, You know, we've picked up coffee grounds and lots of things. But, you know, just back to the, the diversity is, is more things you can mix in there. The better the worms do and the better the vermicast.

**Holly Stoltz:** Well, that was, that was great Steve. Mihail do you wanna go next and then we'll open up questions? Sure.

**Mihail Kennedy:** So I'll just give a quick history of why we are composting. We are composting slaughter waste. We take all of the slaughter waste from Pioneer Meats and Big Timber. Comes out to about 30 cubic yards a week in an average week, probably closer to 45 during fair season. Maybe 60 in a big week.

So we're taking bones rumien everything that comes out of the cattle, the pigs, whatever they're killing. We take all of it and we bring it back in. We've got a couple of vehicles to bring it back in. . But this is our manure spreader, so it's kind of a [00:14:00] dual purpose. We haul it and we can spread the, like the finished compost when we're done.

But the reason we got into it was oh shoot, probably three, a little over three years ago now. Baker Commodities pulled out of Montanas that they were picking up all of the, they're shipping to their rendering plant in Idaho. They pulled out Montana about three years ago, and we were kind of in discussions with Pioneer meets about possibly doing this.

And that was kind of the, that pushed us over the precipice. We kind of had to do it. It costs him, it cost the, the slaughter facility. So Pioneer meets it costs them less to pay us to get rid of it than it does to landfill it or buy, you know, a hundred to $200,000 incinerator. So we've been taking the co, the slaughter waste for.

Three and a half years now? Well, yeah, about three and a half years now. And I'll just kind of flip through the slides here and explain as we're going. But what, what I do is I start with a bed of, [00:15:00] of wood chips. We get the wood chips from r y lumber in Livingston. It's 20 bucks a load plus freight.

I think it comes out to maybe freight was about 90 bucks per, per load. So it's, it's not terribly expensive for how much we get. We tried to do it with straw early on, but straw compacts too easily and doesn't breathe as well, so it goes anaerobic very fast and doesn't absorb the so this is kind of my, my setup for when we're bringing the slaughter waste in.

You know, we've got, you know, we're, we're building a win row load by load. This is, you know, about 24 inches of wood chips. And then we'll place the, Yeah. And then I'll, What I'll do is I'll start placing bones that haven't compost, that haven't been digested very well yet. So big old knuckle bones and, and femurs and stuff like that.

The bigger bones, they'll go back into the pile after they've, you know, they don't, the first time we turn the piles, they come out to the side. So I'll scrape 'em up and throw 'em in the bottom to just kind of recook 'em again. And this is kind of, this is prior to adding [00:16:00] the slaughter waste. And we are starting to add bone char and, and wood char to the, our piles now too.

Cause we are, we're turning some of the bones we bring back into bone char. So this is, this is the pile before I start covering. This is the slaughter ways. I know it's a pretty picture. Lots of, lots of interesting things in there, but we, we, I mean, I, I throw a whole animals in there. Cows Fairly frequently.

If they have a, an animal that's condemned and they're not allowed to butcher, we'll just throw it in hole and it, you know, any death loss on the ranch, it, it breaks down just as fast as everything else. So it can kind of sh see our wind rows there. What, what we do is we static compost for a while.

I'll start covering it with some straws, maybe some wood chips, just on top of that, on the, the slaughter waste. Just to add, you know, another layer of carbon in there we're, we're trying to go real carbon heavy to keep the, the fungal counts up. And also the nitrogen content of the slaughter waste is really high.

So in order to have a good balanced compost in order to break down properly and cook properly, not overheat or undereat, [00:17:00] you need to have a good ratio of carbon to nitrogen. And it's, it's taken us a while to figure out our recipe, but we're, we've locked in pretty well, I think to where. Where we're getting, making some good compost then we start covering it with either manure if we have any.

But we, we ran through 20 years worth of feed lot manure in about two and a half years. So we ran outta the manure pretty quickly and right now what we're using is partially digested compost that also acts as kind of a catalyst for starting the process. It's not necessary for starting the process cuz there's so much microbial activity in the slaughter, waste in the, in the guts, the rumien and stuff like that.

So we, we cap it with about 1824 inches of, of partially digested compost in order to just kind of cut the smell down and, you know, keep predators from and, and other vectors from digging in it. We don't really have, The only issue I have is the neighbor's dog sometimes gets into the fresh pile but he always brings the bones back.

The neighbor brings the bones back about quarterly. He'll just bring me a wheelbarrow full of bones. They've pulled out. So this is, this is kind of a pile that's [00:18:00] been static. So as static, it's, it hasn't been turned yet, it's just laid in place. The wood chips on the bottom allow it to breathe and actually pull oxygen from down below through the wood chips.

And then come out the top. You can kind of see on the top of this ridge here, there's some steam coming out. Within about two weeks, the pile gets to about 110 hundred and 20 degrees just sitting there. And so this is a video of our compos or our turner. We, we applied for a grant, well, that the sound doesn't really make, make, and it's just loud.

But we replied for, applied for a grant for the Montana or through the Montana meat processors, essentially to help alleviate during covid the fact that there was no way to, nowhere to go except for. Land filling these, these wastes. So we applied for the grant, got the turner. This is some videos of our turner.

Just aerating the whole pile. This is right behind. This is actually a really dangerous place to be. You gotta stand right behind that, that water tank. So right, right now we're injecting water into the pile as well as [00:19:00] aerating it pulling it with a tractor there. It's quite the project. Here's a good picture of the drum starting up.

So, and you can see the jets of water spraying in. This takes, we can put about a thousand gallons, no, about 1200 gallons of water in, in each pass. So our piles are short enough that that usually translates to about five to 7% moisture by volume of the piles. And so if we're, you know, trying to get to 40, 45% moisture content, In order to have a, a nice cooking pile.

It'll take a couple, couple passes to get through. And then after that, it's about once a week we turn them and to maintain the moisture. But this here this picture was taken in December of 2021, and you can see that there's a lot of steam. These piles run 150, 160 degrees all through the winter.

And as long as we build them properly and have the right and, and, and have the right amount of oxygen and moisture in there [00:20:00] they will, they, they don't shut down even on the coldest days. I've got some pictures in here too that show. I mean, the, the steam coming out of these piles is just amazing. I mean, I think this was like a 10 degree day.

And it, it doesn't stop. I mean, it, even the piles that were not turning yet you know, they maintain their heat. There's a lot of, lot of insulation there and a lot of biology going on. I did get a call when he turned this, the pile this day from our neighbors asking us if we were burning cuz they saw a huge plume of smoke in the air.

It was probably 150 feet up there. Just the, this moisture coming from the pile. Here's another picture turning.

We had the, we actually had the Montana Meat Processors Convention tour. Our site this spring because this is, this is turning into a lot of meat. Processors are looking at this as a viable option for disposing of their slaughter waste. We take everything from Pioneer meats in big timber. I don't see us going any further a field because the transport is, is difficult.

For anything, I think over 20 miles would [00:21:00] be a stretch. But this is our whole setup. You can see the, the water wagon behind the, the Turner, the water wagon just has a pump on it injects the water into the turner as it's. As the drums spinning the drums designed to take everything from the outside and put on the inside and vice versa, just to get everything homogenous.

After the first turn, the first time you turn a pile, it takes about three, four days and it'll jump from 110 degrees to 160 degrees, and it'll stay there until it runs out of oxygen or food. And so it seems to be about every week, every other week, we have to turn them to keep that oxygen going. And it takes about, we're, we're estimating it probably gonna take about five months to finish each pile here.

So from start, that's first, first load of, of slaughter waste into finished compost. It should take about five, maybe six months, depending on, on, mostly on staffing. And, and if I can get, we can get the amount of time out there that we need to turn the piles properly.

So this is [00:22:00] a good picture of my daughter and I, but this, this shows kind of the scale. This is a 14 foot wide turner. We bought it from Sitler in Canada and it's, it's really handy. There's, you can see where the pointer is. These are little jets. These are where the water sprays into here. It's a very efficient system.

This is another cold day of turning compost. You can see the bones don't necessarily cook out entirely right away, so that's why we collect them. After each pass, we'll come through with the bucket, with the tractors, scrape 'em up and save them for going down on our next pile just to recook them. Also so we don't pop anymore tires.

We've popped quite a few. This is a winter shot. I think I've got some, You can see the steam coming up, you know, 40 below, 30 below. They're still steaming. There may be a little cap of ice on the side, but they're really well insulated and they cook through just about all the, all any weather you can imagine.

Our water wagon also has a, an inoculation tank, so if we did want to add anything to it, we could. We haven't, [00:23:00] haven't done that yet. We're doing some testing. So here's a thermometer, 150 degrees, pretty standard temperature for our piles right now. As the, when we turn it, if the temperature doesn't go up after that and it just continues to decline, that usually means that the piles just about done.

So at that point, we can kinda let it cure on its own and, and leave it alone. That process probably takes about a month. And then we're, we're doing genetic testing on the piles as well as nutrient testing. We want to see, you know, how nutritious those piles are. You know, what kind of Fertilizer, they gonna, how, how good a fertilizer gonna be.

Use 'em as compost teas spread them just over the, our dryland pastures anyway. But we also want to know what microbes are in there and what their functions are in the pile. You know, some of them are converting methane to, you know, ammonia and some of them are, you know, responsible for fixing certain micronutrients and, and macronutrients as well and making them more plant available.

You know, if you think about what we're feeding these [00:24:00] piles, a lot of the cattle that, and pigs and stuff that have come into pioneer meats have been on mineral rations, so likely they have a lot of minerals in their system as it is. So we should be able to capture a lot of that stuff and have a really high mineral compost.

But that's why we're testing to see if, see how that works. And you know what, maybe we need to add some, some micros or some colloidal clays or more bone char or whatever it is, just to, to figure out what exactly we have. So we're, we're just starting that testing process now. Just some more pictures of piles.

This is a pile that, this would be the first time we turned it. It still has a, you can still see it's got a lot of wood chips, a lot of rocks and bones and stuff in it. And so we'll, we'll turn it once, let it cook for a while, It'll settle down a little bit, then we'll, we'll turn it and wet it down real well again and get it cooking.

And it'll start to looking more like this, like more, you know, more real, a lot more like real compost as long as we maintain the moisture in there, which is difficult sometimes. In the summer and windy winters [00:25:00] here. They'll just continue cooking and should finish fairly quickly. And you know, I, I'm thinking, you know, we probably have about a.

You know, each wind row is gonna be probably close to when it's finished, about 800 cubic yard, no, 500 cubic yards per wind row. And I think right now I've got four that are work cooking right now, and then another six that sh still need to be finished. So we have a lot of, I mean, it's, it's generating a lot of material.

We do save about every third wind row for covering and just capping the piles just cuz we ran out of manure so many years or so long ago. But this is just, just more cooking compost. And this is a good picture of where we kind of store the bones and stuff that rolls outta the piles when we turn, we'll, we'll just make a separate pile of that.

And then as we're building, so we'll put this on top of the wood chips, but below the, the fresh slaughter waste. And the next time through these bones are all. We've put numerous. Yeah. This is kind of a picture of, of [00:26:00] after that first turn, what it looks like. But we put numerous bulls, you know, 2000 pound bulls in there, in the pile hole that have, I think, broke.

Yeah. We had one break its leg and had to put it in there. And a month and a half later when we turned the pile, you could not tell that there was a whole animal in there. And then this is a, a little patch that I just, I trialed the compost. It wasn't finished. It was just some stuff that I thought I'd just spread it.

And the grass greened up and grew better than everywhere around it. When I turned cattle into here, they didn't touch it, just because the worst thing you can do. On your land is put unfinished, compost out, you know, it's just too hot and it robs all of the nitrogen out of the soil in order to finish its composting process, and then it gives everything back.

So it's, it's just a, this was an experiment for me to just kind of see what happened. And it was wild to put, you know, we put cattle in here, high density after I, I did this, it was probably about a month and a half after I took this picture. And they ate everything but the grass in [00:27:00] there, in that little patch in the middle here.

So, lesson learned, but I guess that's kind of the, the longest short of that. And open for questions now.

**Holly Stoltz:** Great. Thank you, Mihail. That was awesome. Eric, really quick do you use any like straw or wood chips and do you layer it like, like Mihail was saying, with just your dead animals?

**Eric LeFeldt:** All right. So what we're doing, what we're doing is cleaning out our cabin barns. And so that's gonna be heavy straw, heavy cow manure or real wet. It's really interesting to hear what Mihail doing and I need to go visit him. But there be no wood chips. I just started using wood chips with my sheep this year.

But what, what we'll do is take the cattle manure and straw and any waste from hay. And there we don't layer it so much. We'll pack it down and get our piles cleaned up. It'll rest for. Probably two to three weeks before we open it up and maybe put an animal in there. So it's already at that 150 degrees.

And so it's just right, [00:28:00] it's cooking, it's, it's steaming. Drop 'em in, cover 'em. Covering is our it's, it's an issue like Mihail said with, with the dogs. It's an issue. As long as we can keep 'em covered, it eats up and disappears. I think we can get rid of a carcass in I think we can get rid of a carcass in 50 days.

Bones and all but everything has to be right. And it, and it's really interesting to hear Mihail's talk about the water, but with the wood being dry, those wood chips, it's interesting to soak more in from this conversation than I had on what we do versus with that. But with the straw coming outta those pins, they're socking wet from those cattle going in there every night.

And then especially we, we calve really early, so it's raining in the barn. We got quite a lot of moisture we're, we're working with versus the way he's doing it. So but no layering everything. It's just trying to get deep and trying to keep it covered. It's, it's, it's our biggest struggle..

**Steve Charter:** Yes, I got, I have a couple [00:29:00] questions for Steve. Real quick, could, could you run us through constructing your pit for your verma cast? Right. So originally when I did it, I didn't do a pit. I just, you know, I put straw out on the ground and then put the feed on the straw.

And and you, you know, I've read, I've read a lot of things of saying absolutely do not put a worms in a pit because they'll drown. But I think all these people are from country where it rains. So so the idea of having it down in the pit was just for keeping 'em warm and winter. And so when we start a new pit, we'd put a layer of straw down and then, and then feed on that.

And then and then I just keep feeding on, you know, one of the big problems is over feeding. And, and it's, for some reason it's just hard for me not to over feed 'em. [00:30:00] And if, if you have more feed than the worms can eat, then you, you know, that it can start to just get rotten. And so so the ideal way to do it is, you know, not feed pretty lightly.

Don't feed it too thick. And then you, you basically kind of wait till that's they eat that up and then, and then you feed 'em again. But I, I've just, Well, one thing, it's, you know, it's more time consuming to feed small feedings, and that's one thing I have a lot of trouble with, with his time. But usually if I over feed him, I just wait longer.

And e every once in a while maybe you'll get some stuff in there that smells a little bit. But and then the other thing that kind of varies is the worm population. And I, I'm not sure you know, why it varies. But you know, there's times when you just dig in there and it's just full of worms. And then sometimes, [00:31:00] like you start digging and then where did they go?

And sometimes they just go down and hide, I think, and, and wait for the conditions to get uh, Get better. And the other biggest problem I have is keep keeping it wet enough. And especially, you know, when you get these 110 days and 110 degree days you know, you, it takes, it takes quite a bit of water. And so you and then when, when, when we had, you know, the best voice, best way to, whenever it rains, I throw the tarps back and just let that natural rain get in our, our water's pretty saline or whatever, salty.

And so over time, that pH is kind of as kind of built up. So Yeah, I, I don't know. Did that get to what you were, you were asking about or? Yep. That's good. And how many worms did you start out with? Is it you had like a a Yeah, a number of worms per, It [00:32:00] wasn't that many. I mean, it was like a small cardboard box we sent off, you know, and, and and they, when conditions are right, you, you know, they really, really mul multiply.

And those, I guess the first couple years I think were, well, they were kind of wet years and, and you know, and that this year, well last year is the population kind of crashed and I think you never quite know what it was, but we had, you know, we had some real warm weather and then, you know, like really late March, it got really cold and I think.

That might have, that might have got some of 'em. And now our, this summer, the population, it's been recovering. It's getting, it's getting pretty good right now. The, the other thing we do, we, a lot of the feed, we precompost it and there's, I, I think that works pretty good. [00:33:00] I mean, sometimes it just seems like they really like just the, the raw food before it's composted.

But I, I do kind of a mix of that too. And, and I think the idea of pre-com composting it is, you know, at that point the, the worms are just basically eating the mic microbes from the compost and just kind of speeds up the, it speeds up the process.

Let's see, as long as I'm talking, I got a question for Mihail. Now, does Pioneer meet, do they pay, do they pay you for taking the, their, their waste?

**Mihail Kennedy:** They sure do. Yeah.

**Steve Charter:** And is, is that, I don't know if I wanna ask how much, but is that a pretty big part of the economics of it? I mean, the economics would be, you're, you're then you're getting that compost and I was just [00:34:00] wondering if you've kind know how that breaks down between.

What you're getting paid and the value you're getting out.

**Mihail Kennedy:** Yeah. The disposal fees we charge pays for the entire program and then some including labor and equipment. Oh wow. Yeah, so it's, I mean, it, it pays for itself and then every, all the value in the compost is just on top of that. Yeah. Well that, that's pretty impressive.

Yeah, it sounds like uh, and even, even if we hadn't got that grant for the Turner, you know, it would've put the payoff on that back maybe two years, you know, so the, if we'd had to, to do purchase everything that we needed for this you know, minus the tractor that we need, obviously, cuz we used that elsewhere on the ranch, so it's kind of in other budgets as well.

It would be a, it'd be about be about two years to three years to pay off everything to get that process started or to buy everything and,

**Steve Charter:** Right. Wow, that's, that's pretty interesting. So on the 20 miles of hauling it, like, is that just basically, The mileage it costs [00:35:00] to haul it or is there some other limitation on hauling or,

**Mihail Kennedy:** Yeah, it's, I don't know, it's, it's mainly the mileage it costs to haul.

I mean, it, it takes it, it wears on the equipment pretty bad, so we have to haul it mostly over dirt roads. Just cuz I, I don't know if I wanna be right driving that, hauling that you know, I'm trying to think how many pounds that is. I think on average our loads are 14 to 16,000 pounds. It could be pretty heavy.

**Steve Charter:** Could it be hauled like in a live bottom semi or is there that be too messy?

**Mihail Kennedy:** It could, yeah. I mean it, it sure could. It's just we, we did, we, we don't really want to go that, that way, that route I guess, you know? Right. Getting CDL and, and you know, none of us here have CDLs and so we kind of went with something we can do without having that.

Right. And not having to pay. You know, more, more taxes on that stuff and just be able to do that. So we, we do have a C 50 grain truck that we have modified as a dump truck as well. So we can go either that route or haul the manure [00:36:00] spreader behind us.

**Steve Charter:** Have you heard of anybody, you know, hauling it this more conventionally, like in a, in a truck or over the highways?

**Mihail Kennedy:** No, not really. . I haven't really heard of anyone hauling it. Aside from us, there's, I know there's Ta O'Connor in Eastern Montana is doing this as well, but he's got his is on site pretty much for his slaughter facilities. So he's not taking it more than a, you know, quarter mile or something like that away from the plant.

Uhhuh . Okay. So that's, I mean, that's, that's the main thing. The, the, we have a minor compost license which allows us two acres of active, active compost. And if we, if we were to go higher than that and get a I think it's all called a major compost license there'd be a lot more regulations involved, a lot more inspection, and we just don't have the capacity to, you know, or the need to have a, a large compost site like that.

So essentially our, we've, we've found that the DEQ has offsets for, you know, neighbors watersheds, you know, [00:37:00] mitigation for flood, that kind of stuff. Which is pretty easy on a two acre site to live within. The thing we did find was the offsets for our neighbors. I think they're a little bit ambitious for what the, the DEQ requires.

I think you're only required a thousand feet. No 500 feet maybe for neighbors, but the odors produced, It's not a bad odor, it's just a lot of composting. The odors produced definitely, you know, I'd say probably at least a mile would be a better offset for that kind of stuff, just so you don't get complaints from neighbors or my wife and I , our first compost site was a little too close to quite a few people.

So,

**Tricia Kimmel:** so I, I guess I don't care who answers this, but how do you all capitalize on the compost itself? Or do you just use it kinda on your own operations?

**Mihail Kennedy:** Well, right, right now we're, we're just going to use it on our own operation for a bit until we figure out what we have and [00:38:00] if we, you know, it'll be compost ts, or spread just as compost.

You know, dryland pastures. But that being said, at some point we're gonna start selling it depending on, you know, how, you know, if we can show we have a good quality product, we could probably start charging up to $30 a pound for it. So there's a, and there's, there's a lot of new markets out in Montana this year or the last couple years for compost like that, organic especially, or, you know, regenerative.

Anyway so there's, that's, that's something we're gonna, we're thinking about going in the future. So,

**Steve Charter:** yeah, this is Steve. So we you know, use it ourselves, but we also sell it. We, us usually try to do it on a fairly, you know, we, we do sell some to gardeners and stuff, but it's, we're not really set up to do that small, small scale, but the gardeners are probably the most enthusiastic about it. So like, we sell it by the pound pretty much in the, the one, one of those tote bags that's about a [00:39:00] yard I think is about it, weighs about 1200 pounds.

So that's, that's kind of the units we sell 'em to. And our biggest customers have been the people putting it in with the, the cover crop seeds that there's, and mo mostly, we've gotten good feedback every once in a while. You know, people aren't seeing the results that they want and, or, or, you know, it, it just varies.

And I think well there was one instance when they, they were putting on quite a bit like 15 pounds an acre. I think they were doing that through the you know, through their seeders and I, I think they were having trouble with the, you know, just putting that much through the seeder. I, I think, you know, a lot of people are doing more like five pounds and some of those heavier amounts.

That's where they were maybe not getting as good a results. And I, I kind of think at times you can, maybe, you can maybe use too much. I [00:40:00] know in one instance, like it was the, the best com, the best vermicast we had by the test, and they put it on and then did some brick tests right afterwards, and Bricks actually went down and everybody's wondering what was going on.

And then a couple weeks later it really went up and I think they, I think it was. They just kind of shock the plants. So, so more isn't always better, but kind of knowing that, knowing that right amount is you know, it, I think it, it's a little hard to know, you know, you know, like with commercial fertilizer, I mean, everything's really predictable and you put on X amount and you, you know, what the results are gonna be.

And, and you know, this, there's just more variables and in, in the, in the long run, you, you know, if you put on quite a bit of verma cast, it's gonna be, it's gonna be doing you good for, you know, a long time. So it's just a, [00:41:00] it's just kind of a different mindset I guess.

**Chris Mehus:** Hale, this is Chris. I wanted to ask you quick going back to the economics a little more. So are you saving Pioneer meets money over what they used to pay Baker transport or what they'd have to pay to take it to the landfill? And if so, how much?

**Mihail Kennedy:** Yeah, we are less expensive than land filling it for them.

And then I think, I think we started charging them originally, what I mean pretty much exactly what Baker Commodities was charging them early on. That's just where we started at. We've since raised our rates here and there, but, you know, Brian's raised his his rates as well, so it's kind of a push me, pull you thing sometimes with Brian.

Just, it depends on, you know, when we did open our new site, we had to raise our rates a little bit. I'm trying to remember. We have a, a kind of scaled yeah, we kind of have it scaled so, you know, or tiered, I guess. So one load in the one load per week is a certain price. Two loads per week is another price and three loads [00:42:00] per week or more than that, you know, normally we charge him at that point, I think we charge like seven or $800 for that load.

Just because that does, you know, economically it works for him sometimes. And it, it's really difficult for us to spend three full days or four for full days if we are doing that to pick those loads up. So we, we have it ki it's, it's, he's incentivized to, to produce a little bit less than that, but we kind of w worked with him a little bit to figure out where that happy medium was.

He pretty much told us what he wanted us to be able to haul out per load, and we had to kind of make that happen. So he wanted us to be able to haul 15, you know, 12 to 15 cubic yards per load. Was, was economical for him, and, and it worked out, You know, it works out for us and we, we can haul a little bit more than that.

So

**Chris Mehus:** Okay. And then a question for all three of you. I'll start with you Eric. So you, I assume that all of you are spreading at least some of this out. And Eric, I didn't hear if you answered this question or not, but what benefits are you seeing out there on the [00:43:00] ground or any of you doing any soil tests and are you seeing definite results both in the soil tests and or visual?

**Eric LeFeldt:** Thanks Chris. I'm not doing any soil tests on that and at that at the moment, but more visually where I'm taking it is to, we've got a lot of clay soil, a lot of hard and a lot of country that 20 years ago doesn't grow anything. And from just feeding on top of that ground and as well as spreading our composted manure animals out, I, something's growing there.

And so it's just a visual thing to me. The idea owning ground that doesn't grow anything is pretty hard for me when it's so simple to change it. And the further we can take this away from our home buildings and corrals and, and everything to ground that isn't producing the, the more we see if we spread it across straight sage brush, I see the sage brush growing another six inches, So I try to stay away from that and into more [00:44:00] areas like crested wheat and then improve pastures.

I see , a lot of response as well as in the native too, if we get into the right places. But no, we're just using on our own and trying to pick an area every year that needs, needs a little extra bonus. And our sheep, shearer has a manure spreading business, so it works pretty good to have when he's done shearing, haul the piles in the summer and get out there and get at work and thanks.

**Chris Mehus:** And a quick follow up for you, Eric. I know you've got quite a bit of, or at least some salinity issues out there. Have you tried it in their, those areas and success? I

**Eric LeFeldt:** have, I had a big plan this year, Chris this year I really wanted my key to spread in this area that was gonna really boom and help.

And I told Mikey, you remember where we spread it and I could not be there. And he took it to the exact opposite spot of where I was hoping . So it's next year. , I mean . So it's just cause do this year. I, I really think it, it's [00:45:00] the, it's gonna be on salinity. We, you know, we do have some salinity areas because we don't summer graze it isn't as bad as say some of the neighbors, but it's where you need to be on that salinity and is putting that, getting something going on it.

I, I really do believe it will be the ticket for it.

**Mihail Kennedy:** We've had good luck reducing our saline seeps by just spreading it on there and, and maybe drilling into it a little bit with some, some cover crops or something like that. It really has worked quite well and we haven't had a, haven't had a ton that we've finished yet. Just transitioning from one compost site to the other.

We have a bunch that's not finished that we still need to finish. But we have, where we have spread it, we have seen, or the, the stuff that's mostly finished we've seen quite a bit and we have done quite a bit of increase in production. And we, our goal with it is to put it in the crested wheat and drill into that so we can get something other than crested wheat growing in there.

And hopefully knock the, the grasshoppers down cuz it, you know, having that extra cover ground cover in there will keep the grasshoppers out and make it less conducive for their [00:46:00] reproduction as well. So it's, it's. For us, it's kind of a, a strategy for, for dealing with pests as well as increasing productivity.

And, you know, the pastures I have crested wheated in, that's the last thing I want in those pastures. We've, we've drilled our cover crops into 'em and we're starting to get a lot more diversity in there, especially with our grazing practices. But I think this, this should help, you know, and we have, we've sprayed compost ts in them before.

I use, I haven't put vermicast or compost through my drill at all. The last time I did that, it. I did it for Roger Inland, I think it was your vermicast Steve. And he, he put way too much in the mix and it was, it was a big headache and I wasn't, wasn't very happy with him that day, . But we did get it down and, and, and it did work really well, you know, having gone back over that a couple times since then.

But I've, I've just gotten into a seed treat and then when I, what I do is I wait until the, my seedlings have come up you know, at least second leaf stage, so they're not super fragile anymore. And then I'll just, I'll broadcast my compost t to feed them.

**Steve Charter:** Yeah. Yeah. So [00:47:00] we've mostly using ourselves, we mostly did it as a extract. I, I guess there's a, a, you know, and this is kind of technical, but I think a t is usually like you feed it like molasses or something, and and that when you do that, then that really, the microbes just. Take off. So when you do, when you make like a true t like that, you need to be putting in oxygen because it'll go anaerobic really fast.

So what's what's more practical is an extract where you just basically run water through the verma cast or compost. And that, that's mostly what we've done. And then when we do that, it's, it's you, you know, it's just ver it's a very small amount that you're actually putting out there, like say maybe 10 pounds an acre.

And, and when you spray that out, you know, you, you don't even hardly see the water droplets on [00:48:00] there. And so we've done that over quite a bit of, you know, quite a few acres of grassland and, you know, we're, we, we're seeing results. But I can, cuz we're also doing different things, you know, we're experimenting with cover crop seeds and.

And you know, key line plowing in a few places. So, so it's you, you know, it's, you can never say, Well, this, we did this and this happened, but generally, you know, looks pretty good. And, and we're also trying to do stuff with Crested Wheat and we, we've had some pretty good at success on getting native to go back into Crested.

And you, you know, I guess most pe you know, crested used to be like everybody, that was the thing, the government planted and, and then, you know, now it's really on the outs. But I, I don't, you know, I, I see [00:49:00] some good things about Crested. I don't really want, want to get rid of it. I just wanna get some more diversity in it.

And we are kind of seeing that happen, especially with. Western Wheat, but it, you so I also sell it and, and you know, I think it's more valuable to people with crops and especially irrigated you know, you're gonna, you're gonna put the same thing out on semi arid Range land, but you're not gonna get near, near the results of like, if you got irrigated or high rainfall.

So it's really more valuable to people like that than it is to me. So, and I, I was talking to Holly before this, I'm a pretty typical farmer in that I'm way better at producing than I am at marketing. And I think I, I really do think it's a good product and I think, you know, people should be. Cutting down on their commercial fertilizer and their nitrogen and u and [00:50:00] using more things like vermicast

so it's you know, we need to get out there and sell the pro product and have examples and, and cuz I, I, I think it is a better way to go than commercial fertilizer and I think it's more economical in the run.

**Dick Holzer:** I guess I'd like to know from Steve, how does he know when he is over fed him?

**Steve Charter:** So, you know, you put that feed out and then if you go back, you know, a week or 10 days later and it's still, it's still not, if it hasn't been, haven't eaten it. You know, you'll just, you know, you should be able to dig in and pretty.

Find worms everywhere, but if you got too much feed, they're gonna be just concentrated in one area and you'll, you'll dig in and there won't be any worms in that uneaten feed.

And it would start to smell too.

Yeah. Steve, hey for spraying verma cast, should a guy just do that in the spring or could you do that now that we've had some rain just fall here?

[00:51:00] This would be a great time to do it. Yeah. Just you, you know, when you don't wanna do it, just when it's really hot, you know, you won't, don't wanna go out on a hot day and, and you know, and all, all those microbes that, I mean, they travel, how they travel is in moisture.

So like, in the fall like, you know, like this, this would be the perfect time right now. And then spring too. But the, the other thing is, you know, it's a living thing and it, it but all those things, they, they, they don't really die. They just go into like you know, they have a dormant stage. And so even if you don't get it out on the right time is, a lot of that stuff will just be there until the conditions change and do Right.

So it's not like, it's not like you're gonna put it out there and it's gonna be a total loss. It's just gonna wait for the right opportunity. And would that apply to like the fish hydro slate too? [00:52:00] Yeah. I, I think it would be the same thing. Yeah. And then in your deal with water, you, did you mix a little molasses in with that or not?

Yeah, when, Well, we, we just put some, a little bit of molasses in right when we were spraying it out. Not, you know, not, not ahead of time. Like if you're making tea, you, you'd put it in and then, you know, run bubble oxygen through it. And then you know that, that's when you know your populations just really take off.

And there's some applications where you really want, like, if you're doing a follia spray, you know, spraying it right on the leaves of a really high value crop. Or, you know, sometimes if it, if they have some kind of a pests problem, you know, mites or something, you, you'd want like a really high concentration right on the leaves.

And so that, that's when one of those tees. But like if for some reason you don't [00:53:00] get it out, you know, that day, like if you get rain or something, then you know, it could go anaerobic pretty fast. Okay. And then if I got a thousand gallon tank, how much would you use for verma cast and molasses and tigerslate?

Yeah, I, I don't have it right off the top of my head, but, you know you, you, you'd kind of figure out how, you know, how much you're spraying out and then you, you know, try to, try to get it to about like, like say five pounds an acre or something like that. Yeah, I, I, I'm, my numbers go outta my head pretty fast, so I, I, I do, I, I have known that number, but I don't, don't have it right on the top of my head, you know.

Ok. You know, I think like in a thousand gallon tank, we were putting about five gallons of molasses in, and then we were also putting some like, you know, the. Redmonds a little bit of Redmond salt and that, [00:54:00] you know, it seems counterintuitive because like our but I think that there's pretty good data that, that just a small amount of salt is, is gonna give you quite a bit of good.

And, you know, sometimes we've mixed it with fish. I mean it's, it's just like, back to that diversity thing is you know, the more, more diversity. I mean there's some stuff that fish has that vermicast doesn't. And so like, if you can come up with those mix I think it's all the better. So like the fish, would you use five gallons, 10 gallons to a thousand gallons or more, or any guess there?

Yeah, that would be, I think you're, you're in the ballpark there. Yeah. Fish. Okay. Thanks.

**Mihail Kennedy:** We do a foliar compost t where we actually do you know, brew it and add fish hydrolysate and maybe a little molasses every year and inject it through our pivots. And have seen incredible results from [00:55:00] that with our compost.

**Steve Charter:** You know, the other way I've heard people do it is just like, like put a sack at vermicast in a, in their irrigation ditch and, and do it. I think, I think that's a pretty, pretty good way to do it too.

**Sue Fitzgerald:** I have a question for Mihail. Do you have a marketing plan or are you planning on using all of your compost?

**Mihail Kennedy:** Currently we don't have a marketing plan. We are going to use all of our compost initially here. And then, you know, eventually it's, it's a matter, we need to figure out what the compost looks like first you know, what the mineral and biological aspects of it are and where exactly that fits with, you know, different different markets.

I do have, you know, there's a lot of regenerative gardeners kind of starting up the like harvest tech and some of those, you know, organic grow. And gardening companies around Montana I think are, [00:56:00] are very interested in, in purchasing our product as well. But they want testing done obviously with genetic testing as well because certain, you know, certain they're looking for certain microbes to be able to sell essentially.

So as part of their either growth medium or soil amendments.

**Sue Fitzgerald:** Okay. And how long does it take from start to finish? Like three years or?

**Mihail Kennedy:** No, it's, it's more like four to six months. Okay. Yeah.

**Sue Fitzgerald:** So you've, you've had quite a bit finished then? No, we, we don't have any finish just because we had to move compost.

**Mihail Kennedy:** Oh, okay. And in the pro, cuz we, we had to shut down this compost site and I couldn't cook all that compost. Mm-hmm. cause of the odor. So we're slowly trucking it to our new site to finish that as well as the stuff we're finishing currently. So. Okay, thanks. Yep. We had a little, we made a little mistake on that one in putting it too close to people

Despite the fact that our nearest neighbor is a sewer in septic guy it is very [00:57:00] powerful smell. It's not a bad one, but it's a very powerful smell.

**Sue Fitzgerald:** I'll ask Eric the same, do you sell any of your compost or do you use it all yourself?

**Eric LeFeldt:** No, no. We, we use it all ourselves. Yep. No, it's I could use more in the process of getting some straight manure slash compost from quail operation south of town, about 15 miles just for the high, high nitrogen that, that, that will bring us.

But no have no, have no plans of taking anything further than where it's going right now.

**Mihail Kennedy:** And our goal initially is to, you know, we're, we're trying to close that nutrient cycle. So every pound of beef that leaves the ranch is nutrients lost. And so this is us closing that nutrient cycle, hopefully.

And we are, we're bringing a lot more back than we're sending off cuz we're, we're not just taking our slaughter wastes back, we're taking everybody's so long term we will probably end up selling maybe. 10 to 15% of our annual production, maybe, which still amounts to, you know, a couple thousand cubic yards possibly.

**Sue Fitzgerald:** So [00:58:00] this can be for anyone. Is the sale of, is there a regulating body for the sale and commerce of the compost or the verma cast?

**Steve Charter:** There is kind of a, you know, if you're selling what they consider fertilizer, you know, you have to, you have your three ingredients, you know, as a fertilizer, but that's really not relevant to, to like verma cast or compost because you, you know, the, the purpose of Verma cast isn't.

You know, nitrogen, phosphorus whatever the third one is, you know, the purpose is the microorganisms, but technically if you sell, you know, and they consider it a fertilizer, but it's not, that's not really what it is. But, so when you sell that, you're supposed to put those, those three ingredients on there.

But it's, it's kind of [00:59:00] misleading in a way because the you know that that's not its value.

And then compost, You know, if you're, if you're selling compost it, it has. Reach a certain temperature, like has to go to at least one 60, get rid of the pathogens.

**Mihail Kennedy:** It's gotta go to one 30 for 15 days straight is Oh, okay. The regulation. Okay. I have a tough time keeping anything less than one 50 for more than two months almost.

So. Right, right. Yeah. So it's, yeah, it's, it's for the pathogens and, and stuff like that. So,

**Steve Charter:** but it's, it's different with worm castings cuz the, the worms, anything that passes through the worm takes care of all those pathogens. So that, that's one, one thing where vermicast is a little simpler is you don't have to worry about that that temperature thing.

And then the, the compost we do I, I kind of like to cold [01:00:00] compost it because, you need those higher temperatures, but you know, a lot, a lot of your microbes really thrive on it, on maybe lower temperatures. So the compost I feed to the worms. I try not to let it get very hot.

**Mihail Kennedy:** Yeah, that's, that's kind of why we do the static compost early on, is to keep those cool temperatures in the start and have kind of, it's kind of a mixture of cold and hot compost.

And then at the end we cool it down again too, so it's not that super duper, because you do lose, when you get those, those, you know, you have the thermophilic processes going on there. 160 degrees does kill a lot of, a lot of, a lot of, Well, it doesn't necessarily kill 'em. They go dormant too,

**Steve Charter:** I just maybe add that you know, the good, the good thing about wor or Verma cast or compost is like we, you know, we have a lot of this stuff available on our places and so it's, it's something that everybody can maybe experiment a little bit with is, is either verma cast or compost. I [01:01:00] mean, it's, none of this stuff is simple and it's, it's quite a bit of work, but I think it's pretty good idea if you can take something, you know, the value.

Compost or verma cast versus just putting straight manure out there is really, you know, putting straight manure, You know, you can actually go backwards because it's drawing stuff from the soil. So I, I think it's a skill that would be worth cultivating for lots of places of just at least using your own whatever waste you have and, and then using those right on your place.

I, I think it's a, I think it's, you know, it's, it's, it's not like we don't have enough to do, but , I think it's would be worthwhile.

Well. Awesome. I think that's a good note to end on. Thank you all of you for getting on and thank you to the speakers. I really appreciate your taking the time to do that. So yeah, I guess thank you and, and have a good night. [01:02:00] Thanks Holly. Hi everybody.