Growing hemp for CBD presents opportunities, challenges for farmers

By Chuck Anderas

Hemp is a wild new frontier for American farmers. Having only recently been legalized state by state in the last few years and nationally in the 2018 Farm Bill (still to come into effect), farmers, marketers, processors, and researchers are scrambling to figure out best practices and develop reliable supply chains. This is especially true for hemp harvested for cannabidiol (CBD).

CBD is one of the medicinal compounds in hemp, which is a form of cannabis sativa that is low in tetrahydrocannabinol (THC), the psychoactive compound in marijuana. While CBD has been getting a lot of attention for its pain-relieving properties, the Food and Drug Administration (FDA) cautions that dosing, drug interactions, and other questions about CBD use have yet to be answered. The FDA announced in May that “under current law, CBD and THC cannot lawfully be added to food or marketed as a dietary supplement.”

While CBD works its way through the federal arena, many states, including Wisconsin, are issuing licenses to grow industrial hemp and hemp for CBD. Patrick McHugh grew 40 acres of hemp for CBD at his farm outside La Crosse, Wis. Plants are spaced widely to reduce pressure from pests and diseases. McHugh said he added hemp to his rotation “first and foremost for its positive health benefits, and the challenge.”

With production costs ranging from $5,000 to $10,000 per acre, it is important to know the risks of production and marketing before planting.

‘Meatless’ farms not ideal for regenerative system

By Rachel Henderson

With the Amazon burning, the call is out to abandon beef, or meat altogether, as the most effective way to save the rainforest. This is because the fires have been credibly attributed to actions by cattle ranchers and loggers-who, backed by multinational corporations, are attempting to claim land for beef production or other forms of industrial-scale agriculture. Some activists have called for boycotts of Brazilian beef, while others suggest that reducing the global demand for beef would make it less profitable to burn down forests. In either case, beef consumption has come under scrutiny. People concerned for the health of our planet and the people who live in rural communities that are impacted by the spread of large livestock farms are examining the role of animal agriculture in deforestation and other types of land degradation.

Meat production has been widely identified as a contributor to climate change. In 2006, the United Nations Food and Agriculture Organization (FAO) identified the livestock industry as a greater emitter of greenhouse gases than the transportation sector, making it the largest contributor worldwide. This generated a lot of global and national attention on the heavily meat-based diet common in the United States and increasingly common around the world.

This has fostered a sense of alarm about the implications of such a diet. Many environmental and animal welfare organizations have advocated for “Meatless Mondays” or other ways to cut back the amount of meat we purchase each year, and to encourage people to find vegetarian protein sources (as well as just eat more veggies). Studies suggest that adopting these practices could help reduce greenhouse gas emissions, even if we don’t all switch to a completely vegan diet. The website MeatlessMondays.com says, “Skipping one serving of beef every Monday for a year saves the equivalent emissions to driving 348 miles in a car.”

At the same time, there is another narrative emerging about cows and land. Advocates for grass-based meat and dairy production point to actual ecological benefits of well-managed grazing on soil and water quality. They point to historically successful farming systems that combined animals with crop production that were sustained over centuries before industrial agriculture separated them.

Further, there is evidence that healthy soil in perennial grass cover serves to sequester carbon, though the complete carbon cycle is very complex and difficult to summarize in simple talking points. The FAO has specifically pointed out that the use of carefully managed grazing to improve poor soils is one of the areas for the greatest potential improvement in carbon cycling. Farm fields in perennial cover for grazing also have much higher water-holding capacity and soil organic matter than fields of annual crops.

Many farmers say the jump to condemn animal agriculture misses the point; the question shouldn’t be whether or not we eat meat, but how and where animals are raised. In fact, the FAO report that seems to support the narrative most is the 2006 work by the FAO, not the later work that attributes many of the problems to industrial agriculture.

Markets

McHugh likened marketing CBD to marketing hay. “If I have high-quality hay, I have no trouble finding buyers,” he explained. “If I can produce a high-quality product people will be pounding on the doors.”

That being said, finding markets for hemp for CBD can be complicated. Since hemp is such a new crop, it does not have the infrastructure that established commodities, like corn, have. Farmers will have to be more proactive in their marketing than with typical grain crops. Jay Fentress with Higher Yields Consulting recommends that farmers do the work early to connect with people and look around for good prices.

If you sign a contract, make sure to look at it carefully. According to FL Morris and Steve Acheson of South Central WI Hemp Cooperative, there have been some bad actors in the hemp market. They have seen contracts written by companies backed by venture capital that put all the risk on the farmer. Morris said that “the narrative that you shouldn’t plant anything until you have a contract to sell it puts all the power

To CBD Hemp: on page 6

Women in Sustainable Ag Conference


KEYNOTE:
Food justice advocate Miah Ulyssse on “Working in Harmony to Transform the Food System”

Workshops, demos, meet-ups on leadership skills, farm business success, more! –Day 1 Intensives & Tours (limited seats)–

Don’t miss out—register today!
mosesorganic.org/wisa-conference

To Regenerative Systems: on page 8
From the Executive Director

As summer slides into fall, farmers everywhere are thinking about harvest and preparations for winter. We know our chore lists have more goals in them than can be reasonably accomplished before snow falls. Crops need to be harvested, prepared, and sold. Culling and breeding choices need to be made. Projects need to be completed, tools collected, and pipes winterized.

There is so much to do, and yet, fall is also a “tired” season. Most of us have pushed ourselves further than we should have, trying to attain the bliss of being “caught up” when winter arrives. It can be easy to skip meals or forgo sleep as we run our combines, balers, or pack sheds at full tilt trying to make the most of our remaining time.

We work hard...for good reason. However, the balance between the work and the joy of life can be difficult to hold onto. In these quests, we can inadvertently neglect the things that matter most: sleep, observation, meals, creativity, and relationships. But it’s the things that seem easiest to set aside that really make life worth living.

As I’ve traveled, attended events, and chatted with farmer friends, I hear a pattern of how difficult this year has been. Farmers are battling a lot of fronts, and it can feel overwhelming. Several people have said this was the hardest season they’ve experienced. Others have shared their plans to cut back because they, “just can’t keep going at this pace.” As we continue trying to build the farms that we imagine, we also need to build the lives we want to lead.

As you work, consider how you can build sustainability for yourself and the life you want to lead in the future. Remember that it’s ok to push, but it’s also ok to take care of yourself. No harvest is worth sacrificing your own health and well-being.

At MOSES, we’re in “push” season, too, ramping up for the Women in Sustainable Agriculture (WISA) Conference next month and the MOSES Organic Farming Conference in February—yes, it takes 5-6 months of planning and work to build that event.

At both of these conferences, we strive to create environments in which you can learn, gain friendships and knowledge, and recharge. It’s important to us that this whole community builds the resilience we need to weather the storms, make it through the lean times, and share the deep joys that come from a life of producing for our community. We hope that you can find these things for yourself throughout the season and keep working toward your greater goals.

~ Good Courage, Lauren Langworthy

MOSES Staff:
Lauren Langworthy, Interim Executive Director | lauren@mosesorganic.org
Alice Acken, Program Director | alicea@mosesorganic.org
Audrey Alwell, Communications Director | audrey@mosesorganic.org
Chuck Anderas, Organic Specialist | chuck@mosesorganic.org
Sarah Broadfoot, Data & Registration Coor. | sarahb@mosesorganic.org
Sophia Cleveland, Development Coor. | sophia@mosesorganic.org
Stephanie Coffman, Presentaion Coor | stephanie@mosesorganic.org
Lisa Kivirist, In Her Boots Coordinator | lisa@mosesorganic.org
Tom Manley, Account Service Coordinator | thomas@mosesorganic.org
Jennifer Nelson, Organic Specialist | jennifer@mosesorganic.org
On-Farm Organic Specialist Team | specialist@mosesorganic.org

MOSES Staff:
Lauren Langworthy, Interim Executive Director | lauren@mosesorganic.org
Alice Acken, Program Director | alicea@mosesorganic.org
Audrey Alwell, Communications Director | audrey@mosesorganic.org
Chuck Anderas, Organic Specialist | chuck@mosesorganic.org
Sarah Broadfoot, Data & Registration Coor. | sarahb@mosesorganic.org
Sophia Cleveland, Development Coor. | sophia@mosesorganic.org
Stephanie Coffman, Presentaion Coor | stephanie@mosesorganic.org
Lisa Kivirist, In Her Boots Coordinator | lisa@mosesorganic.org
Tom Manley, Account Service Coordinator | thomas@mosesorganic.org
Jennifer Nelson, Organic Specialist | jennifer@mosesorganic.org
On-Farm Organic Specialist Team | specialist@mosesorganic.org

MOSES educates, inspires, and empowers farmers to thrive in a sustainable, organic system of agriculture.

MOSES
Midwest Organic & Sustainable Education Service

“NO weed can resist a Buffalo Cultivator”

Board of Directors:
David Abazs | Round River Farm, Minn.
Mike Bollinger | River Root Farm, Iowa
Sylvia Burgos Toftness | Bull Brook Keep, Wis.
Dave Campbell | Lily Lake Organic Farm, IL
Dela Ends | Scotch Hill Farm, Wis.
Clare Hintz | Elsewhere Farm, Wis.
Charlie Johnson | Johnson Farms, SD
David Perkins | Vermont Valley Farm, Wis.
Molly Rockman | EarthDance Farm School, Mo.
Sara Tedesch | Dog Hollow Farm, Wis.
Darin Von Ruden | Von Ruden Family Farm, Wis.

Norfolk, NE 800-345-5073
www.henkesbuffalo.com
A Global Equipment Company, Inc.
When she graduated from the Land Stewardship Project (LSP) Farm Beginnings course in 2011, Hannah Breckbill had solid grounding in how to produce food for eaters who want to support a certain kind of agriculture.

That’s why we offer our Farm Beginnings classes, such as the one that will be convening in Menomonie, Wisconsin, this fall. It also means tackling the land access issue head-on. We are working to reform crop insurance and return it to its roots as a safety net, rather than a program that subsidizes economically and environmentally risky behavior, all while putting land out of reach for beginning farmers. We are also putting on workshops for retiring farmers seeking to transition their operations to a new generation that wants to do more than build a farmstead to expand a corn field.

One group we have been focusing on is “non-operating landowners”—they aren’t active farmers, but they control a lot of farmland. In kitchen table conversations with these folks, we’re learning that many of them are extremely interested in having their acres farmed by someone who will treat the soil well and in general is a good steward. Surveys of our Farm Beginnings graduates show the majority of them fit this description. That’s why we’ve been holding work and developing resources that help landowners and stewardship-minded farmers build relationships.

Too often, these two groups are two ships passing in the night.

Finally, it’s become clear that new land ownership models are needed. LSP is researching alternative access scenarios that rely on trusts, community partnerships, and cooperative models, among other things. And that brings us back to Hannah Breckbill. Like other Farm Beginnings grads, Breckbill found it difficult to find land. She worked on a farm in Texas and moved her budding vegetable operation from there to Iowa, where she borrowed in Minnesota to land she borrowed in Iowa. In 2014, she was tired of being a transient farmer. Fortunately, she connected with some folks in northeastern Iowa’s Winneshiek County who were attempting to save 22 acres from being bought by a factory hog farm.

Through a combination of luck and intentional- ity, Breckbill and her second cousin, Emily Fagan, are now on their way to owning that entire 22 acres, where they are already raising organic vegetables and pastured livestock. Breckbill and Fagan have made Humble Hands Harvest into a worker-owned cooperative, and they have plans to bring in other farming partners. Breckbill feels one thing that has gotten small- and medium-sized farms in trouble is that many lack an exit strategy. Forming a cooperative that has a life beyond any individual farmer is a way to create a relay system, one that avoids the problems which arise when an individual farmer moves on or dies.

“Is it just taking a big picture view of how this land looks in 50 years?” she told me recently.

I don’t think this can be a model for getting more beginning, regenerative farmers on the land. There were some unique circumstances in Winneshiek County that brought this partnership to fruition. However, when writing about this situation for LSP (www.landstewardshipproject.org/posts/1223), what struck me was that the younger generation and the older generation each brought something to the table, and that’s something that can be replicated. For example, Breckbill had a vision for how the land could be farmed. That vision ran counter to the conventional wisdom of what is done with prime ag real estate, but it resonated with enough older residents to catch fire.

David Sliva, a fruit producer who was one of the members of the LLC that rescued those 22 acres from factory farm purgatory, told me it was key that the person offering up a different vision for the land had already proven her farming chops. “We had experience with farming over several years and we knew what it took to have a successful operation,” said Sliva, who is in his late 70s.

But this isn’t just about one farmer carrying the day. Sliva remembers attending the MOSES Organic Farming Conference three decades ago when it attracted less than 100 attendees. When he returned in 2019, there were over 3,000 participants, many of whom were young farmers who had plans similar to Breckbill’s. The young farmer’s vision for those 22 acres didn’t seem so out there after all.

Perhaps the most critical role LSP, MOSES, and other organizations interested in getting more regenerative farmers on the land can play to is to provide the opportunity for the Hannah Breckbills of the world to not only have a new vision, but to take the practical steps needed to make it a reality. That’s why Farm Beginnings and the MOSES Conference play key roles, and not just for neophyte agrarians—the older generation needs access to that special combination of vision and practicality as well. Otherwise, how do we give them the kind of hope that fuels the future?

“Should I even try to grow raspberries with Spotted Wing Drosophila around?”

Answer by Organic Specialist Rachel Henderson

Spotted Wing Drosophila (SWD), an invasive fruit fly, is still a relatively new threat in the Midwest. Native to eastern Asia, it was first identified in many states in 2010, and has quickly become a top problem for fruit growers. Throughout the summer, SWD lays its eggs in soft fruit, resulting in fruit that disintegrates quickly and often surprises the eater with larva inside. Fruit that’s affected by SWD is not suited for fresh sale, and may even be problematic for processing, depending on the market and the size of the larva. Raspberries, blueberries, and strawberries seem to be its favorite hosts. For this reason, many growers have abandoned or scaled back these crops, especially raspberries.

Because fruit flies reproduce and mature quickly, the populations can grow exponentially throughout the season. This makes treated with pesticides tricky. The amount of applications necessary for control can be costly or just impossible to do while following guidelines for intervals or number of applications. This holds true with both organic and conventional pesticides, so the question of what to do about SWD is not unique to organic growers. Because it is a new and invasive species, there are no known natural predators or clear biological options for combating SWD. Some people have success with traps. Although they are only designed to be used as monitoring tools to determine the extent of SWD infestation, accidentally some growers find that traps reduce damage. They do not seem to attract SWD to farms where it isn’t already present, so there is little danger in using traps. Traps are available on the market, and a web search will also turn up many options for homemade or improvised traps, as well as tips for maximizing effectiveness.

Interesting research on essential oils has been done recently. In laboratory settings, several plant essential oils seem to deter SWD. Researchers suspect that volatile compounds in the plant leaves are what attract the fruit flies to their favorite hosts. The next step has been to test ways to use these essential oils in the field with the hope of masking the scent of those tasty raspberry leaves. Peppermint and thyme oil in particular have been identified. Hopefully we’ll know more about the efficacy of these in the next couple of years.

Another option for organic growers is to attempt to control or keep SWD at bay through dedicated cultural practices. For many people, this seems to be the most reliable way to achieve a saleable crop of SWD-affected fruit right now. These practices can make harvesting a little more time-consuming and potentially eat into profits on berries. You will need to consider your markets and source of labor in choosing to implement these.

Monitoring: It is very important for grower who sell fresh berries to learn to identify the signs of SWD in order to monitor damage. Eggs may hatch inside berries after they’ve been packed for market, and a customer is likely to then find a live larva inside the berry. This can damage your relationship with your customers or market, as well as damage the reputation of organic berries overall.

Narrow rows: A reduced canopy can make berry rows a less hospitable place for SWD. Traditional raspberry plantings often grow into a patch or thicket. Maintaining a row that’s only one cane wide can eliminate the shady space where fruit flies like to be on hot summer days.

Daily picking: Completely removing all ripe fruit every day during peak SWD season removes the host material for SWD to lay eggs. This means ALL the ripe fruit! Spot-picking the nicest fruit, or avoiding ugly and mushy berries, will NOT help achieve control. Fallen fruit on the ground continues to attract fruit flies, and should also be prevented. Growers who have pick-your-own berries will find that this means they have to go back through to clean off plants after customers have picked. Training employees or volunteers to do this kind of thorough harvesting is essential. An added benefit of daily picking is that it helps a lot with monitoring. We can often identify the day that we start to see SWD larvae.

So, can you grow raspberries? Sure! Just be prepared for a little more management work than raspberries required a few years ago, and pay close attention to new research.

“What’s your advice to farmers trying to manage the current forage crisis?”

Answer by Organic Specialist Kevin Mahalik

As a full-forage Grassfed dairy and beef grower, I find it paramount to grow as much quality forage as our farm can every year. Conditions in Wisconsin this year have made that especially challenging.

The winter and spring here and in many parts of the country set up conditions for winter-kill in alfalfa hayfields; even stands of typically winter-hardy grasses and pastures suffered losses. We experienced significant ice sheeting and cold for an extended time followed by record February and March snowfall. This led to an extended feeding season with high forage demands because of cold, wet weather. The incredibly wet spring left many acres unplanted in our region and acres planted early suffered flooding.

We also faced a slow start to the growth of pasture. We had to calculate which paddocks to sacrifice to avoid making a mess in feeding and outwintering in paddocks. This meant selecting certain resilient paddocks that would require some reseeding. Once we had pasture growth it was important to monitor field conditions and avoid putting livestock on the wettest paddocks to avoid soil compaction and damage.

The major problems with livestock on pasture are leaving them too long in one place and grazing too early in the season before the pasture species can handle livestock pressure. An entire seasons’ production is typically restricted by starting too early and stressing the pastures and soil. Feeding hay an extra week in the spring can allow pastures to produce enough forage all season to more than offset the extra spring feeding. The trainwreck happens when farmers run out of feed and go out to pasture too early.

On our farm, we utilized an array of methods to reseed in late May when conditions allowed. In a field where winter wheat cover crop failed to overwinter properly, we disc’d in the cover crop and did a full replant with a grain drill and followed with a crop roller to terminate the winter wheat and promote seed to soil contact. This worked very well and the diverse new seedlings look great now in mid-August. The seed mix was a diverse mix from one of the major organic seed suppliers; we mixed bags containing several varieties together and added in a higher legume component to achieve at least a 50% stand of legumes. We used an oats-and-peas cover to nurse the seeding and then harvested it as baleage.

On outwintering and feeding areas where cattle plowed fields with hoof action, we disc’d and drugged the field to prepare the seedbed and did shallow incorporation of residue. We’ve found that light surface tillage works far better to spread residue on the surface and breaks down rapidly rather than trying to plow under residue. We used the same seed mix. Cattle grazed the oats prior to seed maturity and the initial growth was weed-free. The cattle are now grazing the second regrowth in mid-August.

We utilized a no-till drill to reseed into existing hayfields after second crop where legumes disappeared over winter. The no-till drill is heavy enough to slice into the soil and has a tight 5-1/2 inch spacing. The seed mix was a diverse mix with 5 pounds of red clover.

To Ask a Specialist on page 14
Research project develops naked barley varieties suited for organic production

By Constance Carlson

Barley has a long history in agriculture—it was first cultivated about 10,000 years ago and has been used for feeding livestock, flour milling, bread baking, and beer production. Barley is the fourth most commonly produced grain in the world and the second most widely grown organic grain in the United States, according to 2016 statistics from the U.S. Food and Agriculture Organization. In addition to its diverse market options, barley has important nutritional aspects for human consumption; it’s a rich source of complex carbohydrates, especially beta-glucan which is a soluble dietary fiber that has been shown to reduce cholesterol levels. Beta-glucan from barley also has been shown to slow the release of sugar into the blood, which reduces the risk of type 2 diabetes.

As humans discovered that wheat works better in bread baking because of its higher gluten and that barley with hulls works better for beer production, naked barley got left behind. Even more exciting, they are developing it for organic production. In 2017, Pat Hayes from Oregon State University (OSU) and a wide-ranging team of breeders, growers, educators, bakers, millers, malsters, brewers, distillers, and seed companies from across the country were granted multi-year funding through USDA-NIFA-OEI (National Institute of Food and Agriculture-Organic Agriculture Research and Extension Initiative) to test and develop breeding frameworks for new naked barley varieties specifically for organic production. The study, Developing Multi-use Naked Barley for Organic Farming Systems, spans three regions across the country: Pacific Northwest (Oregon and Washington), Upper Midwest (Minnesota and Wisconsin) and North East (New York). The study recognizes that organic producers need new crops and rotation options that have been developed within and for organic production. The study also recognizes that producers need viable markets for those crops in order to adopt and integrate them into their rotations. The long-term goal is to provide a wide range of stakeholders—from organic gardeners and producers to food companies, processors, and consumers—an alternative food crop that will be economically, nutritionally, and ecologically beneficial.

“Naked barleys have been around for almost 10,000 years but they haven’t gained the traction that we would like to see in the United States,” Hayes explained. “Plant breeders, bakers, chefs, brewers, distillers, animal feeders—we are all united in the goal to provide organic gardeners, growers, processors, and consumers with an alternative crop, food, and raw material that will be economically rewarding and sustainable.”

Organic Naked Barley

A key component of the naked barley project involves testing and selecting varieties in organic production conditions. Currently, most of the crops grown in organic production have been developed in high-input, conventional scenarios. Therefore, desirable traits are often selected in conditions in which organic farmers don’t operate. These varieties need improvement to better serve the complex needs of organic production; surveyed organic producers frequently state they need varieties that have disease-resistance and can compete against weeds. This is especially true in barley production, where weed pressure can significantly impact yield. Most organic farmers incorporate small grains into their rotations as a strategy for weed suppression, so the development of an organic small grain that can compete against weeds and has high demand in the marketplace would be a valuable crop and tool for organic producers.

Currently, there are naked barley varieties in various stages of development in the project, including a fall-planted naked barley variety released by OSU in 2016 named Buck. (Yes, as in “buck naked.”) Scientists have a sense of humor, too! Buck is adapted to the Pacific Northwest but has done well in field trials in the Upper Midwest, even surviving some Minnesota winters. Buck has been achieving high yields with less need for fertilizer and water than wheat. Regional on-farm trials with certified organic producers in participating states have been underway with various varieties throughout the project. These trials will generate agronomic and quality profiles of current and potential naked barley varieties. In turn, this data will be used to help growers and end-users make decisions about future production, market, and product development for naked barley.

As the breeding work continues, the grant team is also tasked with building awareness and testing varieties of naked barley with food processors, culinary professionals, bakers, maltsters, distillers, brewers, millers, and the feed industry. A significant market advantage for naked barley is its status as a whole grain in the consumer market. Barley varieties with adhering hulls must have the unpalatable hull removed by pearling, a process that removes most of the nutrient-rich bran and thus makes grain ineligible for “whole grain” status. Therefore, naked varieties can

As a MOSES follower, you understand the importance of soil health and have likely put in the work to advance your operation toward sustainable and regenerative agricultural practices. If you are considering the next step to organic transition, The Andersons is here to support you. Since 2016, we have worked to build a robust program of products and services to meet your needs:

- A line of organic nutrients including NPK, soil amendments, granular micronutrients and more.
- Transition consulting services to help you master your certification plan.
- Grain marketing expertise for feed and food-grade corn, beans and small grains.

Talk with a member of our organic team today and discover how we can support your organic and non-GMO needs.

FOR MORE INFORMATION
AndersonsOrganics.com
419-891-2785

5-3-2 OMRI
Pelleted & Crumbled Poultry Fertilizer
Nationwide supplier of bulk products

USE ON PASTURES, ROW CROPS AND VEGETABLES

www.chickenlitter.com
info@chickenlitter.com
217-725-4598

To Naked Barley on page 14
in the processor’s hand.” Miss Morris noted that contracts have sometimes used vague language like that they would pay “market value” for the crop at the end of the growing season without setting parameters for what “market value” could mean. Other contracts have the processor taking 40-60% of the biomass as payment for processing the rest.

Joe Rivas of Rivas International is building brands of CBD for treating PTSD for veterans. He said that contracts are inappropriate in states like Wisconsin where farmers are in their first or second year of growing the crop. Rivas plans to have contracts with growers once they have a track record and have built relationships.

The farmers I spoke to for this story said that it is best to make lots of phone calls and get acquainted with buyers early. Don’t take the first contract offered to you, but keep asking around and compare what is offered by each company. Because of the seductive promise of huge profits, the industry has attracted people who might not have the best interests of the farmer in mind. Be cautious and seek arrangements that share the risk between all parties.

Morris and Acheson formed South Central WI Hemp Cooperative in February 2019 in response to both market and production challenges. To Morris and Acheson, organizing farmers in a cooperative was the only way to form a hemp industry that works for farmers instead of the larger industry and investors. Acheson said they didn’t want to see hemp “turn out like every other agricultural industry where there is an oversupply, and then the farmer gets a rock-bottom price, and the only way to survive is to produce huge amounts of crop. We want to flip that on its head and give the power to the farmer.”

With the help of the Center for Cooperatives at the University of Wisconsin, Acheson, Morris, and a small group of local farmers organized their co-op. They have done group buys (available to non-members) for seed, fertilizer, and irrigation equipment. Buying seed together has helped them access genetics that would not have been available to them as individual growers because of large minimum purchase requirements. Co-op members have an internal forum to support each other as production issues arise, often giving each other advance warning of pest pressure. The co-op plans to market their product together to have more advance warning of pest pressure. The co-op members have an internal forum to support each other as production issues arise, often giving each other advance warning of pest pressure.

Production
Along with the legal and marketing challenges with CBD, farmers and researchers alike are working to find the best agronomic practices for producing hemp for CBD.

“Af ter 70 plus years of prohibition, everything is pretty new,” said Ashley Walsh of Pocono Organics. “Lots of knowledge has been lost; so, we’re starting from scratch again.”

The prohibition also applied to research, so there is little scientific data on the best cultivars, planting dates, spacing, nutrient requirements, pest management, and other agronomic issues for Midwest growers. When there is data, it is usually from states and countries where cannabis has been legal for longer, and it is unclear how that information will translate to our climate and soils.

Hemp for CBD can either be transplanted or direct-seeded. Producers start with feminized seed or female transplants because female flowers produce significantly higher quantities of cannabinoids than male flowers. To direct-seed, many farmers have used a corn planter with a sorghum plate. Transplanting hemp is no different from transplanting any other crop and can be aided by vegetable production equipment like water wheel transplanters. It is commonly either transplanted into plasticculture or a living cover of clover, tillage radish, alfalfa, or a mix of these and other crops that are mowed throughout the season.

Spacing depends on a number of factors, but some data shows that yields per acre are highest at the tighter spacing of one foot by one foot. However, there does not appear to be any data comparing cost per acre and yields at different spacings. It seems that most farmers are planting CBD hemp at a wider spacing of around 4- to 6-square feet apart. Because the cheapest feminized seed costs over $1 per seed, farmers may choose to grow at a wider spacing to limit the cost of production. Wider spacing also increases airflow around the plants to limit mold and other disease issues.

Starting with feminized seed does not guarantee there won’t be male flowers in a field. Producers are scouting their fields regularly to remove male flowers. McHugh started his first transplants mid-May, transplanting every week, and switched to direct-seeding at a tighter spacing later in the season. This helped stagger the workload for both planting and harvesting, and could help make the most of limited space for drying the crop.

Most varieties that are available were bred in the drier climates of Colorado, Oregon, and California, and it is unclear which varieties will work best in the more humid Midwest. Dr. Leah Sandler, the education director and research agronomist at Michael Fields Agricultural Institute, is conducting cultivar research to see which of the 10 they are studying will work best in Wisconsin. She is also organizing a grower survey to learn which varieties worked best for them. In 2019, it seems like farmers had to take whatever they could get of a reasonable quality at a reasonable price. With each year that passes farmers will have better information on which cultivars to grow for CBD production.

A common misconception is that hemp can grow anywhere. Instead, hemp should be grown on good, well-drained soils, and fertility should be closely managed. Overall health of the crop is the main way that farmers can grow hemp with high CBD content (as well as keeping THC content low). So far, it seems that CBD hemp has similar nutrient requirements to corn.

The farmers I spoke to for this story said that it is best to make lots of phone calls and get acquainted with buyers early. Don’t take the first contract offered to you, but keep asking around and compare what is offered by each company. Because of the seductive promise of huge profits, the industry has attracted people who might not have the best interests of the farmer in mind. Be cautious and seek arrangements that share the risk between all parties.

Some farmers and researchers recommend splitting fertilization between a pre-plant application and a side-dressing in July, aiming for between 125-200 pounds of nitrogen per acre. Dr. Sandler recommends applying around 100-120 pounds of nitrogen per acre at planting and around 50 pounds about one month later. The second application is timed to meet the plant’s increased nitrogen requirements when flowering. Potassium uptake is also at its peak at the start of flowering and the plant needs around the same quantity of potassium as it does for nitrogen.

There are no approved herbicides made specifically for growing hemp—a benefit for growers experienced at managing weeds organically. Weed management starts with field prep. Cover crops, either to be tilled or roll-crimped, can help to build the soil and suppress weeds leading into the season. Spacing is the second major consideration. Wider spacing allows for mowing of a living groundcover. Plasticulture allows for mowing or cultivating between the rows and hand-pulling weeds next to the plant. Some growers in drier climates have used straw mulch, but Dr. Sandler is concerned that it may contribute to moisture-related disease issues in more humid climates. Availability of labor and equipment are the other key issues; your weed management plan will largely depend on your system.

Managing pests and diseases in any new crop can be challenging. As McHugh said, “I can’t just easily identify things like I can with corn, soybeans, or small grains.” Scouting is the first step to successful pest management. While there are not any EPA-registered pesticides for use on hemp, some state departments of agriculture recommend using 25(b) minimum risk pesticides, which are considered to “pose little to no risk to human health or the environment” according to the EPA. Check with the agriculture department in your state (and your organic certifier) to see which pesticides might be allowed.
Researchers test robots that locate, remove weeds without damaging crops
By Marianne Stein

Weed management remains one of the most difficult challenges for organic growers. Even conventional growers are struggling as “superweeds” develop resistance to herbicides. Crop losses due to herbicide-resistant weeds are estimated at a half billion dollars per year in the U.S. and are expected to increase dramatically as chemical control is lost for many weeds.

Researchers in the College of Agricultural, Consumer and Environmental Sciences at the University of Illinois are working to provide alternative tools for weed control. Small, autonomous robots that work together in teams, removing weeds at the ground level.

Standard mechanical control is impractical after planting because tractors and other machines are too large to work under the canopy. Hand-weeding by humans is more precise, but it is time-consuming and expensive, explained Girish Chowdhary, assistant professor of agricultural and biological engineering at U of I. “Human laborers are really good at dexterity, but they can't really scale up. Large equipment is really good at scaling up, but it's not very dextorous,” Chowdhary said. “How do we fill this gap between high dexterity and high efficiency?”

To bridge that gap, Chowdhary’s team developed TerraSentia, a small robot that combines the speed and power of technology with the accuracy of a human’s close attention. “These robots will be helpful for a broad swath of different grower types,” explained Adam Davis, professor and head of crop sciences at U of I. “Weed management for organic growers is a challenge as organic production systems do not have a lot of chemical options. And, with increasing herbicide resistance, it has become necessary to find other ways of managing weeds for conventional growers as well.”

TerraSentia is a compact, rugged robot powered by a lithium battery. The robots are directed by a mobile app and are currently semi-automatic. They can run up and down rows of crops by themselves, but must change directions by remote control. They are steered by GPS when moving between rows, and LIDAR (light detection and ranging) technology under the canopy.

The robots are small enough to move under the canopy and between rows. They are nimble enough to work in dense fields, locating and pulling weeds without damaging the crop. They are also lightweight enough to run in wet soil without doing damage.

The robots are still being developed and researchers have several hurdles to overcome. One challenge is to teach the robots how to distinguish between weeds and crops. “Farmers do this using knowledge; they know what a crop looks like,” Chowdhary said. “The robot needs to have the same skill. We use machine learning to do this, providing the robot with many examples of corn and not-corn so it learns to tell the difference.”

Through machine learning, or artificial intelligence, the robots also learn how to navigate in different field conditions and move past rocks or other obstacles. Another major challenge has been to create the mechanical application that removes the weed. Researchers have tried different options, such as motorized arms that brushed off the weeds. The current iteration uses a small plow or hoe that pulls the weed out of the soil. Each robot carries its own hoe, removing the weed through soil disturbance as it moves down the rows.

“A mechanically pulled mechanism, like a hoe, reduces the complexity of the problem. As the complexity drops, so does the cost. The goal is to find the simplest solution, because otherwise it’s difficult to scale up,” Chowdhary explained.

Research also has shown it is most efficient to have the robots get the weeds in the white-thread stage as they are just germinating.

“There will be different worker classes of robots,” Davis added. “Some will have snippers, others will use soil disturbance. There will also be towing robots that can bring the weeding robots back to a solar power charging station when they run out of battery.”

The robots will work the fields as a coordinated team that provide information to each other and feed into a collective map of spatial weed population density.

“We’re developing a framework following a concept called ‘bandit’ after one-armed bandits, or slot machines,” Chowdhary said. “Imagine having a bunch of slot machines in front of you. How do you know which one to pull to get a payout? This framework can be applied to the problem of coordinating the robots so they know where to go. The question is which rows provide the greatest payout, in terms of the amount of weeds to be removed.”

This concept can be used to build a learning model of the field; first, the robots explore the conditions, then use that to build a heat map of hotspots that tells them where to go for maximum results.

The weeding robots are currently in the beta-testing stage; the researchers expect to have them ready in about three years. They have been tested in university fields, and will be tested with growers this fall.

PrairiErth Farm, a family-run 400-acre USDA certified organic operation in Atlanta, Illinois, will be one of the sites for field testing. Dave Bishop, who owns and operates PrairiErth Farm with his son, Hans, and daughter-in-law, Katie, believes that robot technology can be particularly useful for high-value crops.

“We grow 35 acres of vegetable crops, as well as corn, soybean, and small grains,” Bishop said. “The vegetables are high value and typically more problematic from the standpoint of weed control.”

Because of the cost of robots in the developmental phase, a higher-value crop would be the logical place...
to condemn meat also goes on to cite solutions such as improved animal diet for healthier animal digestion, soil conservation practices through grazing and silvopasture, and reducing large-scale livestock concentration. These sound very similar to the practices proposed by advocates for Regenerative Agriculture. Regenerative Agriculture has been getting a lot of attention lately. The term is understood as a set of practices that seeks to continuously improve whole ecosystems—including soil and water conservation and increased biodiversity—within the context of a given farm and place. This means that it will look different depending on the needs and resources of a farm, but also that a good regenerative system will be responsive to the needs of farmers, the deficits of the land, and the available resources.

"The most basic principle of regenerative agriculture is that it requires both plants and animals on the land together—as does every ecosystem in nature," explained Dave Bishop, a farmer who has seen firsthand the benefits of adding livestock back into a diverse crop system. Bishop farms with his family on PrairiErth Farm in Illinois, where, he said, the animals they raise are not just a product they offer, but partners on the farm. Having transitioned to organic from conventional crops, he is clear about the benefits he sees from a more integrated way of farming.

The Bishop family received the 2017 MOSES Organic Farmers of the Year award. A profile of the Bishops and their farm in the Organic Broadcaster in March-April 2018 details their farm’s evolution and the role of livestock. In their case, adding grazing cattle into their crop rotation has helped build soil and create a more resilient farm. Bishop identified years of drought in which a crop that would have otherwise been lost served as forage. Besides the fertility benefits, Bishop said, “The cattle give us a way to stabilize our business. They help protect us from the shocks of weather and the markets.”

This approach is different than simply turning animals out on a field and letting them eat. Managed grazing includes planning. To realize the goal of soil regeneration, farmers need to consider the number of animals their land can sustain and be prepared to rotate their livestock through the fields based on what’s happening on—and under—the ground.

At an upcoming field day with The Land Connection, focused on mechanical weed control, Bishop will talk about the role of grazing in a row crop rotation. He wants to kindle conversation about plants and animals working in consort to build a more profitable whole farm enterprise. The field day, which will include equipment demonstrations, is Sept. 18 at Gwenny Hill Farm in Waukesha, Wis.

Bishop suggested that farmers who want to take steps toward establishing regenerative practices on their farm ask themselves these questions first:

• What kind of animals are appropriate on your farm?
• Exactly how will you use them?
• What are the biological benefits each species might bring to your operation?

"Poultry, for example, tend to work well in vegeta-ble operations that don’t have the size or infrastructure to handle larger animals like cattle," he explained. "They can be rotated through the fields—and even inside of hoop houses—to address the build-up of pests and diseases in the soil and enhance farm income. What was once an expense becomes a source of income.

The jump to condemn animal agriculture misses the point; the question shouldn’t be whether or not we eat meat, but how and where animals are raised.

While plant and animal integration can seem foreign in our modern farm environment, “all of this is hardly a new idea,” Bishop added. “Most all farms in my childhood were like that—small, diverse, mostly organic, and had several kinds of livestock. That was the norm. Massive monocultures of crops and livestock are a recent phenomenon, already under stress from all sides—weed resistance to chemicals, environmental damage, poor profitability, and on and on. Now the time is right for this discussion, no matter how you farm.”

As Bishop has said, there are many different ways of accomplishing the integration of plants and animals. The best approach for a given farm will depend on the land base, the enterprises already in production, and what farmers have the appetite to take on.

In their 2017 Farm Progress Report, Iowa State University details a study into the potential for adding chickens to a vegetable-cover crop rotation. They cite improved soil fertility, leading to better potential vegetable yields, as well as reduced weed pressure.

Another example of an animal partnership is the recent enthusiasm for hogs integrated into orchards and fruit plantings. Historically understood as a good way to clean up fallen apples, now current research is proving that pigs foraging under trees post-harvest is effective at breaking several pest and disease cycles. As a result, organic orchards can reduce the need for inputs, see an improvement in high-quality fruit, and have an additional source of income.

Another idea gaining traction is grazing a cover crop. With careful planning, farmers have found they can seed a cover crop following a cash crop. Depending on the crops, timing, and zone, this cover crop can then be grazed in the fall, the following spring, or both times. A 2018 publication from The Pasture Project, part of the Wallace Center, explains the benefits of growing cover crops, how to select a mix of cover crop species for livestock, and some of the risks involved in the practice, including toxicity concerns and fencing needs. The guide is online at bit.ly/CoverCropGrazing.

As farmers, and as people who live and work in rural communities, we know that it is in our interest to be stewards of the resources we have. Our modern agricultural system is far removed from a natural, balanced ecosystem. It is up to us to find ways to produce food for our communities while making choices that sustain our ability to farm.

While animal agriculture has had massive negative impacts on land around the world, we also know that livestock can and will be part of a balanced farm conservation and regeneration. Aided by the knowledge and expertise that has come from years of study and trial and error, we are in the exciting position now of being able to shape the future of food production in a way that values life and the planet.

Rachel Henderson is an on-farm organic specialist with MOSES. She and her husband raise pigs and chickens in their orchards at Mary Dirty Face Farm in Menomonie, Wis. Rachel will be on a farmer panel at the Women in Sustainable Ag Conference Oct. 19 to talk about building farm resiliency. See mosesorganic.org/wisa-conference.

---

**Regenerative Systems — from page 1**

---
Mentor program helps northern Minnesota Band work toward food sovereignty

By Nikki Crowe, Erika Legros, and Jill Jacoby

Just as fertile soil is the foundation of a successful organic farm, the MOSES Farmer-to-Farmer Mentoring Program is the foundation of farmer success. Through this program, the Fond du Lac Band of Lake Superior Chippewa has been paired with mentor John Fisher-Merritt from the Food Farm in Carlton, Minnesota. John is a well-known and respected organic farmer who along with his son, Janaki, and his wife, Jane, own and operate the Food Farm. The family received the 2010 MOSES Organic Farmers of the Year award.

The Fond du Lac Band is one of six Chippewa Indian Bands that make up the Minnesota Chippewa Tribe. The Fond du Lac Reservation was established by the La Pointe Treaty of 1854 and is located outside of Cloquet, Minnesota. Archaeologists, however, maintain that ancestors of the present-day Chippewa (Ojibwe) have resided in the Great Lakes area since 800 A.D. Today there are over 4,200 Band members. The Ojibwe name for the Fond du Lac Reservation is “Nagaajiwanaag,” which means “where the water stops.”

Food Sovereignty Initiative

As tribal nations lost control over their homelands, they also lost connections to ancestral knowledge about subsistence ways of life. After treaties were signed, the U.S. government began distributing annuity foods that were high in fat and salt compared to traditional foods, and this dietary shift led to poor health.

Food sovereignty is the right to healthy and culturally appropriate food produced through ecologically sound and sustainable methods. Today, Fond du Lac is reinvigorating local food sovereignty with vegetable and herb gardens, farms, and orchards that complement the harvest and gathering of traditional wild foods, fish, and game.

Ojibwe life is deeply connected with food production. The term “farmer” is perceived as limiting to many in the Fond du Lac community because it implies a Western perspective of conventional agriculture, such as excessive use of fertilizers and pesticides which act against natural cycles rather than in sync with natural systems. For this reason, we use the term “producer” to refer to community members involved in agricultural activities, which connects to the concept of cultivating and harvesting resources as a participant in greater natural systems.

The initiative aims to balance social and ecological needs and desires of the Band while providing food in a sustainable manner as well as strengthening community resilience to natural resource vulnerabilities and risks.

There are several programs under the umbrella of the Food Sovereignty Initiative:

Bimaaji’idwin Garden Program

Translated, Bimaaji’idwin means “saving each other’s lives.” This name is a big responsibility to live up to and the Bimaaji’idwin Garden Program attempts to do so through education outreach and preservation. An important objective for the garden is to expand and maintain a collection of Anishinaabe and Native American heirloom crop seeds through a seed library. The garden also provides over 1,000 pounds of produce to the community members. Elderly Nutrition Programs, Babaamaadiziwin Gitigaan (Journey Garden), Fond du Lac Summer Program, Age-to-Age Camp, and the Ganawenjigewin Maawanji’idwin (Taking Care of Things event). The project also includes a demonstration garden, hands-on gardening lessons and workshops, seasonal outlooks, and internships.

Gitigaan Program

This is a 10-week program on horticulture and nutrition topics, combining current information with Ojibwe history, culture, and tradition. Horticulurists, Native American Elders, and other resource people lead evening discussions.

Babaamaadiziwin Gitigaan

This is a youth garden program that provides education on gardening and marketing produce at a farmers market. This program is run in conjunction with the Ojibwe School on the Fond du Lac Reservation.

Rimaaji’idwin

The Fond du Lac Band has received funding from USDA Outreach and Assistance for Socially Disadvantaged and Veteran Farmer and Ranchers Program to develop a food producer training program. The goal of the program is to provide outreach, education, and technical assistance to the Fond du Lac Band of Lake Superior Chippewa members and the surrounding communities, with a special effort to support socially disadvantaged farmers and veteran farmers.

The producer training program is modeled after the Big River farmer education training model in Marine on St. Croix, Minnesota. Producers in the program receive ½ acre of tilled land, training, supplies, materials, seeds, and tools to use. This allows for a trial period for producers in the program without a large financial burden. The program’s optimal capacity is seven producers. They are required to attend training sessions in the winter, create a business plan, plant, tend, and harvest their crops. Participants receive a $250 scholarship upon completion of the program and their business plan.

Mentorship

To get the Producer Training Program off the ground, the Band signed up for the MOSES Farmer-to-Farmer Mentoring Program and eagerly accepted the chance to be mentored by John Fisher-Merritt, who has been working with the Gitigaan Program since 2004.

To Farmer Mentorship on page 16

Boost your farming skills!

Get 1-to-1 guidance from an experienced organic farmer who can show you:

- Best practices for your type of operation;
- How to get your farm ready for certification;
- Tips to move your farm forward!

Cost: $350

Program runs one year, beginning and ending with free admission to the MOSES Organic Farming Conference in La Crosse, Wis. Applicants must have farmed at least one year.

Apply by Oct. 31:

mosesorganic.org/mentor-program
As reports of dicamba drift rise, groups move forward with lawsuit

By Linda Wells, Pesticide Action Network

Each year since Monsanto’s dicamba-resistant Xtend seeds hit the market, farmers and rural communities have braced for record levels of pesticide drift. This season, the number of reports is even higher despite the new label restrictions for applications.

From its inception, the Xtend crop system was bound to be a divisive disaster for all kinds of farmers. The negative impacts of the Xtend system on neighboring farms and ecosystems, and on the ever-tougher battle with herbicide-resistant weeds, will last longer than dicamba’s effectiveness as an over-the-top pesticide application for commodity crops.

The Xtend system is another instance of Monsanto (now Bayer) promising a short-sighted “solution” to a problem of its own creation—herbicide-resistance. While farmers who don’t use the Xtend system deal with dicamba drift, crop damage, and yield loss, Bayer sees financial gains from an increase in acreage planted to dicamba-resistant soybeans, and a corresponding increase in purchases of their dicamba-based herbicide formulation, Xtendimax.

Drift Incidents

With this year’s late start to planting season, reports of drift incidents were trickling in through mid-August. But now several state agricultural agencies are reporting that 2019 may see the highest number of dicamba drift incidents yet. In Illinois, for example, the state Department of Agriculture has received 590 reports of alleged dicamba drift incidents, up from 330 last year. Indiana has had 140 dicamba drift reports this year, already surpassing 2018. In Arkansas, nearly 200 dicamba injury cases have been reported.

Though these numbers are high, we also know that pesticide drift is vastly underreported. Reporting protocols vary by state and aren’t always clearly communicated or readily accessible, and farmers may worry they’ll face social repercussions for reporting drift from neighboring farms.

Xtend crop planting has increased each year, from 25 million acres in 2017, doubling to 50 million in 2018, and estimated to reach 60 million acres in 2019 (Bayer’s projected total for soybean and cotton acreage combined). Some soybean farmers who were themselves reluctant to buy into the Xtend system have said they felt compelled to do so as a defensive measure to protect their own bean fields from drift damage. With more dicamba-resistant soy in the fields, we may see a decrease in the number of soybean acres damaged by drift. However, this year more than ever, we’re hearing from state forest services and environmental groups that dicamba is taking a serious toll on trees, posing further threats to pollinators, birds, and other beneficial organisms that rely on those plants for food or habitat.

Further, dicamba drift has become so pervasive that plant breeders at public universities in Missouri, Kansas, Nebraska, and Arkansas are witnessing dicamba damage in their own experimental soybean fields. In effect, Bayer’s Xtend system is now under-mining the publicly funded agricultural research that farmers need more than ever, as increasingly erratic weather and environmental stresses require them to have access to a greater, not lower, diversity of seeds.

Dicamba itself is already losing its efficacy in weed control. In recent months, weed scientists have reported new evidence of dicamba-resistant weed populations in Tennessee and Kansas, as researchers have been predicting for years.

“Dicamba is probably a technology that can’t bear the weight of true science,” said Charlie Johnson, MOSES board member and organic farmer from South Dakota. Johnson’s farm has been hit by drift six different times, including by dicamba in 2017. He and organic farmer Dea Ends shared their stories and strategies for dealing with drift in a workshop at the MOSES Organic Farming Conference this year.

“If you can’t keep your product on your side of the fence, it is useless technology as far as I’m concerned,” Johnson added. “Strong agronomy in organic farming is showing that you can raise quality food without the use of these harmful chemicals. The dependency on chemicals shouldn’t take precedence over individual freedom for good air and good food.”

Long before Xtendimax was approved for over-the-top applications, dicamba was well-known as a particularly volatile chemical—it simply does not stay where it is put, no matter how it is applied. Early advocates against its increased usage include Steve Smith with Red Gold and weed scientist Dave Mortensen, who both warned of the damage the herbicide can and would do to off-target organisms.

Bayer, however, refuses to accept that its new star pesticide is a problem. Instead, the company blames applicators for applying the product incorrectly.

Regulatory Framework

The U.S. Department of Agriculture (USDA) swiftly approved the genetically engineered Xtend seeds in 2015, ruling on the narrow basis that the seeds themselves posed no “pest risk” to other plants, while ignoring both the agency’s broader mandate to “help rural America thrive” and the virtually assured impacts of a GMO seed specifically designed to enable widespread spraying of a volatile, drift-prone herbicide.

Soon thereafter, in 2016, the Environmental Protection Agency (EPA) approved use of Xtendimax on these seeds, while steadfastly ignoring evidence that dicamba is highly toxic to conventional soybeans, fruits, vegetables, trees, and many other broadleaf plants, and that its use within the Xtend system would ensure application throughout the warmer months, virtually guaranteeing increased volatilization and widespread damage.

The seemingly willful refusal of both public agencies to consider the devastating ramifications of their twin decisions to farmers’ livelihoods and rural communities exposes fundamental flaws in our regulatory system. Agency officials speak of the “coordinated framework” around biotech regulation between USDA and EPA. However, the coordination in this flawed system is one that facilitates corporate profit at the expense of rural communities and their environments.

Lawsuit

In response to our public agencies’ failure to defend the public interest, the Pesticide Action Network (PAN) along with the National Family Farm Coalition, Center for Biological Diversity, and Center for Food Safety (which provided legal representation) filed a lawsuit against the EPA in 2017, challenging the EPA’s decision to deregulate Xtendimax. This lawsuit explains how the EPA knew of dicamba’s potential to drift and damage sensitive areas, yet—at Monsanto’s request—approved the genetically engineered Xtend seeds in 2015, ruling on the narrow basis that the seeds themselves posed no “pest risk” to other plants, while ignoring both the agency’s broader mandate to “help rural America thrive” and the virtually assured impacts of a
Minnesota court cases reveal legal issues in pesticide drift incidents

By Dean M. Zimmerli

Although the popularity of organic farming methods has increased in recent years, there is no question that conventional farms still make up the vast majority of farms in this country, and almost all organic farms share a boundary with a conventional farm. Thus, there is an ever-present risk that pesticide application on a neighboring farm could result in spray drift onto the organic farm.

The most immediate consequence of spray drift onto an organic field is the potential loss of the organic status of the crop. Further, spray drift can cause plant damage and resulting yield loss. Deciding who is responsible for damages in a pesticide drift situation can be challenging, as organic farmers in Minnesota discovered when they sued a pesticide applicator. Oluf and Debra Johnson are organic farmers in Meeker County and were transitioning one of their soybean fields to organic, which required they farm the field with organic practices for three years before they could market the crop as “organic.” A local farming cooperative sprayed a neighbor’s field with a combination of glyphosate, difluenzopyr, and dicamba on a day when winds were blowing toward the Johnsons’ soybean field. Testing by the Minnesota Department of Agriculture found dicamba residue on the soybeans. The Johnsons’ organic certifying agent determined that the soybean field would have to be returned to the beginning of its 36-month transition phase (i.e., they would not be able to market their crop as organic for an additional 6 months). The Johnsons tilled in the contaminated portion of the crop. The following year, spraying by the same cooperative resulted in potential contamination of the Johnsons’ organic alfalfa.

The Johnsons eventually started a lawsuit against the cooperative seeking damages for lost profits from having to take the fields out of organic production for three years and for the crop that had to be destroyed because of the contamination. The case, Johnson, et al v. Payneyville Farmers Union Cooperative, Inc., eventually wound its way to the Minnesota Supreme Court, which was asked to decide what legal theories the Johnsons could advance against the cooperative for the spray drift.

The first legal theory the Johnsons advanced was trespass. Most people are familiar with the concept of trespass; if a person enters onto another’s property without permission, it is trespassing and the trespasser can be liable for any damage caused. The Johnsons argued that the cooperative “trespassed” by causing particulate spray to drift over and enter their property. The Minnesota Supreme Court rejected this argument, holding that the entry of particulate matter is not a “trespass” under Minnesota law. However, the court did recognize that several other states have come to the opposite conclusion. The Johnsons next argued that the cooperative should be liable under a nuisance theory. Minnesota law provides that a nuisance is “anything which is injurious to the health, or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.” More simply, a nuisance is conduct that interferes with another person’s use and enjoyment of their property. The court recognized that the Johnsons may have a viable nuisance claim for the spray drift.

The Minnesota Supreme Court also looked at whether the cooperative might be responsible on a theory of negligence. Negligence is simply the failure to act in a reasonable manner to avoid harming other people or property. The court held that the Johnsons may also have a viable negligence claim if they prove the cooperative was not careful enough in applying pesticides to neighboring fields.

Finally, the Minnesota Supreme Court looked at whether the cooperative could be held liable for damages resulting from the destroyed crops, loss of organic certification, and the three-year delay in being able to market the crops as organic. In deciding this question, the court interpreted federal organic regulations to determine whether the Johnsons’ fields should have been decertified in the first place, or whether it was their certifier’s fault for mistakenly decertifying the field.

After interpreting the federal regulations, the Minnesota Supreme Court held that the inadvertent, accidental application of spray to an organic field does not require the removal of their field from “organic” production certification. The court determined the Johnsons’ organic certifier was mistaken, and the certifier was the cause of the destroyed crops and loss of certification, not the cooperative. Thus, the Minnesota Supreme Court concluded the cooperative could not be held liable for those damages.

Second Lawsuit

Several years after the Johnsons’ first suit, another cooperative allegedly damaged their alfalfa field when spraying a neighboring conventional farm. The Minnesota Department of Agriculture inspected the Johnsons’ field, found prohibited chemicals, and ordered the contaminated alfalfa be destroyed. The Johnsons’ organic certifier, however, initially concluded that the field did not need to be decertified from organic status. Interestingly, the Johnsons then appealed their certifier’s decision, and the US Department of Agriculture National Organic Program overruled the certifier’s decision and suspended the field from organic certification for three years.

The Johnsons sued again, arguing this time that the state’s negligence in allowing the affected field to remain on the market was negligent. The court interpreted federal organic regulations to determine whether the Minnesota Supreme Court was correct in the first place and that the Johnsons should be able to recover damages for the loss of organic certification. The Minnesota Court of Appeals considered the Johnsons’ arguments. Unfortunately for the Johnsons, the Minnesota Court of Appeals considered itself bound by the Minnesota Supreme Court’s decision in the earlier Johnson case. Thus, the Court of Appeals held that the alleged damages for the loss of certification were caused by the cooperative. The Minnesota Supreme Court afterwards declined to consider the Johnsons’ arguments again.

Considerations for Organic Producers

The Johnson cases provide some useful guidance for farmers facing a spray drift problem. First, if the farmer can show that the applicator did not act reasonably in applying pesticides, such as failing to follow application instructions or spraying on windy days, the farmer may have a negligence claim. Similarly, the farmer may also have a nuisance claim. However, in many cases, damages will be limited to lost yields or for crops ordered destroyed. Until the Minnesota Supreme Court revisits the Johnson decision, it is unlikely that farmers will be able to recover lost revenue because of a loss of organic certification.

In many situations, the cost of a lawsuit may be prohibitive. The old adage that “an ounce of prevention is worth a pound of cure” is particularly applicable. Organic farmers should maintain buffers around their vulnerable crops to avoid any potential cross contamination and inadvertent spray drift. Further, it may be worth having discussions with neighboring producers, informing them about organic or otherwise vulnerable crops, and requesting that spraying is done when the risk of drift is low.

It is unlikely that the prevalence of pesticides in agriculture will significantly diminish in the near term. As the prevalence of organic and other non-conventional farming methods rise, it means farmers of all stripes will be dealing with risks of potential spray drift. And while there are some legal remedies for farmers impacted by spray drift, some preventive practices and communication with neighbors are still the best solutions.

Dean Zimmerli is an attorney with Gislason & Hunter, LLP, where he advises farmers and ag businesses about drainage and water issues, land use, environmental regulation, contract disputes, and other issues. Reach him at dzimmerli@gislason.com or 507-354-3111.
Two of the key hemp diseases are powdery mildew and gray mold (Botrytis), according to Dr. Sandler. They are both related to moisture on the leaves, so plant spacing and ventilation are two preventive practices that may help give your plants a competitive edge. Control of these diseases is important because even a small amount of mold in the flowers can make the crop unsaleable. The same organic pesticides that are used on diseases like powdery mildew on vegetables can be effective on hemp. Examples include products that contain neem oil or potassium bicarbonate. Again, check with your certifier and your state’s (B) minimum risk pesticide list to make sure a product is allowed for you to use. Some major insect pests are aphids, mites, thrips, Eurasian hemp borer, corn borer, and corn earworm. European corn borer and Eurasian hemp borer have been reported across Wisconsin in 2019. Bacillus thuringiensis (Bt) can be effective for control of borers and worms. McHugh ran into varied crops on his crop. To control them, he pulled them off by hand and put them in a bucket of soapy water. He explained that his main problem with pests is that the pressure to create optimum plant health and going four or five years between hemp or other host crops.

**Pollen Drift**

One major risk factor with CBD production is pollen drift. Farmers planted feminized seed and cultivate male plants because the CBD content plummets when the female plant is pollinated. A reasonable expectation for CBD content as a percentage of dry weight is above 6% when the female flowers are pollinated. The CBD content can go below 4%. Beyond just cutting your saleable product in half, you probably would not even be able to find a buyer for hemp biomass with 4% CBD content. Pollen can travel up to 10 miles, so you don’t just have to be aware of what is in the neighboring field. Susan Cande, a farmer in southern Wisconsin, said she drove a perimeter of 20 miles to get to know what other farmers are growing. Because hemp was historically grown in Wisconsin, some areas have high populations of wild hemp, also known as ditch weed. McHugh said he found some along a local bike trail and destroyed it. Before deciding to grow CBD hemp, take stock of the wild hemp populations and other forms of hemp production in your area. If this risk is too great, you may have to grow CBD inside a greenhouse or find creative solutions to keep pollen off the female flowers.

**Testing**

Testing for THC is required for every variety of hemp from every field where it is grown. These tests are $250 each, and the farmer has to notify the state 30 days before harvest. The crop must be destroyed if it has over 0.3% THC. Choosing the right seed genetics is the first way to keep the plant from “going hot.” The second is to provide ideal growing conditions since hemp produces THC in part as a response to stress. Overfeeding phosphorus and, in later growth stages, potassium will put your plants at greater risk of crossing the THC threshold. Every variety of hemp will eventually pass the THC threshold if you leave it in the field too long.

Cande said she plans to test her crop regularly as harvest time approaches. Even though the state only requires a single pre-harvest test, she wants more peace of mind about THC levels to mitigate some of the risk. While crop insurance will be available for hemp in 2020, the USDA’s press release announcing the change also noted that “hemp having THC above the compliance level will not constitute an insurable cause of loss.”

**Harvest**

Harvest is one of the most important aspects of hemp production. A crop harvested and dried incorrectly can be destroyed. Left to grow, a hemp plant will produce only one flower. CBD is produced in the trichomes (glandular hairs) on the surface of female flowers; so if you minimize the time you plant you can reduce bushing to produce more flowers. The flowers are ready to harvest when the trichomes turn from a clear white to a milky white color, according to Dr. Sandler. Harvest times will vary by planting date, day-length, and cultivar but will generally be from mid-September to mid-October in the Upper Midwest.

Growers harvest the entire plant (including the stems, leaves, and flower buds), just the flowers, or trimmed flowers (just the flowers), according to Dr. Sandler. It’s up to you to find a buyer for your harvest. Some buyers require a minimum of 8% CBD. Harvesting CBD is labor-intensive as it is usually harvested by hand. If you do not have enough labor available to harvest the crop on time you can drastically reduce your CBD content (as well as increase your risk of passing the THC threshold). Large-scale growers can invest in tractor attachments and other tools for harvesting and removing the flowers from the stalks. Some examples are the RIRF1 CBD Hemp Harvester and the Hemp Harvest Works’ Hemp Handler. Both appear to work similarly, as they were reengineered from tobacco-harvesting machinery.

CBD hemp should be dried as quickly as possible. Ventilation and humidity control are very important. Heat can degrade the CBD content, so fans are used instead. The ideal conditions for drying CBD hemp are between 60 and 70 degrees and 60% humidity. If there is too much moisture, the crop can mold quickly, which will make it unsaleable. In the Midwest, it should be dried under a roof and out of direct sunlight. Drying facilities have to be clean and free of animals, birds, and insects. At a large scale, hemp drying machines can aid this process.

**Organic Certification**

Any certified organic CBD product must be from a certified organic crop that’s processed at a certified organic facility. It may be difficult to find certified organic processors to extract CBD, but there are several in the process of certification now that should be ready in time for the hemp harvest. Because certifiers are regulating federal law they can’t certify products that are allowed in some states but aren’t allowed federally. They may be wary of certifying CBD products because of their murky federal legal status. Some certifiers won’t certify CBD as a food product or in a food product. Some will certify CBD as long as the label is not making a health claim or has a disclaimer along the lines of “this claim has not been evaluated by the FDA.”

Seed treatments can be an issue in organic production. MOSA’s Kristen Adams, who is a nationally recognized expert on hemp certification, said there are two commonly used substances that can be applied to hemp plants to produce feminized seed. The first is colloidal silver. It is allowed if you can verify that it is natural, which Adams said is “very hard to do.” The second is gibberellic acid, which is allowed in organic production.

To get feminized seed, when the plant starts to flower, you spray the plant with either gibberellic acid or colloidal silver. Then the plant only produces female seeds because it stops the production of the male chromosome. For certification purposes, the seed is not considered treated because the plant is treated before it produces seed. As long as the harvested seed is not treated with other prohibited substances, and you conduct an organic seed search that shows that it is not available as organic, you can plant the feminized seed produced with either gibberellic acid or colloidal silver. To produce certified organic feminized seed, you’d have to use feminized pollen from a gibberellic acid treatment to pollinate a certified organic mother plant.

Certifiers have to verify that producers are in compliance with their state hemp program, and they will ask you to submit information about your state hemp license. In order for the oil or the end product to be certified organic, the processing facility also has to be certified. Contact your certifier early in the process to make sure you are in compliance.

**Promise of CBD**

There are still more questions than answers when it comes to growing CBD hemp and the challenge is someone who enjoys experimentation and is not afraid of taking risks. Most farmers are growing CBD because they believe their medicinal properties offer an alternative to the debt and addiction that can come with modern medicine. There are many challenges and a lot to learn. If growers in this region can be successful growing CBD hemp, and if they can make their voices heard in building equitable supply chains, CBD hemp could transform rural communities.

Chuck Andersen is a MOSES organic specialist. Reach him through the Organic Answer Line: 888-90-MOSES.

---

**Online Resources for Hemp Growers**

fyi.extension.wisc.edu/hemp
University of Wisconsin-Extension’s hemp website has webinars, blog posts, and a buyer/seller list.

michaelfields.org/hemp-information-exchange
Listen to ask questions and offer answers about hemp.

rodaleinstitute.org/science/industrial-hemp-trial
Rodale’s industrial hemp trial

datc.wp.gov/Documents/IHPesticides.pdf
List of pesticides that may be used on hemp in Wis.

datc.wp.gov/Pages/Programs_Services/IHLicensedSeedSources.aspx
List of licensed seed and transplant sources

www.kellysolutions.com/wi/pesticideindex.asp
Searchable database of pesticides approved in Wis.

**State Hemp Sites**

Illinois—bit.ly/IllinoisAgHemp

Indiana—www.oisc.purdue.edu/hemp/index.html

Iowa—iowaagriculture.gov/hemp

Michigan—bit.ly/MichiganMOAIRD_Hemp

Minnesota—www.mda.state.mn.us/plants/hemp

Wisconsin—bit.ly/DATCPwigov_IndustrialHemp
Regenerative organic agriculture has potential to halt climate change
By Jeff Moyer, Rodale Institute

We can stop the climate crisis. At least, we can start reducing the 23% of global greenhouse gases that the United Nations Intergovernmental Panel on Climate Change recently attributed to agricultural activities.

The answer is regenerative organic agriculture. And the time to implement it is now.

In a recent report, the UN said humans cannot stave off the effects of climate change without making drastic changes to how we grow food and use land. Conventional, industrial agriculture depends on chemical inputs and fossil-fuel intensive synthetic fertilizers, in addition to heavy machinery and tillage, to grow food. Industrial farming also relies on factory farms for animals. These methods release large amounts of carbon, methane, and other gases into the atmosphere.

In contrast, science proves that regenerative organic systems, which prioritize soil health and good farming practices like cover cropping, crop rotations, and pasture animals, use 45% less energy and release 40% fewer carbon emissions than conventional agriculture, with no statistical difference in yields.

The Rodale Institute Farming Systems Trial was started in 1981 and is the longest side-by-side comparison of organic and conventional grain cropping systems in North America. We’ve collected data on soil health, crop yields, energy efficiency, and more through our research trials, which have led us to discover the implications of switching to an organic system.

Rodale Institute and others have concluded that if we converted all global cropland and pastures to regenerative organic systems, we could sequester more than 100% of current annual CO2 emissions. As the UN report states, we don’t have time to wait. Regenerative organic agriculture works with natural systems to produce nutritious and abundant food, instead of relying on synthetic inputs like pesticides and artificial fertilizers. Regenerative goes beyond sustainable to improve resources, not just maintain them.

Regenerative organic agriculture utilizes strategies like organic no-till, which uses cover crops to return nutrients to the soil while absorbing carbon dioxide, reducing greenhouse gas emissions. Because the soil is not disturbed in organic no-till systems, the carbon dioxide absorbed by the cover crop is sequestered in the soil instead of released into the atmosphere.

Regenerative organic prioritizes soil health, but also considers animal welfare and social fairness in its standards. Regenerative organic livestock management emphasizes rotational grazing, grazing on grass, and no antibiotics or hormones, reducing the heavy burden livestock places on climate.

But we don’t need regenerative organic agriculture only to mitigate the effects of climate change. We also need it in order to feed a world that’s already been shaped by a changing climate.

As extreme weather events become more frequent, agricultural systems must become more resilient.

Our research has found that organic crops have the potential to produce yields up to 40% higher in times of inclement weather—like flooding or droughts—than conventional systems.

This means that it is possible to feed the world while reducing carbon emissions. Regenerative organic farming prioritizes soil health, creating living soils teeming with bacteria, fungi, and a thriving micro-biome that is otherwise degraded through the use of pesticides and herbicides, and other industrial farming practices like monocropping. Healthy soil is also more stable, sticking together like glue and preventing the erosion and runoff that come with climate change’s extreme weather and decimate crops.

Each region is feeling climate change differently, which is why Rodale Institute is starting Regional Resource Centers in three agricultural hubs of the United States: Iowa, Georgia, and California. We will conduct research on resilient agriculture in these distinct regions, bringing our world-renowned expertise to new audiences as we face a growing climate crisis.

However, farmers shouldn’t shoulder the burden of changing our food systems alone. Consumers have a responsibility to protect the planet as well. Every purchase matters when it comes to the climate crisis.

The Regenerative Organic Certification, launched by Rodale Institute with brands like Patagonia and Dr. Bronner’s, helps consumers make informed choices about the food and products they buy. Coming to store shelves soon, the Regenerative Organic Certification will ensure that the products that bear its label were created with an emphasis on soil health, animal welfare, and social fairness.

Voting with your dollars is the only way that we can change our food system and save our planet.

We don’t have time to waste. Our planet is changing, but we believe we can make a difference—because the future is organic.

Jeff Moyer is the executive director of Rodale Institute in Pennsylvania. He is the author of Organic No-Till Farming: Advancing No-Till Agriculture.
Native Forages

On the majority of our grazing acres, we have utilized a grazeb-what-grows concept with some variety of surface seeding where needed. Without these hardy old volunteer species in our mix, we would be in major trouble this year. Kentucky bluegrass, quackgrass, bromegrasses, Timothy, canarygrass, white clover, plantain, and dandelions may be considered weeds to some, but they are workhorses for us. They survived the winter and were our first spring feed.

Each year we manage one long grazing interval (40-60 days) on most paddocks to allow a seedbank deposit. In many places that were bare the amount of new volunteer seeding was tremendous. In the no-till pastures, we graze very tightly prior to seeding to give the new seedlings a chance to compete with the existing sod.

In all cases, we manage to keep a high legume component for free nitrogen contribution as well as a high-quality protein component in the feed. Where we have clover we see far less of any grass diseases like rust or molds. The legumes also seem to make the whole mix palatable even when we graze at a taller height of more mature forage. Root health is very critical to stand resilience all around.

Forage Supply, Demand

Make sure you track, measure, and estimate forage production throughout the growing season. Planning and monitoring will help you manage better and will give a realistic assessment of the need to purchase forage. Matching livestock numbers to forage inventory is critical. A grazing plan can help determine the farm’s carrying capacity and prevent overstocking.

If you are running short of feed or have acres that can be planted late season consider forage oats, millets, brassicas, or even full renovations in August. As the season gets later, the winter wheat, rye, and triticale options are worth considering.

Fundamentals

To grow anything we need fertility, so fall soil testing is a great tool to assess those needs. Mismeasure and legumes can provide good fertility. Harvest by grazing animal or machine is a symphony of timing to optimize quality. Invest in good storage—feed losses are unacceptable. Maximize your plant leaf area solar panel and control weeds. Buy any needed forage early and search out neighbors who might have acres to rent.

We have found some insurance fields from neighbors who want to see hay and forages grown on their land and are happy to see the farms managed organically!

Naked Barley

be used by companies to meet the demand for whole-grain foods in the market.

“Barley has unique fiber characteristics that are appealing to the health-conscious consumer and we expect the market for organic food barley will continue to grow,” said Brigid Meints, a postdoctoral research associate at OSU who was hired under the USDA-NIFA-OREI grant. “By combining the health characteristics associated with the whole grain status of naked barley with improved varieties bred for certified organic production, the value of naked barley to the producers, processors, and consumers becomes quite high.” For organic producers interested in meeting this market demand, naked barley doesn’t require producers to invest in a de-huller, which makes adoption of this crop into their rotation that much easier.

Another market to watch for naked barley is craft brewing. With the explosion of the craft beer market throughout the U.S., brewers are on the search for new and exciting flavors to serve their customers. Naked varieties may be able to provide not only new flavors, but also processing advantages. In traditional brewing, barley hulls act as a filter. Advances in brewing technology, including the use of mash filters, make it possible to achieve higher brewing efficiencies with naked barley which result in lower carbon and water footprints. Brewers without mash filters are still able to use naked barley in recipes by incorporating rice hulls as a natural filter.

The project has also been running micro-malting tests on naked barley to determine the best protocols for the malting process. The University of Minnesota team visited with a Minneapolis brewery, Modist Brewing, that experimented with naked barley. Modist teamed up with Rahrl Malt to malt and analyze a small batch of naked barley for brewing. The result, called “Deviation #6,” was delicious according to everyone involved. Similar activities are happening with other grant partners throughout the project, with brewing recipes in development or already on tap.

Education and outreach are important aspects of the project and opportunities are available regularly in all of the regions, including field days and tours, culinary showcases and presentations at organic conferences. Representatives from the team presented a poster highlighting the work at the 2019 MOSES Conference. In the fall of 2018, the New York region hosted a “Brew and Bake with Naked Barley” culinary event in Brooklyn that brought together professionals in the food and beverage business who are interested in regionally grown grains. Attendees learned about the variety trials and tasted various products and beverages made from naked barley. OSU hosts a similar event every year as well.

Print and social media channels have been following the project and sharing information with audiences since its inception. Beth Dooley, a culinary professional and cookbook author based in Minneapolis, has crafted recipes that have been included in print articles, blogs, and TV segments.

“I find naked barley an easy grain to work with and have enjoyed sharing tips and recipes with various audiences,” Dooley said. “However, I’m most excited about the idea that this crop can be another important tool for our organic producers to use in their rotations that will support their economic and ecological production goals. That’s great news for everyone.”

The project also include a public awareness program that incorporates K-12 educators. Seed samples and a small stipend have been provided to participating schools to manage experiments, organize field trips, and provide interactive learning experiences focused on naked barley. Students are collecting data and learning how to do basic research; the lead teachers have been posting descriptions and images of their work on the project website. Lastly, participating schools are also being matched with a culinary professional to demonstrate how naked barley can be prepared and consumed.

Consumers, brewers, and culinary professionals can find naked barley at select retail locations, but the goal of this project is to make it even easier to find, access and consume this nutritional and beneficial crop.

Although work on this grant project is expected to conclude in the next year, the regional teams are already in discussion about what the next steps are for the research and development of naked barley. The best way for farmers and others interested in staying informed about this project and opportunities in their area can be found at the OSU website, barleyworld.org/orei-project. The Naked Barley Project Resources page on eOrganic (eorganic.info/node/25366) includes a highly informative webinar. Finally, the project also has active Facebook and Instagram feeds filled with beautiful photos of the work, people, and products involved in this project (search “multibarley”), which is a great way to keep up-to-date on the work under way to bring this ancient and important grain back to growers, brewers, and consumers.
By April Prusia

I have been raising pigs on pasture for almost a decade. With over 90% of pork production occurring indoors in factory-like settings, it is not always easy to access resources for pasture operations. I am an anomaly in this country as a female pasture producer of pork. My model takes into account our native ecological systems. Our land has pastured pigs as well as native prairies and oak savannahs.

From my perspective, Alice Percy does a great job touching on all the pieces that come with raising pigs on pasture, as well as covering requirements for labeling through the National Organic Program and Animal Welfare Approved. There is a great amount of information to digest in Happy Pigs Taste Better. This book covers it all: feed, housing, breeds, farrowing, healthcare, butcher cuts, marketing and financing.

I enjoy and respect the fact that the author is a woman, and has been doing farrow-to-finish organically on pasture. Percy and I both started our pig journeys with similar approaches, with just a few pigs, then growing into a farrow-to-finish operation. I like that she gives a quick lesson on wild pig behavior and relates that to domestic management.

Percy does an excellent job in the Hog Health section describing ailments and disease symptoms. She shares how to prevent these ailments and suggests organic-approved treatments as well as "not approved" treatments. This organic approach is refreshing and enlightening. It's something I have never seen published in a swine book. I like that she lays out the organic rules on medication. Too often I hear folks who misinterpret organic husbandry as excluding conventional treatment, which leads to the mistaken belief organic folks don't care for their animals. She admits this as well, but this can cause confusion for the reader. Different regions have different names for the same plants. For example, what is cocklebur to one, it might be mucuna to another. She uses common names of plants, which I admit do as well, but this can cause confusion for the reader. Different regions have different names for the same plants. For example, what is cocklebur to one, it might be mucuna to another. She uses common names of plants, which I admittedly glazed over the section on financials, but will look back to it for some guidance. I will use it as a guide and reference book. The index is extensive and aids in that reference use. She even has a recommended resource section in the book.

April Prussia raises pastured heritage Gloucester Old Spot hogs on her farm, Dorothy's Range, in southern Wisconsin.

I also had a problem with Percy’s take on calories, grazing, and rooting. Her take on rooting and pasturing disagrees with my take and management of rearing grazing traits. While I fully agree that pigs are not ruminants and should not be left to forage solely, I do think they can adapt quickly and will utilize more pasture if selected to do so. You can have pigs that rarely root and choose grazing over rooting. In my experience, rooting can be nearly eliminated by culling and selecting the desired grazing traits.

Percy also mentions that no study has found a significantly higher ratio of omega-6 to omega-3 fatty acids in pork from pastured pigs. However, Practical Farmers of Iowa recently published research that shows significant differences in fatty acids and vitamins between conventional (grain-fed) pork and pasture raised pork.

I admitted glazing over the section on financials, but will look back to it for some guidance. I will use it as a guide and reference book. The index is extensive and aids in that reference use. She even has a recommended resource section in the book.
to trial the initial models of these robots, he added. "We hope that they’ll become one of the tools we can use in this larger toolbox of weed control techniques, along with increased diversity, increased rotations, and livestock inclusion," Bishop explained. "To have a clean field, there will have to be multiple approaches and multiple tools used, and robots are being thought of as one of those tools.”

The robots will be manufactured and sold by EarthSense, a start-up company incubated at the University of Illinois research park. While the weeding robots are not available commercially yet, EarthSense currently provides a version of TerraSentia that scouts the field and collects crop data such as plant count, stem height, and leaf measurements. The scouting robots were first developed for phenotyping, a method of relating plant information to genetic traits that helps researchers develop better-performing varieties.

"There was a need for smaller vehicles that could move under the canopy and collect detailed plant data at large quantities," explained Chowdhary, who is the Chief Technology Officer of EarthSense. He notes that while the robots were first intended for research, growers were also excited about the opportunity to get precise data at the ground level. For example, early indicators of nitrogen stress are found under the canopy and cannot be seen in data from aircrafts or satellites.

The new food producers have learned firsthand that while the robots were first developed for phenotyping, a method of relating plant information to genetic traits that helps researchers develop better-performing varieties.

Producers in the program also have had the chance to tour John’s farm, where he showed them how he has used cover crops, manure, and compost to turn an overgrazed pasture into the fertile soil where he grows a large variety of organic crops. He also reinforced how much time and effort is put in on his farm to manage weeds, which he referred to as “no goods.”

The new food producers have learned firsthand how hard it is to keep up with weeds. At one point this summer, a tractor operator plowed up an entire row of potatoes thinking there was nothing but weeds. At one point this summer, a tractor operator plowed up an entire row of potatoes thinking there was nothing but weeds in the row! John has found the partnership rewarding as well. "I have been given a glimpse into the Ojibway agricultural philosophy," he said. "I consider my time with the Producer Training Program well spent, and I look forward to continuing my relationship with the program as it matures and results in advancing food sovereignty on the Reservation."

To learn more about the Fond du Lac community’s programs contact Jill Jacoby, Food Sovereignty Coordinator at 218-878-7142 or jilljacoby@fdlrez.com. Nikki Crowe is the Tribal Conservation Coordinator and was the visionary for obtaining the farm and creating the producer training program. Erika Legros is the Tribal Conservation Coordinator at 218-878-7142 or jilljacoby@fdlrez.com. John has found the partnership rewarding as well. "I have been given a glimpse into the Ojibway agricultural philosophy," he said. "I consider my time with the Producer Training Program well spent, and I look forward to continuing my relationship with the program as it matures and results in advancing food sovereignty on the Reservation."

We provide financial, certification, agronomic and educational resources to help you go organic.

<table>
<thead>
<tr>
<th>Organic Broadcaster</th>
<th>Bay Shore Sales</th>
<th>Hatzenbichler Equipment</th>
<th>MicroSpark Seed Treatment</th>
<th>Cover Crop Seed</th>
<th>Soybean and Dry Bean Seed</th>
<th>Nature Safe Organic Fertilizers</th>
<th>AgriEnergy Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>October 2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contact Anders Gurda: 612.868.1208

Contact us today: 763.999.7667

GET TRANSITION SUPPORT

We provide financial, certification, agronomic and educational resources to help you go organic.

Contact Anders Gurda: 612.868.1208

We are actively buying organic grain for immediate and deferred shipment!

<table>
<thead>
<tr>
<th>PIPELINE FOODS</th>
<th>Hatzenbichler Equipment</th>
<th>MicroSpark Seed Treatment</th>
<th>Cover Crop Seed</th>
<th>Soybean and Dry Bean Seed</th>
<th>Nature Safe Organic Fertilizers</th>
<th>AgriEnergy Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELL YOUR ORGANIC GRAIN</td>
<td>Exclusive Bay Shore Blend - Custom Foliar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bay Shore Sales

The Farmer’s Connection

(989) 412-0038

www.BayShoreSales.com

Marianne Stein works in the Office of Marketing Communications in the College of Agricultural, Consumer and Environmental Science at the University of Illinois.
Women in Sustainable Ag Conference

Be part of the national Women in Sustainable Ag Conference Oct. 17-19 hosted by MOSES at the Inter-Continental Saint Paul Riverfront hotel. The event features workshops, demos, and networking opportunities focusing on leadership skills and farm business success. Food justice advocate Miah Ulysse presents the keynote, “Working in Harmony to Transform the Food System.”

Add-on intensives on Thursday combine a morning class with an afternoon tour to a related spot in the Twin Cities. Topics are storytelling to create change, live-stock production, regenerative farm design, and mind/body resilience.

The conference includes the NCR-SARE Farmers Forum, a traveling annual event focused on research, demonstration, and education projects funded by NCR-SARE that promote profitable practices that are good for the environment and community. NCR-SARE is the North Central Region-Sustainable Agriculture Research and Education, a USDA-funded program that supports and promotes sustainable farming and ranching through grants and educational opportunities.

This event welcomes every gender expression. Registration closes Oct. 7; with only 50 seats apiece, opportunities are limited. For more, email info@mosesorganic.org, or call 888-90-MOSES.

To make sure you get one, update your subscription at mosesorganic.org/sign-up, or call 888-90-MOSES. The fifth annual Organic & Non-GMO Forum happens Oct. 29-30, 2019, in Minneapolis. This event is the source for conventional food and ag businesses to learn about opportunities in the organic and non-GMO industry, and for those in the field to discuss its challenges and advantages. MOSES leads a producer panel at the forum.

This event, which has grown three-fold, promises unique insights from leading experts, and unparalleled networking opportunities. Tickets are $799 but farmers in the MOSES community may use the following discount: producers with more than 5,000 acres under organic or transitional production use the code MOSES to reduce registration to $499; those with fewer than 5,000 acres use code ORGFARMER to reduce registration to $499.

Certification Cost Share

Local Farm Service Agency (FSA) offices are taking applications now through Oct. 31 for the organic certification cost-share program (OCCSP). The application also is available online at forms.sc.egov.usda.gov/Forms/searchAction.do (Search the keyword “OCCSP.”) In addition, state departments of ag in Michigan, Minnesota, North Dakota, and Wisconsin facilitate the cost-share program. Certified producers and handlers can apply for reimbursement for certification-related expenses incurred from Oct. 1, 2018 through Sept. 30, 2019. Payments will be up to 75 percent of certification costs with a maximum of $750 per scope of certification.

Fall NOSB Meeting

The fall meeting of the National Organic Standards Board (NOSB) will take place Oct. 23-25, 2019, in Pittsburgh, Penn. This is the semiannual meeting for the board to hear comments from the public about substances used in organic production. Written comments and requests for speaking time at the meeting must be received by Oct. 3. For the agenda and links, see bit.ly/NOSB2019pa.

Grant Opportunities

The USDA North Central Region-Sustainable Agriculture Research and Education (NCR-SARE) has several open calls for proposals, including its Research and Education Grant Program (Oct. 10 deadline), and for those in the field to discuss its challenges and advantages. MOSES leads a producer panel at the forum.

This event, which has grown three-fold, promises unique insights from leading experts, and unparalleled networking opportunities. Tickets are $799 but farmers in the MOSES community may use the following discount: producers with more than 5,000 acres under organic or transitional production use the code MOSES to reduce registration to $499; those with fewer than 5,000 acres use code ORGFARMER to reduce registration to $499.

Certification Cost Share

Local Farm Service Agency (FSA) offices are taking applications now through Oct. 31 for the organic certification cost-share program (OCCSP). The application also is available online at forms.sc.egov.usda.gov/Forms/searchAction.do (Search the keyword “OCCSP.”) In addition, state departments of ag in Michigan, Minnesota, North Dakota, and Wisconsin facilitate the cost-share program. Certified producers and handlers can apply for reimbursement for certification-related expenses incurred from Oct. 1, 2018 through Sept. 30, 2019. Payments will be up to 75 percent of certification costs with a maximum of $750 per scope of certification.

Fall NOSB Meeting

The fall meeting of the National Organic Standards Board (NOSB) will take place Oct. 23-25, 2019, in Pittsburgh, Penn. This is the semiannual meeting for the board to hear comments from the public about substances used in organic production. Written comments and requests for speaking time at the meeting must be received by Oct. 3. For the agenda and links, see bit.ly/NOSB2019pa.

Grant Opportunities

The USDA North Central Region-Sustainable Agriculture Research and Education (NCR-SARE) has several open calls for proposals, including its Research and Education Grant Program (Oct. 10 deadline), and for those in the field to discuss its challenges and advantages. MOSES leads a producer panel at the forum.

This event, which has grown three-fold, promises unique insights from leading experts, and unparalleled networking opportunities. Tickets are $799 but farmers in the MOSES community may use the following discount: producers with more than 5,000 acres under organic or transitional production use the code MOSES to reduce registration to $499; those with fewer than 5,000 acres use code ORGFARMER to reduce registration to $499.

Certification Cost Share

Local Farm Service Agency (FSA) offices are taking applications now through Oct. 31 for the organic certification cost-share program (OCCSP). The application also is available online at forms.sc.egov.usda.gov/Forms/searchAction.do (Search the keyword “OCCSP.”) In addition, state departments of ag in Michigan, Minnesota, North Dakota, and Wisconsin facilitate the cost-share program. Certified producers and handlers can apply for reimbursement for certification-related expenses incurred from Oct. 1, 2018 through Sept. 30, 2019. Payments will be up to 75 percent of certification costs with a maximum of $750 per scope of certification.

Fall NOSB Meeting

The fall meeting of the National Organic Standards Board (NOSB) will take place Oct. 23-25, 2019, in Pittsburgh, Penn. This is the semiannual meeting for the board to hear comments from the public about substances used in organic production. Written comments and requests for speaking time at the meeting must be received by Oct. 3. For the agenda and links, see bit.ly/NOSB2019pa.

Grant Opportunities

The USDA North Central Region-Sustainable Agriculture Research and Education (NCR-SARE) has several open calls for proposals, including its Research and Education Grant Program (Oct. 10 deadline), and for those in the field to discuss its challenges and advantages. MOSES leads a producer panel at the forum.

This event, which has grown three-fold, promises unique insights from leading experts, and unparalleled networking opportunities. Tickets are $799 but farmers in the MOSES community may use the following discount: producers with more than 5,000 acres under organic or transitional production use the code MOSES to reduce registration to $499; those with fewer than 5,000 acres use code ORGFARMER to reduce registration to $499.

Certification Cost Share

Local Farm Service Agency (FSA) offices are taking applications now through Oct. 31 for the organic certification cost-share program (OCCSP). The application also is available online at forms.sc.egov.usda.gov/Forms/searchAction.do (Search the keyword “OCCSP.”) In addition, state departments of ag in Michigan, Minnesota, North Dakota, and Wisconsin facilitate the cost-share program. Certified producers and handlers can apply for reimbursement for certification-related expenses incurred from Oct. 1, 2018 through Sept. 30, 2019. Payments will be up to 75 percent of certification costs with a maximum of $750 per scope of certification.
Changes to Whole-Farm Revenue Protection

USDA's Risk Management Agency (RMA) has announced changes to its Whole-Farm Revenue Protection (WFRP) program for crop year 2020.

- RMA added coverage for hemp grown for fiber, flower or seeds in areas covered by USDA-approved hemp plans or who are part of approved state or university research pilot programs. However, producing hemp above the THC compliance level won’t count as an insurable loss.
- State and federal disaster program payments will be excluded from revenue-to-count and allowable revenue determinations.
- Livestock and nursery limits increase to $2 million.
- Several measures will be available as options to prevent large drops in approved revenue from year to year and smooth the historical values.

The agency developed WFRP as a risk management safety net to cover all commodities on a farm under one insurance policy; it was designed with specialty and organic operations in mind. Learn more about WFRP online at bit.ly/WFRP2020.

Organic Grain Financial Tools

Farmers who are considering the transition to organic grain production have two new resources to help them make decisions: the OGRAIN Organic Grain Compass and Turning Grain into Dough, a 22-page publication written by Paul Dietmann of Compeer Financial (one of the authors of the MOSES book, Fearless Farm Finances). This new publication assesses the financial implications of transitioning to organic crops and explains how to best use the OGRAIN Compass tool for projecting income and expenses. It’s available free online at bit.ly/Small2GrainsCostShare.

Food Justice Certification

The Agricultural Justice Project has teamed up with the Ohio Ecological Food and Farm Association to certify farms and businesses to the Food Justice Certified (FJC) label. The label highlights farms that pay a living wage and support worker rights. The label can be added on to organic certification. For details, see www.agriculturaljusticeproject.org/en/certification.

Farm Viability Conference

The fourth National Farm Viability Conference is scheduled for October 22-24 in Red Wing, Minnesota. The conference is geared towards professionals in the fields of farm and food business planning, financial planning, crisis management, farmland conservation, agricultural market development, and food hub management. It offers attendees the opportunity to network and learn from industry leaders and other professionals in their fields, develop new knowledge and skills, and tour nearby farms and value-added processing facilities. Learn more at www.farmviabilityconference.com.

Pest-Insect Control in Cabbage

The University of Missouri published a study in the journal Insects showing that flower strips and trap crops are more effective at pest-insect control when used in combination. The study focused on organic cabbage plantings that included the insectary plants sweet aluyssum and buckwheat with a trap crop of mustard, kale, and collards. Pest insects were drawn into the trap crop, while natural predators that had established themselves in the flower-strip habitat were able to control pests in the cash crop.

Land Stewardship Project Leadership Change

The Land Stewardship Project (LSP) announced last week that Mark Schultz will step down as executive director after working closely with LSP’s board to ensure an effective transition to new leadership. Schultz became executive director in 2017; He joined LSP in 1987, came back after a stint with other grassroots organizations in the 1990s, and has been an organizer and program director for years.

Organic Eye

Beyond Pesticides has announced the formation of an investigative arm, OrganicEye, headed by Mark Kastel, formerly of The Cornucopia Institute. OrganicEye has established a new toll-free tipline, 1-844-EYE-TIPS. For more information, go to www.organiceye.org.

Small Grains Cost-Share Program

Farmers in Illinois, Indiana, Iowa, Minnesota, Ohio and Wisconsin who are transitioning to organic can enroll in the Small Grains Cost-Share program to earn $2/acre (up to 100 acres) by diversifying a corn and soybean rotation with a year of small grains and a summer cover crop containing at least one legume species. Participants must attend at least one learning opportunity in the year. For details, see bit.ly/Small2GrainsCostShare.

Nutritional Benefits of Pasture-Raised Products

Studies consistently show that pasture-raised animals produce nutritionally superior meat, milk, and eggs. To help farmers explain the benefits to their customers, Food Animal Concerns Trust (FACT) has created a series of handouts that can be customized to the farm. See foodanimalconcernstrust.org/nutritional-benefits.

Organic Hay for sale. 32x32 large square bales. 1st and 2nd cuttings, test available. Ed Baum at 920-427-2575 Shottow, WI.

Organic corn silage for sale. 10 acres ready mid-September. 18678 Scenic Valley Road Richland Center, WI 53518 262-202-0536

First cutting 4x5 organic dry hay bales. $55 per bale. Last year’s organic oat straw. 5x5 bales. $45 per bale. LaValle, WI. Barbara at 630-962-9991.

Certified Organic Alfalfa For Sale. 4x5 round bales, and 3x3 square. One semi load of 4x5 organic round grass bales available, nice color. Tim Cada. Caucasian. NE. 402-750-1414.

Organic Straw, Corn and Oats For Sale. Ellington Elevator, Spring Grove, MN. Delivery available. Call or text Travis Schull 563-419-1848.

Forage Mixes:
- Organic Gold Base Mix
- Organic Gold Starter Mix
- Organic Gold Top Dressing Mix

GRAINS


Winter wheat, spring wheat & oats. All organic. Call for price & amount of each. 605-880-2121 Winter wheat, spring wheat & oats. All organic. Call for price & amount of each. 605-880-2121

Winter wheat, spring wheat & oats. All organic. Call for price & amount of each. 605-880-2121

ROTTEN TO THE CORE

We Stock Dr. Paul’s organic approved Animal Health Products including Health Tinctures, Buluses, Aloe Pellets with Garlic, Immune System Boosters, CalH Health Products, De-wormers and more. We also sell wholesale and retail. Also looking for dealers to stock our organic certified help meal, Sea 90 Salt, Reed Seed Peat (feed grade humated), etc. Sunrise Seeds Plus, LLC. Topeka, Indiana 260-463-0380.

Eco-Friendly Chem-Free-Organic Fertilizers

We Stock Dr. Paul’s organic approved Animal Health Products including Health Tinctures, Buluses, Aloe Pellets with Garlic, Immune System Boosters, CalH Health Products, De-wormers and more. We also sell wholesale and retail. Also looking for dealers to stock our organic certified help meal, Sea 90 Salt, Reed Seed Peat (feed grade humated), etc. Sunrise Seeds Plus, LLC. Topeka, Indiana 260-463-0380.

Organic Fish Fertilizer 15-1-1, 100% dry soluble fertilizer, 5-7 times more nutritious than liquid fish. Will not clog drip irrigation. One lb. 5 lb. or 55 lb. packaging, can be shipped UPS. Frommelt Ag Service, Greeley, IA. 563-920-3674.

For Sale: Tempered, insulated, double-pane glass. Large panes for sunrooms, solar homes, ag buildings, greenhouses or ??? One hundred fifty thousand sold since 1979. 32” x 7’6” x 1” double-pane only $69.00. We will be moving Arctic Glass to Roberts, WI. If you need glass now would be a good time! Arctic Glass, www.kissioursglass.com, call Sandy at 507-259-6351.

Organic Corn Silage for sale.

For Sale: Organic herd. 26 Holsteins, 4 Fleckvieh, 5 heifers due in October, and 25 younger animals. Ron Heebink 715-977-0602.

Farms/Land


Organic Farm For Sale. 40 tillable and 40 wooded acres. Creek winds through property. Debt free (near completion), large fire place, lots of windows. Large 2 car garage, plus work shop. Near Spring Grove, Minnesota. $500,000.00 Call Lois 612-251-5650.


Farms/Land


Farms/Land


Farms/Land

**FACT Grazing Tasting**
September 22 | 2 – 5 p.m. | Chicago, Ill.
Meet from Brattstr Family Farm and food prepared by Uncommon Ground. Register at https://www.eventbrite.com/e/fact-grazing-tasting-68520726337.

**Seed Saving for Northern Climate**
September 22 | 1 | Twin Harbors, Minn.
Seed Saving Gathering hosted by SFA Lake Superior Chapter. Call 1-844-922-5573.

**Principles of Managed Grazing on Organic Dairy Farms**
September 28 | 9:30 a.m. – 3:35 p.m. | Random Lake, Wis.
Learn about paddock size and grazing rotations to meet the organic dairy cow’s nutritional needs. RSVP to Nadia Alber: nabern@wisc.edu or 608-265-6437.

**Cottage Food Producer Food Safety Training**
September 25 | 3 – 8 p.m. | Duluth, Minn.
Meet the training requirement of the Minnesota Department of Agriculture to register as a cottage food producer. Call 612-624-1222.

**FACT Webinar: How to Create a Farm Website that Sells**
September 25 | 6 – 7 p.m. | Online
Learn to refocus your website to build a stronger customer base. Register at https://www.anymeeting.com/AccountManager/RegEv.aspx?PID=EE50DF85894A39

**2019 UMSH Annual Forum - Antimicrobial Resistance in Agriculture: Is it a Worker Health issue?**
September 26 | 1 – 4 p.m. | St. Paul, Minn.
Meet the training requirement of the Minnesota Department of Agriculture to register as a cottage food producer. Call 612-624-1222.

**Soil Fertility & CSA Customization**
September 26 | 3 – 6 p.m. | St. Paul, Minn.
Learn about soil fertility and using the Hervie CSA customization program. Call 612-389-8455.

**Urban Community Supported Agriculture Farm Tour**
September 27 | 9 a.m. | Youngstown, Ohio
Join OEFFA for this fun and educational farm tour. Call Lauren at 614-421-2022 x203.

**Growing Organic Expertise in Iowa**
October 1 | 9 a.m. – 4 p.m. | Des Moines, Iowa
Organic production training to ag industry professionals and farmers. Email info@iowaorganic.org or call 515-608-8622.

**Midwest CRAFT: Urban Ag**
October 2 | 9 a.m. – 4 p.m. | St. Paul, Minn.
Team up with Windy City Harvest and Advocates for Urban Agriculture to bring you a full day of discussion about urban farming, land access, and small-scale farming. Call 615-389-8455.

**FACT Webinar: How to Find and Engage with Customers on Social Media**
October 2 | 6 – 7 p.m. | Online
Learn how best to show up on social media platforms and then convert those followers to paying customers. Register at https://www.anymeeting.com/AccountManager/RegEv.aspx?PID=EE50DF85894A3C

**Growing Organic Expertise in Iowa**
October 2 | 9 a.m. – 4 p.m. | Atlantic, Iowa
Organic production training to ag industry professionals and farmers. Email info@iowaorganic.org or call 515-608-8622.

**Growing Organic Expertise in Iowa**
October 4 | 9 a.m. – 4 p.m. | Webster City, Iowa
Organic production training to ag industry professionals and farmers. Email info@iowaorganic.org or call 515-608-8622.

**Midwest CRAFT: Fall Biodynamic Prep**
October 5 | 1:30 p.m. – evening | Free | Ethor, Wis.
Experience hands on learning and make biodynamic preparations at Ziniker Family Farm. Call 615-389-8455.

**Pasture Establishment, Nutrient Management and Soil Health on Organic Dairy Farms**
October 6 | 9:30 a.m. – 3:30 p.m. | Free | Rudolph, Wis.
Learn how to establish and maintain high- quality pasture for organic dairy cows. RSVP to Nadia Alber: nabern@wisc.edu or 608-265-6437.

**Webinar: Oak Decline in the United States**
October 9 | Noon | Free | Online
Symptoms, range, impact and possible management strategies for oak decline in the U.S. Attend at http://www.forestrywebinars.net.

**Horse-Powered Diversified Livestock and Regenerative Farm Tour**
October 12 | 10 a.m. | Free | Xenia, Ohio
Join OEFFA for this fun and educational farm tour. Call Lauren at 614-421-2022 x203.

**Savanna Institute: Midwestern Silvopasture – Green Pastures Farm**
October 12 | 10:00 a.m. – 4 p.m. | $30 | Clark, Mo.
Learn from the experience of Greg and Jan Judy who run a silvopasture operation. Call 608-448-6432.

**Savanna Institute: Nuts and Bolts of Midwestern Pecan Production**
October 13 | 1 – 5 p.m. | Free | Clinton Hill, Mo.
Learn about Midwestern pecan production and take a tour of the harvesting and processing equipment and a mature pecan orchard. Call 608-448-6432.

**FACT Webinar: Transitioning Off of Nitrogen Fertilizer:**
October 16 | 6 – 7 p.m. | Online
Learn about the how to’s of tall grass grazing using sheep, the combined economic benefits and challenges. Register at https://www.anymeeting.com/AccountManager/RegEv.aspx?PID=EE50DF85894A3C

**Women in Sustainable Ag Conference**
October 17 – 18 | | St. Paul, Minn.
For women with roles in all aspects of sustainable agriculture, from farming to education to food-system activism. Call 715-778-5775 or go to mosesorganic.org/wiva-conference

**Organic Seed Alliance: Upper Midwest Seed Summit**
October 18 | | St. Paul, Minn.
Learn, connect and identify opportunities to advance the regional organic seed system in the Upper Midwest with industry leaders. Call 360-389-7192.

**National Farm Viability Conference**
October 22 – 24 | | Red Wing, Minn.
This conference is geared towards ag and food-system professionals. Email to info@farmviabilityconference.com

**Organic & Non-GMO Forum**
October 29 & 30 | | Minneapolis, Minn.
Learn about opportunities and challenges in the organic and non-GMO industry. Call 207-801-9274.

**Farmer-to-Farmer Marketing Intensive**
October 29 & 30 | | St. Paul, Minn.
Learn the strategies and tactics. Charlotte Smith of 3 Cow Marketing has used to start and grow into a profitable farm. Call 815-389-8455.

**Midwest CRAFT: Extend Your Season With Alternative Income**
November 1 | 10 a.m. – 2 p.m. | Free | Matteson, Ill.
A panel of farmers discuss ways to extend your seasonal income on your vegetable farm. Call 615-389-8455.

**Oregon Tilth Webinar: Social Equity and Sustainable Food**
November 5 | 5 p.m. | Online
See how to integrate diversity, equity, and inclusion in everyday practices and programs. Call 503-378-0690.

**Green Lands Blue Water Conference**
November 19 & 20 | | Minneapolis, Minn.
Learn about fresh perspectives moving continuous living cover (CLC) farming forward. Call 612-625-3709.

**Oregon Tilth Webinar: Organic Hop Production**
December 2 | | Online
Hops production will be examined through the lens of conservation, offering insight into producing hops that also preserve soil and water health, while increasing biodiversity. Call 503-378-0690.

**2019 Acres Eco-Ag Conference and Trade Show**
December 9 – 12 | | Minneapolis, Minn.
Find farmers and consultants from every facet of eco-farming who come together to share their experience and expertise. Call 800-355-5313.