

Cutting Edge: In Search of New Crops For Wisconsin

Episode 1: Industrial Hemp with Guest Dr. Heather Darby

Recorded May 21, 2029

SPEAKERS

Jerry Clark, Carl Duley, Jason Fischbach, Dr. Heather Darby

JASON FISCHBACH 00:00

This is a podcast about new crops. You're gonna love it. Join us on the cutting edge, a podcast in search of new crops for Wisconsin.

Dr. Heather Darby (music in background) 00:11

There were no barriers. I have never seen this with any other crop that I have tried to get farmers to grow. It just see, you know, the view was there's no barriers because ultimately, there's a pot of gold at the end of the rainbow. (Music)

(bluegrass music playing)

Jerry Clark 00:43

Welcome to cutting edge, a podcast in search of new crops for Wisconsin. I'm your co-host Jerry Clark with the University of Wisconsin Madison Extension in Chippewa County, serving as an agricultural agent. Today we'll be talking about industrial hemp. My co-host today is Carl Duley in Buffalo County.

Carl Duley 01:01

Thanks, Jerry. I'm Carl Duley. I'm the UW Extension Buffalo County Ag Agent. And it's a real pleasure today to have for our very first podcast, special guest, Dr. Heather Darby. Dr. Darby is a professor with the University of Vermont, Extension Agronomy Specialist. And I think with that together we'd like to give us a little bit of your background. You can throw a little bit of that Wisconsin twist in there for us.

Dr. Heather Darby 01:30

Okay, well, thank you. Thanks for having me on your show today. I'm really excited. Ah, yeah. So I'm actually a Vermont native. I grew up here. And, so I'm really proud of that. But I would say my second home is Wisconsin. I'm a UW alumni. I got my masters at the University of Wisconsin so spent about three years there and was really fortunate enough to be able to travel the entire state. So I had some research plots at seven locations. So when I was there, I really got to see, see the whole state, which

was nice and even made it way up to Ashland. I don't know if the research station is still up there, but I had some plots that far north.

Jerry Clark 02:21

Yeah, I believe that's closed. Yeah.

Dr. Heather Darby 02:24

Yeah. Yeah. Well, so it was a while ago when I was there. But yeah, so I have a connection to the Midwest and my, my, my husband's family lives in Iowa, too. So it's a place that we get to go a lot and visit. So I do consider it a second home. Yeah. And as far as what I do here in Vermont, I'm I'm at UVM, the University of Vermont. I do a lot of different things here. And, but hemp is one of them. So that's why I'm the special guest.

Carl Duley 02:58

Well, we should start a little background on your research with industrial hemp, Heather.

Dr. Heather Darby 03:04

Yeah, okay, well, I've been working or researching industrial hemp since 2015, I believe or 16. And I've, you know, I've been excited about working with hemp. I think like probably many people on this, you know, listening to new crops, you know, I'm excited about new crops too. There's just a level of exciting excitement working with something new that we don't know a lot about. And so when we were, you know, afforded the opportunity to work with hemp, I jumped right on it immediately worked my way through all the bureaucracies associated with that and put my first research plots in the ground. I guess it must have been 2016. And so we've been working on grain research, fiber, a little bit of fiber research and then also over the last I guess it'll be three years now flower research or you know hemp for CBD which has become, you know, the popular popular hemp product lately.

Jerry Clark 04:20

And Heather, can you just explain a little bit about the physiology of industrial hemp and how that's the differences between what you would do maybe for grain fiber production and CBD?

Dr. Heather Darby 04:30

Yeah, so industrial hemp I think everyone knows that it has very, very low levels of THC. So that's why we're allowed to grow that as a crop now. And if we're growing hemp, or if you're growing hemp, you should know that there's both male and female plants. I think that's, that's really a big piece of understanding hemp which is different than a lot of the crops that we work with. You know corn as an example has male and female parts on the same plant but hemp itself has male plants and female plants. So if you want to make seed, obviously you need both you need male and female plants, so you grow them both. If you want to produce hemp for flower, so you're just harvesting the female flower bud, you definitely don't want any males around. And so if you're growing for grain, you're growing both male and female plants and also for fiber. And if you're growing for flower, then you're only growing female plants and you definitely don't want any of those pesky male plants around. Because you know, when you're growing for flower for female flower, that's all you want. You're really looking to harvest the female flowers that are really high in these cannabinoids or CBD as an example, I know a lot of

listeners probably hear about that cannabinoid the most. And so if it does become CD quote, unquote, the level of those cannabinoids goes down considerably. So if you're really trying to meet that market with high cannabinoids and things like CBD, you definitely don't want any male plants. So that that's probably one of the primary pieces of hemp physiology that people need to know about. One other I would say is the fact that most hemp that people are growing is photo period sensitive, which means that when the day length changes, the plant moves from vegetative to reproductive. And so that obviously has implications when you're when you're growing the crop. So those are probably the two biggest physiological pieces that people should know about.

Jerry Clark 07:07

So what are you seeing as far as that marketing picture for that whether it's for the oils or for the grain fiber market that growers might be interested in, in growing industrial hemp?

Dr. Heather Darby 07:20

Yeah, well, you know, things are a lot different than they were a year ago I'm sure you folks have noticed that in Wisconsin to the the buzz of making millions off from hemp has has gone away. We're you know we're not sort of seeing that gold rush mentality right now. So the market is really different than it was a year ago. So let's start with hemp flower. So again, hemp flower is the female flower buds that are harvested and they're harvested to be processed into primarily CBD at this point but also CBG, which is another cannabinoid, and the market for that has declined quite considerably at least the pay price, it's still actually a good price per acre, you know, it's not \$40,000 return per acre that was being projected last year but it's still it's still a good return per acre, you know, well over \$1,000 but, you know, that's if you have someone to sell it to. So the market prices for biomass which is basically just harvesting some leaves and stems and female flower, and, and that's taken and the CBD is extruded out of it, and then sold, you know, you got to connect with the market because even though the price is decent, if you don't have any one that's going to buy it from you. You know, I think we all know it doesn't matter. So, so the price is so good. But finding a market is challenging because the processing side of this equation is growing slowly. So the capacity to handle the hemp that's being grown right now is pretty limited. And I'm sure it's that way in Wisconsin flower too. It's that way in Vermont, in many, many places. The market for dried high quality flower for smoking, so some people will smoke the flower bud to get that the CBD effects, which again are not psychoactive at all but some people use it to manage pain, stress, anxiety, things like that. So people do roll and smoke it similar to tobacco. That market is very good. That's still at \$250 up to \$400 per dried pound of flour. So that market is holding strong. But again, you have to be able to connect with somebody who can process and distribute that smokeable flower. So finding the market outlet for your crop is, is critical or else you know, really don't bother growing it because especially for flower because the quality just doesn't hold up over time. If you're not set up to handle it, which most people aren't.

Carl Duley 10:36

Yeah, but isn't that really the most labor intensive one too, the flower? It's not a lot of mechanization in the flower industry.

Dr. Heather Darby 10:45

Yeah, but even with the labor involved, if you have the labor force, it's still you know, it actually still can generate a return. But yes, absolutely. That's the one that's still largely hand harvested. You know, I think last year probably in Wisconsin to I saw some of your innovations, people are innovating to harvest mechanically, but that's for biomass, right? So biomass has kind of lower lower grade I would say they don't care if you break this, you know, the bugs and you know, mash up everything. But for smokeable flower, which is so you know, gaining that higher price that's going to be more finely handled, manicured stored all of that.

Carl Duley 11:33

What about the grain and fiber market then do you see it growing in the northeast or across the country at this point?

Dr. Heather Darby 11:42

So yeah, I mean, on a very small scale, right, so most of the markets that we have right now are, I don't want to call them boutique necessarily, but very local, locally produced products that are coming out the door. So the markets aren't huge. We're not talking yet about big commodity sales of thousands of acres of grain crop. Because on the more industrial level, again, the processing and the the value chains to bring this stuff to market have not been set up. So you know, we're we're so much we're so anxious in agriculture to have something new, maybe something that can make us some money. We're way ahead of the processing and distribution side of things. So it's growing very slowly. You're probably seeing the same thing, I'm sure.

Jerry Clark 12:40

Yeah, just just to clarify, we've got the the cannabinoids that are pulled out of the flower part of the plant, or could be the whole plant in general if it's lower, lower grade. But then we can also get oil out of the seed, correct. Oh, yeah, there's something there two.

Dr. Heather Darby 12:56

Very different though. So I think that's where people get confused. So the oil that comes out of the seat so hemp is an oil seed and you know very similar to canola let's say or sunflower or flax, I would say it's probably a little bit more closer to the oil you would get out of flaxseed. So it's it's very high quality, very nutritious has a lot of omega threes in it. It doesn't have any THC in it, you know, it doesn't have those cannabinoids. So it's used for very different purposes. It's not necessarily considered, I guess, like a nutraceutical or herbal supplement or anything like that. hemp oil is used, like very minor for cooking. Again, it's used more as a health supplement for a lot of people a protein source, so it would be used similar to flaxseed oil. You know we don't cook with flaxseed oil we you know put it in little capsules and take it to supplement our diets.

Carl Duley 14:08

What about the meal that's leftover after the the processing of the oil? Yeah. Do they use that for I understand you use some of that for flour, is it a possible livestock feed? But I don't think that's approved yet

Dr. Heather Darby 14:21

No, I don't think it's approved yet. Yeah, it's not in Vermont. But yeah. So again, I always think about flaxseed meal, right. And hemp meal is very similar can be used with really similar you know how like my husband puts it on his sprinkles it on his oatmeal in the morning. So, you know, again, it's, it's still got a lot of good goodness in it a little bit more fiber. So it's used in baking. When we say flour, it's not a traditional flour, you're not going to really want to make an entire cake out of it or anything but it's still got a good amount of protein in it and fiber so people use it when when they're cooking. We use it as a fertilizer. It's a really good fertility source. Yep. Sorry. That's my son. This is a real podcast folks, right we're doing this. We're in a pandemic. Yeah. We've been actually trying the, trialing the hemp seed meal as a fertility source. It's got a lot of protein, which means it has good amount of nitrogen in it and it breaks down really quickly in the soil more quickly than some of the other like soybean meal as an example. So it may not be the highest value product to gain from it but a good way to return that back to the ground and get some fertility out of it for sure.

Carl Duley 15:50

Have you guys gone anywhere with fiber in Vermont yet or in the Northeast?

Dr. Heather Darby 15:54

Ah, feels like people are continually trying to, are trying, you know, we get called regularly from businesses that are trying to get started. We have a business recently that's trying to turn the fiber into paper to replace some of these, you know, cups, like coffee cups and things like that. But nothing substantial yet. Nothing substantial. And then I would say that's pretty... Yes, go... pretty similar around the Northeast. So not a whole lot yet.

Carl Duley 16:31

Here in Wisconsin, we've had some discussions with a couple of our other university institutions about the paper industry and, and also some processing equipment and but unfortunately, that was early March when those conversations started. And yeah, everything's on hold right now, of course, but yeah. the fiber hasn't taken off too much yet hasn't it?

Dr. Heather Darby 16:56

No, you know, I think there are big capital investments. And, you know, beyond that, you know, stiff competition, right? So I mean, there's other sources, synthetic and natural for for fiber that are already set up in place. So these kind of big capital intensive investments aren't moving as fast as I think we'd all like to see.

Carl Duley 17:26

One other product you hear a lot about is hempcrete. Do you hear anything about hempcrete out there?

Dr. Heather Darby 17:31

There's a little bit of movement with hempcrete. Again, no manufacturing facilities yet, but a lot of people, you know, kind of going around trying to figure out how to make it happen. You know, it's a more expensive building product. So again, that's, you know, part of the limitation, even though we can probably make these things there might be in some, you know, people that want to invest in it ultimately will that more expensive product, at this point, have a spot in the marketplace enough to warrant the

investment. And I think, you know, that's what we're everybody's trying to figure out. So those will I think, be some of the last things to come for hemp.

Carl Duley 18:17

So, so maybe just a little bit I know some of your first studies, you did some seeding rate trials and things like that if you want to just just talk a little bit about what you found on seeding rate for grain and fiber. Yeah.

Dr. Heather Darby 18:32

Yeah, well, so one of the things I think, you know, if folks are interested in growing hemp, this is a big take home message I would say is that the seed itself is very or the the emerging seedling is really really sensitive to, like compacted crusted soils. And also the seed itself, when you buy, it tends to have pretty low germ rates. So when you're planning your seeding rate, those are two pieces you really need to be thinking about. So first, you want to make sure that you adjust your seeding rate based on the actual germination rate that's listed on the on the bag of seed. So if the seeds only 80% germ, and I tell you today, you should be seeding at 20 pounds of seed per acre. That means you need to be planting more than 20 pounds you need to account for that low germ. Otherwise you're going to be disappointed when you watch the crop come out of the ground. So that's one thing

Carl Duley 19:50

Can we talk about seed a little bit there. Can we just where, where do you look at for finding the highest quality seed right now? Some people refer to it kind of like a it's the Wild West out there. Yeah. But what do you recommend for looking to find that high quality seed?

Dr. Heather Darby 20:08

Yeah, well, so if you're going for grain or fiber, there are some very well established companies already in Canada, and they now have distribution into the United States. And so it's pretty easy to get, what I would say is like high higher quality and also better genetics for grain and fiber. So there's companies like Hemp Genetics International, HDI. They're distributing at least through Kings Agra Seed, as one there's other companies, I'm sure as well. They're located in Pennsylvania, and then Seed Way, which is a kind of a more local company here. They're distributing UNI Seeds, and that's coming out of Ontario. I like the Ontario varieties better for where we are because they're adapted to that kind of temperate climate, where a lot of the seed coming out of the western part of Canada, you know, has been bred and developed in a drier, drier conditions. So I think you've worked with those, Carl and Jerry, and you've seen that they're pretty short. They don't, you know, they're not putting on that tall growth. And, and so there's some weed, you know, can be some weed issues there.

Carl Duley 21:30

Yeah, you brought up a good point, Heather about talking about where the climate differences and it's one of the reasons besides you being an excellent researcher and extension person on the climate at your research station at Rogers Farm is really, really similar to what we deal with here in Wisconsin, so that's why I point a lot of people towards your data because of that.

Dr. Heather Darby 21:51

Yeah, yeah, absolutely. Yeah, I think that's, um, you know, we started I mentioned we, I know a lot of people have had challenges establishing good stands of grain and fiber. And again, this gets back to the seed quality. But it also gets back to soil quality. Because again, that little hemp seedling hates crusted soil. And so making sure you have excellent soil conditions when you're planting hemp is just really critical because otherwise, you know, you can lose up to 40% of the seed that you put in the ground. So I know in Canada, they actually account for that in their seeding rate, you know, so they're not only accounting for germ, you know, the germ rate that's listed on the bag, but they're also accounting for a 30% mortality loss on top of that. So you can see how those that you know, 20 pound per acre seeding rate can be up towards 50. By the time you make all these adjustments, so You know, these are really important considerations because if you don't get a good stand of hemp, you're gonna have weeds. You can't you know, and if you get a good stand of hemp, they will, the hemp will easily out compete the weeds. But you gotta have a solid stand.

Carl Duley 23:18

Yeah, we mowed off half of our plots, because the weeds had just destroyed it. But and I think part of ours is that we've been planting too early. What do you guys look like look at for planting dates or planting conditions or weather conditions?

Dr. Heather Darby 23:31

Yeah. Yeah. So we have done some planting date studies. And really the end result was it depends. It depends on the weather. So it hemp can actually be planted when it's relatively cold, but it's really about the soil moisture, and also about the conditions on on each side of planting. So you know, it's so hard to predict the weather these days, but what I've been told by farmers in Canada is just be patient. And you know you have a pretty decent window for planting hemp that can go from mid May really to about mid June. And so finding that sweet spot for planting is really when you know you have a, you know, pretty decent amount of moisture to go out and plant but not too wet. And and you're not expecting, you know, some deluge in the next week. And I think that's what's been challenging for you folks as well as us. Our springs have been really pretty tough the last few years so it's been hard even in that window to find a time to get out there. So I would say bump up your seeding rate, you know if you if conditions are poor.

Carl Duley 24:51

I know last year we struggled a little bit. Jerry what was our planting date last year? Doyou recall?

Jerry Clark 24:55

In Chippewa County we planted June 11

Dr. Heather Darby 25:00

Not too bad.

Jerry Clark 25:01

Yeah. And we're actually hoping to plant, you know, right after Memorial Day this year, so maybe a week or two earlier.

Carl Duley 25:08

Yeah. And I think our planting date was right around June 15, here in Buffalo County, about a week later, and they germinated really well, then it got cold, and it just sat there and the weeds took off and then one of our colleagues, Dr. Brian Lucked out in Madison planted trial at Arlington, because he wasn't able to get the seed in time. He didn't plan till the 25th of June and his crop is amazing compared to ours. So yeah,

Dr. Heather Darby 25:34

I will say that it is pretty, it does, it likes the heat, you know, and once the the heat units pick up, it grows really fast. So you know, it is like some other crops where you need to manage those weeds on the front end a bit. And I know I don't know what, you know, the sort of regulations are but in Wisconsin, but we do have farms that do some pre plant herbicide applications with things like trifluralin products like that basically that helped to take care of some of the weeds before they're going to go in and plant other crops. You know, we do that with canola and hemp and things like that. So that can help on the front end, and then that gives the hemp a little bit of time to kind of get established up and going before you know all the rest of the weeds kick in.

Jerry Clark 26:33

So yeah, as a new grower, how would you you get started? What's your advice for someone that's, you know, wanting to make the money and thinks this is the way to go?

Dr. Heather Darby 26:44

Yeah, well, I would tell them to first start searching out a reputable market. You know, I, I don't. We had a lot of issues. I'm sure you did, too, last year with people that even had contracts with buyers. And then the buyers folded before they even got to harvest or, you know, once the we got to harvest, the buyers realized the price had dropped substantially. So then wanted to change their contracts, you know, so everybody was in this real learning mode. And I don't, I don't necessarily think that any of the buyers were were shysters or you know, trying to, you know, to do bad things. But, you know, the market the the market fell apart. People didn't even know what they were getting into, you know, farmers and processors for the most part. So now I feel like things are settling out a bit. There have been people in the business for more than a year, you know, a couple, two, three years in some cases. So to start searching out, especially if you're new grower, you know, a market that might be more stable with a more reputable buyer. Someone that maybe other farmers in the area have also been selling to. So they have a little bit of a track record. And you know, that's where I would start. I wouldn't definitely go out and put 50 acres in thinking they were going to sell it at the end of the season.

Jerry Clark 28:18

Yeah, that seemed to be the, the the questions we were getting last year here with extension in Wisconsin was I've got 30 acres, I want to grow hemp, and it was like, Whoa, whoa whoa, back off. Do you have a market? Do you know what you're getting yourself into? You kind of had this list of questions, not to talk them out of it, but to make sure they knew exactly what they were getting into. And there was a big difference between whether they were going to try to grow it for grain and fiber, which maybe a farmer did have a drill or you know, some of the equipment to do that but growing it for the cannabinoids, that's a whole different ballgame because it's more like I'd like to look at it as

gardening so to speak. Yeah, because if you've got an individual plant that You're doing more mechanical, or, you know, weed control is much different. And you're trying to treat each plant separately, or individually, so to speak. But those are the questions I think we got was, you know, I've got this acreage, I want to do this. And you had to make sure they were going into it with their eyes open. Because Because of these challenges you just explained,

Dr. Heather Darby 29:22

Yeah, but there was the allure of money, Jerry, I mean, yes. I mean, you've worked with a lot of specialty crops, and so have I and I just, I have never seen anything like this where it didn't really matter. There were no barriers, right? There were no barriers. Even even when you put up the barriers for the farmers, they still did it anyway, you know, they, they bought black plastic mulch layers and they, you know, figured out how to irrigate and they were paying this like absorbent amount of money for plants and there were no barriers. I have never seen this with any other crop that I have tried to get farmers to grow it just see, you know, the view was there's no barriers Because ultimately, there's a pot of gold at the end of the rainbow. So, you know, I think it's a real interesting lesson learned on on a lot of levels like if we if we want farmers to diversify, tell them there's a pot of gold at the end of the rainbow. There were no it was just crazy. I've never ever seen anything like that. I'm sure it was the same for you. Market, no market. Just they did it. So we can grow hemp. We know that now. Yes.

Jerry Clark 30:41

And I think that's the way we've approached it here with some of the trials that we've done. This will be our second year of a research project here in Chippewa County with UW Madison. And I think we've proven that you can grow this stuff now. Let's put that aside. You got to have a marketing plan and go forward with with what you're going to do and go into it knowing this is a costly production, like you said it Yeah, people just thought the money was gonna kind of just show up. But you've got a lot of inputs before you can even have any kind of return on it.

Dr. Heather Darby 31:10

Yeah, I remember talking to some dairy farmers last year that wanted to do this. And I said, you know, it's a lot of work, and it's gonna cost a lot of money. They said, well, dairy farming is a lot of work, and I'm losing money every day, you know, so it was worth it was worth the risk for people. Yes, you know, or they thought that it would be worth the risk. And for some people it was, you know, some people did come out the other end, smiling. And a lot of people didn't.

Carl Duley 31:42

There was a lot of excitement, which we haven't seen in agriculture, you know, in recent years. So, right, not as much excitement this year. But yeah, and Jerry, and I've had this conversation with some of our colleagues that maybe we're in a good spot right now as far as Extension people, researchers that that with the grain and fiber at least we have a little time now we maybe we have a couple of years to really get a good handle on this. Yeah. And how to grow at what are the barriers, and then maybe some of our colleagues who are in market research have a little bit of time to, to, to go ahead and get the research done before we before we plant thousands of acres again. Yeah.

Dr. Heather Darby 32:28

Yeah, I do think it's certainly it's definitely an exciting time, I think for the researchers because we do have the opportunity to set the stage, you know, to be to think about how we're going to grow this crop economically, sustainably, environmentally, you know, we're not trying to get people to change the way they're growing something we're leading, you know, hopefully, the way saying, you know, these are the best practices and you know, that to me is exciting we have been there for for a while. So, it's good.

Carl Duley 33:05

And I had a chance last summer to, or I took the chance to go to to Germany to their European Industrial Hemp Conference and you mentioned the word sustainable and that's that word was used constantly at this conference. What's your viewpoint on hemp as is quote, sustainable crop?

Dr. Heather Darby 33:20

Yeah, well, um, you know, I think people definitely tout hemp as being you know, like some people the Savior you know, um, but, you know, with any crop I think we can do a really good job growing it to both produce, you know, good yields quality and protect the environment and we can do a really bad job and hemp's no different hence not just going to be environmentally friendly, you know, we have to grow it in a way that it will be, you know, and the potential for it to, you know, have less inputs, let's say is there, but it's not a given. You know, it's not a crop that grows without fertilizer, we already know that. It's not a crop that grows without herbicides, we already know that. And so can it be? Well definitely, it can be a really great crop and a rotation with the other crops that we grow. So that we can you know, reduce inputs and have reduced herbicides and all of those great things, but it's not a given. It's not a definite we have and that's why I said it's exciting because we have the opportunity right now to set the stage so that it does become a you know, a crop that has a lot of benefits to the farmer, you know, and other crops in the environment and so on and so forth.

Carl Duley 34:53

Good point, I know in Buffalo County, we tried in the last two years, we put in some under no till conditions. And with very, very mixed results. Yeah, because of weed control. So the the whole idea that it's sustainable in our hillsides in western Wisconsin. There's a question mark there. We have to we have to practice them or live some of our practices before I would consider like any erosion control crops.

Dr. Heather Darby 35:18

Yeah. Right. Exactly. Yep. Yeah, so we have some work to do and but I do think you know, there's some definite benefits to growing the crop. But it does take fertilizer, you know, it you know, it's very similar to corn and a lot of ways from that perspective. And I you know, I did a historical, I don't know analysis of hemp in in New England. And, you know, the, the colonists did not want to grow hemp, even when the government tried to subsidize them, you know, way back, early on. They wouldn't grow it because it took too much from the land. That's what it says in these very, like old, old historical documents. So, you know, they, they wanted to grow something else like flax, because it was, you know, much easier on the soil. So, you know, I think it can go right and it can go wrong, just like everything that we do. So we have this task right now and the opportunity to make it go right.

Jerry Clark 36:27

That's what we learned in, in Chippewa County was the inputs of we did a nitrogen trial here. And yes, absolutely. It turned out, you know, 80 to 100 pounds of nitrogen was needed at a minimum. That was kind of that that sweet spot somewhere, depending on soil type, and, you know, previous crop was soybean. So we got a little bit of credit, some of that kind of stuff. But yeah, it's not an input free, free crop at that point.

Dr. Heather Darby 36:53

Yeah. Yeah.

Jerry Clark 36:55

So do you have any, any advice as far as some of the harvesting and we talked a lot of production type of stuff, but we get to that harvest point of whether it's for for the cannabinoids, or we look at harvesting for grain and fiber. What's your experience on on those sites? Heather?

Dr. Heather Darby 37:11

Yeah, well, so, fiber, so it depends. Okay, so for grain, I think this is where a lot of farmers run into issues is because most of the grain that we're used to harvesting looks really brown and dead. But we go out to harvest it, you know, so it's naturally "When would you harvest hemp for grain?" When it's brown and dead! But that is not what you should do. You know, you actually harvest hemp when it's still very green and leafy, but the seed is ripe. And that goes against, you know, our farming fabric, right? It's like everything we know says wait, and I think that's where people run into trouble with the wrapping, you know, so if you wait too long There's a change in the fiber of the hemp plant as it becomes more mature. So what I believe happens is the the pectin that holds the outside bass fibers starts to break down. And once that starts to happen when you when you're combining, the stems start to break, and then they start to get wrapped up in the combine. So the harvest window isn't a long period of time, it actually is fairly short. And it's pretty predictable, because it is a photo period sensitive crop. So you know, for most places, we're talking about the end of August, just past Labor Day. So you can always count on it roughly being harvested around the same time. So that's a big challenge is just re you know, tooling, the way you look at things. The other challenge I would say is making sure you have a way to clean it. Because there's because you're harvesting green material, there's a ton of leaves and hulls that are in the seed. And so you have to have a way to dry it rapidly, but not with too much heat, or else you, you know, burn things up or get it cleaned and in a dryer. So, you know, to me that's that's a step that people have figured out the hard way.

Carl Duley 39:28

Yeah, and when you mentioned cleaning and drying, you got to do that rapidly is Yeah. Because in a couple of hours, oh, yeah, I found out it'll start to mold already. And uh huh. And your product is total waste. So yeah, you really have to get on the ball. It's a, to me it was a little bit similar to canola because the plant has some green seeds on it and all that and you got to get air on it right now. And yeah, I would really emphasize that you have to Yeah, you have

Dr. Heather Darby 39:57

It's actually easier to dry it and then clean it. Trying to clean it first, if you had a big rotary screen cleaner that probably would work okay. But, you know, it's gummy. It's way more gummy than you got

because you still have all those oils and terpenes all over that plant and so when you put it through a regular seed cleaner oh my gosh, what a mess. So you're you're better off if you can get air on it and dry those hulls down and then put it through a cleaner but, you know, it depends I guess what kind of equipment you have.

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Jerry Clark 40:31

So on the cannabinoids side that's not combine that's more hand harvested at this point for the most part and then individually flowers are harvested?

Dr. Heather Darby 40:43

Yeah, that's uh, you know, go out into the field and cut the plants down and break down, break them down. They look like little trees, you know, so you have to cut the stems off or the branches and then you cut the stems off the branch. And pull off the big leaves and very labor intensive, depending on how fine you're going to process it for, you know that smokeable flower bud, we're talking, you know, two to

four hours, maybe five hours per plant and if you're harvesting for biomass, you know, you may be looking at five minutes a plant, but still it's, it's quite a bit hand labor. It's all hand labor for the most part. So why should we grow hemp? (Laughing)

Carl Duley 41:35

Yeah, what is gonna state that a little bit? Maybe easier? What do you think the future? Yes.

Dr. Heather Darby 41:46

Well, I mean, at least in Vermont, you know, and this is Vermont, of course, we're small. You know, we're not going to grow big commodity crops of hemp, not here. You know, we don't do anything that way. So for us, it's really going to be those kind of value added local high quality, specialty markets that our farmers are already going for. You know, we have some very well established hemp companies in Vermont Sun Soil is one of them. They've been here since 2014. And and, you know, they're one of the biggest and most reputable CBD businesses in the country right now. And I will say that they're still only growing 50 acres. So, you know, I think there's still opportunities, there's still products coming out the door, but our excitement is ahead of where all of that is right now. So, you know, what I see are farmers that are still in it. Know that there, there will be more opportunities coming you know, all the time. So, you know, people connecting and continuing to connect, and network is where I think people should be at Right. Right now I do feel like the opportunities are going to continue to come, this isn't going to go away. It's not a fly by night thing. But, you know, the crop what has been legal for what a year? Really, you know, we can't expect entire infrastructure to be set up to process everything that we want to do.

Carl Duley 43:32

Heather, this has been great to touch bases with I think, and, and hopefully at some point in time, we can all get together in person again. Yes. And, and maybe we can venture out and come to your field day and, and vice versa. And yeah, share in our research projects. Jerry, any any last questions, comments that you might have?

Jerry Clark 43:56

No, I think Thank you, Heather, for joining us on our initial Cutting Edge podcast today. Appreciate your time. And yeah, like Carl said, see you down the road.

Dr. Heather Darby 44:07

Yeah, well thank you. I appreciate it and have a great growing season.

JASON FISCHBACH 44:18

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