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Thu, 10/1 8:39AM • 2:08:29

SUMMARY KEYWORDS

plants, hemp, flowering, varieties, cbd, wisconsin, growing, fiber, questions, year, grain, state, trial, growers, harvest, cannabinoid, crop, field, cultivars, seedlings

00:02
We are going to get into our industrial hemp grain and fiber updates. And our first video and first speaker today is Jerry Clark

00:17
UW-Madison Division of Extension stationed in Chippewa County. We've done Industrial Research last two years, related to seed and fiber production. seed and fiber production varies much differently than what we've seen with CBD production. And for seeding fiber production, we typically can use more mechanical type of planning, like for instance, a grain drill, and then for harvest, we can actually use a combine. So a lot of the equipment that farmers currently have is available to get into industrial hemp related to grain and in fiber production, what we would see with grain and fiber production, for industrial hemp, we have male and female flowers both planted. So we want that pollination to occur and have that seed production available. what we've been researching here the last two years have been some of the agronomic types of conditions related to seeding rates, varieties as well as nitrogen application. And with those types of economic studies that we've been doing, we've been discovering that industrial hemp is related very closely to fertilizing similar to corn, your pH levels would be more similar to alfalfa. So from those standpoints, you're looking at your soil conditions, that would be the fertility we would look at, typically as a warmer season crop. we look at planting into June, definitely after soybeans. So we'd like to see that planting date. Push back into June when we know those soils are much warmer, it seems like we get better germination, I get some of those early weed control problems. Currently, there aren't a lot of options available for weed control in industrial hemp. Therefore we'd like to see a burndown treatment or free growing organic, able to do something where you can keep that weed control down. In terms of harvest side of things, again, we can use it.

03:19
I apologize the video keeps playing here and and we we've seen that a couple of technical difficulties,

03:26
be able to do something where you can keep that

03:29
control okay.

03:30
03:42
all right next, as we stopped the video edit wanted up. Keep playing as we're moving through our green and fiber update. Our next speaker today is Haley Ort Meyer Clark and she's a graduate research assistant in the department of agronomy with division of extension and UW Madison. So we are going to hear from Haley. We have a video and then she's going to be speaking and then after that we will take questions for both Haley or Jerry if there are any.

04:19
Hello, my name is Hayley Ortmeyer Clark, and I'm a second year master's student here at UW Madison working with industrial hemp. Unlike most of the other crops that we grow here in Wisconsin, with industrial hemp, we don't have well defined management guidelines and practices for growers. So all of the work that we're doing here is helping us to better understand how industrial hemp grows as a crop here in Wisconsin and how we can better help the growers trying to produce it. The field that I'm standing in is where we're looking at different agronomic practices like planting density and nutrient management programs to see how they impact final grain and fiber yield as well as things like weed suppression and other plant characteristics. So what we're doing is we have two different varieties, X, 59, and CRS one. And we planted those at three different planting densities of 2030 and 40 pounds of seed per acre. On top of that we have three different nutrient management programs of no additional applied nitrogen, and then 60 and 120 pounds of nitrogen per acre. We're really looking forward to seeing what we find out with this year because it is a replication of this study. This is year two. And we had very different growing conditions between last year and this year, we were able to get planted earlier than last year. And then it was a lot drier this year. So the environments that these plants are growing and have been very different. On top of this trial, we're doing a variety trial. We're evaluating 15 varieties from all over the world to see how those varieties grow here in Wisconsin. Aside from growing that variety trial during the regular growing season, we're also establishing it after winter wheat harvest at the end of July and early August to see if hemp can be a viable double crop option. The last part of my program is looking at herbicide tolerance and hemp. I screened around 44 herbicides that we commonly use here in corn and soybeans and apply those to hemp to see what are some of the possible symptom that we could see for herbicide injury, as well as Are there any viable options that we can use for chemical management of weeds in industrial hemp. So all of this information, like I said, is just really helping us develop ways to help growers across the state of Wisconsin in their

06:45
ventures to grow industrial hemp here in the state.

06:49
Hello, my name is

06:58
alright, so I've actually said my name is Hayley. And I work with Dr. Werle, and Dr. Conley here at UW Madison working with grain and fiber hemp varieties. So I'm going to briefly look through some hemp

physiology, some of the challenges that we face when growing hemp, and then touch a little bit on our results that we saw last year.

07:26

So to start, hemp is a naturally dioecious plant, what that means that there are both male and female flowers, and they're typically on different plants. There are some where they have both male and female flowers on the same plant. But for the most part, we see the two different types of plants. The hemp leaves to see if it will change are pretty characteristic, we see the serrated edges there palmate. So they have different leaflets, we typically see about seven to nine leaflets and in our varieties. And that's pretty recognizable when people think of hemp, they tend to be able to picture the hemp leaf. Looking at the flowers, this is one of the most important distinctions that you need to be able to make when growing hemp is being able to tell between the male plants and the female plants. Again, when you're growing for the green, you need both in order for that pollination to occur and have the green development. So on the left side of the screen, we see the male flowers, they're a lot more loose, and tend to dangle down at the top of that plant versus very see on the right, which is the female flower, we can see it's clustered at the very top. It's now really spread out on the top of the plant and they do tend to also grow in the node where leaves attached at the top of the plant. And a characteristic is that if you look in the diagram there, the white stigma kind of emerged from that flower and that is what except the pollen so if you are growing for grain and fiber, you need to make sure that you're communicating with your neighbors if they're growing for CBD where they don't want that pollination to occur making sure that there's not that cross pollination with the two different types of of hemp. Next to touch on some challenges, um, it really starts with when you're planting. So our target planting date is much later than common crops like corn and soybean. We target to the very end of May early June to try and get it planted. And that means that early emerging leads are able to establish and get going before you even plant your head. You need to make sure that your seed bed is kind of the best environment you can get for your hands. Whether that is some final tillage right before you plant or a burndown herbicide. If that is something that you use just to make sure that you take care of all of those weeds that are early established, which then leads into the issue of weed management. So there are no chemical control options for him right now there are no registered herbicides for use in hemp in the United States. So without that option, you have your seedbed preparation, and then you also have mechanical cultivation. But there are also some challenges with that, because hemp is planted at a relatively shallow planting depth of about a half inch. And so when you're doing mechanical cultivation, you have to be careful that you're not being too rough and actually uprooting. So the top picture here is after one pass of a time leader, and this is at the recommended growth stage of about two true leaves on the hemp, and the hemp itself was almost completely uprooted. But as you can see, in the bottom picture, that grass seedling is actually still fully intact and not damaged. So if there was a rain right after this, it would have the chance to kind of reroute and continue growing. Another issue with mechanical cultivation is that you are kind of limited depending on what row spacing you're using. Here, just a few pictures. Looking at the picture on the left here is a plot that was in the middle of pollination, it should have been thriving, and this plot was almost completely overtaken by weeds. That was a no till system. So we didn't have the opportunity to really give the hams a good start. But even with tillage, or mechanical cultivation through these last few pictures, we can see that between those rows, we still did

11:43

occur.

11:46

Lastly, we have the weather challenges, which is something we face when trying to grow anything. But we saw very different growing conditions between last year and this year. So with precipitation, if you have a lot of excess water, like we did last year where it was really hot and humid and wet, we did see a lot of disease, there was a lot of mold going into harvest which can affect your yield. And this year, we saw the flip side of that where drought or the lack of rain can lead to plants drying out and we did see some drought damage in our fields this year. Another thing to keep in mind is that hemp is very photo period sensitive, which means that it flowers just depending on the daylight. So we saw flowering shortly after the summer solstice or the end of June in 2019. And in 2020, we actually saw right before the summer solstice. So late planting could result in lower yields just due to the length of the growing season. I'm going to quickly go through this trial or agronomic trial, which I introduced in the video where we have two different varieties, three different planting densities, and then three different nitrogen rates. We have this at two different locations for both 2019 and 2020. In 2019, we planted are in the first few weeks of June, and then we harvested the first few weeks of September. In 2020, we were able to get planted about two weeks before that at the end of May. And that earlier planting date translated into an earlier harvest date. But even though it was kind of planted earlier and harvested earlier, we still ended up with about the same length of growing season between about 90 and 100 days. Some general observations is that the plants grow and flower really quickly. So in 2019, we actually saw that between the end of June and early July, the average pot height doubled on a week to week basis. And then again, with the flowering around the time of the summer solstice. This is just a quick timeline photo here from 2019, where we can see you looking at June 17 date, and then going into July 8, just that difference between a few weeks. I'm working go from just being a few inches to well over waist high. So every time you go out and look at these fields, these plants, it looks very different. These are a few photos from leading up to harvest last year. Something to keep in mind is that as pollination ends and green development begins, the plants will start to lose their leaves. And that's just because it's kind of taking energy and putting it towards making sure that that green develop. Another thing to keep in mind is after pollination is gone, the male plants will die. Their job is done pollination has occurred so they will die off. So if you go out into your fields and see that things are starting to yellow When those plants are dying, that is normal. I won't have any 2020 data for a few weeks yet, but we can look back at what we saw last year. And kind of the main thing to take away is that we're not necessarily seeing an increase in yield, when we move from 60 to 120 pounds per acre. When we look at grain yield for Arlington, we did see that there were some interactions between seeding rates and nitrogen rate. But if you look at the green bars, which are the center bar and each, we don't see that as we move, we clearly see that there's a benefit to adding nitrogen. But we're not seeing that difference between the 60 and 120 pound rate. If we look at Chippewa Falls, we see that same trend. And then if we break it down into varieties, this is the only time that we saw the X 39 variety, doing better than the CRS one. So look at five reels, we see the same story where between the varieties, it's just the CRS one varieties doing better. But when we look at the nitrogen rate, we're not seeing that advantage of increasing weight. For the variety trial, we expected going into this that we would see a lot of variation in our yield data. And this is because these varieties are coming from all over the world. So we're looking to see what varieties might be viable adoptions here in in Wisconsin.

So that's why we see a lot of differences in where you're at. This was an example of the green yellow book last year between our two locations.

16:40
We did replicate the study again about each of the varieties are the same. So it will be interesting to see how they fared across the two different environments. Lastly, I will touch on THC testing. Something to keep in mind is that we're not necessarily concerned with THC levels. In green and five varieties, they're not naturally producing a lot of THC or CBD. So looking back at last year, we hardly saw any THC. And what we did see was that we had a few plots in our variety trial that did produce them. But if we look at our point 3% limit here, we're still well under that. So it's not as much of a concern, when you're growing a variety where it's mainly for grain and fiber, you still definitely have to get tested and be compliant. But those results shouldn't be too happy. With that, to summarize, we're really hoping that all of this data can go forward and help growers as they move into this venture of growing hemp. But one thing to keep in mind is that there is a lot of challenges. We haven't figured everything out yet. So if you're going to do this, need to make sure you have a good plan. And we're putting all of the information that we have up on our hemp website. And that is the Extension website is the best place to find all that info. Project wouldn't have happened without a lot of help from a lot of different people. Namely, our funding, which was through the UW have capacity fund and a private donation by Mr. Timmerman was that that was a very quick overview. But I think we still have some time for questions for both myself and Jerry.

18:23
Actually, I think you have

18:26
Thank you, Haley, for your presentation. I do have one question so far that did come across the chat. It's asking how will cross pollination be controlled or outward, for example, I want to grow for CBD and my neighbor wants to grow for grain and fiber, including males that potentially could potentially ruin my CBD crop.

18:58
Yeah, so that is a concern. And there's not really a good way you can't control pollination. So that's like communication is really important. Make sure that if you are going to be growing hemp for CBD, if you talk to your neighbors, you know, they want to broker grain and fiber, making sure that there is a good amount of distance between those. There are some studies out there and how far the pollen can travel. We're not necessarily looking at that. But that's communication, making sure that you're open and honest about what you're growing and have that kind of the best way to go about that.

19:39
Thank you, Haley. Have you next question is have you seen any impacts of applying more than sufficient nitrogen on your plots?

19:50

So our study is a little bit limited with only the three rates nothing and then the 60 and 120 pounds. There's a lot of anecdotal things that we hear from growers about applying a lot more nitrogen, but I can't speak specifically to applying more than you need. Because it's not necessarily a part of our study. Sorry, we don't have all the answers yet.

20:23
What is the form of nitrogen?

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We use urea.

20:28
Because we knew exactly what we were putting on.

20:33
So we did that at planting.

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Another question that has come through that they noticed in the up that fiber hand pollinated much earlier when there was no sign of flower on the CBD hemp? Did you look at that effect in your study at all.

21:00
So, like I said, we saw flowering around the summer solstice, both years it lasted through about the end of July. I think Shelby might touch on when they were seeing flowering in their CBD plus, but I do believe it is a little bit later. So that can happen, where you know, we know that their hemp for grain and fiber is going to start pollinating at a certain time. And that's more of a Yeah, I don't know the exact specifics on when Shelby start to flower, but I do believe it is well after. That's not to say that that's a sure way to make sure that you don't have the cross pollination. But depending on where you are, that could happen.

21:45
Okay,

21:46
thank you, Haley. And Shelby is adding in the chat box that it's about six weeks later on average for the pollinating. And so with that, to keep moving along, there are a few more questions that are popping in but I'm going to save those for later in our in our presentation today. And so with that, thank you, Haley. And thank you, Jerry. And we are next going to move in to our economic update with him. And that is going to be presented to us today by Dr. Shahir Burnie, and they're not able to be with us today, but we have the video recorded presentation so we can move into our economic update.

22:50

Hi, folks, I'm a professor in the Department of Agricultural Economics at the University of Wisconsin River Falls. Today I'll be talking about the economics of industrial hemp. I will start by talking about what hemp looks like on the national stages. So we'll start with some national trends. And then bill will drill down drill down to some specifics regarding Wisconsin, also talk about federal regulations, changes that have occurred over the past year and I'll end with talking a little briefly about what we at leadership Wisconsin are doing.

23:24
Okay, let's start with national trends.

23:30
and let's start with the 2019 season. So the size of the CBD market in the US in 2019 was estimated at about $4 billion. There's a few estimates out there $4 billion, about reasonable and it's growing rapidly over time. What's going to happen next, who knows. What we also saw in 2019, was a downward trend in CBD hemp prices about midway through 2019 in July, hemp biomass hidden in a max at a high of $40 per pound. And prices have been falling since then. So as of January 2020, the prices were about $10 per pound, it's about a 75% decline in CBD home prices. What has driven this trend? Well, you know, basically its excess of supply over demand. In 2019, we saw a large influx of hemp growers throughout the nation. And that led to led to a large increase in supply and demand however, has started to taper off. So panics change that this pen exchange is the organization that puts together the price index that's followed in the industry. They did this study where they estimated that to cater to the entire CBD market in the US we would need about 20,000 acres worth of production in 2019 Well, the harvested acres were actually 115,000 acres. So huge, huge divide between demand and supply here. And whenever you see a situation like this such a big excess of supply or demand it's bound to put downward pressure on prices. So as of January 2020, was $10 per pound, and we expect that this trend will continue. In 2020, hemp production was projected to decrease for the first time since 2014. Recall 2014 is the year that hemp was legalized as part of the 2014 Farm Bill it allowed to be grown for experimental purposes by the state for my states, but ever since 2014, hemp production has been on an annual basis increasing pretty consistently. But 2020 is the first year we'll see projected to see a decline. Licensed hemp acreage is expected to fall by 9% to 32%. That's a range of pretty wide range of estimates, because comes from multiple sources. So depending on what source you're looking at, they'll get 9% or 32%. However, the takeaway is the same that we can expect to see a significant decline in licensed hemp acreage. And remember licensed tend to have acreage doesn't mean harvested acreage, so heartless that acreage is going to be of course even more than that. So even though the acreage is falling, the license acreage has fallen, the number of licensed cores has actually increased in the nation by 27%. Part of it is driven by the fact that other states that had not been producing before are have legalized hemp as well. So large states such as Texas and Florida are going to have their first growing season in 2020. As a result of that we see we're going to see more about 27% increase in the number of people going home.

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Also note that many doors have also affected the industry.

26:56

That means that the number of incomers, the market entrance have to exceed 27% to compensate for the people who are leaving the industry as well. So that's sort of what it looks like for the output looks like but this year, this is a map that shows total license acreage for 2020. by state. These dark orange states, these are the big players in the market. So California, Arizona, Colorado, Tennessee, Kentucky, these are the states that have more than 30,000 licensed acres. So view of the large player players the lighter shade of orange there that's 10,000 to 30,000 acres. And Wisconsin know that Wisconsin falls in that region, Wisconsin, Illinois, Missouri, Michigan, the lighter shade of green, that's 1000 to 10,000 license acres, that's Minnesota right there. And then the dark green ones are less than 1000 acres. So these are the very small hemp programs here. So let's talk about some data for Wisconsin this this chart comes from the Wisconsin dad cap, Department of Ag create consumer protection, a lot to unpack here, if you look at the bottom of the graph. This is three years worth of data 2018 2019 and 2020. The dark green bars represent him doors of the light green bars represent have processors, the under each year you have the number of licensed growers and processors and the number of growers and processors that were licensed and registered. So if you look at the licensed and registered goes and processors see about 180 and 78 in 2018, very small number, and then a large, huge exponential rise in 2019. As a lot of new people and new farmers entered the industry so increased about 1251 and 560. And, you know, if you follow this trend, we would expect to see a larger increase in 20. In the year 2020. We expect to see these license licenses registration handed out both Scott and Kevin increase in 2020. However, we actually see a slight decline. So in 2020, the number of drawers that were licensed and registered is about 1224. And for processors, it was about 585. So processors were slightly higher drawers were slightly lower. Nonetheless, the point here is that it did an increase. for all intensive purposes, we can say that it was relatively stable between the two years. So here's another evidence that the number of people growing hemp is actually starting to decline, or at least increase at a decreasing rate. This map I put together by looking data from the Wisconsin cap as well. This is plant hemp acres by county in Wisconsin. So here's one of the scores home They plan to grow. And as you can see around them, The Rock County and Dane County area that's where the majority of hemp production is going on. Rock County is the largest one, I think there's for over 1400 acres. For Rock County game counties the next big one. And then there's surrounding counties are similar. So that's where a lot of the hemp production is concentrated in other parts of the state, especially the northern parts and closer to the Twin Cities, not as much federal regulations. I'll start by talking about what didn't change. So it is still illegal. As far as the FDA is concerned to market CBD as an additive to food or animal feed or as a dietary supplement that is still not FDA has still not allowed that. And FDA still has not allowed CBD to be used for medical purposes with one notable exception which is epilepsy treatment. That's the only thing that the FDA has approved there are no other FDA approved drug products containing CBD to date. Let's talk about what did change. Profit insurance is now available for hemp farms as of the 2020 growing season, hemp farmers are qualified to purchase crop insurance. Multiple policies are available for them purchase one is a multi federal crop insurance. This is insurance that provides coverage against the loss of yield for CBD green and fiber hemp. So all three types of hemp. The second one is an APA stands for non insured Disaster Assistance Program, which provides losses against adverse losses incurred by farmers due to adverse weather may lead to lower yields to strike crops and prevented planting. And this one is also available for all three types of hemp CBD grant and fiber.

31:55

And the last one here is a whole farm revenue protection. This is not crop specific. This covers your whole farm in the income of the whole farm. It provides coverage for loss of coverage against loss of total farm income. So all three of these policies of these insurance types are available for hemp farmers now and which was not available in the past. And another thing that's available in the 2020 growing season FSA farm loans, so hemp farmers can are now eligible for FSA farm loans of all types, operating ownership beginning farmer and farm storage facility loans. All of these loans can be

32:35
taken by him for

32:38
Okay, so what are the interests of Wisconsin economist up dude, myself included, the US of the Wisconsin River Falls and University of Wisconsin Madison in 29 2019. Actually, earlier this year in January, we released this study with it conducted in 2019, of the hemp industry in Wisconsin. And the idea was to collect data on the first growing season which is 2018. And figure out, just get a feel of how growers are doing what are the challenges they're facing. What are some estimates for cost of production yields and market price and things like that. So that was the goal of this study. What we saw is there was a lot of uncertainty in the first growing season that is not surprising at all. And we expect that to equilibrate over time. If you want to take a look at the full study, this is actually a hyperlink. So if you have access to this PowerPoint, if you just click on that 2019 Wisconsin comm marketing study, it's going to take you to the full study. Otherwise, at the bottom of the screen, you'll see the full link for the marketing study, you can use that as well. Here's an example of the type of information I've included in there. So one of the tables is on yields the estimated yields for different types of hemp, CBD floral is CBD CBD hemp grown from smokeable flower, and then biomass, secret and fiber, large variation in yields. And then here's another table. This is for prices. Of course Flora smokeable flower gardeners, the biggest premium, so the highest prices of hemp biggest has a higher CBD count.

34:22
Hi folks, I'm sure you're burning.

34:31
Alright, so that was the on some occasion that Dr. Sheree sent and he's not available to be here but we can put his contact information up at the end if you do have more questions.

34:49
Otherwise

34:53
some of these questions that you could have from this may get answered as we go further into our prisentations today. Um, so now that we've gone through the update on

35:07
So Dan, can you hear me? Actually, I think there's still a few minutes on that video. Can you try to go to the last few minutes? Because I believe that, um,

35:19
I think it ended somehow with the last few minutes. Oh,

35:31
I thought that because there's a 2020 study that I know that he wanted to put in a plug in for. So I want to see.

35:41
Sorry, everyone for the technical difficulties,

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as I talked about,

35:53
we will see if we can

35:59
get it to pop here.

36:01
Yeah, just sorry, maybe it cut off. But

36:06
oh, here is it is here, I think so, maybe right around 15 play

36:17
you directly if you want to do that, and just send me an email. And my contact information is on the next slide. So just get in touch. And I can send it to you. So that's all I have. If you have questions and comments, feel free to get in touch with me.

36:38
So if you'd like to be part of this

36:46
great producers and livestock

36:52
product. Matching compass is a set of spreadsheets that growers can use, and to input their own data in there. And it's going to spit out grower specific information specific to the growers farm. And the type of information is there's a whole detailed whole gamut of information and puts out such as a cost of production estimates such as profitability measures by different types of market channels, organic versus non organic things like that. And so a lot of other good variables for financial matter management purposes, that's the veggie compass project exists currently for vegetable growers, green

garden, grain producers and livestock, we're gonna, we're developing the same thing for him that that's the idea here. So this will be a tool that hemp growers can use to input their color information and

37:45
use the metrics for financial management of the hemp farm.

37:49
So we're going to be conducting focus groups in late fall, we would love to have as much participation from hemp growers in the state as possible, the bigger group II have, the more accurate our our estimates are going to be. So if you'd like to be part of this project, like if you'd like to participate in these focus groups, please get in touch with me, we'd love to have our list. And early next year, sometime mid to late January, we're going to start distributing a wide scale survey as well, which will help us construct these tools here. So if you're a ham door in Wisconsin, you're very likely going to receive one and I, I request that you make it a point to fill that out. If you'd like I can send it to you directly if you want to do that and just send me an email. And my contact information is on the next slide. So just get in touch. And I can I can send it to you. So that's all I have. If you have questions and comments, feel free to get in touch with me. Here's my email address or here's Bernie at UW rf.edu. But the bottom there is my phone number as well for my office line. So you can call me if you'd like. Once again, I'm in the Department of Agricultural Economics of the University Wisconsin River Falls. And that's all I had. Yeah, if you have questions, comments, please don't hesitate to get in touch. Otherwise, that's it for me. Thank you for listening.

39:16
All right, I apologize for that minor technical glitch there. And Shelby for those of you following on zoom, Shelby did put the link to the study into the chat box. And we do have some more questions that are coming in. But like I said, we will get to those a little bit later. There are a couple questions regarding if we will be sending out this recording or if it will be on YouTube to view at a later time. And the answer is yes to both of those. It may take us a little bit to final. Make sure our closed captioning and everything is updated but for those that registered we will have this available At a later time for you. So with that, we are going to move into our next segment of our meeting today and presentations with the update on the essential oil research. So Shelby, I will hand it over to you.

40:24
Okay, thank you, um, if we want to so Hello, everybody. I will play my video to a person but, um, so we'll play this video quickly. Hi, I'm Shelby. I'm talking Assistant Professor in the Department of horticulture at UW Madison. And as you can see, today, I'm out in our hemp cultivars trial. So there are several different cultivar trials that are happening this summer in 2020. This one is particularly dealing with essential oil production, or what you might be more familiar with is CBD cannabidiol, or CBD production. These are some of the most common cannabinoids that are extracted from hemp. So a little refresher of where those compounds come from. So all the plants that are in this field are female. hemp is a dioecious crop, they're both males and females. For cannabinoid production, the oil is extracted from a pollinated female plant. So all the plants here are females, we're just getting into flowering and that's the part of the plant that will be extracted. So a little background about this trial. There are three main components of the trial. I'm growing, and I should mention this The purpose of this variety trial is

really to understand what cultivars perform well in Wisconsin so we can make better recommendations to Wisconsin producers. So we are looking at 42 different cultivars in this trial in three main categories, auto-flowering types, there are four cultivars, and these are varieties that do not depend on day length. So they typically will flower after about 45 days or 60 days and be finished by 75 - 85 days. So these are far into flowering right now and there'll be harvested soon. We also have this photo period sensitive trial around me, this is the seedling trial. These were grown from seed I planted in the greenhouse in mid May. And then they were then transplanted into this field about a month later. So we have 24 different cultivars grown from seed in this trial. So these are going to be dependent on photo period for when they start flowering. So you can see maybe there's a little bit of variation. So some have been flowering for about two weeks, while some have been flowering for about four weeks, and some haven't even started flowering. And that's really going to be dependent on the amount the ratio of daylength that they're getting. So sun versus darkness. And they really will start flowering when you're getting less than 14 hours of sunlight in the day. So we'll see that flowering period happen all the way into mid September when these will start blooming. So besides the seedling trial beyond me is the clone production. So as I mentioned, all these are females, if you have clonal production, you're going to see a lot more uniformity within your clones. They're typically taken from a female plant that's growing vegetatively a clone is cut and propagated and then I then planted those about a month after I received those cuttings at the end of June. And, again, much more uniformity in the clone, they're genetically identical. However, there are some benefits to growing seedlings over clones such as the seedlings have a much stronger taproot system and can really anchor the plant in for strong wind events or for accessing water. So, but you'll see more genetic variability in the seedlings. So what I'm This is the summer of COVID. So we were actually limited and what we're able to grow and do this summer. So I am working on this trial in collaboration with Michigan State University. Extension up with in Chadha, Michigan with James Decker. He's growing the same cultivars that are in this trial, and also working with Michael fields egg Institute in East Troy, Wisconsin. So we have three different locations growing the same cultivars taking the same traits. So some of those traits include, as I'd mentioned earlier, the flowering time is an important trait. We're also scouting for various pest insects and disease pressure are they preferentially attracted to certain cultivars over others, things like plant height and architecture for understanding what's going to fit under different cultivation systems. And then once we get into the flowering, what most producers are interested in is how much of that cannabinoid concentration is in the plant. So once they start flowering, we'll sample at three weeks, five weeks and seven weeks post flowering and get a gauge on the CBD THC. And if there's any CBG in these cultivars and kind of understand that trend, to see when we can make recommendations of when farmers are going to want to harvest before the crops become too hot or have too much THC concentration.

45:18

And then finally, at the end of the season, after we take that last cannabinoid analysis, we'll chop these plants down at the base, and then in the field, you know, they'll come out about 60% moisture, we need to dry them down to about 10% moisture, and then the floral material will be bucked off. So you'll kind of strip off the flowers and then that dried flower material will be weighed to calculate a total yield on the particular cultivar based on the cannabinoid content at harvest, and the total dry biomass weight. So all the data from this trial will be available on our UW Extension hemp website as well as the other locations. I should mention, this is part of another joint effort that we have going another joint effort with the across the Midwest, we have four different institutions that are working on creating a Midwestern

hemp database. So Phil, Birdie and extension agent at the University of Illinois, kind of thought up this database where he wanted producers to be able to join a program to get to, you know, feed the program information about their experience with various cultivars and their farming practices. So what's their row spacing? What irrigation? Are they using? What nutrients? What varieties are they growing, and then this is in collaboration with rock river laboratory, where they'll be sending all of their samples for hemp potency analysis to get that cannabinoid content. And this will go into a public database where people will be able to look at a given variety, look at all the locations it was grown under what production systems to feel, figure out what works best for them. So we also at UW Madison, are participating in that. And the results from this trial are being integrated into that database, as well as Michigan State Extension with James Decker. And with Marguerite Bolt at Purdue University. So collectively, we have about 400 farmers that are in that trial, or in that database that will be contributing information. So definitely check out the Midwestern hemp database, that's going to be there's going to be links at all four of our institutions to that resource. So that's that.

47:44

All right, so I'm going to try here to take over um, it says that I'm controlling the screen looks like, Am I doing this? I think so. Okay, well, Hi, everybody. Welcome to our virtual hemp field days. So I'm going to give an update as that video was taken about three or four weeks ago. So we have a little bit of preliminary data coming out of that trial, and then I'd be happy to take any questions. So just an update on some of the cannabinoid or essential oil research that we are doing at UW Um, so just to reiterate, so this variety trial or field trials, focusing on CBD and CBG cultivars, in collaboration with Michael fields and Michigan State University, we actually have 44 different cultivars in this trial, with four different auto flower types, which were direct seeded at a spacing of one plant per foot. 26 transplanted seedlings that were started in the greenhouse on May 12, transplanted on June 15, and 14 transplanted clones that were transplanted on June 23. For our trial at the Arlington Research Station as part of UW Madison, we used a four foot spacing within row and a nine foot spacing between row which is very, very wide, but we wanted the ability to get a tractor through to do some cultivation later in the season for weed management. You can see that I also used four foot wide black plastic so we use plastic culture that was just based on experience from last year to help with weed control and especially in our very, very limited employee summer help this summer because of COVID and social distancing. I taking all the help I could get with weed control. Um, no other inputs. We did soil tests later, we tested the plants for nutrient deficiencies and everything was a Ok, so there were no other additional inputs into this field. And then I'll be presenting some of the data that we collected from this from this trial, sorry, I'm seeing things pop up on my screen. So a little bit here, I'm just looking at the growth progression of these plants over the summer. So remember, they went in, in the middle of June. So kind of the first two, three weeks didn't see much growth. And then starting about mid July to about mid August, on average, plants were growing six inches to a foot a week. So tremendous growth. It was a good year, we got just the right amount of rain at the right time up until about three weeks ago, and I'll talk about that soon. So very good growth and just a snapshot of what that looks like. Um, so here, just focusing on the seedlings. So the seedlings, I think, thrived on this year in our growing environments. So they those were plants that we direct Be seated in the greenhouse transplanted A month later, they had a nice strong tap root system were able to get water when they needed to. So this is the distribution of the height of those in centimeters. So you can see a very nice normal distribution other than these little small kind of scraggly plants, a few of which were actually auto-flowers. So there was

quite a bit of uniform, there were quite a few cultivars that did have differences within the cultivars, including some of that auto-flowering traits popping out that explained some of those really small plants. So this is the average height on September 5, it was right around 136 centimeters, or four and a half feet. But you can see a very nice normal distribution of plant height there. Um, so what were some of the pests that we observed a lot of the same, same things that I saw last year, but in different frequencies, which was interesting. So I'm early on in the season early July saw a lot of corn borer coming in. Of course, the hemp four, which is probably the most common insect pest or the most detrimental insect pest.

52:07
We saw some of

52:08
that not quite as much as last year, I mentioned that we had that really large spacing for weed control with nine feet. So we took this rototiller through just one pass this year, weeds weren't so much of an issue, but we had a really nice low seed bank in our field when we selected that location. So luckily didn't have to deal with weeds. Um, interestingly, those cultivars that did have auto flower, either the auto flowering cultivars or some of the full season varieties that we're segregating for auto flowers, that um, because of that type bud structure in the inflorescence we saw a lot of bud rot or the treatise and now as all the other plants are starting to flower, we're starting to see some of that but it was much more noticeable in those really early season. I'm calling cultivars. Down on the left here we see downy mildew so about three weeks ago in Arlington it started raining and it didn't stop for about two weeks I think we got at least four inches, huge wind events, lots and lots of rain so we got a lot of downy mildew putting pressure on a lot of lodging of the plants tipping over completely breaking this was more apparent in the clones than in the seedling varieties. So I really think that that chakra system is doing something to anchor those plants and make them stronger, a lot of leaf spot or leaf septoria also coming in after those late rains. And I saw a question in the chat box. So out of my whole field which was about 1000 plants that we have in the trial. I have one plant that was Moni shoes that had both male and female flowers. So I asked for feminized seed or for clones and the company's delivered So good job had so very happy to not have to deal with too much extraneous pollen. Um, so a report I

54:05
just trying to advance to the next slide, but it's

54:10
taking its sweet time here.

54:21
Look, no went too far. Okay, so I did reach out to PJ leash at the UW Madison insect diagnostic lab to kind of get a report on what people were having problems with across the state for insects. He said that the most common insect reported again was that Eurasian hemp borer for also some spider mite issues that's going to be happening more where there's a drier environment. We did have a stretch of mid July to mid August that was a little bit dry across the state. So more prevalent there Japanese beetles. I have seen a lot of Japanese beetles but they don't seem to do that much harm which is good timing.

plant bug and cannabis aphids which if you have a large population of Lady beetles will do a good job at fighting against those cannabis aphids. Talking to Brian Huddleson at the plant diagnostics clinic. Um the two primary diseases right now fully are diseases are downy mildew and that yellow leaf spot or septoria. Again, that's coming on when you get a lot of late season rains and you have compact your plants are very tightly packed in together I imagined the Titus will start picking up now as we get closer to harvest and the bud structure is getting tighter as well. There is this insect and mite pest guide here that Russ groves Bryan Jensen and PJ leash put out last spring or this previous spring that talks about some of the common insects observed in in Wisconsin, so you can check that link out or just look up insect and mite pests and field grown hunts in Wisconsin To find out more and it talks a little bit about cultural control. But as most of you on the call are familiar, there are still very limited resources for synthetic pesticide or herbicides. So some mostly cultural practices for managing both insects and, and pathogens in the field or what people are using currently. Man Um, so a little bit more data from that. So for my trial with these 44 different cultivars, I saw again, a very nice normal distribution across flowering time, I'm

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with

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sorry, when I get a comment in flux. Um, so the first flowers, those auto-flowering varieties were at 50% flowering. So lemon of the of those plants that were in the field, at least 50% were starting to show flowering, starting as soon as July 20. Again, that's still about a month after some of the fiber and green crops start flowering. So there is a temporal difference in flowering between the CBD and grain and fiber varieties. However, since they do both have these normal distributions, you will get a little overlap, we saw that the average amount of the average of the trial was flowering the week of august 10. And I actually still had some plants that just reached that 50% mark at the end of August. So it will be interesting to see if those plants can finish before we get our first hard freeze in Arlington, which will happen about mid October. So very, very preliminary data on the cannabinoids, this is what everyone wants to see. But I must urge that this is very, very early on. So again, for the cannabinoids, I was really interested in the trend across all these cultivars. So after they reach that 50% flowering, oh,

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that change.

58:04

58:19
Okay.

So preliminary data on the cannabinoids. taking samples at three weeks, five weeks and seven weeks after flowering. So only a few, we only have five of our 44 cultivars that have been harvested at this point. And those are mostly the auto flower types. So if you look at the total CBD here, you see that they're all hovering around 5%, one of those has zero and that's because it was a CBG variety. So then if you look at the Power Point, you see total CVG a little bit over 6%. Um, so that trend is going to I

imagine increase a lot with the full season maturity. But we do see a slow progression. I'm looking at total THC, which everyone's interested that even at the first even looking after three weeks of flowering, we already see one sample that is over the THC threshold. And I imagine as we get to week seven, we're going to have quite a few of those. What that might end up being is that this week five is going to be kind of that sweet spot for harvesting while staying compliant for THC. And then the CBD THC ratio, which I think is really important. It's kind of common knowledge that Right now the best varieties or cultivars available right now are 32 one, which is that once you get 2.3%, THC and 10% CBD, that's about the best combination of those two compounds that you're able to find. And what we see here is the majority of our cultivars between maybe 20, and 30, for that ratio, um, with some of these really, really early flowering varieties that we have not coming close to that 30 to one ratio. So that's really where we're going to be pushing the envelope is trying to break that 30 to one barrier for the CBD to THC ratio, which will allow people to have more than 10% CBD without while remaining compliant. So this is very preliminary. As I said, we're just starting to reach the seventh week. And we'll be sharing all these results with you at the end of the season. So, just a few other things that we're working on. So we are also part of the F 24 essential oil trial, which is a multi state collaboration. I think that there's over 10 different states that are participating in this trial, our location is up in Buffalo County. And we have Carl Duley on the call who is running this trial, and he's he'll be available after my presentation to comment more on it or if you have specific questions. This is looking at six cultivars to auto flowering and for photo period sensitive. This was direct seeded so different than my trial, which was transplanted on direct seeded and has a much less, a much more dense planting density. So the autos are one plant every foot and the photo period sensitive at every foot and a half. Um, so you can see an aerial view there, we had addressed some drone footage, you see that tighter path planting dusty and there's a whole suite of traits that are being collected really interesting because we'll be able to compare this across different states with the different climates and latitudes and really compare how these varieties are doing across the country. So please ask Carl, any questions that you have about that trial. Going up on Sunday to harvest the auto flowers can't wait. Um, one other thing that I'm very passionate about, I think it's really interesting. I mentioned in the introduction to this whole field day that we grew a lot of hemp in the 1930s and 40s. And remaining from that hemp that was grown is what are these feral hen populations. They've been thriving in our climate for the past 70 years kind of, without any human intervention, so are really nicely acclimated to our region. This is this picture was taken earlier this week, I'm currently scouting all those guns and landscape for feral ham populations, you can see these plants must be at least 12 at least 14 feet tall because they're not even cut at the bottom. If you have any feral ham populations, let me know this will also help to populate the new US hemp seed bank, which will be going in Geneva, New York, which is a really important resource that we do not have as hemp researchers or breeders or hemp stakeholders right now. So trying to repopulate that with germ plasm is really important. Um, some other things that were involved with the Wisconsin crop Innovation Center, which is part Oh, no.

1:03:33

Though something called Innovation Center, which is part of UW Madison. Um, so they're a biotechnology and genomics facility. And they actually have succeeded in genetic engineering hemp, which they believe might be the first time crop to be genetically engineered in the world. And they received funding from the work accelerator grant to look at engineering trace through genetic engineering and gene editing, including zero percent THC lines, high CBG, and high CBD lines,

increased flour and trichome density as well as traits like roundup resistance and disease resistance. So they're currently doing that in a kind of experimental capacity. They also have an HPLC designated for high potency analysis, which we use for a lot of our trialing. And they're contracting and can contract with external companies that are interested in looking at specific traits. So here you can see a picture of that edited, hemp plant so this was what the test dream that would make that plant glow red under a certain light. So plants that had a successful genetic transformation show that trade underlay versus those that were not successfully transformed. So pretty interesting. Um, just a few other research projects to touch on. I conducted a national hemp research needs survey in early end of 2019 early 2022 What year is it? To identify have research and education priorities and this was presented at the National hemp research conference this summer, over 1500 people responded to that survey, and I'm currently writing the publication that should be published this fall. But it was really getting at ideas of what should we should be focusing on our research efforts and forming collaborations that will be fruitful for the hemp industry. I also have a in collaboration with Dylan Bruce in West organics, we're working on an organic fertility trial looking at different organic fertilizer treatments to determine how they affect biomass and cannabinoid content. So at the bottom of the screen here, this is just

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kind of looking at different

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common organic fertility regimes, and seeing how increased particularly amounts of nitrogen contribute to that biomass yield. And indeed, we see that as we increase the amount of enter treatment, we get a higher biomass. But interestingly, the cannabinoid data, we don't see a statistical difference in the amount of cannabinoid content with increased nitrogen. So this is a one year from 2019. We're repeating it in 2020. So we'll have those results later this year. I'm also collaborating with the Lac Courte Oreilles Community College on a companion cropping study, which we're very excited about, which will look at the effect of companion cropping on yield pest management, and income or revenue on a per acreage basis. And the Midwestern hemp database, I touched about this in the video, and Philip will be presenting on that in his regional update. So, um, so many people to acknowledge this is the labor of many, many people. And I first like to thank Shonai, Daniela, Liam and Dan for this summer helping me in the field. It's been challenging under COVID. And they have helped a tremendous amount. So thank you. Lots of collaborators across the Midwest, the different extension agents and educators in different institutions such as, like the fields in West Madison and rock river that have played a big role in making these projects, successful, successful funding from University Wisconsin high capacity funds, and a very special donation from Tim Erdman that made this really this research kickoff at the UW Wisconsin, UW Madison. In 2019, you're first starting and then finally, all of the provide the seed companies that provided seed for these trials, I really appreciate because, um, you know, they wouldn't have happened without the donation. And then I think now we're gonna open it up for questions. And this will be specific to kind of what I talked about and relating to essential oil research at UW.

1:07:51
Thank you, Shelby. Um,

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we do have a couple minutes here for for a couple of questions. And you may have touched on a couple of these already. But one of the questions was, how is CBD or CBG extracted from the flowers?

1:08:14
Yeah, um, so there's a few different extraction techniques. But typically, they're done either using a solvent such as ethanol, or people the common or ethanol or carbon dioxide, supercritical carbon dioxide. And so that's pretty much where you're going to soak it in these different solvents and it will extract those cannabinoids. And then depending on downstream processes, you either extract kind of what is a crude extract that will have all of the cannabinoids as well as things like terpenes or different liquids that are in that plant, or you can go through further steps of refinement distillation that will isolate the comments and make them the compounds and make them more pure, but ethanol and CO2 extraction are probably the most commonly used extraction methods right now.

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The next question is regarding the 10% moisture content, would you recommend to still put dry packs into storage bags to prevent mold during the storage time?

1:09:20
Well, it really I mean 10% is even kind of pushing at 10 to 15 I think is fine. It really depends on your final market. If it is for biomass and you have a large quantity of biomass, you really are going to want to just do what you can if you're if you're trying for a cured or smokeable flower market where you're trying to get a higher price point. Then you want to take your time dry slowly here it where you're going to pay more special attention to the drying process, in which case you definitely want to control them moisture level, but I truly think that it's kind of garbage in, garbage out situation. So remove any source of potential candidate contamination during the drying process. If you start to see detritus in your plants, you want to get rid of that it will set the rest of the batch

1:10:13
in the wrong direction.

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The next question for you, it says in March, there was a webinar about novel CBD production where they talked about using seed from for CBD project production, instead of feminized seed only Is that something you are looking at UW are doing any trials with that method?

1:10:40
Yes, and actually, um, that company I saw was on the call that had that seminar and newest genetics day. So we're actually in our grain and fiber trial, we have that variety growing. So we're testing it Hailey's testing it, I didn't want the pollen by my CBD trial, but it is being tested in our grain and fiber trial. So we will be able to compare the results with that. And that's certainly something that's of interest for larger scale production, it's going to be much easier to be able to not have to be concerned with males and mechanically harvest that material, as well as have a secondary crop of grain production.

1:11:23
Thank you. I'll do one more quick question. And then we will keep moving on. And we'll get to the rest of the questions at the end. I just want to stay on track here today. So the next question, is there any research on grafting with hemp? Like better root system or uniform growth?

1:11:44
Yeah, um, so first of all, I'll try to answer questions in the chat too. And I'm sorry, to not be able to get through all of them right now. But I'm very interesting with the grafting question. I actually started to try to do some handcrafting, early in the spring, and it was right before COVID happened. So I had some root stocks. And I was trying to do that. Um, I think it's really interesting, especially because a lot of hemp is clonally propagated. So it's kind of ripe for the taking to do some graphic experiments. Um, so I'm very interested in that I had mentioned, I just started on it. I'm not sure if there's other people looking at it. But I do think that it will be an area of research, the question will just be whether clonal propagation continues to be common. If we move more to a C based system, then that route stop, or clonal propagation might not be as useful. But certainly, if you you've grabbed on to a nice hearty root system, you might be able to grow some monster plants, or change the flowering time and all kinds of interesting things. This is my research brain going. Let's do it.

1:13:01
Thank you, Shelby.

1:13:02
So

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our next segment, we are going to get a Midwestern regional Hemp update. But before we do that, we do have a quick poll, for those of you that are over zoom for our demographic data that we do collect through UW, and for funding purposes. So if you are able, and willing to answer that would the poll, we're just going to take about 45 seconds to a minute. And then we will start in with our regional hub, Hamp updates, industrial hemp updates. And we will have each of the speakers go through their updates. And then we will do questions at the end after all of them have gone. And I will take those questions along with the other questions that we still have popping up in the chat box from Haley and Shelby. And I also know I do have some questions coming in over YouTube as well. And we will be getting to those and answering those live today. And once again, I'd like to thank everybody that is joining us for our UW Madison, division of extension, industrial hemp, virtual field day and update.

1:14:25
Yeah, we'll give it about another 40 seconds here, Ashley, and then we'll close the poll and move on to the video from Illinois.

1:14:38
Phillips online I believe I'm sorry, correct?

1:14:44

Yeah, getting my slides mixed up. Okay. We'll give it 30 seconds and we'll resume.

1:14:49
I am here but it's going to be a recorded video.

1:14:52
Oh, it is. Okay. Thank you, Bill.

1:14:59
And well, we're just Waiting and finishing up the poll, our first regional update and is going to be from the University of Illinois from Phil Albert and it is a video but he is on live to be able to answer questions once we get through all of the updates, and Phil is a Extension Educator through the University of Illinois.

1:15:30
Hello everybody. My name is Phil Albert and I'm a commercial agriculture educator with the University of Illinois Extension. Today I'm going to talk to you about the collective effort known as the Midwestern hemp database. topics to be covered quickly include a program overview, a database demonstration, some of the current observations that we have and resources which are available to you. This project builds upon the UW Madison THC CBD tool created by University of Wisconsin Extension Educator list University. This project is a collaboration between several land grant institutions, private laboratories and grower cooperators across the region. This includes the University of Illinois Extension University of Wisconsin Madison, Purdue University Extension and Michigan State University Extension. The laboratories include rock river laboratory and pride analytics and consulting as well as 140 grower cooperators across the four states. The goal of this project will be to provide insight into agronomic performance and cannabinoid development of industrial hemp varieties. This is of importance as many varieties are being grown across the region from different suppliers without having reliable data on their performance. In addition, as well as with the impending adoption of USDA rules, 2020 has become a very valuable year to gain information. In short, participation in this program provides an exciting opportunity to receive significantly discounted cannabinoid profiling in exchange for providing information regarding individual production systems, agronomic performance and cannabinoid development of specific hemp varieties. To participate in this study specific instructions regarding formal sampling and must be followed to ensure participation in the program, and integrity of the data that we collect. This information is being made public via a data sharing tool, that Midwestern hemp database, and any identifying information will be kept confidential and will not be shared via the public tool. With that, let's take a look at the database itself. So if you click on the link here, or just follow it go.illinois.edu slash database, and it will take you here, the database is quite large. So I typically like to zoom out just a little bit to really see the interactions with the tool itself.

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When you click on a link, it'll take you here, this is the database interface. If you scroll down slightly, you can see all sorts of graphs and figures containing all the information we have collected in the program. So far, the top portion of the database contains information on production practices, and systems including row spacing, previous crop irrigation system, etc. What you are looking at is all the

data that we have. However, if you wish to refine your search, you can by using these specific filters we have at the top of here. So for instance, let's say we only want to look at the state of Wisconsin. And we would only like to look at varieties from a specific company, let's say Oregon CBD just for an example. And what we can do is we can see all the information submitted from the growers on their particular production practice, what previous crop they use, soil type planting method etc. And all the graphs and figures will be updated to reflect the changes in those present parameters.

1:19:02

However, if you scroll down to the bottom of the of the database here, this is where the information really becomes valuable for us. So here are the results of the cannabinoid time study that we've taken. These results have been updated weekly, every Monday actually and will continue to be updated throughout the remainder of the season. As of September 14, we have about 260 samples that are into the database. And going through these briefly, we have the table containing the information from the cannabinoid analysis for each sample, you can see information on the source variety, sampling date, CBD THC CBG, you'll also notice a sample ID number. This will allow the same plants to be tracked over periods of a season of a grower sent in multiple samples. This table can be sorted any which way you want based off of a parameter of interest. Do you want to look at variety or sampling date etc. all this information is envisaged Utilizing several scatter plots and figures which we've created here, really just trying to visualize the information that we have available to you and make it a little easier. On the eyes, you can see we've taken a look at specific emphasis on THC and CBD but all the other cannabinoids will be added to the database in a bigger form. Moving forward, that you are even able to just kind of hover over these data points here to get specific information on sampling date, variety source of sampling ID and information on that particular parameter. Which then you can use that sample ID numbers, scroll back up to the table here and get specific information on the other cannabinoids if it's really of interest to you. Again, this information will be interactive and kind of brought together a little bit better moving forward. But this is just kind of where we're at right now. Just a few observations of things that we're noticing from the database itself that we're now nearing the middle of September, and harvest will be here before we know it for most of the full season varieties in the region. Now is a time to consider taking steps for harvest, whether that's notifying the appropriate regulatory agency or sending them samples through your state approved laboratories prior to harvest. As always be caught up on the rules and regulations for growing compliant hemp in your state as they are quite different from each other. There are some earlier flowering and auto flower varieties entered into the data database which have different planting and harvesting schedules and typical full season varieties. This may explain why some of the cannabinoid values are significantly greater or appear as potential outliers. Hovering over the data points will reveal variety and sampling information and which may provide some more clarity on that particular sample. This is mostly for our Illinois growers but be aware of the difference between Delta nine THC and total THC and how state and federal programs defined compliance. This is a subtle but important distinction and will have impacts on end product use potential for interstate commerce and utilization of certain distribution channels. The database is in the early stages and will contain data pertaining to final cannabinoid accumulation and agronomic performance later this fall. The database is a living document and will be altered as needs and interest change to better serve our stakeholders. If you have any questions or comments, please contact me at p l birdie@illinois.edu. or reach out to us on our website at go that illinois.edu slash help. That's all I

have for now. With that I'll take questions. Thank you very much, everybody, and looking forward to the rest of the meeting

1:22:30

All right, we're going to be doing the questions at the end for our regional update here. So moving on. Our next speaker is Esther Shekena and she is from the Michael fields Institute. So we will be hearing from her.

1:22:49

Thank you, Ashley. Hello, everybody. It's nice to meet you all in this virtual field a Hello from Michael fields. So Michael fields is many of you might know about our institute. For those of you who haven't heard about us We are an NGO that's based in East Troy, Wisconsin. And we work through policy research and education to help both rural urban farms and agricultural communities in Wisconsin and beyond to be healthy environmentally, economically and socially.

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So here I'm just going to give a overview of what he did this year. We have been involved in hemp research for three years now. We started out in 2018. just not a good year for hemp and this year we really took off with grain hemp and I just want to give you an update of the grain as well as the CBD hemp work that we are doing the CBD work. We are working together with Shelby and Michigan State University and most of the data of which Shelby has presented so I'll just be quick and I'll just share my experiences with whatever happened a numbering system this year. So this is just a overview of the grain hemp. Okay, so the varieties that we grew are the six varieties and so they were all grown in 30 inch rows planted on June 28 June 15. And there was a wide variation in the height. We saw that onka and Rachel are pretty tall varieties. They are between five to seven feet in height that is Vega was pretty sure you're still harvesting if we just started harvest yesterday. So I am not in a position to give our data but I would be having a Application come on

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by November for all these data.

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So this is just a picture of how our after sowing This is about like 14 days after sowing the plants, just germinating the different varieties. So you can see that Rachel was not as thick as Vega. But still, when I see the data, it's kind of catches up because of the big coolers that we have. So this is a variety Onka on 25th, day after planting, and as Haley just find it out, so high just doubles every two weeks. And if you could see the difference in height, this is the 25th day the next one. Okay, so this is on the 14th day. So within 15 days, you could see the difference in height between all the varieties. So this is a general view, this is time leading. So we did one time meeting, we know this is organic production systems So we were not able to use any chemical. And so we did one time meeting on the 20 32nd day after planting. And so it was pretty good, it was clear the plants were just able to take off the main observation that we did the business the competition that the grain camp was able to give Canada. And you can see that in areas where the plant was growing and the population is pretty good. Then you see the candidate height was not there. But then it was there was an aerial there, the seats didn't grow well

then you can see the difference in height, this is when the rows are uniform and continuous there is when the camp was not good, then the candidate This was at this height, it's already starboard floating. So kind of interesting observation that we made. And I'd like to talk about the that's about the brain hemp and we are doing the harvest and I guess and then about two weeks time you would have the data ready with between the posting on our website. And then we are also part of the CBD hemp trial along with Shelby This is submit this collaboration effort Michael fields is an organic production system. So cbd's organically 44 varieties the same like 26 varieties as transplants, sick 14 clones and for righties, we could see a difference like shall be said that most of the 50% flowering was on the week of 10th August, but mine is I have observed as of 24 August, I would essentially think this difference is because of variation or observations. This is we constantly have meetings and this is what we are discussing and how do we actually need it. And the constantly the constant thing is that each of us are doing it. So it's a slightly varied variable, but it's almost around the 15 to 20. And within that 15 day period and we are doing also the CBD analysis, the third fifth and seventh week of flowering thanks to rock to the labs who are doing analysis all the righties.

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Okay, so this is something that we observed in

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Hemp, we did a cover cropping so as to reduce the compression. And so the first we planted right and lower, you could see how the rows are germinating and then it was pretty thick, the whole area was covered next, next, so this is how we raised the seedlings into our seedlings. And then we planted into a place that was filled with fully covered with rye, the rows of Rye tour didn't take off so much for the rave right had grown. And you can see the seedlings that are transplanted into this dense place we just took out holes and then we planted the seedlings. Excellent. So this is how it looked like the clover and the right row and then we had to plant it where it was fully covered. The other area was covered by vegetation. This is not at reduced weed growth. But what we found was that this was not a good method because the plants just sat and sat and sat the first four weeks they never grew. And so then we had to really work on it. To help it to grow this is one thing was gayborhood bound because soil was not loose and they couldn't spread out and grow. And so I would think that this method of growing in order to reduce weeds in organic farming systems, at least we have to strip down before you go in for planting. If you plant into cover crops then there's a fierce competition with the organic Have plants and it's not able to grow. Next slide, please. Okay, so this is how it was just that for a long time, this is four weeks after planting, because the date of planting was 15th of June. It didn't, it didn't grow at all. And so it was turning yellow. And we did have many more compost of chicken manure application, right, moving the, the cow crop around the root zone and then applying the chicken salad to chicken menu. And then you could see within a week the change in color, and then the been another week it was fully branching and growing. So this is one observation that we've made, the DRI is not a good plan to grow, which not a good cover crop and you want to go in for Excellent.

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Nick. Yeah. So this is just an overview. Now, this is how the plants look. So it was it. It just took off after that application of manure and then you can see that we regularly I go ahead and keep moving the

cover crops first not have great competition. Now it's all dying back. And then you can see that the clover just existing. Excellent. That's more from me here. This is just was a thank you slide probably for traffic, and it's critical. So it is activated. So yeah, thank you. This is this is just I just wanted to share my experiences. Any questions, we will take a vendor.

1:31:39
Thank you. All.

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Right, thank you. Our next update is from Marguerite Bolt from Purdue University. So welcome, Marguerite.

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Hi, thank you. I'm gonna mostly focus on some of the problems we've seen this year. We have multiple research projects going on. One of them is a large USDA Organic research initiative with Rodale Institute. But there are a handful of graduate students working on that. And I haven't seen any of their preliminary data yet, since this is the first field season. So I'm just going to focus on what I've dealt with, with our growers. Since my position is 100%. Extension.

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There we go.

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So a couple of key observations for Indiana. And this really mirrors what economics discussion went over. We are seeing a lot more licenses this year, but reduced acreage than what we expected. Part of this is due to Colvin. So there are a lot of people who intended to plant more, because they grew last year and it was successful. They wanted to scale up. But there were delays in both propagation from different greenhouses, and they're also delays in shipping. So we saw some scaling back of actual acreage while keeping a lot of growers in the game. And then we saw a lot of Lake planting. This was due mainly to new growers, not exactly knowing what was going on. We saw a lot of mid to end July plantings. So I just have a couple photos to demonstrate the difference we saw. So we had a mid July planting. This is up in northern Indiana. So we do have a difference in our climate regions. And then we had a mid June planting and typically new county which is in the central part of the state. But the the plant size is drastically different. And I've seen this across the state regardless of what region they're growing. These really late planted crops are flowering at the same time as early planted crops right because it's a photo period dependent plant. But the size is just drastically reduced to those late planting. So they're going to see a reduction in yield. We have a lot of girls trying new varieties, that has come at an expense to them however, so there are a lot more varieties available this year. However, not all of those are reliable. So our state chemist is starting to send out a lot of destruction reports within the last week. I haven't seen the specific varieties that are consistently hot. At this point. I haven't gotten a list from our state chemist. But growers are still seeing issues when it comes to that. There are also a handful of growers who unfortunately worked with a company that sold them what they claim to be as feminized seed but we're actually just standard days just hemp seeds, so they're paying, you know, $1 per seed plus that extra 75 cents for greenhouse to pop those for them. And they were

purchasing just regular hemp seed, so about 50 to 60% male. So that's been an issue for some of our growers this year.

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So I have a background in entomology. So to talk about some of the key pests we've seen. Some of those are the same as University of Wisconsin, some are different. So in the top Left photo we have a common stalk borer. So what was kind of funny about this one is I haven't observed it in him. It is recorded as a pest of him in the McPartlin pests and disease book that came out in 2000. But this pest was also a problem in Iowa. So what happened was growers were trying to manage weeds around the perimeter of their field. This pest happened to be residing in those weeds and when they cut those plants down or sprayed them with an herbicide, all those caterpillars moved within their hemp crop and caused about 12 to 18 inches worth of damage within the stock. So that was a problem for some of our growers due to weed management later in the season. But we also see potato leaf Hopper, which I know James did Dr. Decker found up in the Upper Peninsula. We saw his pest last year, it was pretty isolated to one field that was right next to alfalfa is organically managed. But this year, within the last three weeks, I've seen a lot more potato leafhopper damage. And it's been pretty consistent among two varieties, one that's called woo five and another one called Midwestern strain, which is the same strength, same variety I saw damage in last year. And then we have Eurasian hemp borer, which shall be mentioned we have this in Indiana as well. You look for rotting at the top of the flower and then if you pop that open, you oftentimes will find this little larva there. I don't have any photos of cornea worm, just because I started getting emails today and yesterday about this past. So cornea room is a huge problem in Indiana, not just for sweet corn and field corn, but also for him. So we tend to see damage. September to October once corn is sweet corn is either harvested or filled corn is well past the silking stage, we see hemp is a really attractive host for this pest. And this is true in a lot of other states. There have been reports of thousands of dollars worth of damage due to corn earworm alone. So that's just something for growers, especially in you know, Southern Michigan, Illinois, Indiana, we see a lot of corner worm damage. So just be aware of that we do have products registered through EPA or however, they don't work when you have big fat, you know, two inch caterpillars in your flowers. And then lastly, I want to talk about pathogens because we've just had a huge surge in pathogen problems. Within the last couple of weeks, we've seen a lot of foam a leaf spot which is in that top left corner. And that's from our research farm, south of campus. So that's where I've seen the most Phoma. And each year gets worse and worse. And this year was you know, every single plant we observed had foam a leaf spot. Also in the bottom we have hemp leaf spot. This is a problem that has been identified in Kentucky and they see it pretty widely distributed across their state. We're also finding it in Indiana, we're not sure about yield loss at this point. We have a lot of powdery mildew right now we have some really cool kind of damp conditions within the last couple of weeks. And so we've seen a lot of powdery mildew pop up, which we haven't struggled with in previous years this year, it just seems like conditions were right. And then the bottom photo is what I think is downy mildew. We haven't sent that sample into the lab yet, but we did get a positive report for the first time of downy mildew in Indiana. And we saw those cooler kind of damp conditions that lead to more mildew is popping up.

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So that's kind of the

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update I have for problems girls are seeing weed management is always an issue for him growers with the lack of herbicides and defined management techniques. But that's the update I have. And I have quite a few of questions. I'll take them at the end of this Midwest segment.

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All right, thank you. So

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last, and final Muslim Midwest Regional update is coming from James Decker, from Michigan State University. And then once he's done, we're just going to bring up his presentation quick and then James can take it away. We will stay on to answer questions. Again. We appreciate everybody being on our meeting today. And with that, I will have Dr. James take it away.

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Yes, wonderful. I'm actually out

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locations today but the one is would have been

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like probably shouldn't stand the field. But I'm James Decker. I'm the director of the MSU Upper Peninsula Research and Extension Center. And today I'm gonna talk about one of our projects, called the hemp tribal Research Initiative for Michigan or hemp trim. Next slide.

1:40:11
I have right.

Looks like we have some formatting issues. So bear with me. Looks like we went to a wide screen. This is just a overview that I'm going to things I'm going to touch on today. We'll start with a look at the project funding and partners and then I'll talk a little bit about our objectives with this project to make it a little bit unique in the hemp world right now. And then I'll talk a little bit about the research that we're conducting and some of the things we've seen this year not really results per se, but more in season updates like we just heard from Marguerite. Next slide, please. This is a project funded through NIFA and it's a NIFA tribal research grant and the objective of that program is to build research capacity to be a tribal institutions around the country. We've partnered with Bay Mills Community College that's where I'm at today and Brimley, Michigan, and we are the PI’s on the project. And then we're also working with the little traverse Bay bands with our Indians and their tribal farm called Ziva Milan farm, as well as of course, Michigan State University and extension. And Lake Superior State University, their cannabis chemistry program. I'm Dr. Mountain South was doing the analysis for this project. So we also have another university.

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So I won't read off these objectives. But just to give you a sense of what we're up to. The main thing that we're doing this year is variety testing at different locations that I'll show you in a minute. And we were doing variety trials for both grain and fiber and a combined system and CBD. separately. I heard a question earlier about pollination. And we ran into that concern last year. But as was stated in response to that question, we've seen an offset in flowering time in between green and fiber and CBD at our northern latitudes. So it's worked out pretty well to do that research, with fairly close proximity at some of our locations. And we're also evaluating our variety plots for pests and pathogens. And next year, we'll be getting into more of the weed control work is interesting to see what Esther shared we're going to be looking at different methods of cultivation, synthetic malts cover crops, like the living mulch, as we control tools in health systems here. And then I mentioned working with the Lake Superior state to try to analyze the quality of the flour and cannabinoid content and the contamination. We're also looking at grain quality, both protein and oil in the brain coming from our grain of fiber, right. And then finally, we're doing some outreach that's focused specifically on tribal communities in Michigan trying to use a discussion approach to understand their needs and priorities and questions related to this crop and how our research can best. Excellent. This is a four year project so you can see we're starting with variety trials, and then we'll be moving into some of the other components in subsequent years. Next slide, please. So to give you a sense of locations where we're working, so our facility is the top Spartan helmet, they're located in Alger county in the central up. We also we did separate our grand fiber and CBD trials at the MSU locations this year. So our grain and fiber is down in Escanaba area that's at lower Spartan helmet, and why should you be fine where I'm at today is over in Chippewa County in the eastern Upper Peninsula by that turtle symbol. And then in the north, west floorplan peninsula just below the Mackinac Bridge is a visual on farm. In our grain of fiber, Charles, we've got 14 varieties at these three locations. And then in our CBD trials, we have 36 varieties at approach at our North farm facility, and that includes the 16 varieties as part of this project. Also an additional 20 in collaboration with Shelby and Esther at UW.

1:44:39
Next slide, please.

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There's some pictures to give you a sense of what our CBD trials look like. Much like some of the photos that we've seen already today, from early season in the top left towards mid flowering in our auto-flowering varieties at bottom right. Next slide, please.

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And these are photos as an example of our grain and fiber trials. So you can see obvious differences in the production systems that we've heard about. These are direct seeded seven inch rows, higher populations in graining fiber compared to the transplant system or horticultural model that we're using in CBD. I'm glad that someone mentioned though the novel CBD production we are also testing some varieties that are intended for grain and CBD in this agronomic system that we have for our granite fiber trial.

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Just to give you a sense of some of the things that we've run into this year, we have seen European corn borer damage both in grain and CBD plots at different locations in northern Michigan. In the grain fiber, we did have loss because they were single stem plants, they pretty much died from the entry point to that boring whole upward picture. Top there is where the stalk borer into an episode that actually does the flower according to the flower of life far below. Some cases though, they went in lowering the plant actually killed the whole plant. In the CBD. We haven't really seen a lot of extensive damage. We saw a lot of larvae and borer holes and frass but not last plants stepped in the case at the top left, where it seemed that in some cases where we had damaged from porn board and CBD, we had more white mold coming in later. So I suspect that perhaps that plant injury might have contributed or created a route of entry for white mold that has caused some lodging in those plants that are severely infected. We've also had cannabis aphid for the second year in our CBD, plants at different locations. And one of the challenges that we're facing this is the first year working with CBD is just all the harvest and post harvest issues. And the differences in that system learning about dry, Buck cuter trim that material. Next slide.

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We've seen quite a bit borer

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damage in our grain fiber plots at certain locations this year. So that certainly has been challenging and caused us to actually harvest one location a little bit early to try to avoid as much damage as possible leafhopper and CBD. And it's the variety specific or certainly not every plant in our travel the same amount of pressure. And we interesting to see if that really has many implications for yield anything like that. For the most part, it doesn't seem like it's really causing economic for us. Excellent. If there's anyone interested specifically in the issue of hemp cannabis generally and tribal communities or a number of resources targeting tribal communities, this is a unique issue in terms of sovereignty of tribal nations, because tribes are charged like states by USDA at coming up with that submitting and managing their own regulatory process for him. So the two tribes that were working at may have fairly different policy from the state of Michigan, and they have the sovereignty to be able to do that as long as that by USDA and they can manage to administer it. So pretty interesting issue in terms of agriculture and food sovereignty for Michigan tribes or tribes across the country. I think the next slide is just inviting questions. So thank you for the time today and Thanks for the invite Shelby and happiness stick around for a q&a.

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All right, thank you, James. So um, we do have some questions that I would like to get to you, we are approaching close to time. So I do understand if people need to log off. But I'm going to go through what we have our speakers on and ask questions. And again, we will be sending the recording out at some point to everyone who registered. And we will also be sending an evaluation along with that if if those participants would fill that out along with a sheet with all the contact information and different links that we have shared today. I know people have been asking for those. So we will compile that all into a nice sheet for everyone and send out along with our eval and the recording. So with that, I since I have everybody on here, I'm going to go on With what we have our Midwestern region update, there was a

question for Phil from Illinois with the database, are there plans to scale this database nationally or internationally,

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we are still kind of in the middle of it, you know, right this year. But we would like to expand this to other states. If we can find a good way to do it moving forward, there's a lot of interesting things we're kind of dealing with right now with differences among the labs and how interpretations of compliance are. But we would certainly like to expand this program moving forward. But it's going to take a team effort. And we would like to maybe even expand this to different states with state approved labs being on board to contribute to this. So we certainly would like to do this moving forward, increasing the scope, and the scale of the project. And we're looking for suggestions and comments. But yeah, absolutely. We'd like to keep this move. Moving forward.

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All right. Thank you. The next question would be for Esther, with the cover crops. Um, if you are not, if rye is not recommended for a cover crop, what would you recommend?

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I'm so

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so last year, we did the right into Word, but after planting the hand, and the broadcast that included was pretty good. The rye already established by then, I'm sorry, the hemp already established. And by the time I was growing up and serve as a good weed control, after if you plan it after repeated, but if you establish right in the beginning, and then plant hemp into it, then there's a fierce competition. So that is something that, but next year, we're planning to go with just clover and see how it's gonna work out. We haven't had any other experimentation with other cover crops. So maybe next year, we'll be able to give more a better answer to that question.

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All right, thank you. Um, I'm gonna just go back up here a second to some of the other questions that have come in. And this might be for Shelby, or Haley. Or even Jerry, if you're able, are we using any other nutrients like potassium or phosphorus in our fertilizer besides nitrogen?

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I could take a quick crack at that one. I think, you know, soil testing is always going to be number one. A lot of these fields, you know, there might be some alternative fields that people have used, or they've been fallow for a number of years. So I think soil testing is number one, but just in general, across western Wisconsin anyway, we've seen potassium levels low, just in general agricultural fields. So that's number one is good, is good testing. As far as actual research. We've just been looking at nitrogen from the Chippewa County side of things. And Haley can maybe comment if they're delving deeper into other nutrients. But I know, soil test is number one, we've been preaching that for years, get that done. And then, you know, we'll have some recommendations that'll that'll come along with that.

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Yeah, to echo what Jerry said, we are only looking at nitrogen. But we did take soil tests between the two sites on both years. And we did notice that the triple A fall site had lower levels of some of those routine nutrients that you might adjust for, specifically with phosphorus and potassium. So that would be something that you would want to look at and see where your fields are at to see if they are well below other critical levels. But we are only in the terms of a specific research project looking at

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nitrogen from the grain and fiber standpoint. I'm just

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another thing to add today is the most common micronutrient deficiency that I've observed in the essential oil crops tends to be sulfur. So that's, um, again, we're not i'm not specifically doing any research on that right now. But that's something that pops up time and time again for deficiencies.

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All right, thank you. Um, and while I have both Shelby and Haley on and maybe Haley you could go first and if and, and if you can answer Otherwise, this may be for part of the economic section. Are there any information on the fiber and green marketplaces specifically for here in Wisconsin? Do we know have certain buyers or processes? Are they at capacity? Are they looking for more producers? And that goes along with for fiber and grade if maybe Haley could answer and then also that question is come up on the CBD and as well for Shelby

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Yeah, so right now I am not aware of any fiber processing, or grain processing in the state of Wisconsin, for grain, you have a little bit more opportunity specifically with certain companies that may be contracting out for grain to go into kind of that oil extraction from the grain. For the fiber, there's really not a lot of options anywhere. There was a processing plant in Kentucky at one point it was running, and then it wasn't, I'm not sure where the actual standpoint of that processor is right now. But markets is a pretty significant limiting factor for the graded fiber.

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Yes, and that's what I've heard as well, I think with the fiber, there's, I mean, both with fiber and grain, there's a lot of excitement. But the infrastructure for dealing with those products, particularly the fiber is is very intensive. And it's not just even the reading process. But then there's so many different potential products that all have different specifications. So it's really figuring out I think, what those industries are going to be and what their specifications will be for the products that are needed. Um, I know there are lots of people that are very interested in putting money into this. So I, you know, I hope that the way that it's approached is just figuring out how to grow the crop on smaller acreage and doing it well then better understanding of the reading process the same with the grain for making sure it comes off the field and it's dry quickly, so you don't have any microbial problems. Because that's I think, very, very common that people grow it and then the same with the CBD, once you're ready to harvest, there's this huge bottleneck, you have to have place to dry it, you have to have a place to store it. Um, with the CBD, I think the people that I've seen that have been most successful in the industry so far have

access to direct brought buyers. So right now there are people who will process materials, but they will either take a split and take part of the oil of the extracted or you have to pay them to process it. So if you have any way to get into a store or do online direct sales, I think that that's one of the only parts of the CBD industry that is increasing right now his direct to consumer online sales because of COVID. Um, but really, if there's a way that you can do it yourself or where you get your oil processed, you have a way to sell it at farmer's markets or direct to consumers is the best way to be profitable with it. Um, so in the meantime, we just have to figure out how to make the process less expensive. Um, so there is a better margin for the producers.

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Show me if I could follow up on the green side.

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I do think because of the symbol

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ease with other commodity grain or oil production that capacity for handling and processing and markets for grain hemp will emerge rather rapidly, maybe more so than the CBD and can have annoyed industry. However, right now we're seeing growers in Michigan that are doing the same thing integrating and cup figuring out how to process and market their own crops like Shelby was just saying on the CBD side. So for example, there's a couple that are growing green hemp for the first time in the Upper Peninsula in your facility, and they are in the catering industry. And so they have a commercial kitchen space and they're experimenting with how to process that seed and create a protein bars or other protein supplement products food products. With that grain other people are doing cold pressed hemp oil. I know of a grower that has is now selling oil that he's pressed from the grain so probably not what we'll see long term but there are folks that are taking that approach short term with the grain

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as well.

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All right, thank you.

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I'm one of the next questions and I'm just going to keep going through we have a few more left if that's okay with everyone. And this could be for anybody will you be looking at THC concentrations in plants that are allowed to mature past optimum harvest time. I've seen studies that suggest THC percent goes down if the plants are left in the field past their traditional harvest time.

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So um The trial that we're running that was kind of the thought process behind taking the three, five and seven weeks is, knowing what we know about the current status of cultivars that are being grown for cannabinoid production, um, that seven week is going to be hot for the majority of samples, and it is going to be pushing it for some of those later flowering varieties into kind of less ideal weather, um,

beyond when it snows, we're not going to be able to have plants in the field still to kind of like, test it, at least for this child. But one thing that I did last year and I plan on doing this year is after harvesting it and bucking it. So I have biomass coming back maybe after six months in storage to see what has happened to that cannabinoid profile, I'm very interested, even if I were to try a few different treatments under ideal storage conditions, or kind of rather harsh conditions with either high highlights highlighter, too hot or too, I don't think it gets too cold. But I'm just seeing how storage conditions influence that

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profile.

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That's one thing I hope to do this fall in winter.

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And I and I do know from last year taking a few data points after harvest in storage for a few months that there was a small decrease in that cannabinoid content. But that's well after it's been out of the field.

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And another question, how did you take samples for the cannabinoid potency? Was it just your best flowers? Or Which ones did you use?

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Bill? Do you want to answer that one? Since you designed the protocol?

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I'm sorry, what was that question? i?

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The question was, how did you take your samples for cannabinoid potency did you use just your best flowers or other flowers.

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So the protocol itself was kind of a combination of things here. So we really followed mostly the procedures that are followed by Wisconsin and Indiana, and pretty similar to Michigan, we took the top three inches of a of a cola provided, it's in the top one third overall plant height. And that comes from the USDA sampling guidelines. And since we're trying to find a way to really keep us on the same playing field, we wanted to find a way that fit each state's rules or guidelines, but also allowed us to work together to figure this out. So I'd be glad to send the protocol and it's actually available on our database, there's a whole grower protocol of what we did. But five plants were selected in the field, and they were supposed to be marked, so we could continue to sample from the same plant. And then from those five plants, we took three samples from each plant, or kind of vice versa, right. So we want to make sure we had 15 sample plants from the top one third of the plant that was being sampled plants that were being sampled and we try it, we're hoping that by keeping the protocol in place, and then also

having the same lab on board that we're able to really make sure that these samples are being collected in the same way,

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or as close to as we can.

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All right, thank you, Phil, there's a few questions are some comments going on in the chat. I'm just going to go double check that I've answered all the questions here through our YouTube stream. And then we will wrap this up here for the day and be finished. And like I said, we will get this recording out to you. Um, one of the other questions that is on here, are there any suggestions for CBD drying after harvest?

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I'm in the chatbox. James, you answered that correctly. Um, so the, it really comes down to the size of your acreage. Um, so you know, if you're working with small scale acreage, that you have a drying facility that can accommodate that a lot of people you know, are just using barns with fans and dehumidifiers or any sort of indoor structure where you can drop the humidity below, hopefully 60% down to 50% and keep it um, you know, you don't, you don't want to promote any sort of pathogen growth. So you want to avoid really damn cold environments. So if you have a drying facility, a lot of people are just cutting off their prime branches or hanging that whole plant to dry. There are also large drying facilities that are available there several times and I think there's some on the call right now that they will help you dry the material. They'll actually chop the material, run it through dryers, that's if you have really large scale and you need a you don't necessarily have the place to do that on your own. Um, that's going to lower your CBD percentage, but you're also going to have a lot more pound per acre if you're if you're chopping that whole plant. And they're also, you know, in the future, there's going to be ways where you might be able to

2:05:11
further

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separate that plant parts into different, you know, floor material versus stock material versus grain material. So you could get different, different products out of the end of processing it. But really, it comes down to what you have access to, and how much time you have.

2:05:34
All right, thanks, Shelby. All right, I have two more questions. And then we will make sure we wrap this up here by 1:15. And I will put them together. One was maybe more of a comment. But then the other is a question. Could you just quickly explain Shelby, the difference between being licensed and registered as a grower? And then Have you heard of the Garden of Eden method

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might be the fun one that came through the other chat. So,

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um, so so with licensing and registration. So that's handled through DeKalb in Wisconsin, but pretty much there's a one time on a one time license fee that you paid to be able to grow hemp in Wisconsin, and then you have to register year after year, if you want to grow in that particular year. So that's the difference with that. I'm not sure how that will change under the new 2018 federal guidelines. And we're not exactly sure Wisconsin is working on their plan right now. It hasn't been submitted yet. Um, I have not heard of the garden of eating I don't think but the one other thing in the comments that I wanted to see, or just mentioned his people were talking about reputable businesses to buy seed from and local businesses. And I will just mention that, you know, these calls are trials that we're running. That's really the goal of that is to see we're getting see from all over you know, it might perform wonderfully in one place, but we're we want to see how it performs here locally. So we can make the best recommendations of people that seem to be selling really reliable, high quality products for for all types of pens. So stay tuned for those results. And we hope to continue doing those types of studies so we can make the best recommendations to the growers. But now let's talk about that Garden of Eden.

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Yeah. Have you seen like people using the back to Eden gardening method?

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Does anyone else have any comments on that? I look it up.

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All right. Well, with that, um, I don't have any more questions. There's been some chat going on. If for some reason we did miss one of your questions today. Again, we will be sending out all of these speakers with their links that and emails, you can send them messages or send any of us here at extension messages and be looking for that in your inboxes for those of you who registered in the next week or so, um, please take time to fill out the evaluation as well. So again, I would like to thank everyone for joining us today. And stay tuned for more hump updates. Thank you