

Agricultural Innovation Board Meeting Transcript

August 26, 2024, 5:02PM

□ **Griffith, Morgan** started transcription

0:07

Noon it is one.

O'clock on August twenty sixth.

We are officially calling this meeting of AIB to order as a reminder, this meeting is being recorded as public record and that participation in a recorded meeting will be deemed as consent to be recorded, including statements both written and oral public records, including this recording can be requested at any time in accordance with the Vermont Public Records Act.

So welcome.

Thanks for coming.

Let's first.

Go through our introductions quickly and we'll start with.

AIB members that I see on the call.

Ah, so first on my list to Sarah.

OS

Owen, Sarah 1:00

Umm hi.

Sorry, I was having lunch.

Sarah Owen on the state toxicologist with the health department and I will probably be off camera so I can eat that lunch.

1:05

Sorry.

OS

Owen, Sarah 1:13

Thank you.

1:14

Enjoy Abby.

PA Pajak, Abbi 1:20

Yeah.

Hi, Abby Pajak DC CAFO program.

1:27

Thanks.

Uh, Steve, she work.

SS Steve Schubart 1:31

Steve Schubart, a grass fed beef farmer, first generation farmer.

Uh, glad to be here.

1:44

Thank you.

Uh, Wendy too.

WH Wendy Sue Harper 1:50

Wendy Sue Harper.

I'm a social scientist and I represent the soil biology position.

Thank you.

1:58

Thank you.

We're just doing our quick Member introduction.

So Amanda, go ahead.

AS Amanda St.Pierre 2:04

Amanda saying here dairy farmer in Berkshire and a member Vermont Dairy producers alliance.

2:12

Thanks for coming and Nate.

NN Nate Nourse 2:16

Hello, Nathan.

Norse Montgomery, Vermont, Nate Norse consulting.

2:24

Great. Umm.

In I don't think I see any other Members on the call in the room.

I have myself.

My name is Morgan Griffith.

I work with the public health and age resource Management division of the Agency of Agriculture.

And I Steve Darnell is not in the room yet, but he also works.

He's the director of that division with the agency of AG and he is going to join us in just a few minutes.

And then I'll keep going around the room to go ahead and chill.

Jill Goss.

Agricultural input regulatory specialist with the agency VACATURE.

Pam Grier, agrochemical toxicologist.

With these people like a posse today, today.

I'm broke.

She might. OK.

DB Decker, Brooke 3:25

Sorry, I had to get unmuted.

Sorry, I too was having lunch.

3:28

Yeah.

DB Decker, Brooke 3:32

Brooke Decker I also in the Farm division and I am Pollinator health specialist.

3:38

Thanks.

How about Jared Carpenter?

JC **Jared Carpenter** 3:45
Afternoon everyone.
Hope you're well.
Jared Carpenter with Lake Champlain committee.

3:51
Thanks for joining us, Charron, Kirsten.

KB **Kiersten Bourgeois** 3:55
Hi everyone.
I'm Kirsten Bourgeois, I'm director of marketing and industry affairs for DFA.

4:07
Laura.
Johnson.

LJ **Laura O. Johnson** 4:11
Hello, Laura Johnson with you.
VM extension pollinator support specialist.

4:22
Thanks for joining us.
We're going to hear later from Laura.
She's on our agenda today, so thanks very much for joining us early.
Laura and Steve Lee.
Doctor Lee.

SL **Steve Li** 4:38
Uh, hey, uh, Steve Lee.
I'm a station professor in Auburn University based in Auburn, AL.

4:48
Thank you.

And we'll hear more from Doctor Lee in just a few minutes.
And I think the last person I see is Zach.

SZ **Szczukowski, Zach** 4:58

Zach Sakowski Agency and Agriculture Farm division.

5:05

All right.

Thank you all.

Is there anybody on the call that I missed?

Oh, Becky, go ahead. Sorry.

BL **Becky Langer-Curry** 5:13

Becky *****.

Ohh no problem.

Becky ***** , State regulatory engagement for bear crop science.

5:22

Thank you.

Ohh right.

So just, uh, logistic, Swiss.

We sent out our the Minutes for our meeting on July twenty second.

I didn't hear back from anybody with any edits.

Are we OK accepting those minutes?

See a nod. Great.

Umm and.

Ah, thank you all very much for dealing with my pestering emails and filling out the survey.

Last I checked, there was nine.

Maybe a few, maybe someone snuck in last minute, but thank you very much.

That's great.

Justification, so thanks for taking the time to fill out the survey about Munich.

We will talk about it more next time.

We'll kind of tally those results for BMPS as we work on a draft document for kind of more encompassing Munich BMP than what we had previously for treated seed so.

I am going.

I know our agenda, says the egg update is now because Steve is on another meeting for a minute.

I'm gonna push that back until after Doctor Lee's presentation.

Uh, so basically, we invited Doctor Lee here.

We have obviously been really focused on neonics and treated seeds of late and so we wanted to give our brains a break for a minute and to start thinking about something that is in the future for us potentially.

And so we have the legislative charge of exploring and maybe even incentivizing ad practices that reduce the use of pesticide.

And so Doctor Lee is hopefully going to give us a little bit more of his background and his research, but it's mainly around poset applications by drone.

So thank you, Doctor Lee and I can hand it over to you.

SL **Steve Li** 7:35

OK.

Thank you.

Uh, let me see if I can share my screen.

Umm.

OK.

How does it look?

7:50

It looks perfect.

Just the slide. Yep.

SL **Steve Li** 7:54

OK, alright, great.

Ohm, when I think it I can speak up to like maybe 450 minutes, 4515 minutes.

I mean, I can go long.

I can go short.

I just want to respect your time, you know.

8:10

Yeah, I think two.

Yeah, fifty minutes would be great.

I think we have two more speakers today, Heather.

Doctor Heather Diary is slotted after you.

SL Steve Li 8:21

Uh, OK.

8:21

She might be a few minutes late and so depending on what I hear from her, you might have a few extra minutes, but let's shoot for fifty minutes.

SL Steve Li 8:31

OK.

Alright, I'll try.

I'll.

I'll try and go short a little bit because there are a few questions you know, because somebody wanna ask questions.

8:40

Great.

SL Steve Li 8:41

Yeah, alright.

Uh, yeah.

Appreciate for the invite today.

And again, I I don't know about the audience very well, but it sounds like ohm, but I don't think any of y'all have working experience with these drones.

You know, it doesn't sound like we have commercial operators or farmers actually flying drone here, so I'm gonna make the presentation fairly broad in general.

So you can understand the concepts.

I think that's should be the goal for today.

Again, quick introduction of myself.

Umm, I worked for extension, so we're like farmer support agency.

Umm, we do a lots of fuel trials and we answer a lot of questions from the growers of all different kinds.

Umm, my specialty is in the herbicide, so I got all my 3 degrees from agronomy department.

So just harder core row crop guy and then about four years ago start to play with all these drones and with my pesticide application background, it wasn't a very difficult shift, you know, over time, but it's a it has been a very interesting four years because I learned a lot myself and also witness this new technology from just taking off to rapidly adopted by many farms, many operators across the country.

So you can say we're in a spray from friends.

You right now is a very hot topic.

Is quickly adopted by many, many different farms.

People figure out so many different usages with this new tool.

So if we write down all the things people have done with these spray rooms, and the list can go very long, you know definitely over a page, you know easily.

So we're gonna overview some of these applications in crop management as natural resource management as well.

Hopefully this will give you some idea about this new technology.

Right.

So like I said, in my business is or my research focus is in pesticide application, pesticide efficacy, drift off target movement, this type of stuff.

So whenever you think about people spray their crop for, you know, insect disease or weight control or this could be applying growth regulator or whatever.

Uh, you're thinking about a tractor.

You know, hauling a boom sprayer or this could be a self propelled and big old John Deere sprayer with, you know, very big wheel.

So it can dry over top of the crop and spray drone spraying is quite different.

Just because we don't have a huge tank, you know the largest sprayground tank, commercially speaking, is about 18 gallons at this stage.

So it's not very big versus A1000 to 1500 gallon size tank on a self propelled sprayer.

Umm.

So this means when you fill up the drone tank a sprays out in three to four minutes, they come back and forth refill.

So you are refilling the wrong tank and swapping battery about every 5 minutes.

When you spray with with the drone, This is why, when we do drone spraying, we need to have these strong mixing and the battery charging trailer at the site because we need to refill just every couple of minutes.

And also This is why people may say it's a pretty labor intensive process.

Because of that, you're gonna be staying outside in the heart of blazing sun.

It could be hot and humid day.

You basically just lift heavy battery, swapping batteries, charging batteries, refilling the drone tank for hundreds of time, or, you know, during the day.

So we can get sweaty and you know, tedious.

So I'm now gonna be shy about this physical challenge part because that's that's also part of the drone spray.

But the good thing is you can see from these trailers, you know, it has mixing tank water, tank pumps and all of those we mix our chemical Edge site, which means we don't have to drive back and forth to back to the shop to mix and a saves travel time as well.

So this is the difference between the drones spraying and the ground sprayer spraying.

And also we can put all the things we need on the trailer and be able to haul this trailer even on the Interstate.

So the commercial drone operators will be able to spread across multiple states.

Because of that, I have not seen the ground spraying crew doing that very often on on.

Also, for crop dusters, they are able to fly to Midwest to spray fungicide, but it's still not as easy as these guys basically can pack up and go any time they want to and go anywhere they want to.

Alright, cause so there are about three ways you can spray crops you know.

I'm using chorus example.

You guys see draw spray over the top of clone versus airplane?

And there's this video come from our recent dye study.

One of your projects, you know, so the ink dye lingers over the top of corn canopy for a little while before all these small droplets can eventually fall into the canopy.

This is why when you hire a area applicator, it's always worked the best when you spray when there's no wind, because if there's a little bit of wind, it's going to blow this pink cloud down.

We in a coast off target movement.

What you spray with a drone?

We see we're seeing a little bit stronger propeller downdraft effect.

You can see the drone pushes down the corn canopy a little harder.

Alright, it still created drift concern by this stage.

Data suggest sprayground grief is not as bad as airplane drift because still operating at lower speed.

It's kind of in between airplane and the ground sprayer in terms of drift potential.

Alright, so how does the work in the field?

This is a new disease showing up in Midwest and Upper Midwest.

I probably you guys probably can find it up to Pennsylvania as well.

I don't know how much horns out there in Vermont.

I have never been to Vermont either, but you know, if somebody grow corn over there for dairy cows or for animal feed, this might be something of concern.

You know, so this is a non treaty check plan.

If your corn already has this match of disease on on the plant, you can expect minimal 50% of your reduction.

You know, you lose half of your yield.

This is the plot sprayed by the drone with Valtina fungicide at a 7 ounce per acre rate together per acre using at 40 where timer is not cheap because the front side where it gets the job done, you know you see very few disease lesion on the planet look very healthy.

Already checks straight 50 to 60 feet wide was defaulted first by the disease on healthy plant, usually die off first, healthier plants stay greener, way longer.

Alright.

And also in this case you saw the untreated planned they dial first phone inside alone, you know spread with honey side you'll see a more green leaves over the top front side with borer with micronutrients.

That makes the most healthy plants.

This is usually what we like to see in agronomy, corn cob.

If you look at a year, it's yellow, which means the year is ready for harvest.

But the corn plant is still alive.

It's not there, you know.

And and it's still a screen over the top.

This is usually a sign of high yielding crop.

Alright.

Again on the live this this plot received a Stratego only at the B8 stage.

The plot on the right also receives strategic with the VA stage, followed by Baltimore and the foliar functions fee for your for your neutral.

Sorry, foliar nutrient at a tassel stage.

You can see this case from central IN you are able to see the canopy, particularly the lower half, the bottom half.

The canopy is healthier because of our team versus just one trip at VA stage.

VA stage coins?

Not that big, you know, it's probably pocket high.

You know, a little too early, so more functional side can typically help the plant stay healthy and also maintain the stalk stress.

You know, that's another thing people concerned about fungus can eat up the tissue inside the stock, make them very easy to launch if they're on the ground, you cannot harvest them for anything.

So we're run all of testing in feel.

We want to see how much product can actually make through the canopy and reach the target.

We want to protect the early, so we're measuring a lot of these over the years and we found airplane pretty much deliver about same amount of fluorescent dye to the yearly versus drone at the two gallon per acre.

So these are some of the data from 2023.

I think last year, yeah, 2023 and the two sides T30 drone T40 drone versus airplane.

We saw statistical or statistically similar dye deposition on the yearly because a lot of people ask how, how does it spread wrong compared to airplane.

I mean where you spray two or three?

Operator using the optimal setting, they're pretty similar.

And also you can use adjuvants like a drift reducing agents to increase the deposition.

So in this case, each while represents the amount of dye we washed off from the year leave.

Alright, so each vial represents one year.

Leave.

You know, this is the whole block that we sampled from the field.

You don't need to have a spectral photometer or fluorometer.

You are able to tell the dye the pink color is more intense after we use the drift reducing agent because drift reducing agent not only reduce drift, it also increase deposition increase canopy penetration.

They will make more of your product stay in the field, get into the canopy.

Is that flying off the field cause if they're fly off the field, they are drift?

There are environmental contaminant and also it's your money flying away from you at the same time.

OK, seeing is believing.

So you can see the amount of droplet hits without using the RA and and by using a drift agent it's making a difference visually speaking.

Alright, you insects.

You can also spray insecticides with a drone or plane.

This has been done for a lot of time.

We have a lot of defoliating insects.

They basically just eat up all the leaves, you know, picture on the left shows you a plant.

It used to be a soybean plant.

Now it's just Spriggs.

You know, there's no leaf no more on the warms.

Just eat up all the leaves.

The one the picture on the right shows all the pig way without leaves.

You know the insects can be folded.

A lot of plants, and that's because of this warm right here, the soybean looper, umm, there's a picture of shows the masked on Max insecticide application by the drone.

So the field on the right this field was sprayed.

The field on the left was not sprayed with anything because that's his neighbors.

Soybean field had a free not really check.

You can see the difference between treated and untreated by the drone.

Also, UM, you can spray herbicide with the drone, although the risk is higher alright, if you drift.

Herbicide is going to show if you drift herbicide to your neighbor's field to neighbors garden yard or horticultural plants nursery, you might be paying for the crop damage and it can be a lot of money.

So I'm not a big advocate of spraying foliar herbicide burn down, herbicide nonselective herbicide withdrawn in row crop setting, but you are able to make a good application sometimes depending on the environmental condition and also you can apply a lot of herbicide in pasture, Enfield, rangeland forestry, non crop area. It actually worked out a lot better in those scenarios.

Alright, so in Burndale situation, before planning we can get the weeds killed fairly

efficiently with the drone.

If you can get a fairly calm and windless days.

If this is windy, you know 10 mile per hour, 20 mile per hour, you can forget about using drone to spray.

It's gonna drift all over the place.

Hello this is another example of a burn down case.

You know the day of application versus about 13 days after drone flew, energies of power line around that pole on the kill.

Pretty much all the weeds out there before planning, they still can be done, but this type of herpes, that operation is the hardest job among all applications of different pesticide.

Because if you drift, if you missed a spot, if you set your swath too wide, if you spray in a windy day, it's going to show where you missed.

But if you know what you're doing, you're experienced.

Operator, you have the optimized setting.

You use drift control agent.

You can still get a knife, cut clean lines between where you spray and where you did it, you know.

So there was a lot of yiff out there.

So This is why I said you can do it, but I don't think everyone else I you know, I I don't think everyone will be able to do it.

Some people just want to push, you know, when they get to the field and if you spray these type of foliar herbicide when it's windy, you can leave a lot of green streaks in the field that you didn't kill.

Herbicides are very honest.

You miss a strip.

You miss a spot.

You miss a pass is going to show and that will be bad for the business if you're a commercial operator, we get lots of morning glory before corner harvest.

We have to kill.

This or desiccate this morning glory so we can combine the corn.

Otherwise, when you drive your your combine into how feel like this morning, glory wines will just drag all the corn on the ground, you're just run them over.

You're not gonna be able to harvest anything.

So we sprayed.

We sprayed this field.

With a dessicant this is a nozzle drilling older T30 version.

You can see a produce a lot of fine droplets.

So you have to pick and choose which day to spray.

This is the spot with a ton of morning glory, and the drone just blew fine droplets of herbicide into this can of food.

You can also spray one is threaded we need.

But after about 13 to 14 days, the efficacy was very impressive.

There is nothing rained there.

You can also see this clean cut off line between sprayed and on tree check area you know.

So it looks very good on our end.

That's occasion effect was really good.

You'll see the dry morning glory vines still very crispy.

They can be, they can be broken up even with binder or your fingers very easily.

So the combine will have no problem driving across this field and not worrying about dragging the corner down.

What channel is the big crop?

The only in the South we have to defoliate a crop.

You know we can defoliate with airplane or we can defoliate with a drone.

The efficacy of very similar you know just like what we found out from the corn canopy deposition study, flooring in that situation is another one before harvest.

A lot of roller want to dry up the beans, you know, to drop the leaves, dry the stem, you know, make the soybean field look like this.

You basically just got a bunch of dead planned sticks out there.

They're dry.

They're ready to go.

So this will make harvest a lot easy.

You know, if you are sitting on that combine.

We also have done a bunch of testing in soybean canopy.

I'm not.

I'm not gonna go much into this.

You know the DRA, the drift reducing agent also help penetrating the soybean canopy.

We just saw the results.

You also don't want to defoliate a canopy this thick.

This is too much for the drone.

Ohh, you know every probably if you come back and spray another time to completely desiccate a canopy like this, this is a way too early, but you can see in the pattern of this room spray.

So if I go back a little bit.

You can see the pattern when you spray in the day with no wind.

It's it's a very pretty, you know, and you can cover.

So, you know, left side and right side of the drone evenly without drifting to One Direction or not going to go down to this need to be stuff.

This is for commercial operators.

When I use the training like I said, I never been to that part of the state.

I wish I could.

I bet there could be some orchards or veneers considering the amount of large cities on the East Coast.

You know, for those farmers that have perennial tree crops, you can just spray drones to spray insecticide and fungicide versus your traditional ground blaster.

Or you spread free crop.

You have to use very slow speed and blue or lot of volume into the screen.

So for tree of this size you know these these are 20 some years old orange trees.

You need minimal 20 gallon per acre, you know and and also you need a pre application mapping to make sure your drone is flying exactly over top of the tree rows.

You know, sometimes if the tree is too big, you might have to customize your route and spray twice.

Spray like 2 passes per row to make sure you cover both sides of the tree.

Is that which just flying over top of the tree crown, you know, so this this is all depends on the canopy with and and the thickness.

All right, I'll reyniers some wieners are planted on very steep mountain side because the quality of the grape can be higher on I I just got back from Germany.

Umm, earlier this summer we toured some of those farms around the Rhine River.

You can see some of those vineyards are even worse than the one in this video.

You know, it's literally on very steep mountain side.

I don't even know how these guys can walk in that vineyard, harvest the grapes and they said they hire all those Eastern European laborers to do those, you know,

dangerous and tedious job.

Which I believe you know, and they get paid very little as well.

Uh, so in the states, you know, if if you have a when you're like this, they either don't get sprayed very often or sometimes they don't get spray at all because it's very difficult to drive a tractor on this type of terrain.

Me.

Umm, you know you have rollover concern there and for people to buy, pack, spray a vineyard like this, that's gonna take a while.

And also I feel bad for the poor guy, you know, putting £50 of liquid behind his back and walking on on on a hill like this.

You know, it's a very labor intensive with drones.

You can get it spray very very easily.

This is not even a thing anymore, but again, like I said, there are so many usages out there.

You just have to find your niche, but once you find your niche and it works out really well, that could be really sweet spot for you.

You know, as a commercial operator or a for a farm.

So that's how the drones gets used on those challenging terrains to save labor, you know, to increase safety of the worker as well.

If we can reduce backpack spring, we can reduce human exposure to pesticide.

We want to do at all time.

We also tried a a blueberry.

You know, how does little blower spraying fluorescent dye for us?

We can see it's dependent spreading the blueberry on each side or is all the spray with a draw over the top.

You know, they played a lot of weed.

The below the finest into the canopy.

This is also cool video.

We spray this one last month in Missouri or 'cause.

I don't have grapes down here.

We have the wild grapes, the muscadine, but some of the winemaker refused to call Muscadine agree because it's very difficult to use, although I do like the fresh muscadine I can buy from grocery store, it tastes pretty well.

The the skin are pretty thick though.

It's very different that table grapes, but these are the veneer in Missouri and you can

see how drones spray.

Uh.

Of grapes.

Grape wines and how the fluorescent dye and looks at night.

So this is a newer model of sprayed on T50.

It has.

It has a four rotor atomizers where basically blowing wind and a fine really fine droplets into that canopy and almost like power washing the plants we yes you know whatever product you need to spray mostly if I'm designing sector side you can see the turbulence and the coverage on the ground.

Yeah, this is almost like power washing the plants.

And this is how that fluorescent dye looks at night under UV lights to visualize the droplet size.

You know you can see the droplet start showing up.

Yeah, and my students were really excited, you know, after seeing this, we also prove we also had a ground blaster there of Ground blaster sprayed the dye for us.

We sprayed the same amount of dye about 40 grams per acre sprayed role like this.

Treatment spraying 16 gallon per acre versus ground blaster spray 40 gallon per acre.

I think we we recorded significant more dye on the uh on the canopy or in the canopy from the spray room versus that ground sprayer.

That data was just analyzed last week.

These are held.

The coverage looks like from that application applied.

The horticultural spraying is interesting because you can map the field.

You can use AI to recognize trees.

You can do 3D spraying.

You can do your customized route design.

It's way more fun.

Way more fun than tedious rowcrop spraying, which is just app line back and forth, back and forth, back and forth.

You know, also every orchard has to start with small trees.

You know, there's unless you're just inherited a bunch of really old trees, but at some point you have to plan new trees.

The problem with young there's like a little trees you doing like that is they don't

have a lot of leaves.

They don't have much of canopy.

You'll still have to spray them, alright?

If you don't spray them, they may not have leaves anymore after summer because this is where it is.

But when you spray a little tree seedlings, you know, 345 feet like this with without, you know, without much leaves the ground blaster you saw.

In this case the the ground Blaster is a horribly efficient you create a chemical cloud covering the whole orchard and then most of the droplets are wasted because the canopies are.

The canopies are so little.

They're so small or 80% of alchemical is wasted, you know?

So what's that?

More efficient way to spray chemicals without creating this drift concern, because if you waste 80% or chemical they don't hit the target, they're just move with the wind or land on the ground they run off.

They're just environmental pollutant, so to save money you can use the drones to spray each individual tree in this Rotary dancing mode, and you can even specify how much like I wanna spray half gallon on this tree.

You can even be precise to that level.

You know there can be very precise, but you do that.

These are all of the what new technology allow you to do, to be precise, to save money and also to reduce the environmental impact?

Alright, using spray rules to control allergy and aquatic weeds in lakes, pond, any type of water body is becoming very, very popular on the East Coast.

Now we got more water than folks in the West.

This is a video of how they treat a lake in honestly Kentucky or somewhere.

You know, you don't need a nozzle anymore.

You basically just, you know a apply your tank, mix into the water and water is gonna even out your herbicide.

You can see the algae and aquatic weeds underneath.

This is a public park that they want to spray the day.

If application are three weeks later, you can see this nasty algae you know floating at the surface.

The water disappear so the water become clean again, right?

This is these are some really nasty green algae, if you ask me.

Do you wanna swim over here?

Or heck no, this is.

This is nasty.

You know in summer, but also if you look at this spot, you know the day of treatment and three weeks later, the edge of the bank become a lot more cleaner.

All right, this is a year regulation part.

You know, this is my neck of the woods.

We got more waste than anybody else because the warm weather and and rain, so this used to be a 22 acre irrigation pond.

We it's always start from the edges from the parameters and slowly grow into the pond.

So by the time we sprayed this pawn, I think they only have about 5 acres they can use for irrigation.

The rest is just all junks you know, algae and weeds and whatever.

So we sprayed upon with high rise of glyphosate.

Some of these perennial small weed and hamster spania was like two floor high, probably 15 feet tall, easily easily.

These are just, you know, area that you cannot get into with anything you can get in there with both.

You cannot walk in there.

You cannot use a four Wheeler to spray because they just mod.

You know, it's like March.

So these are what we called a hard to access area.

So if you want to spray these type of area, drone is the best.

So three weeks later that that irrigation pond looks a lot better.

There were pretty impressed.

Another case they're trying to control invasive species.

Somewhere in Florida, I think, Marsh, you can see the water down there.

You know, this is another area that you cannot get into with anything.

Not boat.

Not by foot, not by, not by uh.

UH-44 wheel drive or whatever may maybe a airboat can do it, but so far I haven't seen people using error boat to spray because that thing makes too much of a too much weed that ended and turbulence from the turbine.

This is how they spray the uh, cattail plants in the park.

You can see the water alright.

So I've heard admission they landed.

And you can spray or some really tiny spot as well.

Move back a little bit.

Alright, so this is a day of application.

This is a 15 days later you see the spot it traded start to yellow up, you know, because this is the invasive species.

They're just doing targeted spray in a National Park or some sort of a natural preserve.

You're versus invasive species.

Spraying has become a pretty big business down here.

We also got a lot of timber, so you have to spray those.

A a clear cut fields after you get a timber sale and you know and also you spray young pine trees to kill the rest of the weeds in the field so they can establish quicker.

But this is the wrong spraying herbicides over some young trees.

Yes, Tokyo rest of the perennial woody ways that we don't want.

Alright, so they got 2 pictures taken from the same spot.

The day of treatment and the several weeks later, obviously they're non selective.

Herbicide work out pretty good.

We could also do variable rate spraying based on crop size.

We can also do this is a a prescription for my variable reapplication examples.

We can also do a variable rate spraying using drone made prescription map and we can do that on a John Deere sprayer.

We can do that on ground sprayer.

Uh, these are some examples sprayed by the uh large John Deere sprayer.

You know using the variable rate prescription, you know the spray 16 gallon, 9 gallon and six gallon per acre in the same path.

We can also do spring weeds.

You know, this is where we can save some of the herbicides.

You only spray the weed patches in the field, but not the whole field, so you can see the weekly patches from the sky.

You got an active field 1st and you can choose where to spray where you don't and then in this case we only sprayed about 12 acres of a 30 acre field.

That's about 60% herbicides saving and then per acre caused herbicide was, uh almost a \$30 per acre.

So it's not a cheap products, but we we saved about 15 acre \$50.00 per week and also before and after spot treatment.

Umm.

From the same location.

This is before the spot spray.

This is after this boss spray.

Alright, this was all done by uh.

By uh by the drone, you know, so fully autonomous, I guess I'll show this video real quick.

You know, this is how the controller looks like.

This is autonomous fly.

I'm not doing anything.

Drone knows where to spray and where it should it.

You can see the weedy patches there and here.

Flow rate tells you if it's spraying anything or not.

Right now it's not spraying anything.

The flow rate is 0.

Due to system you can see the flow rate kicks on autonomously and spraying those weeds still spraying.

And then we ran out of weeds.

Just a few weeks out there is it.

It stops brave, so it's not gonna spray all the ways out there, but it's gonna hit the patches for you, you know, just like that.

Those patches will be covered.

We also work out a way to precisely spot spray weeds with a John Deere sprayer.

So this is a redneck version of scene spray.

You can see some ways are coming up.

And then you can see this little blocks where to so ground rig is going to spray this line is is booming and these shows you which section nozzles are turned on based on the position of the winds is that spraying the whole boom where are spraying with only a section of the nozzle.

This is how you reduce your herbicide spray and only apply where you have winds instead of spraying the full for you.

Hope this makes sense.

Alright, you can also use drones to spread seeds, cover crop seeds, natural species you know.

Because the dry tag, I just got an inquiry.

I got a question from North Carolina.

Department of Transportation they want to try spread some natural species of their role side right of way to stop the establish those natural species and they want to know the parameters of running their own testing.

So I gave them some parameters to begin with.

You can use the role to spread cover crop and looks very uniform.

You know, this plot was spread by drone.

This aside, happy summer cover crop after corn harvest, you can see I didn't miss any spot.

Uh.

Uniformity was good.

We can spread tillage, radish, rye, oats and there's a bunch of different seeds as long as it's not too light to fluffy, you know.

See slide rye.

Grass will be difficult because it's lightweight.

Seed it can blow by the wind.

Blow away by the wind easily and very fluffy.

Alright, so where do dual feats?

Ah, small farm were limited cash flow because the whole drone package is only costs 30 grand.

That's a lot cheaper.

That's spending \$300,000 by a new sprayer.

You know new guys looking for new business to start.

You know you with limited start funding that will be a good fit because you can get all the stuff you need and start your custom application business with as little as \$120,000.

You know, something like that.

That's very difficult these days.

Any business you want to start may cost more money than that if you leave it in a region with lots of terrain changes, you have to spray on mountains all the time.

You have frequent wet period.

Against two wet nobody can get in the field.

Drones make a lot of sense if you have a lot of tall crops or crop like a rice, drones will be your best friend because they can fly over those crop to spray them.

Vegetation management.

Your remote area with limited or no access, you know very hard to get to area like those marsh muddy places.

Drones will be your best friend.

Small odd shape fields with many obstacles and three lines and power lines and cables and whatever that's specific for drone.

Because aeroplanes, you know, want to handle those fields.

Typically, uh, challenges for a drone operators regulation is a big one.

Weaned, you know, whenever you you spray, you want to spray.

It's always windy, no doubt, as a challenge.

We want to see higher efficiency.

We are still seeing lots of hardware software issues, how you know, particularly the hardware reliability is definitely not where we want it to be.

There's still a lot of problems.

You know that you'll run into during the spring season because hardware problem, you know you have to fix those drones all the time.

Pets are label is another challenge because there is no dedicated label section for drones, there are still too new, too small as a market yet, but as a strong the as the numbers of drones and the acreage of drones you increase over time, we're seeing more and more interest from agrochemical manufacturers and EPA to consider a specific drone labels for down the road.

Uh labor is a limitation.

It's just hard to find a good quality, good labor quality labor to do anything these days.

Ohh speed we wanna draw the fly even faster because faster means more acres can be sprayed per hour.

Obstacle avoidance is a challenge.

So many people here.

The power lie.

Heard something during the spray season and damaged it wrong.

I mean it can be fixed fairly easily, but that's slow you down it makes you miss your spray time.

It's slow.

Your job, you know, in terms of translating into losing money.

Alright, makes it a refill.

Takes a lot of manpower and it's part is humid outside, so it's it's not a job for everyone.

Usually it's a young kids job, you know, to do mixing that and feeling.

Uh, this is a drone conference that I hosted for last two years, and it's getting really, really popular.

These are the images from this previous springs conference.

We have FDA, EPA global spread from Task Force, State Department representative, major journal manufacturers, major drone distributors and a lot of people from 40 different States and even bunch of Canadians flew down to Alabama to attend the conference and the dates are for next year's conference will be March 23rd to 26 possibly immobile Convention Center in Alabama.

Just in case anybody has the interests and want to attend the conference, we also offer a remote option.

So you can watch the presentation on zoom or watch the recording after the conference.

So this is my email address in case somebody want to connect after the presentation or if you have a question you wanna ask.

Again, I appreciate for the invitation.

I hope everyone finds the presentation useful for for your work.

Thank you.

50:25

Thank you very much.

Steve, I think we have a question from our Steve in the room.

Yes.

Thanks.

So yeah, thanks.

SL Steve Li 50:33

Umm.

50:33

Thanks for the presentation.

I have a couple of questions actually.

So you mentioned that at your conference you had a representative from EPA on the program.

SL Steve Li 50:44
Mm-hmm.

50:45
Do you know who it was by chance?

SL Steve Li 50:47
Uh Katrina White was the one that spoke, and I talked to Amy Blankenship.
You have.
Uh, she can calm down, she tried.
But EPA is under such a tight budget budget cut, even though we offer to pay her travel, they cannot get the eternal approval to travel, even though we we agree to pay for her travel.

51:11
Did they make any?
Did the EPA representative make any comments about modifying labels for UL for drone application?

SL Steve Li 51:22
They do, and also global drone spray, global spray drone tax force matching that as well.
There are the working horse actually behind this initiative, you know particularly Bayer crop sign.

51:34
Any but.
Did they have any?
I mean, obviously they were thinking about it, but any, any progress to report?

SL Steve Li 51:41

Uh thing?

They finish the six trials in several continents.

Ohm.

Several countries in 2023 and they are working on those data.

Those data may have been processed.

I don't know if they have submitted to the Regulatory agency yet, so that's one major focus or major project of that task force is to generate data for regulatory agencies to make decisions about drift models.

You know, because they care the current act.

This model cannot predict spiritual drift and needs update.

So that's the first step they're making.

There has been some discussion in crop life America and and I attended a meeting last year in Arlington, VA.

I don't know if they if they had a meeting this year or not, but crop life America is also working on the drone label for a little while now.

This is one of their initiative, along with digital labeling and then some other stuff, you know, so.

52:57

Thank.

That you're in the last question is do you?

Are the drone operators still required to maintain the light of the line of sight control?

SL Steve Li 53:11

Ohh they will depends on your exemptions.

Most of the guys are under the requirement to fly within lines of sight.

Now, I wouldn't be surprised that FA slowly giving away exemptions to allow people to do beyond visual line of sight operation.

53:22

Umm.

SL **Steve Li** 53:30

But beyond visual line, inside operation comes with risk and FA is all about how to manage the risk.

We need a better hardware.

Alright, so the current drones can do it, but it doesn't make me very comfortable doing that.

You asked me do we do?

Do do I want to fly beyond on the side?

I tell you no, because if I lose signal, very likely I'm gonna crash the room.

So we need a hardware to be a little bit better, but it's gonna happen in the near future because ohh many draws already have the ability to let you put a cell phone, cell phone SIM card in them.

53:57

It is.

It.

SL **Steve Li** 54:11

So you have two SIM cards.

One goes to the remote controller, one goes to the drone, so they'll always connect to each other via cellular network.

But again, that's not a bulletproof method either.

Uh, we spray an egg, we go to middle of nowhere, we're spraying lot of remote area that we don't have cell signal.

So poor signals.

So This is why I said we can do beyond line of sight operation beyond visual line of sight operations.

But I'm not a big fan of that, at least not yet.

Until we have better technology.

54:51

Great.

Thank you.

SL Steve Li 54:53

Umm.

54:58

Does anyone else have any questions for Doctor Lee?

I didn't know my office.

Before it, Pam.

I have a question about nozzles and a matching droplet.

You know, like the label required droplet distribution.

How is that worked?

Because it seems like some of the drones seem to be inventing new Rotary dispenser, has that worked out well?

SL Steve Li 55:21

Umm.

Yep, no.

55:24

What does it?

What does it look like for the average grower?

SL Steve Li 55:28

I mean, it's not perfect, but it's better than the hydraulic and also see my opinion.

But I mean, I'm speaking from the end user opinion as well.

So Rotary itemizer you can change.

You can check us, you know, if you let the road traumatizer spin faster, it's going to create a smaller droplets.

Yeah, let it spin slower.

It create bigger droplets, you know, so it's hard to match a role traffic manager to a specific flat fan nozzle because that's a orange to apple comparison.

You know that's not a fair comparison either, so it just depends on your operation.

If your operation requires really small droplets, then go for it.

But if you wanna reduce drift and reduce evaporation, you spraying trees.

You're flying 20 feet, 25 feet off the ground in low humidity.

Really hard days.

You need to use big droplets.

You need to use DRA.

You need to use all all your surfactant to reduce evaporation.

You know, and then you wanna really big droplets.

Umm, now and again I don't know if I'm in, if I'm answering your questions or not.

56:44

Yeah.

SL Steve Li 56:45

Does it?

56:45

No, that.

SL Steve Li 56:46

Yeah, I know some labels require certain droplet size and whatever you can still do that with Rotary atomizer.

56:47

And.

SL Steve Li 56:55

Just just you know it it doesn't go by the droplet, yeah.

56:58

Yeah.

Has there been any?

SL Steve Li 57:02

Sure.

57:04

Problem with any specific chemistries that has been.

SL Steve Li 57:08
Was it ultra atomizer?

57:10
Yeah.

SL Steve Li 57:12
Ohh, the only one I'm aware of.
It'll work out really well.
The only one I'm aware of is for people spraying weeds in pasture, Hatfield or forestry.
They need a really big droplets.
Sometimes that's problematic.
The rotor atomizer do an all give them a big enough tropolis so some of those guys still want to use flat fan nozzle drones to spray auxin herbicides in that case, because they want to have 600 or 700 micrometer droplet size.
You know that's too much for the road to itemizer other than that, yeah.

57:54
That's interesting.

SL Steve Li 57:56
Other than that is all.
It's pretty much all positive for switching to Rocha atomizer.
You know, I don't want to go back personally speaking.

58:06
Thank you.

SL Steve Li 58:07
Umm.
The other thing I'll also let you know is if you have a really thick techniques which happens all the time.
Your flight and nozzles will now be able to spray, you know, because there's not

enough pressure to break up that really thick high viscosity of techniques.
But those techniques can usually be sprayed by road, right?
Mother just fine because Rosemont father has dedicated power source and it can.
It has a lot more power.
How to break up the thick tagging mix into small droplets?
So a lot of time we're almost spraying stuff as thick as paint.
We can still paint the plants just fine, actually.
You can spray greenhouse shading paint with uh Rocha atomizer drone very, very well.
You can't do that with flat and nozzles.

59:06

The.
Another question, what?
Yeah.
Yeah.
Yeah.
Sorry this Steve again.

SL Steve Li 59:15

OK.

59:16

So what are the in terms of the battery life of the of the of of the drone?
This is the battery life longer, with the Rotary atomizers or with the pressure, you know, like a pump for the pressure for.
A.
You know, if you have to have a certain pressure for the flat sandals and you have to have a pump assume on the on the, on the road to maintain the pressure or how does that work?

SL Steve Li 59:41

Battery life has nothing to do with the the, the, the pump or droplet size and whatever.

So I I didn't get your question.

So are you asking the determining factors for battery life or?

59:56

No, what I'm asking is if you have a drone equipped with a flat fan nozzles and you have to maintain a certain pressure, does your battery last longer in that situation? Or if you have to run Rotary fan Rotary atomizers.

SL Steve Li 1:00:05

No.

Broad randomizer used two very small motors and they don't use a lot of energy, so the impact on battery life is negligible.

1:00:18

OK.

SL Steve Li 1:00:19

I don't know if that's what you're asking, you know.

1:00:20

So on the yeah.

Yeah, that's exactly what I'm asking.

So I'm the drones that use flat fan nozzles.

SL Steve Li 1:00:23

Yeah.

1:00:26

Is there a pressure pump on the on the drone or is he just made just establish a pressure in the tank before you take off?

SL Steve Li 1:00:33

So for Rotary atomizer wrongs, you still need a pop.

But a pop is a low pressure pump and the only function or the only requirement for the pump is to pump the tank mix from the tank to row to administer.

1:00:39
OK.

SL Steve Li 1:00:50
It doesn't need to create a higher pressure or much pressure.

1:00:54
OK, but if you're using flat fan nozzles, what do you do?

SL Steve Li 1:00:54
So.
If you use a flat fan nozzle, you probably need to have a little bit more robust, more powerful pop you know, but most of the time that pump is not enough to handle the thick techniques.
The poem is overwhelmed.

1:01:13
OK, great.

SL Steve Li 1:01:15
Yeah.

1:01:16
Thank you.

SL Steve Li 1:01:16
So yeah, battery life is determined by the weight of the drill.
That's the number one factor.
The amount of payload.
And also how many times you make a turn?

1:01:27
But.

SL **Steve Li** 1:01:29

The more times it needs to turn, the more battery is going to drain.

This is why a small fields.

You'll burn the battery first, burn out the battery first.

1:01:42

Thank you.

SL **Steve Li** 1:01:44

Umm.

1:01:54

Great.

Any last questions productively?

Awesome.

Really.

Thank you very, very much for taking the time to teach us something new today.

You're right, we have very.

Little drone usage here in agriculture right now, but so I think it's just good for us to get a dipper toes in the water a little bit.

So we thank you very much for sharing your expertise.

SL **Steve Li** 1:02:26

Yes, ma'am.

Yeah, alright, good luck to be here.

Hope you're well.

Founded a useful and and yeah just send me an email if you have any other question you would like to follow up with.

1:02:37

Great.

We will thank you very much.

SL Steve Li 1:02:40

Alright, have a great day.

1:02:42

You too.

SL Steve Li 1:02:43

Alright, bye.

1:02:46

So next on our agenda is, Heather, I don't see her yet, so I'm going to pass it to Steve for our didn't see Bag update.

Yeah.

Yeah, I'm.

I'm about the only thing I was going to talk about is that what we're currently.

Doing.

With Tripoli.

We're spending a lot of our eight.

Our division is actively involved in.

Now.

Monitoring for and developing some responses to the Tripoli occurrence, I may have seen some.

Stories in the media about it, and there's been some press releases both from the Department of Health and from our agency.

There has been one confirmed human case actually in Chicken County.

We have been, we have a group of vacation, last podcaster, number of seasonal test who are conducting some pretty active mosquito surveillance.

And so far this year, they've collected and sent to lab and total of forty seven pools of mosquitoes have come back as positive or Tripoli.

And I think the numbers thirty eight for West Nile virus and to compare that I think last year the entire year we had fourteen pools come back positive.

So we get to, you know, but three times in amount so far in the season 's not over.

So.

The take away is that the the virus is out there, it's circulating.

We're finding about half of the pools that were collected in this last round or. Species that act as what's called bridge vectors, which means that they are capable of.

Uh.

Biting both the OR, they feed on birds and mammals, and so they're capable of transmitting the virus to humans.

If it happens, you know if they happen to.

Uh, take a blood meal and even gets infected.

So the bottom line is we're very concerned and the permit health is very concerned about the prevalence of the disease or the virus right now, not excuse me, disease, the virus in the sketo bird.

Uh, populations?

And so we're what we're we just want to be sure everybody is aware of it and urge people to take precautions to avoid exposure to the shoes, especially in the northwest part of that.

I'm going to share.

Yeah.

Find a map here.

The Department of Health has.

Yeah.

So this is the.

Risk map that the Department of Health has published on their website shows the. Relative risk based on the detections of Tripoli and the mosquito pools with the. The highest risk area being there in Denton County, primarily because of the human health case that was found there and then the area above it, which is right now at moderate risk.

That's the area where I found the most.

Mosquito pools and I think actually that area may increase in risk here after some more evaluation.

So anyway, if if these are the areas where people need to pay particular attention, uh, to to the possibility of of you know, or the areas where you need to avoid contact and.

Uh, and we just want to make sure everyone 's aware of that to avoid, you know, so avoid activities at dusk and dawn, use mosquito repellent.

Uh, you know, don't do activities that increase your chances of having some

exposure to misquitos.

So that's the that's the message we're heavily involved in there right now and we'll. Continue to be involved in that over the next probably till the first frost.

A lot of like going on.

Then, but you know with that, I'll just if anybody has any questions.

I think if you umm does anyone have a quick question about Tripoli?

It's not.

We've got Heather.

Hi, Heather. Welcome.

HD Heather Darby 1:07:56
Hi.

1:07:58
Umm, we are.

HD Heather Darby 1:07:58
OK.

1:08:00
You are good to go if you are ready.

HD Heather Darby 1:08:03
Yeah, yeah, Yep.
OK.
Yes.

So Steve and Marian asked me to come and give an update on some of the.

Uh, corn kind of early season corn pest, soybean pests and the neonicotinoid work that we've been doing here at UVM.

We did embark on a second year of her monitoring and research with some new new trials that we started to put in place.

So I'll just share my screen quick.

I haven't had time to really put much of the data together yet, but umm, we have a little bit that we shared at the field day.

Umm.

OK.

So I'll start with.

The past years work just as a reminder to everyone.

In 2023, we had several the new research projects that started to look at Umm.

Neonicotinoids and impacts on farms and water and soil.

So we had two research trials or multiple research trials, one at Border View Research Farm where we're looking at the impact of treated and untreated seed on plant stands across 6 planting dates.

Umm.

And we replicated some of that trial on several on farm sites in Franklin, Grand Isle, Lamoille and Addison County.

So we were putting treated and untreated corn seed on farm as well and we were looking at crop crop measurements primarily.

So we repeated those studies this year and like I said, I haven't really had time to put any of the data together, but.

We did have far worse crop pest UM damage this year than we did in 2023, and that was very notable both on farms and at the Border View Research station.

We started planting at border view on May 7th and if people remember Umm back to May, may, April they were very wet.

I mean, it's been a wet season in general, but we had a really wet spring and for most people that severely delayed planting because people couldn't get out into the fields, but especially those individuals that did plant in early to mid May and even into later May, there was a lot of pest damage to those fields and we saw the same thing in our trial thought.

It was very cold.

We had very delayed emergence and umm, we can really see that out and about at the multiple sites.

I will also say that we did have a lot of reports from farmers this year about poor stands.

Again, it was very cold and very wet and so, you know, if corn was planted, then we had delayed emergence and just really making that seed susceptible to to damage from both diseases and insect pest.

So, you know, have more to report data wise on this.

You know, in the coming months, we'll start harvesting some of the corn here in a couple of weeks.

So, umm, we also had the site at Discovery Acres which is in Saint Albans Bay and this is an on farm research site where we have Edgefield monitoring.

And we're monitoring water coming out of tiles and also the surface of fields.

And so if you remember, last year we were collecting water for nutrient analysis, but we also started to conduct.

Umm, neonicotinoid assays as well to see if we were picking up neonicotinoids in the water that was coming off from the farm field and this field has been in corn now for multiple years and the entire field is planted with umm neonicotinoid treated corn seeds.

So we've also continued this work.

Monitoring what?

Neonicotinoids might be moving both through into umm water off from fields through tile and and surface runoff, but again I haven't.

Uh pulled any of that data together as of yet, but it's been another wet year, so there's plenty of water to measure.

That hasn't been a problem.

OK, so a couple of new projects that we started this year was to try to understand how a current minor management and conservation practices may or may not impact, umm kind of incidents of of these pests.

And again, we're primarily looking for seed corn.

Maggots.

Wider worms and grubs, so we put out a trial this year that had no till cover crops and manure and all sort of combinations of those treatments.

So you can see all the different combinations here where we have no till planted corn with cover crops no till planted corn without cover crops.

Umm or minor, we have broadcasted minor with cover crops, injected minor no cover crops so you can see all the different iterations and this again is very preliminary data that just shows the incidence of pest damage.

So we went out and buried corn seed out in the field.

In these treatments, we also planted corn too, but we buried corn seed in these wire baskets to basically be able to pull them out and look at incidents of of different pests.

So you can see that what we saw and again this is very preliminary is that when we have tillage and manure, umm, we seem to have more seed corn, maggot wire worm, etcetera.

Then when we have no manure and no tillage. Umm.

So you know, there is some preliminary data that you know already.

I shouldn't say preliminary.


There's already published data from the 80s and 90s that indicate no till without any organic amendments you know is less attractive to some of these pests.

But when you start adding in organic matter amendments like manure and tillage, then those conditions are more conducive.

Umm.

To see corn maggots as an example.

So we did see we think an indication that that was true.

 1:16:38
God.

 **Heather Darby** 1:16:40

But again, this is very preliminary.

Just mostly averages across the trial, but you can see where we didn't have any tillage or minor.

We had four to five.

Seeds that were damaged and this was out of 20.

So that is still quite high, actually.

Umm.

And then you can see where we had manure and tillage.

You know, we had anywhere from almost an average of eight of to an average of 10.

So nearly 50% of the seed being damaged.

Umm.

Anyway, so we need to kind of put more of this data together and and look at on the statistical analysis.

I will say there's a lot of variation as well, and so we we do know right off that we need to probably replicate even more than we did.

Umm it's it's actually quite an immense amount of work to dig all of these up and you know, sort of categorize all the damage.

So it's it wasn't a small fee.

I will say that thought, I do think we need to have more replicates.

Umm to to really understand what's going on there.

OK so.

Umm these were this is actually the planning date.

Study that we conducted last year and we were looking at flights of the seed corn maggot and looking at corn populations.

So it's just showing again without, umm, just put it like very preliminary.

I would say putting the data together, you can see the green line on the top is how the target population.

So that's what we actually planted out in the field.

So it's about 34,000 plants per acre and you can see that the populations were below that at all planning dates we didn't see yet a lot of statistical difference between treated and not treated umm corn as far as plant populations go, there are some differences, but again we need to look at this more closely to to pull out you know more statistical differences.

Just again, this was thrown together.

I would say pretty quickly, but overall you can see the the flights which are the blue line.

So we had one flight, you know, somewhere between the 10th and 18th of May, which is pretty similar to what we saw last year as far as seed corn maggot flies flying.

So you can see we had a peak in early kind of early May and and we did last year as well.

Like I said, this is very similar to last year and then you can also see we saw another peak, another flight around the 15th of June and that was fairly similar to last year as well.

Umm, so we are continuing to monitor the flights of the seed corn maggot.

Umm.

And we did this not just up in Albert, but we did this at other sites around Addison County and Franklin County.

And we also put the treated and non treated corn seed on farms, five other farms we wanted to, we had plans to do more sites but because the weather conditions were so adverse this spring, we weren't actually able to do that.

Farmers, we're having enough trouble.

Just getting getting their work done.

They didn't really need another thing to do with us.

So OK.

Umm, we also looked at alternative seed treatments.

And umm, we we looked at that in corn and we looked at that and soybeans. So we had a control which was untreated corn with bone meal application. So the bone meal application was basically to represent organic matter being added like some kind of minore based amendment.

Then we also had a untreated control, so with without the bone meal we had a spinosaurid seed treatment, which would be considered, umm a biological and also approved for use and organic.

We had the NEO neck treated seed, fungicide, treated seed and a diamide treated seed and you can see that without any seed treatment we had very poor corn populations.

You can see in general what our target was was about 36,000 plants to the acre and regardless of treat seed treatment or not, our populations were were low, but they were very low in the control plot.

I mean, not acceptable actually.

So around 30,000 would be acceptable, maybe 28,000 plants per acre, but with the controls, those populations especially around 15,000 would probably be considered, umm a catastrophic loss.

So again, this is just one year, one year data.

We had a great year to do it.

It was very wet and called and we planted, I believe we planted May 7th, so it was really early.

Umm.

And you know the conditions were not good at all.

I mean, as far as corn for corn growth and production, the same trial was also conducted in New York by a number of collaborators.

So they'll be numerous sites plus ours that will go into bigger, you know Project report.

Umm.

Let's see here.

We also looked at soybeans.

We didn't see as big of a difference in soybeans and that is, you know, that's been reported by others as well.

Soybeans are usually planted later in the season, so you know in many cases the ground would be much warmer.

You would expect the plants to germinate and emerge faster, you know soybean,

umm, recommendations are to plant when the soil hits 60 degrees.

Although many people do start to plant in May, it is generally umm, you know, most farms will plant after seeding corn.

There's more of a window for planting soybeans, so these were planted towards the end of May and you can see where we did add the bone meal.

We did have lower populations, we had low kind of lower populations overall.

Again, compared to our target, umm, and you know that that's concerning too that the conditions were that bad that regardless umm, you know see treatment or not we had didn't have great populations and you can see the difference you know the bone meal makes when you're adding in that organic material that's really attractive to some of these pests.

So you know, we would, again we use this to kind of replicate other types of organic amendments that farmers would be using maybe poultry, minor cow manure.

Some people actually do use bone meal, but it does seem to increase the issues that we see with these.

Umm, some of these pests?

And I think that's it.

That's what I have for for the moment.

Umm, we have.

I should add also there were a couple of other trials that we have conducted and are trying to complete at this point.

Umm, the first trial that I I don't have any data put together for yet and we didn't do this last year, was looking at neonicotinoid dust coming off from planters during planting season and we went out and set up these dust collection collection units.

Umm this spring, when farmers were planting and I will say it was this was difficult to get done because of the season again.

Umm.

And So what we did was we put slides, these glass slides kind of on a cardboard plate and we put the slides out at varying distances from the planter and they were placed basically.

UM to catch dust as the farmer was planting.

So you know we we ended up positioning those and whatever spot made sense really based on the direction of planting and the wind speed during that planting event.

And then we also set up some slides on the ground so that when the planter went

over the top of the slides, if anything was kind of coming out of the planter during planting and not going directly into the ground, that we would catch that as well. So we did that at 5 sites.

Umm, we had hoped for more, but with the weather conditions the way they were was very difficult.

Umm, I will say interestingly, this spring they're definitely wasn't much dust at all because it was wet and there also wasn't a lot of wind and maybe I wouldn't have noticed the wind as much except that we kind of wanted it to be windy so that as the plant and dusty so as you know the planter was moving, we would have something moving that would possibly get picked up by these slides that were sitting out around the planting area.

So we completed that project.

The slides have been sent to the lab for analysis and I just got the data back.

Umm.

Maybe a week or so ago and I will say on first glance there was only one site that had any detectable neonicotinoids on the slides.

So I need to look at that.

Obviously a lot closer, but it doesn't appear like we were like we were able to catch, you know, much dust or any neonicotinoids, you know, moving umm off from the field this, you know, this year umm, I need to talk to the lab as well.

To kind of understand the results better.

But again, it wasn't.

It wasn't dusty at all, and it also wasn't very windy.

The only plate that I saw where there was some detectable neonicotinoids was one site and it was under the planter.

You know which we might expect, you know, obvious for some dust with neonicotinoids might come off the planter.

Other people have seen that we did see it at one site, but none of the others.

Umm.

Which I was actually pretty surprised because I would have expected that to happen.

At least we didn't need wind.

You know the planter just went right over the top of the slides.

Umm, you know the method we used had been published by a couple of folks used by a couple of folks.

So you know, it wasn't something we made up on our own.

So I felt good about that.

Not that we couldn't come up with their own methods, but to utilize somebody else's, you know process also so we could compare.

Umm, but again that I'll have more on that once we get to look through everything.

The final project that we we pushed off until later in the season is looking at fluency agents and dust coming off from planters using different fluency agents.

So you know, a lot of farmers use talc or graphite, and in past research that has been shown to kind of be very abrasive and to kind of scratch off the neonicotinoid seed treatment.

So there was the development of some alternative fluency agents.

UM and there really hasn't been much data collected on those.

We've also heard from colleagues and you know through the industry that the seed treatment formulation has changed since this original research was done.

And so, you know, we've been trying to understand if the seed coatings are more stable so that they don't come off during planting or would the fluency agents so to do that research we basically.

He.

Have to hook up a kind of a big vacuum bag to the planter and the planter was really busy this spring, so it just and given the really shortened uh spring work season, we decided to hold off.

So we're hoping to complete that actually in the next couple of weeks.

We are trying to wait again for the ground to dry out because we do need to run the actually run the planter.

To make sure that we're creating umm, you know, realistic conditions and catching. Basically, we're catching all the dust that comes off of the planter through this vacuum bag anyway, so we need.

We need some kind of dry.

We need a little dry stretch to complete the project.

Umm, so hopefully we'll have that done in a couple of weeks.

But umm yeah, I guess that would.

That would now and and my update.

This is any question, yeah.

1:33:04

Ah, thank you, Heather.

I had a question and it's gone.

Oh yeah.

Did you net out for the the vacuum bag?

Right.

So if you're going to, then.

HD Heather Darby 1:33:25

So the vacuum bag goes around the.

1:33:26

Like how you collect it, yeah.

HD Heather Darby 1:33:28

Yeah, it sort of goes around the exhaust of the planter, the vacuum planner.

1:33:32

Yeah.

HD Heather Darby 1:33:33

Umm.

And so again, we're using another kind of method, uh, that we you know that has been published.

It was published from the original kind of.

Neo neck seed treatment work that was done umm.

And so, you know, we have to basically fit this vacuum bag around the outlet of the planter, which we've figured out how to do, you know, the problem is he, our planners like 12 rows too.

So you know, there's just a lot of logistical pieces, but we did finally get it to work and figured it out.

The other pieces, the amount of Labor involved with getting all the material at which I think you were on that email with the lab, like OK, you know, in the original methods they kind of scraped out this bag and then they cut pieces of the bag and they soaked the bag.

1:34:26

Yeah.

HD Heather Darby 1:34:37

And anyway, but we did sort of chat with those researchers and kind of their goal is a little bit different than ours.

So we did come up with an alternative plan to still use the vacuum bag, but we're inserting the slides in the bag to be able to catch whatever dust onto those slides and then remove those slides and send them off to the lab.

So they can use their same methodology.

So I think I think that's all ago.

1:35:12

That's great.

Yeah, that's what I was thinking.

I was like, I thought slides were somehow in there.

HD Heather Darby 1:35:16

Yep, Yep, yes.

1:35:16

But yeah, so they're going in the bag.

My second question was at the.

The Discovery Acres is where you're collecting the water sample, testing the water samples for New Unix.

HD Heather Darby 1:35:30

Yep.

Yep.

1:35:32

By any chance is that also a site where you may have done the dust slides?

I was just thinking if it if you collected this dust slides when you planted at Discovery Acres, OK.

HD Heather Darby 1:35:44

We did, yes.

We actually did use that as a site. Yep.

1:35:50

So if there was any way to show it right, like the dust and water somehow?

HD Heather Darby 1:35:53

Yeah.

And and we're also measuring the neonics in the soil there as well.

1:35:59

Yeah.

HD Heather Darby 1:36:00

Yep, throughout the season we did sort of cut off some of the soil measurements.

We reduced how many we were doing based on our data last year.

Umm but yeah, now we're still collecting soil and we're collecting soil at the Alberg site as well.

Umm.

And then we did go back and sample at the Alberg site last year's trial a year later to look at uh neonicotinoid residue.

After a year and that was a sight that had not had corn, a history of neonet corn.

So we were trying to understand how how quickly it would actually degrade.

Like what one would we get to the point where we don't detect any longer?

1:37:00

So it didn't.

It didn't get planted this year, but you collected the soil.

HD Heather Darby 1:37:03

No, we had a new site.

1:37:04

Yeah, yeah.

HD **Heather Darby** 1:37:05

Yeah, but we did go back and resample and we could sample again.

There's not.

We didn't plant anything there because we wanted to.

Hold on to the site just in case we wanted to sample one more time.

1:37:20

Yeah.

And the other questions for Heather.

I go ahead, Becky.

BL **Becky Langer-Curry** 1:37:34

Yeah, just two quick questions.

You mentioned that the you had only one site that had detectable neonics and that was under the planter.

I was curious if you knew it.

Did all of those sites use the same seed from the same vendor or was it all their choice?

Because what came to mind was perhaps one batch that wasn't treated as well as the others.

Potentially, if it all the others were.

HD **Heather Darby** 1:37:55

Yeah.

Yeah.

So I eat site, we collected a whole range of data and we were actually trying to find sites that were pretty that were really different.

You know, we wanted sites that.

BL **Becky Langer-Curry** 1:38:07

Umm.

HD Heather Darby 1:38:11

You know a different planters, different type of field management.

So we recorded all that, we got seed tags so that we knew what the variety was and what it was treated with and at what rate.

So yeah, it'll be interesting to dig in and see, you know, what was going on there?

Yep.

BL Becky Langer-Curry 1:38:24

That'll be in.

Yeah.

Yeah, definitely.

And then the second question was you mentioned a bigger report for the corn population that you collaborated with New York.

I was curious if that is a report that was done for regulators.

HD Heather Darby 1:38:37

Yep.

BL Becky Langer-Curry 1:38:42

It'll come to a regulatory body or a legislator, or it'll be academic publication where.

HD Heather Darby 1:38:46

No, I mean we're just all doing the same project.

So I imagine, I mean, I've already sent my data to Cornell, so we'll probably work together on a summarized report.

And I'm not sure I'm sure it'll go.

It'll be public.

It's not.

BL Becky Langer-Curry 1:39:02

Umm.

HD Heather Darby 1:39:03

It won't.

I'm assuming they'll wanna publish it in an academic journal, but they're trying to do the same work we are, you know, to inform.

BL **Becky Langer-Curry** 1:39:11
Correct. Yeah.

HD **Heather Darby** 1:39:12
Umm, all of us.

BL **Becky Langer-Curry** 1:39:15
I was just thinking where to watch out for it cause it will be interesting to see the.

HD **Heather Darby** 1:39:17
Oh, yeah, yeah, yeah.
Well, I'm sure I'll be sending it on to folks here, so yeah.

BL **Becky Langer-Curry** 1:39:22
Thank you.

1:39:34
Uh.
Anything else for Heather?
Awesome.
Well, we really appreciate it, Heather, I know this is a busy, busy time.
So as always, thank you very much for taking some time for us and to keep us in for doing such great and relevant research for us.

HD **Heather Darby** 1:39:49
Yeah.

1:39:56
So we really appreciate it.

HD **Heather Darby** 1:39:58
Yeah.

And we'll be we'll have more soon though.

Sorry, there wasn't a ton there yet.

1:40:04

It great.

Well, it's still.

Yeah, I mean, it's good for us to just hear again.

HD Heather Darby 1:40:09

Still going?

1:40:10

Yeah, it was.

What's happening and yeah, and even just your struggles.

Yeah, and reminding us how wet everything is, but Yep.

HD Heather Darby 1:40:19

Yeah, and still very, very wet.

So all right, everyone have a great day.

1:40:26

All right.

Thanks very much, Heather.

HD Heather Darby 1:40:28

I.

1:40:34

Uh, alright, Laura, you are ready.

Yeah.

So our last speaker is Laura also from the VM and we asked her to talk about umm yeah farming practices that support pollinators.

So kind of from the other end of things.

So, but what we can do?

What we can build into our best management practices, so take it away, Laura.

 **Laura O. Johnson** 1:41:04

Hey.

Share.

You see my presentation.

 1:41:19

Yep.

 **Laura O. Johnson** 1:41:20

OK, alright.

Well, thank you for having me today.

I'm Laura Johnson.

Paul Nader, support specialist with you, an extension and.

Today I'm going to be talking about farming practices that support pollinators, and I primarily work with commercial vegetable and Berry farms in my current role in extension, umm.

And so a lot of what I'm going to share today applies to that type of farming system.

And occasionally I'll get pulled into uh livestock operations and more.

So, like grazing systems to talk about farming practices for pollinators.

But I'm not gonna cover that too much today.

And so this will be focused more on small diversified veg farms.

Let's see.

Please there.

So I'm gonna start with an introduction to pollinators and then talk about planning and implementation.

Of supportive pollinator habitat, and I think you've heard from Spencer at, Umm, the Vermont Center for Eco Studies.

So I think you probably have a little bit of background on pollinators, but within extension and the Pollinator support program are tenants of pollinator support are just remembering that there are a lot of different types of pollinators.

All of them need flowers and save places to nest, and the crops and plants that are grown on commercial farms, which is my primary audience, can't provide food and habitat that that supports those populations and their management tactics affect the floral and nesting resources in farms are already doing a lot to support our wild

populations of pollinators and our adapting to provide the needs of pollinators.

I always like to start by distinguishing between managed and wild pollinators.

My work primarily focuses on wild pollination services on farms for crop pollination, though I do have a background with managed pollinators and also work with them to some degree on farms in Vermont, but mostly wild pollinators and.

So the obvious one are honey bees.

Bumblebees are also.

Commonly used as a managed pollinator, Mason bees are sometimes used in tree fruit production, and then another example here are alkali bee's, which are used in alfalfa crop pollination out in the Pacific Northwest, where they they manage kind of soils around alfalfa plantings.

For these soil dwelling bees.

So mostly in Vermont, we'll see honey bees and bumblebees when it comes to managed pollinators on farms, most farms are not using any type of commercial pollinators.

Maybe to some degree in pumpkins or apples, whether or not they're needed within our specific landscape is kind of a question, but most farms are relying on these pollinators, all the moths, Wasps, bees, butterflies.

UM in our.

In our landscape here, a lot of what I tend to lean towards our supporting bees in AG landscapes and there's a few reasons for that.

One is a lot of the research that has been done around supporting pollinators and crop production has been done on bees because they contribute so significantly to marketable crop yields and quality.

So that's one reason another reason is that I'm still learning.

I'm not an entomologist, so I'm still learning about how other types of wild pollinators kind of come into play when it comes to crop pollination and a good example of that is like moms and apples.

Not necessarily.

I don't think in the northeast, but in the other Eastern states South of us, there has been some findings around moth pollination in in commercial apple production, there's also less research done on other types of pollinators in in crop production.

So it's a really new and kind of budding field when it comes to the specifics around crops and different wild pollinators in terms of bees, there's over 350 species in Vermont around 4000 in the US, 20,000 across the world.

And there's a lot of research showing that.

Umm, uh wild bees produce larger and better yields.

This is specific to research at the Gund Institute, or they looked at while these in blueberries, but there's emerging research around other crops as well in the significance of wild bees there.

So all pollinators and insects are facing kind of these four top threats, loss of habitat and resource diversity, pests and pathogens, pesticides and climate change.

I tend to focus on uh cultivating habitat and resource diversity, and you'll see that here today.

So there's a lot of different ways to counter the the four threats that I just mentioned and you know where to start as a farm or a farmer can be a bit daunting because there are so many different types of pollinators and they all have different life cycles and live in different places and feed have different food preferences.

And so thinking about where to start, we've started to develop pollinator support plan, which can be found on the Vermont vegetable and Berry Growers Association website, and it's under the VGA member programs.

And there's four, actually.

There's three listed here, but there's another new one for pick your own farms, but pollinator support planning is a tool that we have started to develop there.

And so typically this is going to be for a grower who is growing crops that require insect mediated pollination.

So these are just not all inclusive lists of what types of crops those might be, and that are also found in Vermont and then the Northeast.

Some are more dependent on insect pollination than others, but and if anybody is growing these types of.

I foods on their farms.

And they are needing insect pollinators and may consider creating a plan.

It's also, you know, if you're growing crops for seed production, some farms who maybe just growing leafy greens or any other crop that may not require insect mediated pollination might be interested in enhancing biodiversity.

Or supporting any managed bees in the landscape.

And you know, if you're using pesticides, creating a plan can help plan around protecting pollinators with through pesticide use.

So some tangible benefits of writing a plan are just supporting those marketable yields, reducing the risk and cost associated with crop pollination by managed bees

or by hand developing a planting or management plan for supporting insects needed on the farm.

Uh crops benefit not only from pollination services, but some of these pollinators are also pest predators, so enhancing habitat, diverse habitat to support those dual purpose insects is important.

And it also could be used as a marketing tool to display on a website or print out for customers.

And I've seen some farms doing this with their produce safety plans and so another opportunity there with a pollinator support plan, depending on the customer base and farm interest.

And then, of course, the pollinator benefits of writing a plan are providing, and you know, bees and other pollinators are feeding on pollen and nectar from flowers.

And of course all need safe nesting spaces throughout their life cycles.

And a pollinator plan can help develop those spaces on the farm.

And just as a reminder or maybe it's new for some folks, if we're talking about be specifically, there's kind of three spaces in our landscape that they're living umm, cavity nesting bees are typically the these that live in colonies like bumblebees and honey bees.

Most other types of bees are solitary.

90% of bee species are solitary and don't live in colonies like those two managed bee species, and 70% of all bee species live in the soil.

So soil health becomes a pretty important.

Management practice to consider when it comes to nesting habitat of bees and then also tunneling bees that might be in snags.

Umm.

Or this is a Raspberry stem where some will burrow into the stem for laying their eggs and nesting.

Oops.

So I'm gonna run through briefly the Pollinator support plan.

This is kind of the outline that the plan covers, and I also and for each section of the plan the farm information cover crops, dedicated hall and pollinator habitat mowing practices, pest management, pollinator monitoring, tillage practices, water sources and use of managed pollinators.

All of these sections I've just partnered with some pictures and examples of how farms have started implementing these themes of pollinator supportive habitat in

their landscapes.

So this is a very like broad overview of what can be done and really dialing into the specifics of plant types or flower phenology versus beef phenology or other type of insect phenology.

Those are those.

I'm not gonna cover today.

I also wanted to highlight that we've started working closely with NRCS and I'm on my way to finishing up umm my TSP certification technical service provider certification to be able to provide farms with pollinator habitat design DIA conservation practices.

So that design and implementation implementation activities, so basically a pollinator sort port plan that is funded by cost share through NRCS.

So we have started to adjust our tool on the VGA website to also support that planning process, but also for folks that may not be interested in working within our CS.

It's it's still a useful and valuable tool for those folks as well.

So as I go through this, some of the sections will be paired with some narcs practices that after completing a plan, folks can engage with in terms of getting cost share to incentivize the installation of practices.

The the plan begins with just looking at the farm broadly.

Maybe that includes a map for the farm and where they are already implementing pollinator habitat or planning to implement pollinator habitat.

And then just kind of general farm information about acreage, what kind of crops they grow, what their market base is and general information profile information like that.

The first section is cover crop selection and management and we started with this because most diversified farms are using cover crops in the state of Vermont.

So it felt like a very accessible way to support pollinators on farms in Vermont and cover crops when they're left to flower, can support pollinators all season long by providing pollen and nectar and around crop bloom, or during crop bloom, which helps provide floor diversity and reduce in species competition for floral resources.

And of course also supports soil health, which is important for those ground nesting bees.

So an example of how this has been playing out on farms 2022 was the first full year of the Pollinator Support program.

It's a very new program at extension and we worked with farms to plant.

A single planting of multi species cover crops to provide floor resources throughout the season, and we use mustard, buckwheat, sunflower and sun hemp for blooms through June to September.

More or less depending on when they planted and this went OK.

It was a pretty drowsy year, but so there was some stand establishment.

So depending on the establishment challenges, so depending on the site it it went better or worse, but it was a really excellent introduction to what pollinators support might look like on farms.

And we've continued that through to this year, though we've gone through from a single plan multispecies planting to multiple single species plantings over time through the calendar season.

So from April Umm to let's see planting April to July and then blooms from June to September using some annual flower and cover crops.

So we're in the midst of this now with a peer group of folks that have been focusing on these plantings.

There's ten farms that did this, and they've been monitoring as well for pollinators at bloom periods and reporting back and we've been sharing that with the the farm community through the newsletter on the through the VGA.

These are the crops that were planted.

Pretty familiar.

Most of them to a lot of farms, oats and peas, buckwheat, mustard, basilia is kind of the newer species that folks have less experience with, but it is an important in terms of species, in terms of pollen resources when it comes to cover crops.

Just some other examples of annual flower and cover crops.

Example within a high tunnel on the left here and then on the right.

Some sorghum Sudan grass mixed with sunflowers.

Another example on a farm that was establishing a strip of fruit trees between their high tunnels and use some biennial cover crop here of yellow sweet Clover.

During that establishment period.

The next section in the plan is a dedicated pollinator habitat, and this is typically establishing areas of herbaceous or shrubby plants to provide diverse flowers and forage and nesting habitat on the farm.

And there's all of these loops potential and our CS practices that folks could engage with and get some financial support through.

Umm.

And these are typically a non cropped areas and also include installing artificial nests as well.

But it's important providing different types of flowers supports different types of pollinators.

So these, like a sunflower, is an example of an open faced flower.

So certain insects that don't have tongues can feed on that type of flower versus something like a legume or Clover species where some insect really has to work to get inside.

Whether that's through having the strength to pull the flower parts open to access pollen and nectar, or they have tongues like moths and butterflies and bumblebees to be able to access those resources.

So just a brief example of the importance of flower diversity.

One type of kind of dedicated pollinator habitat is this idea of a pollinator Meadow.

This was done at Otter Point Farm, Addison County.

I don't typically recommend this as a starting point for farms.

It's pretty tricky to establish pollinator meadows, but if you can get it going and you have the time and the space.

Because there's a lot of weeding involved, it's it does provide some really beautiful or vacuous habitat for all types of insects.

Another kind of easier planting to establish our riparian areas or woody hedgerows with flowering shrubs.

Willows are great early season floral species that farms will sometimes install in order to support early spring pollinators.

2 examples of that here of 1 being installed at Diggers Mirth Collective Farm in the interval and then an existing stand at owls head Blueberry Farm in Richmond, adjacent to her fruit trees and then blueberries which are not in that picture interval has done a lot of work with Audubon Vermont who has a bird in be friendly farming program and this is just an example of a wildlife habitat planting that was intended for both bees and birds and some marginal habitat on farms.

That is no longer usable for cropping, usually because of flooding, so this was a space that was.

Regularly flooded and so they just decided to turn it into some habitat space.

And then it might just be adding some artificial nesting sites as dedicated space for these, like Mason bees who nest in tunnels you can see in the piano this at the farm

between they drilled some holes into the piano where some bees could nest. Also, a lot of snakes living in that piano for rodent control and and then I've seen on several farms installations of Mason bee homes and those do need to be regularly, regularly maintained.

But kind of like easy things to do on farms.

Also, just maintaining bare soil and umm so you can see here on the left a little cellophane B peeking out of its hole in the spring during Apple bloom at the horse farm that was just near the parking lot that gets, you know, regularly mowed pretty closely.

So there's exposed soil for some of those soil nesting bees there, and then a farm Rd at Luna Blue Farm in South Burlington every year has a huge massive.

Mating.

Aggregating space.

Umm.

April of some mining bees, which are important for fruit pollination and there's just thousands of bees mating in this farm Rd.

So they are just mindful of that and and aren't driving their tractors or heavy equipment in that space during the few days that this happens, so.

Mowing practices are another like kind of low lying or low hanging fruit for folks, I feel easy to adjust mowing practices to improve food, investing space and on farm. So just waiting to mow, if you have fields of goldenrod, Joe pie, weed, other types of asters folks, can you know, either neglect mowing for all of the space, or do some rotational mowing.

So maybe only mowing half of it a year and half of it another year just to keep you know, trees and shrubs from coming in.

Also, I started to see on farms or at least notice that in some places they fenced out marginal areas of pasture where it might be too wet for their livestock to enter, or the forages and growing.

Umm.

At a level of productivity that makes sense.

So they've just kind of fenced out wild flowers from those areas to prevent wild livestock from entering and providing bird and be nesting space there.

And I've seen some like very strategic fencing around milkweed plots also, which has been interesting to support monarchs in grazing systems.

And then just in any type of field cropping systems, squaring up fields and leaving a

little extra space for woody shrubs, wildflowers to grow.

Of course, there's always invasives to worry about and needing to deal with those, but depending on the invasive species, you know there are food resources that are provided there as well.

UM past management is another part of the plan, and this is really kind of identifying ways to prevent or avoid using pesticides, but also thinking about best management practices with pesticide use.

So just some examples that are also funded by NRCS, low tunnels and mulching to avoid different types of pesticides in the landscape and also umm monitoring whether that's actively monitoring the field with sticky cards or thinking about and planning for use of the Northeast Weather Association tool where you can monitor disease conditions before applying sprays in apples for example.

So, umm and then also highlighting just best management practices to reduce risk of.

Killing or, you know, compromising the well being of pollinators or beneficial insects in the landscape, like spraying outside of bloom while also being mindful to include in a plan.

Following any state or federal laws as part of that process.

Pollinator monitoring is something that I've been engaged with since the beginning in terms of understanding what types of pollinators are in these these different types of habitats, features that are on farms so they monitoring can be used for that.

It can also be used to assess how things change over time as management practices change, and this is just one example of a farmer up in Grand Isle who has blueberries, who has started monitoring is blueberries during bloom every year.

He was very proud of his monitoring sheet here that he had and.

I was sharing in the VBG a newsletter.

The the bumblebee counts that he was finding in the spring and on his blueberries that he hadn't really done before.

So that's really fun to hear from folks tillage practices is another section of the plan. Just thinking about those soil nesting bees and how tillage practices impact those nest spaces, and depending on the type of insect or B nests are going to be more shallow or deeper in the landscape.

So kind of identifying through the plan.

Different ways to conserve soil habitat for bees.

I'll also mention though, while some bees may prefer undisturbed tillage systems,

there's other types of bees that actually really thrive in intensively tilled systems. And one example of that is a squash bee and which is a specialist bee to the large big belled squash flowers like pumpkins and winter squashes and summer squashes. And these are very resilient native bees that actively create their nests in this highly disturbed areas and pollinate squash, squash plants, which are totally dependent on insect pollinators.

And this is just a quote from a VGA newsletter where a farmer was sharing their kind of thought process around, leaving their soil between squash beds to encourage nesting habitat of those squash bees.

And then the last two sections here are going to be water sources and use of managed pollinators and water sources is really just thinking about and kind of. Stop being supportive of kind of clean water initiatives that farms are already engaged with and providing clean water for for insects and pollinators.

Because some of these bees are using water to mix with soil to make their nests and obviously having clean water is an important piece of that to maintain the health of those bees that are directly interacting with that resource.

Mason bees are an example of this, and then honey bees, if folks have honey bees or are concerned about honey bees, honey bees actively use water to regulate high temperatures, especially in times of extreme heat.

And then the management of standing water to prevent unintentional beneficial insect mortality.

So thinking about 5 gallon buckets and fields, I was going through some of the pollinator plans that were on the website and somebody mentioned that they turned their five gallon buckets upside down to avoid trapping bees and rainwater.

And then I went to the farm.

The other day and took a picture of a new like nursery space that they were establishing.

And then later I realized, like, wow, they're actually are turning their five gallon buckets upside down.

And I was pretty impressed and it was exciting to see that and.

And then finally, if folks are using managed pollinators or just hosting managed pollinators on their farms, there's a lot of veg farms that allow honey bee keepers to have their hives on the farms thinking about ways to protect colony health during crop pollination.

And then also, if folks are actively using honey bees or bumblebees, minimizing

threats to wild bees that may come from those managed pollinators.

Umm, so protecting managed bees on farmers might look like fencing, so from protecting from bears and skunks and other things that might wanna get into either bumblebees here on the left or honey bees here on the right and destroying those colonies during really sensitive times when pollination needs to occur.

Or in the case of bumblebees, specifically using Queen Excluders on commercial bumblebee boxes to reduce the potential for umm.

Commercially bred bumblebee species genetics.

Umm kind of reducing the risk of spreading those genetics to wild bee populations and then also preventing pest and pathogen exposure to wild bees with queen excluders.

So kind of coming back to these like tenants of pollinator support and UM in how we think about pollinators in the farm landscape and what they need, they can all really be championed through the use of a pollinator support plan.

And then implementing the kind of key components of the plan as it applies to your farm.

So that's all I have for you today.

These are the folks that are funding me, including folks you all at the agency have a egg, and if anybody has questions about all of this, I'd be happy to answer them.

OK, Steve.

2:12:09

Yeah.

Hey, uh, thanks for that.

Presentation is very interesting.

Umm, so you mentioned the monitoring of the pollinators, which is that something you're accumulating all that information or is or each individual farmer doing it or how's that work?

L **Laura O. Johnson** 2:12:26

Yeah.

So during the 2022 cover crop plantings.

UMIII kept all of I I was primarily doing the monitoring of the pollinators during that time, so I have that data and then this year with the cover crop plantings, the farmers and myself are engaged with monitoring the pollinators.

And so I, yes, I have that information and.

And then, you know, I kind of do one off monitoring events, but in terms of kind of consistent pollinator monitoring, we do have that.

I've also been engaged with the Gund Institute and Taylor Ricketts work in blueberries, and we also have monitoring data from that research as well.

2:13:25

Is that well published or gonna be published or?

 **Laura O. Johnson** 2:13:28

So the.

Blueberry data.

There has been published data from the Blueberry work in Taylor's lab from a few years ago.

What has been happening in the past couple of years is not yet available, and then the pollinator monitoring data that I've been working on with the cover crops.

More specifically, I will produce in the form of a case study because I haven't been doing it in like a statistically and significant way.

So it's kind of more anecdotal, especially in using data coming from growers as well.

Umm, but I hoped to be able to do that in the future to have more kind of detailed data that would be publishable.

But right now it's gonna be in the form of, like, a case study of this is what we experienced on these ten farms or before it was the last, the 12 farms.

2:14:32

OK.

Well, thank you very much.

Something I'd like to talk to you about.

Maybe working on that with you.

 **Laura O. Johnson** 2:14:36

OK.

2:14:37

We've been talking to Ryan Revos over the Center for Eco states for doing that kind

of work, and he actually proposed a contract with them to do that just didn't work out this year.

 **Laura O. Johnson** 2:14:42

Oh yeah.
Great.

 2:14:45

But like the talked about including you in that.
So I'll give you a call.

 **Laura O. Johnson** 2:14:49

Ohh yeah yeah, they're great.
They do.

They've been doing that for a long time and have a lot of experience with that.

 2:14:57

Yeah.
So I'll give you a call. Thanks.

 **Laura O. Johnson** 2:14:59

Great.
Stephanie.

 **Smith, Stephanie** 2:15:07

Hey I have a question about is Vermont the first state to do this work and the the way that you're doing it?

 **Laura O. Johnson** 2:15:15

Yeah.
I you know, I think so.
It has been quite the ride, kind of like coming into this pollinator program because in terms of extension work I have started to see more and more.
Umm.
Kind of formalized programs around pollinator support on farms and in extension,

which is really exciting, I.

And I do know that, like the Jersey society and another nonprofit that is escaping me right now, have, like, pollinator plans.

Like the sources has bee better certified pollinator plans that folks can engage with, though I did learn that it's more for like.

Companies like Walmart or Whole Foods that kind of buy into this plan to be able to label their produce, and it's not something that smaller farms can engage with so much so.

I haven't seen other extension programs with like support plans like we've been working on Umm other than like NRCS.

Has this DIA pollinator habitat plan, though?

Umm, I haven't seen an example of 1, so we're hoping to be able to.

Do that so I would love to learn if other people are doing this type of work, but it's kind of like in bits and pieces that I've been learning from folks, but kind of like at a holistic level.

I am still seeking out a fellow extension colleague to collaborate with on that.

 **Smith, Stephanie** 2:17:12

Thanks.

 **Laura O. Johnson** 2:17:13

Umm.

Uh, Steve?

 2:17:19

Yeah, I got a question.

So you mentioned the NRCS practice sport, the farms you worked with today take advantage of that or do they just do it on their own or are they involved they enter, yes.

 **Laura O. Johnson** 2:17:31

Yeah.

So some of the examples I was showing you were funded through NRCS and some are not.

And so we really hope that through this partnership and becoming a TSP and being

able to kind of directly engage with growers for those that are interested in cost share opportunities, we can help.

Umm, enhanced opportunities where farms can take advantage of financial resources through the NRCS and UMM, in some folks are already doing that but not everybody.

2:18:25

Sorry, Lauren, you're doing good job of monitoring your own questions.

I'm taking notes.

Anybody else, and I probably Ryan, is not on the call today.

He.

Yeah.

OK, OK.

I'll, I'll.

Yeah.

So that connection is not quite here today, but he promised he would check back in.

L

Laura O. Johnson 2:18:38

OK.

2:18:44

So we can.

Just.

Just, yeah.

Yeah, well, I'll give me a call stuff.

Coordinate that.

L

Laura O. Johnson 2:18:47

Great.

2:18:50


Any any other questions for Laura?


Awesome.

Well, we greatly appreciate it, Laura.

Thank you very much.

You super helpful for us as we two build our best management practices for.
Umm, you know, goes hand in hand with.
Munix is pulling your protection, so thank you very much.

 **Laura O. Johnson** 2:19:16
Thank you.

 2:19:22
Ah, so last but not least, we have ham.
Who is going to take us back to new next specifically and she?
He's going to give us a quick review of EPA 's recent, Umm Occupational exposure assessment or.
Pretty searching, OK.
Yeah.
Yeah.
Something you tell us.
Hi everyone.
Ohh this is really quick and it's in the context of letting the AIB know about all the changes for NEO next and I'll let you all figure out for yourselves how relevant you find this at the end.
But should only take me about five or six minutes.
Umm, there was press recently about neonics and that's what this review update is about.
So as you know, EPA is required to review every pesticide registration every fifteen years, and the Unix are currently in the midst of that review period.
On June twenty seven I OPP office of Pesticide Programs issued a memo updating their occupational and residential exposure assessment for sea treatment uses and that's why this gets kind of pulled into what we're talking about today.
So the background is in about twenty, twenty EPA issued a preliminary interim decision.
The changes they were going to make to the neonet registrations for C treatments after that, there was a public comment period.
They received a lot of feedback and sufficient feedback so that in two thousand twenty two they had to change the baseline data and essentially the mechanics of how they were doing their risk assessments for these chemistries and EP makes the

point that the human health risk assessment that they completed in twenty seventeen still stands.

Everything stands except for what we're about to talk about.

All of the changes that were about to talk about don't come from new information on the units being more hazardous.

It has to do with they got feedback from manufacturers on how many hours applicators are treating seeds, and so the exposure portion of the assessment had to change.

And it's very specific to two.

The the biggest changes are most specific for two areas, commercial seed treatment operations for the folks that are cleaning the equipment when dealing with.

Umm.

Certain crops.

So I've got about seven slides that kind of summarize this, but in general the for clothianidin, which we see on this screen, it's this short list of beats broccoli, carrots, leeks.

The people cleaning that equipment in commercial seed treatment operations and on farm.

Treatment of seed potatoes is has exposures where EPA estimates that it even if the people cleaning that equipment were to wear the maximum amount of PPE required that those individuals would receive a greater exposure than is healthy, so that something has to change.

Healthy.

All of this in terms of the IB, where you're moving forward to is in the future, we're looking at something has to change.

This is EPA saying that something has to change and you could see the label changes related to these uses.

Her middle clobbered it is again the people cleaning the equipment at the commercial sea treatment facilities.

And it's these crops specifically that you PA has recognized are causing the biggest exceedances.

And then for the methoxy, which really it's gonna look like has a disproportionate representation in this in this set of slides, because it has the most uses in agriculture.

But here you can see that the EPA recognized folks doing the seed treatment and that left hand column folks doing the packaging in the second column cleaning the

equipment.

And then on the very end you have on farm handling and planting of treated seeds, this particular table goes on for four pages and that's zoomed out.

So you can start to get a sense for it, but you can really see that third column.

It's the individuals that are cleaning the equipment associated with treatment seeds that are essentially receiving exposures at work that exceed what EPA estimates to be inappropriate dose.

So the the summary there occupational handlers that are on farm with seed potatoes and then occupational handlers that are cleaning equipment associated with commercial operations are the two groups of individuals EPA 's looking to make changes for and how that meets with what AIB is working on right that the MP 's and the BMP 's that we have are you have are working on use and application and what we're gonna be looking at in the future are changes to the label.

But I can't tell you today what they look like EPA specifically looking for additional help in refining that assessment to that they can figure out what changes to make.

There's a comment period that is open right now, so anybody that has an interest, I know this is also something folks and extension for.

Companies or farmers who treat seed had the opportunity to weigh in on this.

And I have a little example of that link will take you to the document that EPA has created looking for additional information on the C treatment scenarios.

And this is an example of some of the questions that they're answering.

And of course, I'm not gonna read through all of this just to let you know that that.

This is the type of information that they have put out on their on the document they release, but they're asking some really basic stuff.

What is the type of equipment most people are using or most people using liquids or solids?

What is the maximum label rate that you can treat with?

But what is the average rate that is being used?

They've also asked how many acres on are.

Most people are able to plant it in an eight hour day and what is the highest seeding density?

Again, these are really the mechanics over EPA trying to set up a a robust, realistic scenario for received treatment.

And that's it.

That's the update for new information on new registrations ready for any questions.

It's.

OK.

Yeah. So.

They're saying that the current PPT is not adequate for treaters, but in some cases, even for the folks are claiming to see not just people treating stupid planning.

Yeah.

Did they have any?

I mean, what are they talking about?

Two higher rate not the people E.

Uh, two could be exposed for too long.

Grand timing.

Where did the problem come up?

They they haven't, they have in their documentation like the pounds and there's this acronym that I'm forgetting now.

Essentially, it's the volume of sea treated.

And I think.

What it was is the volumes per individual, whereas you large was too large for that extent.

Those two large should.

Those two should.

How about for the people playing?

I don't remember specifically, but it's always.

It's being averaged on this volume handled and that's why they're trying to figure out how many acres are you planting in a day and it's getting in into the exposure interval for.

This is acute exposure and subchronic exposures that I think there are also some individuals working more days than they expected, right?

Like it has to do with the size of the treating facility.

Is it one person that's working year round on every single seat that comes through because they go into some details of even the baggers?

Don't just bag the people on the tractors.

Don't just drive a tractor and they're getting out and they're measuring depth.

Penetrate you like so they're touching other parts of the implementation.

Other parts of the field, so I think that's what they're.

Right. And the only sense.

About where they're going to get the information they need.

You said that.

We business see the emergency trip, see Trade Association.

OK.

It's all public comment, right?

Yeah.

So you always comment.

Yeah, I think it would be interesting to see what comes back on this next step.

Jonathan is not on the call, is it, which probably make sure he hears about this.

Sees a seed treater.

Or maybe I'll send an e-mail.

We're able, sure.

But talk.

Others to stop sharing apologies.

You can't.

Umm.

This is me just being dumb, so I guess I was trying to hear a lot of things that so it is the people planting also outside of seed potatoes.

For very small.

Group of like one chemistry and OK crops. Yeah, OK.

Crap. OK.

Crap.

And I can show you that document.

OK, this properly.

I just wanted to make sure I was capturing that.

So it's people planting.

I'll go ahead.

Stephanie, you can ask your question.

SS

Smith, Stephanie 2:29:33

Yeah, I was just thinking about and I don't know if this comes into play with what you just talked about, Pam, but whether or not there's a quality control, quality assurance. Documentation for treating seeds as relative, I mean relative to coatings in particular, but like but like does and you don't have an answer for this, but it like the industry, what is the industry provide?

2:29:58

No. Yeah.

Checking my belt to tell us what do you think, Becky?

SS

Smith, Stephanie 2:30:05

I see a hand up, so that's my own.

BL

Becky Langer-Curry 2:30:06

Alright, I I don't.

I don't know if we provide you know that type of information on a label or something.

I haven't seen it, but I will say there's the haibach testing that they do the dust off and everything and that then there is risk assessments that go along with it.

So I think I think the data is there, it's a matter of finding out where it's you know, is it only coming in in these data, Collins and then in comment sections or is it published somewhere on a material safety data sheet or label.

If the group wants to know, I can only look into that further, but there I'm there is data associated with things there.

2:30:44

Uh Becky, is there a standard that they're supposed to try to meet or?

BL

Becky Langer-Curry 2:30:48

Uh for treating the seed?

Yes.

And that's where that Ryback testing method comes in, because they have to test like how much of that pesticide comes back off of the seed, like in this big Tumblr that would look kind of like agitator and drier or something or a washing machine where they tumble the seed mimicking the planting process and things.

So they there.

2:31:07

Yeah, but you understand that it's a test, but is there a standard they have to meet with that test?

BL **Becky Langer-Curry** 2:31:13

Yes to the, to the best of my knowledge, let me let me clarify that just in case I'm what.

2:31:15

Who? What?

But is that like an oak?

Is that like an OSHA standard, or I mean trying who would set that kind of standard as well?

SS **Smith, Stephanie** 2:31:29

And who regulates the standard?

BL **Becky Langer-Curry** 2:31:29

I think it's multiple, I would say with your risk assessment of the humans, it would be OSHA.

There's the equipment manufacturers select the planters have standards associated with it that were changing.

I know when I was in charge of the bee care program from like 2014 to 2019, there was new equipment standards coming out for equipment that would hit the market for the planters and so that we got the humans, we got the planter.

I can get you more information.

2:32:03

Yeah, I would be very unfair.

Other folks would, too, is that whole process.

What the standard is?

How the standard set you know who new monitors for compliance with the standards?

BL **Becky Langer-Curry** 2:32:10

Umm.

2:32:15

That's a lot of questions.
It would be interesting.

BL **Becky Langer-Curry** 2:32:17

Sure.
OK.

2:32:19

Thanks.

BL **Becky Langer-Curry** 2:32:19

I'll I'll follow up on that.

2:32:21

Alright, appreciate it.

Uh, any other?

Questions.

Comments before I open it up to for public comment.

Three, alright, I know that I was.

Yeah, information down back to our old days of hearing, a lot in one sitting.

We are hoping to continue this for our work plan and developing and we're going to flip through your responses to the BMP new Unix survey.

So stay tuned.

Or kind of our next plans in future agendas.

Umm.

So with that, anybody, any member of the public, wish to?

Give a comment for today.

Awesome.

So thank you all very much for joining us and participating and stay tuned.

Alright, thanks.

I'll have a good rest of your day.

Thank you.

OS **Owen, Sarah** 2:33:55

Thank you.

BL **Becky Langer-Curry** 2:33:56

Thank you.

□ **Griffith, Morgan** stopped transcription