

A Season of Field Days

A Ground-Level Peek at the Challenges (& Promise) of Regenerative Ag

By Brian DeVore

It's easy to get a bit down about the state of our farm and food system these days, what with consolidation making it difficult for small and medium-sized farmers to get a fair price, climate change wreaking the kind of weather havoc that at times resembles the plot of a bad movie, decades of abuse coming home to roost in the form of degraded soil, lack of local meat processing constricting family farm

together on a particular farm and see firsthand what its operators are experimenting with. Field days are the foundation of the farmer-to-farmer education model that the regenerative/sustainable agriculture movement was built on — a model that runs counter to the conventional system of passing on knowledge: an expert from academia or industry hands down the ultimate “truth” about a certain production method in a cookie-cutter manner, and then moves on to the next farm.

True agricultural innovation isn't that



Martin Larsen: “If I had a bigger dream for southeast Minnesota in the next 10 years, it’s that we need more small grains.” (LSP Photo)

livestock production, bloated land prices blocking a new generation of farmers from launching careers, an “insect apocalypse” threatening the survival of key pollinators, and agriculture policy increasingly tilted in favor of industrialized, monocultural production that shuts Main Streets.

But spending time on a farm that's using creativity and grit to tackle any of these issues can provide one with a sense of hope and confidence that with a policy change here, a market shift there (coupled with a paradigm adjustment), a regenerative form of farming that supports economically and ecologically resilient communities has a real shot at becoming mainstream.

One way to cultivate that optimism is to attend a field day. For decades, such events have been used by groups like the Land Stewardship Project, the Sustainable Farming Association of Minnesota, Practical Farmers of Iowa, and MOSES to bring folks

clean and simple. Every farm — heck, every *field* — is different. Field days are a way for farmers to not only share what's working, but just as importantly, what's not. It takes a lot of courage to open up to the community and host a field day in farm country, a place where farmers will often plant a cover crop far from a public road to avoid the derision that can come with failure. Chris Gunderson, who hosted an LSP field day on his southeastern Minnesota corn and soybean farm in July, made it clear his initial foray into cover cropping has so far raised more questions than answers. “I'm just getting my feet wet,” he said while showing off the no-till equipment he uses.

The following pages include mini-reports on eight field days held in Minnesota, Iowa, and Wisconsin during the summer of 2021. Some were sponsored by LSP, others by allied organizations, and

still others were a group effort. Some of the methods and systems that were discussed at these events represent a major overhaul of a farm's production system — converting row crops to grass-based livestock, for example. Other innovations are less dramatic — one farm has simply re-introduced a small grain into its corn-soybean rotation. But these changes, ideas, and tweaks, taken as a whole, provide insights into the potential for creating a more sustainable, resilient system of producing food. ●

Small Grains, Rotations & Economics Witness to the Long View

Standing in the shade on his farmstead west of Rochester in southeastern Minnesota on a 90-degree July day, Martin Larsen pointed out a cross-section of a burr oak that he had recently cut down. “It's 195-years-old and it's witnessed my entire family's history here, from homesteading in 1865 'til just a number of years ago when it died,” he told the roughly 40 farmers who had gathered there for a field day sponsored by LSP's Soil Builders' Network, along with the Soil and Water Conservation Districts in Olmsted and Wabasha counties.

Larsen talked about all that this “witness tree” had overseen, from wars and economic collapse to changes in land ownership.

Larsen's point was that like that burr oak, farmers need to be in it for the long haul. That means building systems that create the kind of soil that can withstand the extremes climate change tosses their way. A few years ago in this part of Minnesota, that meant struggling with flooding of Biblical proportions. In 2021, it was the other extreme.

By mid-July, over 70% of the state was experiencing “severe” drought, according to the National Weather Service. Although the part of the state where Larsen's farm is located was only in a “moderate” state of dryness at the time of the field day, the impact of extreme weather in other parts of the country was literally in the air. Smoke from wildfires in Canada and out West had drifted into the Midwest, and during the field day one could catch the acrid smell of burning timber on the breeze. In fact, on this particular day the combination of smoke drift and weather patterns had created a situation where Minnesota had the worst air quality in the nation.

“We went almost a full 28 days without

Field Day Season, see page 23...

any rain in that May-June period,” said Larsen, who farms 700 acres of rented and owned land. But thanks to soil-building methods such as no-till, cover cropping, and diverse rotations, the farmer was able to retain enough moisture to get through that dry spell. He explained that by bolstering organic matter levels and keeping the soil covered he was able to retain any moisture that was present, plus reduce the surface temperature of that soil. Larsen described how one day the temperature of some of his bare soils had soared to a moisture-sucking 115 degrees Fahrenheit, a full 30 degrees higher than what it measured under crop residue.

The farmer is convinced that not disturbing the soil and planting cover crops are key ways to build the soil’s resilience. Besides farming, Larsen also works for the Olmsted County Soil and Water Conservation District, where, among other things, he helps coordinate trials on a research farm dedicated to soil health. Those trials have shown that cover cropping dramatically cuts the amount of nitrogen fertilizer leaching out of farm fields and into the groundwater. That’s important to Larsen, who, as an avid caver, is intimately aware of the quality and quantity of water that runs through the karst geology of southeastern Minnesota.

He’s even more excited about the potential offered up by reintroducing small grains into a row crop rotation. For the past few years, Larsen has had good luck with oats, which he raises for the food market while selling the straw to construction companies and transportation departments. He’s found that a small grain like oats breaks up pest cycles, provides fibrous roots that keep nutrients in place, and overall provides the diversity healthy soil needs.

“I think we need more cover crops, but if I had a bigger dream for southeast Minnesota in the next 10 years, it’s that we need more small grains,” Larsen said. “It’s good for the farm, good for the water.”

He walked the field day participants over to a recently harvested oat field, where some of the equipment he uses to grow and harvest the crop was parked: a grain drill, a hay rake, and a combine — the latter which he also uses for corn and soybeans. Larsen’s point was that it doesn’t take a lot of extra expensive equipment to bring small grains

back into the rotation.

The farmer is particularly happy with the 2021 oat harvest, which produced an impressive yield of around 115 bushels per acre. Larsen did a quick calculation showing that when one considers the lower input costs associated with oats, along with the markets available for the grain and straw, it can at times out-compete corn financially. And that doesn’t include the long-term financial boost he receives by introducing a third crop into the rotation. Research out of Iowa shows that making small grains part of a rotation results in a yield bump for row crops down the line. In addition, harvesting an oat crop in July opens wide a planting window for a soil-building cover crop that might be hard to get established after harvesting corn in the fall. That, said Larsen, is the advantage of thinking beyond one growing season — of taking the long view.

At one point, a field day participant



Rachelle (left) and Jordan Meyer conducted a Brix test on giant ragweed growing in one of their paddocks to determine its sugar content. “We realized we could use these weeds rather than pull them,” said Jordan. “The land was telling us we need to graze this.” (LSP Photo)

asked the farmer whether he considers soil health or economics when making planting decisions. “Both,” he said while holding a double handful of oats. “We’re here to make money off our farm and we make that off our soils.” ●

Soil Health & Land Access Embracing the Weed

Sometimes the land speaks to farmers, and what it’s saying in none-too-subtle terms is that a certain form of management isn’t quite working for this particular piece of real estate. Maybe it’s too wet, too dry, too hilly or just plain too impoverished to raise a decent crop of corn

using conventional methods, for example. This communication can take the form of bad or inconsistent yields, eroded soil, even chronic pest problems. Conventional practices can sometimes quiet the land’s complaining through intense use of inputs, but that’s just a short-term fix, at best.

A few days after the LSP field day at the Larsen farm, Rachelle and Jordan Meyer were telling a group of their neighbors that the message they received was less a whisper in the ear and more of a slap in the head. The beginning farmers — they are in their late 20s — have launched an ag enterprise on a combination of owned and rented acres in southeastern Minnesota’s Houston County. They are farming in the heart of the Driftless Region and some of those parcels are pretty rugged — hillsides, wooded stretches, and oddly shaped fields are the norm.

The site of this LSP Soil Builders’ Network field day, in particular, has been a challenge to farm. The Meyers tried row-cropping some of the open land for five years, and struggled mightily. Much of the land on this particular farm is highly susceptible to erosion, especially when planted to corn and soybeans. And the plant pests — especially giant ragweed, thistle, and wild parsnip — were loving having the soil opened up and exposed for much of the growing season. It was clear the soils here were dominated by bacteria. That’s important, since soil high in bacteria has a harder time making use of and storing fertility, and weed pests take advantage of the situation. Soil that’s higher in

fungal activity, on the other hand, is efficient at recycling and utilizing nutrients.

The Meyers had an idea — why not listen to what the land was telling them and, rather than trying to make it grow input-intensive row crops, run all those weeds through grazing livestock? With that, they could accomplish two goals: in the short term it would provide a cheap feed source for their animals, and in the long run they could feed fungal communities in the soil high amounts of carbon, which they thrive on. The Meyers’ grazing system, which relies on high-density, short-duration rotations of animals, is an ideal way to feed carbon to the soil in the form of cellulose provided by the plants that are stomped into the ground during frequent paddock shifts.

“We realized we could use these weeds

Field Day Season, see page 24...

...Field Day Season, from page 23

rather than pull them,” said Jordan. “The land was telling us we need to graze this.”

The couple led the group behind a barn to a field that was covered in five-foot-tall-plus weeds. Using portable fencing, the Meyers had set up a long, narrow paddock along a ridge. While people watched, they turned a small group of beef stockers into the paddock. Because of the narrowness of the paddock, the bovines were forced to feed on the weeds.

“The first thing they’re eating is the ragweed!” shouted an onlooker.

What they didn’t eat they were stomping



U of M researcher Jacob Jungers (left) and farmer Kaleb Anderson describe how they are pushing Kernza’s productive life with grazing. “The question is, ‘Can you continue to push it each year and still get profitable grain yields?’” said Jungers. (LSP Photo)

into the ground, which the young farmers explained helps build biomass while covering the soil. While the cattle grazed, Jordan and Rachelle used a portable Brix Meter to measure the sugar content of a few crushed ragweed leaves. The reading was relatively high, a sign that it can serve as a good source of forage for livestock.

“In fact, maybe I should start raising ragweed for seed,” Jordan said with a sly smile. In recent years, giant ragweed has evolved into one of the Corn Belt’s nastiest weed pests. Jordan’s comment elicited a nervous laugh among the gathered farmers.

But the goal is not to propagate more ragweed in this paddock. Within 30 days, it will be growing a lush carpet of grass and other forage species, said Jordan.

“When we trample that down and let other things grow back, we see *lots* of new species come through from the seed bank

that we already have in the soil,” he said.

In other intensively grazed paddocks, they’ve seen perennial rye grass, orchard grass, red clover, and white clover emerge. Even native species like wild bergamot and common yarrow come back.

“It just opens the environment for a lot of different things to come in,” said Jordan.

The pasture walk continued down a narrow, rocky path that passed through a gully surrounded by trees. The Meyers led the group up the other side of the gully and emerged into an open pasture full of goats. This pasture had been overgrazed in the past — neighbors used to joke that some pastures on the farm were so short that you could see a mouse run across them a-half-mile-away. But today, even under dry conditions, it was full of lush forage for the goats and other livestock. Chicory, red clover, and wild bergamot were growing in this pasture, and the soil compaction had been reduced to the

a variety of terrain — from almost impenetrable woods to open, steep pastures.

“It’s definitely a learning experience,” said Rachelle. “You have to be willing to learn every year. We’ve learned to be a resilient farm.”

Adding value to marginal land by building soil health with careful management of livestock fits in nicely with the Meyers’ business plan. They raise beef cattle, goats, chickens, and hogs on pasture. Through their Wholesome Family Farms business, they direct-market this meat as a grass-fed, non-GMO product. And the goats, which are a relatively recent addition to the business, provide another way to make use of marginal, rough land; Rachelle and Jordan find the goats can graze hillsides that are inaccessible to other livestock and are excellent at controlling invasive species such as multiflora rose. As with many beginning farmers, finding creative ways to add a spark to marginal acres is key for the young couple as they seek to access land affordably.

“We don’t have to go around looking for the best land out there,” said Jordan. “Grazing brings life to the table.” ●

Land Grant Research Pushing a Perennial

Let’s be honest, despite all the impressive innovations it’s spawned in American agriculture, the land grant research system has not exactly been an ally of regenerative farming. In fact, the system’s emphasis on input-intensive, industrialized crop and livestock production systems has resulted in some significant economic and ecological problems over the years. It’s frustrating to watch the resources of all those labs, test plots, and classrooms focused almost solely on such a reductionist way of producing food.

That’s why it’s so gratifying when an innovation emerges from the land grant system that is not just one more way to boost yields of corn and soybeans or represents a new twist on producing livestock in large concentrated animal feeding operations (CAFOs). Take, for example, the Forever Green Initiative at the University of Minnesota. Forever Green is working to develop a variety of crops that can provide an alternative to monocultural plantings of corn and soybeans while keeping the soil covered year-round.

During the past several sessions of the Minnesota state Legislature, LSP and its

Field Day Season, see page 25...

allies have successfully pushed for public funding of Forever Green. This funding not only helps advance this key research, it is a moral victory for farmers and others who would like to see more public resources directed at promoting a diverse form of agriculture.

Perhaps the most exciting crop to come out of this initiative thus far is a form of perennial grain. Intermediate wheatgrass was first introduced to the United States in 1907 as a forage, and in recent decades groups like the Rodale Institute and the Land Institute have been experimenting with it to develop a grain and forage crop that would produce multiple economic and environmental benefits without having to be re-planted year-after-year.

Out of this research has emerged Kernza, an intermediate wheatgrass that appears to grow well in the Midwest. In recent years, the University of Minnesota has been working with Kernza germplasm to develop lines that will thrive in the climate and soil conditions found in the Upper Midwest. Kernza represents a key step in developing the world's first commercially viable perennial grain.

Innovation in regenerative agriculture is always exciting. What's particularly positive about Kernza is how farmers are taking the baton from researchers and putting their own creative twist on raising this innovative crop.

For example, consider what Kaleb Anderson is doing. For the past three years he's been attempting to boost the lifespan of Kernza on his southeastern Minnesota farm by utilizing an intensive form of managed rotational grazing. It turns out that although Kernza is a perennial, the older and more mature it gets, the more its productivity starts to wane. In fact, research and real-world results on other farms shows productivity starts to slump significantly after the third year. Anderson's hope is that by pushing the plant through intensive grazing, he can extend its productive life well beyond three years.

Anderson, along with U of M Kernza researcher Jacob Jungers, described this plant hack during a field day in late July sponsored by the Cannon River Watershed Joint Powers Board, Goodhue County Soil and Water Conservation District, the Forever

Green Initiative, the Sustainable Farming Association of Minnesota, the USDA's Natural Resources Conservation Service (NRCS), and Clean River Partners. The two gave their presentation while standing in front of Anderson's six-acre Kernza field, which looked to be thriving after three years of intensive grazing.

Anderson explained that he grazes the Kernza in the spring for a short, intense time — four to six days — and compares the viability of the stands to control plots that are not grazed. After the cattle are taken off, the



“I think the common story or narrative out there when it comes to farming and growing food is it’s either farmland, or it’s woods,” said Dayna Burtress (in yellow jacket), shown leading a tour of Nettle Valley Farm. **“I want to illustrate we can do all of these things at once.”** (LSP Photo)

Kernza re-grows and it's harvested for grain in late July or early August. Anderson also harvests the straw, which he uses as a source of feed for over-wintering cattle. He then grazes the Kernza again in the fall.

The goal is to not only get multiple sources of income off the stand, but to keep the plant stressed, and thus in a reproductive state. It's a fine line between pushing the plant too hard and just hard enough to keep it viable.

“The question is, ‘Can you continue to push it each year and still get profitable grain yields?’” said Jungers, adding that so far, this grazing regimen is showing great potential for extending the life of the perennial. “This is probably the best third-year crop of Kernza I’ve ever seen.”

Anderson grew up on this farm and was initially not a fan of livestock — he had seen how overgrazing resulted in erosion and water quality problems. However, after

traveling to North Dakota to see how Gabe Brown and other members of the Burleigh County Soil Health Team were using animal impact and cover crops to build soil health, Anderson began raising livestock on permanent pasture as well as cover crops. His focus now is to utilize managed rotational grazing to balance productivity with ecological health. Having a crop like Kernza helps the farmer strike this balance, since grazing it in the spring takes pressure off cool season pastures that might otherwise be damaged by early-season livestock impact.

“Soil regeneration is everything that we do. And we are dealing with a degraded resource on this farm,” said Anderson. “So, everything that we do needs to be an attempt to improve that resource. The organic matter levels in your soil are directly related to the profitability of your farm.”

Finding a way for a farmer like Anderson to make a perennial like Kernza profitable isn't just good for this specific farm. At one point during the field day, participants checked out a pit that had been dug at the edge of the stand of Kernza. The root system of the wheatgrass spider-webbed through the soil profile that was exposed to the July air. Standing in the bottom of the pit, Bailey Tangen, a University of Minnesota graduate student in water resources science, pointed out the impressive root mass and root depth.

“We dug down five-and-a-half feet and we haven't even reached the bottom of the root,” she said.

Soil scientist John Beck pointed out that this kind of root system is made for the new climate reality — it can help soils manage water both by storing moisture during dry times and by taking up excessive rains during extreme precipitation events. In fact, research has shown Kernza can cut nitrogen fertilizer pollution by 90% compared to annual row crops.

That's good news in this part of the state, which is home to the 1,460 square-mile Cannon River watershed, a basin that empties into the Mississippi River just above Lake Pepin and that has been heavily impacted by agricultural runoff.

“Any drop of rain that falls on our farm we want it to stay on our farm,” said Anderson. “So, anything we can do to improve our soils and have that deep, deep root system, that's attractive to me. And those root systems will hold the soil and keep sediment from running into Lake Pepin.”

But can this alternative crop be lucrative

...Field Day Season, from page 25

enough to have a significant impact on a wide expanse of the Midwestern landscape? After all, despite all the buzz, it's still seen as a niche product that only a few specialty bakers and brewers have experimented with.

Currently, roughly 1,200 acres of Kernza are raised on farms around Minnesota, and it faces the classic chicken-and-egg dilemma: how do we create a profitable, consistent market for a product that is just getting off the ground? Carmen Fernholz, a pioneering Kernza producer from southwestern Minnesota, stepped before the field day crowd to announce that prior to the event, a group of Kernza producers had held a meeting at the Anderson farm. There, they signed the articles of incorporation for the Perennial Promise Growers Cooperative, which Fernholz, Anderson, and others hope will provide a way for Kernza producers to access profitable markets far into the future. It was one more example of farmers taking a land grant innovation and pushing it just a little bit further.

"It's exciting," said Fernholz. ●

Silvopasturing & Marginal Land Interaction & Integration

At its most basic, silvopasturing is a system of integrating livestock grazing with wooded habitat. Ecologists are excited by the potential this system holds for giving farmers an economic incentive to preserve healthy timber and control invasive species. This holds special promise in areas of the Upper Midwest where oak savanna habitat — open meadows interspersed with trees — once dominated much of the region, but which has been replaced by row cropped fields and development, as well as decimated by invasive species.

On the other hand, because of the difficulty of row-cropping some of the steeper hillsides that make up places like the Driftless Region of southwestern Wisconsin, southeastern Minnesota, northeastern Iowa, and extreme northwestern Illinois, that region has prime pockets of oak savanna habitat remaining. In fact, scientists believe this region has the largest area of what they call "restorable" oak savanna.

And beginning farmers benefit from finding a way to raise livestock in stands

of timber and woodlots because those trees are often growing on land too marginal to be prime corn and soybean ground anyway, which makes them more affordable.

But on a Saturday in early August, Dayna Burtness wanted to make one thing crystal clear: good silvopasturing management *does not* entail simply turning animals out amongst the trees and forgetting about them, especially on a day like this — a steady, drought-breaking downpour was in progress, and chain-linked lightning flashes in the surrounding hills signaled that an outright thunderstorm was in the offing.

"They'd be liquefying the soil, so right now the pigs as we speak are in their barn in a deep bedded system snuggled up in the hay," she said while leading a sodden group of Practical Farmers of Iowa field day participants past Nettle Valley Farm's grazing paddocks and down into a wooded valley.

The farm is near Spring Grove in the heart of the Driftless Region, and, not surprisingly, it's extremely hilly. The marginal nature of the land made it affordable for Burtness and her husband, Nick Nguyen, when they came to the area seven years ago to raise heritage breed hogs on pasture.

"As a beginning farmer, that was the only kind of land we could afford," said Burtness. "We would have never been able to get prime, tillable land."

And that's okay, since by using portable fencing and frequent movement of the hogs, along with innovative direct-marketing techniques, they've been able to draw economic value from these owned and rented acres. It's taken adaptation as well. For example, on this day the hogs are holed up in a barn that's part of Nettle Valley's "wagon wheel hub" system, which consists of centering the grazing paddocks around the main structure like the spokes of a wagon wheel. It provides the hogs shelter during rough weather and allows Burtness and Nguyen the flexibility of keeping them off those hilly paddocks when they are vulnerable to damage — such as during a rainstorm.

Joining the group touring the paddocks on this day were Bailey Lutz and Heidi Eger, two young farmers who represent another way in which Nettle Valley is trying to make the best use of this marginal land while supporting the next generation of agrarians. In 2021, Lutz and Eger wrapped up a three-year incubator program on the farm, which has helped them launch their own farming careers without investing heavily in land and facilities (see page 21). Burtness benefited from her own incubator experience when she was getting started in agriculture, and sees this as a way to give back. And having two more enterprises on the land also helps Nettle Valley make use of acres that its hog enterprise simply can't. Lutz's Listenmore Farm is a goat-production enterprise, and Eger's Radicle Heart Farm focuses on sheep and chickens. Burtness feels that multi-species grazing is what this



"Pastured livestock really complete our system," said Rachel Henderson (center), shown leading a tour of her orchard. (LSP Photo)

land needs economically and ecologically, but she's quite satisfied to focus on one animal: hogs.

"This land needs sheep and goats and eventually it needs cattle, but I certainly don't want to manage all these enterprises," said Burtness. "I do think we need to be able to farm in a way that doesn't force us to do everything all the time."

By utilizing livestock to control invasive species in these woods, Burtness and Nguyen have gained a greater appreciation for the ecological benefits of sustaining an oak savanna habitat. That's why one of the tour participants was Karin Jokela, a pollinator conservation planner for the USDA's NRCS. Pollinators are in major peril these days, with exposure to pesticides and

Field Day Season, see page 27...

chronic disease threatening the viability of a class of animals that is responsible for every third bite of food. Hanging over all of this is a massive loss of insect habitat and places for these beleaguered critters to forage.

Jokela explained to the participants that when people think of establishing pollinator habitat, their thoughts naturally turn to open meadows. But it turns out wooded areas also provide key support for insects like the rusty patched bumblebee, a federally endangered species. That's why Jokela is recruiting farmers who are interested in pollinator habitat in the Driftless Region. Supported by the Wildlife Conservation Society, the Xerces Society, Practical Farmers of Iowa, and the U.S. Fish and Wildlife Service, Jokela is helping farmers optimize habitat in places like remnant woods.

Jokela, who also co-owns and operates Sogn Valley Farm, a Community Supported Agriculture (CSA) vegetable operation, said her business benefits immensely from the services provided by pollinators. She is especially excited about working with Nettle Valley, where the enhancement involves using "forestry mowing" — basically using a mulcher mounted on a skid steer loader to clear out multiflora rose and other invasive species on a few acres of forest floor this winter. In 2022, grasses and forbs will be seeded in the area that's been opened to sunlight. Those grasses and forbs will benefit pollinators as well as provide forage for livestock, which, in turn, can help control the return of invasive species.

Livestock and woods have a mixed history, with overgrazing often resulting in wrecked habitat. But managed rotational grazing has shown great promise for balancing farming and habitat improvement.

"What I like about the silvopasture system is that it's bringing people and animals to parts of the farm that have been ignored for a long time and become impenetrable because of invasive species," said Jokela as she took shelter from the storm under a porch overhang. "We just need more interaction and integration." ●

An Orchard's Fruitful Side Enterprise Completing the System

In its efforts to blend farming and forests, Nettle Valley Farm is executing a "silvopasture by subtraction" strategy via removal of invasive species that crowd out beneficial plants. Two weeks after that



"Biology needs one thing — it needs plants," said soil expert Steve Lawler, shown here holding a soil sample on the Jon and Ruth Jovaag farm. (LSP Photo)

sodden field day, Mary Dirty Face Farm in western Wisconsin's Dunn County showcased the opposite approach: "silvopasture by addition." Rachel Henderson, who owns and operates the farm with Anton Ptak, led a group participating in this MOSES field day out into a pasture where two parallel rows ran 100 yards part as they headed downhill several hundred feet. The rows were sprouting a mix of a couple dozen species of trees and berry bushes, some as tall as 18 inches, which were planted in the spring of 2021. Species like red maple, dogwood, basswood, Juneberry, quaking aspen, burr oak, shagbark hickory, and hackberry were represented.

Fencing was protecting these new plantings for now, but eventually they will be mature enough to provide dual services to the farm: pollinator habitat and shade for grazing livestock. Unlike forestry mowing and seeding grass, this is a long game: although benefits for pollinators will emerge almost immediately (leafcutting bees were already utilizing the Juneberry leaves on this day in late summer), it will be five to 10 years before any meaningful shade will come from some of the canopy producing trees.

That's not a big problem for Henderson and Ptak, given the nature of their farming operation. On both sides of the pasture stands of organically certified apple and other fruit trees such as plums grew on gentle slopes. The farmers started planting the orchard soon after acquiring an open, 20-acre hay field in 2008. Henderson and Ptak eventually purchased 40 adjoining acres, and they didn't get their first fruit crop until around 2012. It's only been in the past few years that they've had enough fruit and berry production to consistently supply CSA

and farmers' market customers.

"It is a long-term project when you're doing an orchard and a long-term project to establish silvopasture," said Henderson. "So I think we have the right temperament to do this kind of work."

One of the participants in the field day was Sarah Foltz Jordan, a senior pollinator conservation specialist with the Xerces Society, which focuses on invertebrate conservation. Last winter, she approached Mary Dirty Face Farm about establishing more pollinator habitat. That appealed to Henderson and Ptak — they have always focused on farming in a way that enhances natural habitat, and as fruit producers they rely on the pollination services of insects.

"When I got the e-mail and had my first conversation with Sarah, my mind sort of went to wildflower plantings," recalled Henderson.

But, as Karin Jokela has found across the border in southeastern Minnesota, wooded habitat can be critical for pollinators as well. Over 350 species of butterflies and moths feed on the leaves of certain canopy tree species, for example.

It turns out Henderson and Ptak have long been interested in silvopasturing. They are graduates of LSP's Farm Beginnings and Journeyperson courses (see page 17), through which they were introduced to Holistic Management, which teaches participants to look at things from a whole farm perspective, rather than focusing on raising just one commodity. Once they got the orchard business set up, they began thinking about what would complement it without interfering with their existing workload too

...Field Day Season, from page 27

much. Vegetable production can be labor intensive at a time when fruit production is as well. They needed another enterprise that was perennially based. A few years ago, the couple started rotationally grazing a neighbor's cattle on open land not planted to trees. They also turn hogs into their orchards in the spring and fall to clean up apples, helping to break up pest cycles.

"Pastured livestock really complete our system," said Henderson.

So, she and Foltz Jordan struck on a plan to establish trees and bushes in a pasture. Henderson said one major benefit for the farm is that with climate change making extreme heat waves more common, livestock increasingly need access to shade. Henderson and Ptak are also interested in adding other ruminants to the farm eventually, and species like goats can actually feed off some woody species without damaging them.

Foltz Jordan is fascinated by ways working farms and pollinator habitat can go hand-in-hand, often in ways more nuanced than planting a row of trees and shrubs. At one point during the tour, she pointed out how carpenter bees were nesting in the pruned canes of raspberries. Creating habitat by carrying out a routine orchard chore strikes a critical eco-agricultural balance on this farm, said the insect expert. "It's really a win-win for their agricultural systems and also for wildlife conservation." ●

Organics, Crimping & Soil Structure The House Biology Built

It's been said that soil without biology is just geology. Such a clever quip succinctly describes why, without bugs, fungi, bacteria, and other organisms, that stuff beneath our feet is about as lively as a box of rocks. And participants in an LSP field day at the Ruth and Jon Jovaag farm in southern Minnesota were reminded that all that biology doesn't just magically materialize out of thin air.

"Biology needs one thing — it needs plants," said Steve Lawler, a resource specialist with the Mower County Soil and Water Conservation District. He was saying this while spading up a sample of Jovaag soil a few hundred yards from the Cedar River,

and he liked what he saw. This field was sprouting a cocktail mix of cover crops such as peas, buckwheat, and brassicas that had been seeded after cereal rye was harvested a few weeks before. Years of management that relies on a diverse mix of cover crops and as little tillage as possible was paying off in the form of stable soil aggregates that were sticking together while allowing space for air and water to move through. "Sometimes we are dealing with compaction created by 100 years of certain farming methods," Lawler observed while farmers gathered around the sample. "What I'm seeing here is that the soil is repairing itself."

Keeping enough living plant roots in the ground can be a challenge when raising crops in the harsh climate of the Upper Midwest. Add to that the fact that the Jovaags are transitioning all their 500 acres to certified organic production. Although avoiding the use of petroleum-based fertilizers and pesticides is good for the soil biome, organic farmers are often more reliant on mechani-

ers gathered for the field day. "We're trying to mimic nature, somewhat. You never see a single crop in nature."

Of particular interest to the farmers in attendance was the Jovaag family's use of an implement called a "roller crimper" — a long metal drum mounted on a tractor with a chevron pattern welded to its face. The tool, which was developed by the Rodale Institute, is designed to pass over a cover crop in the spring at the time when it's most vulnerable to being killed by having the stalks crimped. That method not only terminates the cover without chemicals or tillage, but leaves a natural mulch layer. The mulch, combined with the allelopathic weed suppression characteristics provided by cover crops like cereal rye, is a nice fit for an organic system.

In September 2019, the Jovaags planted a field to a cereal rye cover crop after oats were harvested. The rye overwintered and when it was about five-foot-tall in the spring, the farmers crimped it and planted



Anna Racer described how Waxwing Farm has used various government programs to build its infrastructure and become a consistent source of local food in the community. (LSP Photo)

cal weed control than they'd like. And that tillage is bad news for soil structure.

So, since their first field was certified organic in 2014, the Jovaags have relied on a strategy of diverse rotations and cover crops to keep the soil as biologically active as possible. Besides corn, soybeans, and hay, they raise small grains like oats and rye for organic markets. They have also grown sunflowers and buckwheat. Their most recent foray into soil health involves participation in an LSP on-farm experiment involving the Johnson-Su Bioreactor, a composting system that has shown promise for inoculating soil with the kind of biology it needs to achieve a healthy balance.

"What you do this year will impact the next three to four years," Jon told the farm-

soybeans into the mulch with a no-till drill. By October of 2020, those organic soybeans had yielded an impressive 58-bushels-per-acre. "It was a perfect year," said Jon. Roller crimping not only suppresses weeds and builds organic matter, its mulching effect saves moisture by keeping the soil cool in the depths of summer. Moisture probes showed the Jovaags were able to delay turning on their irrigators for an extra week or more during the summer of 2020.

Ruth and Jon led the field day participants across the road from their farmstead to another soybean field that had been roller crimped, this time in the spring of 2021. They planted those soybeans on June 4, and

Field Day Season, see page 29...

it didn't rain for two weeks, but they looked good during the field day, which was being held during the first week of September. A thick mat of dead rye covered the soil between rows. However, Jon expressed some concern that the soybeans were a little behind as the first frost fast approached. Roller crimping worked so well in 2020 that the farmer was afraid he was being set up for a letdown. It doesn't hurt to remind oneself that every year is different when it comes to weather, soil conditions, and work schedules.

"With organics, I joke that it will always keep you humble, because the minute that you think you might have something figured out, a curve ball comes in, and you don't have some of the Band-Aids that you have in the conventional system," Jon said.

Roller crimping is a creative way to control weeds without chemicals while protecting the soil. But the Jovaag field day also highlighted that a piece of ingenuous iron used in isolation isn't enough—it must be coupled with a diverse rotation that opens wide a cover crop planting window.

Léa Vereecke, an organic consultant with the Rodale Institute who has worked with roller crimping research at the University of Wisconsin, walked into the soybean field and checked out the mat of dead rye between the rows. She congratulated the Jovaags on the "best roller crimped field" she'd ever seen. She said the key was that they planted a crop like oats that could be taken off early enough in the growing season to get the rye cover crop established well before fall freeze-up. That provided the biomass needed to suppress weeds throughout the growing season. Waiting until after corn or soybean harvest in the fall wouldn't have provided the same opportunity.

"That's why the four-year rotation is important," said Vereecke.

Field day attendees, many of whom were transitioning to organic crop production on their own farms in Minnesota and Iowa, peppered the Jovaags with a myriad of questions about roller crimping. What about seeding rates? What kind of cover crop mix is best? When's the best time to plant the cover crop and to terminate it?

The Jovaags fielded the questions as best they could, but also acknowledged that last year was different than this year, which will be different from the following year. After all, regenerative farming is not a destination, but an ongoing journey.

"We're five years from where we want to be, and then we'll be five years from where we want to be," said Jon with a laugh. ●

Government Programs & Local Foods Infrastructure Investment

One can get pretty cynical about government's relationship with agriculture. Over the years, countless billions in tax dollars have gone into creating and supporting a system that often does more harm to small and medium-sized farmers than good. It's frequently a case of good intentions gone awry. Federally subsidized crop insurance, for example, was set up to protect farmers from weather disasters. While it still does that, it also has given mega-cropping operations the resources needed to crowd smaller producers and beginning farmers out of the land market. And the Environmental Quality Incentives Program (EQIP), which was set up to provide grants to farmers looking to adopt environmentally friendly production systems, has unfortunately become a major source of funds for CAFOs looking to build massive liquid manure systems.

But during an LSP-Clean River Partners field day in late August, the good side of food and farm policy was showcased. The audience was farmers, but just as importantly, legislators, local food enthusiasts, and environmentalists. The focus of the event was to make the case for using public funds to support a public good—in this case, regenerative farms. One way to support these farms is to take a little of the risk out of experimenting with an innovative practice.

"What we need the public to understand is that conservation can't lead to crop failures," said crop and livestock producer Mike Peterson during the first stop of the field day on his farm near Northfield, just south of Minnesota's Twin Cities. He explained that planting cover crops on his farm is a \$35 per-acre investment that may not produce economic benefits right away. The majority of farmers won't adopt such a practice without some sort of public support to get them through those first few trial years.

The federal Conservation Stewardship Program (CSP) provided Peterson the financial support needed for him to transition from moldboard plowing to conservation tillage. It was a good public investment: after the CSP contract expired, the farmer liked the new system so much he made it a permanent part of his operation.

That kind of "priming the pump strategy" went into LSP's push for the "100% Soil-Healthy Farming Bill" during the 2021 session of the Minnesota Legislature. In the end, parts of the legislation went into initiatives that provide \$5.35 million in funding to help farmers adopt practices such as cover cropping and managed rotational grazing.

After leaving the Peterson farm, tour

participants caravanned a few miles west to Waxwing Farm, where Anna Racer and Pete Skold explained how they've used a variety of state and federal grants to help launch a thriving vegetable operation. Since graduating from LSP's Farm Beginnings program and starting their farm over a decade ago, Racer and Skold have built up a 130-share CSA that also markets produce to local schools and restaurants. They had one fulltime employee in 2014; in 2021 they had close to four fulltime equivalent workers.

The farmers did all this thanks to hard work, creativity, and a little bit of luck. But Racer and Skold are the first to admit that another key ingredient has been government programs that help jump-start infrastructure building. They've used EQIP money to erect high tunnels, Minnesota Department of Agriculture AGRI funds for packing facilities, and a USDA Sustainable Agriculture Research and Education grant to establish a radicchio and Belgian endive growing operation, which allows them to market to restaurants during the winter.

Racer pointed out that there are indirect ways public support can help support more local, resilient farms. For example, recent Minnesota state legislative funding to create smoother connections between farms and schools has helped break down barriers that kept these two parties from doing business in the past.

"Public schools are something our state has already invested in," said Racer. "So why wouldn't we connect those dots and help to invest in those schools purchasing from local farmers?"

It's important to note that the kind of government support Peterson, Racer, and Skold have benefited from is not a long-term subsidy in the way that price supports or even subsidized crop insurance premiums can be. Rather, it's a short-term push down the road toward self-reliance and resiliency. Such help is a sparkplug, rather than a tank of gas that constantly needs refilling.

"We're not reliant on the income from those infrastructure grants we've received," said Skold. "But they lowered the cost of entry for those big investments that have had *huge* impacts on the profitability of our farm. It's a onetime infusion that allows us to take the next step, or to get over those barriers when we couldn't just go and get a loan for the full amount we needed."

And Waxwing's stable infrastructure makes it possible for Racer and Skold to spend more locally on Main Street and to employ more people for more of the year, in a way closing the public expenditure loop by putting money back in the state coffers via

the payroll tax.

“That’s going to add up and the return on investment is going to be significant,” said Skold.

Jessica Kochick, who organizes around federal policy issues for LSP, told the field day participants that since the COVID-19 pandemic revealed to the general public just how fragile our food and farm system is, it’s become clearer than ever that we need a public investment in making it more resilient. That means directing public resources toward climate-friendly, regenerative practices, as well as local processing facilities and safe working environments for food industry workers. That’s one reason the Land Stewardship Project and its allies have been pushing for funding of such initiatives in infrastructure legislation Congress has recently passed (see page 10).

“The farm and food system *is* infrastructure,” said Kochick. ●

Innovators, Adopters & Networking Sugar High to Soil Health

All the on-farm events described in the preceding pages share a common element: farmers sharing information with farmers. For good measure, stir into the mix experts in areas like soil science, agronomy, organic weed control, and entomology to provide that crucial link between innovative idea and implementation.

And, oh yeah, it never hurts to launch the proceedings with a little shot of adrenaline.

“Good morning! We’re going to have fun today!” shouted Ray Archuleta at around 8:30 a.m. on an August day while standing in front of some 100 field day attendees on a farm in northern Iowa’s Mitchell County.

Archuleta is very aware of the purpose he serves in the soil health movement: he’s a messenger of doom and source of hope, all rolled up into one. The bad news is that conventional agriculture has decimated our soil’s health. The good news is we can fix it, and farmers have the ability to do that on their very own piece of real estate.

“I’m like the grandparent that comes and brings candy to the kids and gets them all wound up and then gives them back to the local parents,” Archuleta said with a laugh

later that day. By that time, he had spent roughly eight hours presenting, leading soil health demonstrations, grubbing up dirt samples, answering endless questions, and putting up with the demands of a French television crew that was following him around. His energy level seemed little diminished, despite the long day and hot weather.

He’s a soil scientist who, before retiring in 2017, spent over 30 years with the USDA’s NRCS. He has recently founded two initiatives related to regenerative farming: Understanding Ag and the Soil Health Academy. Archuleta also owns and operates a farm in southwestern Missouri. It’s fair to say that during the past decade or so, he has played a critical role in launching and advancing the soil health movement. He travels the country and gives presentations to farmers and soil conservation professionals about the ecological interconnectedness of soil systems. His PowerPoints and hands-on demonstrations touch on a wide array of topics: from chemistry and biology to ancient history and psychology. He takes audiences on a journey around the world of soil and then brings them back to the farm. The message: sick soil is a global problem, but we can do something about it right here at home utilizing a basic knowledge of ecological interactions.

“How we farm affects the rest of the world,” Archuleta said at one point during his opening presentation. “It’s all connected.” He uttered that last phrase several times during the course of the day.

If you’ve spent anytime viewing YouTube videos related to soil health, you’ve probably run into one of his high-energy presentations, which have been tailored to appeal to a variety of audiences. Farmers and conservation professionals are the main folks he’s trying to reach, but gardeners, public officials, and environmentalists also come away from his talks inspired about the power of the soil biome. This field day was dominated by farmers — regenerative, conventional, even some members of the Amish community — but there were also a handful of non-farmers who represented organiza-



Ray Archuleta talked about experimenting with soil health practices at an LSP field day. “I tell farmers, ‘Don’t do this on your own,’” he said. (LSP Photo)

tions and municipalities trying to figure out ways healthy soil can protect water quality and sequester greenhouse gases.

Mervin Beachy is a prime example of someone who has been energized by Archuleta’s sugar shot. He and his wife, Cherlyn, operate Red Rooster Ranch, which was hosting this field day with the support of LSP, the NRCS, the Mitchell County Soil and Water Conservation District, the Iowa Department of Agriculture and Land Stewardship, Byron Seeds, and the Rock Creek Watershed Project.

The Beachy family raises beef, pork, broilers, and eggs using rotational grazing and other soil healthy methods, and they sell their products direct to consumers. Mervin launched his farming enterprise six years ago armed with information he had gleaned from some conventional sources and, as he tells it, had a rough start as a result of “advice they were giving me.”

“I thought I was farming, but was going backwards,” he said. Animals were sick, the workload was unsustainable, and the economics were simply not working out.

One thing he noticed during this time was that his fields were suffering as well, with compaction and lack of earthworms tell-tale signs. Inspired by the writings of farmers like Gabe Brown and Joel Salatin, as well as food journalist Michael Pollan, Mervin became committed to raising livestock in a way that mimicked nature.

“They were all saying get biology in the soil,” said the farmer of the people he was reading about. But how? Then, while attending a soil health conference in Kansas, he saw Archuleta speak, and Mervin began

Field Day Season, see page 31...

to connect the dots. The Beachy family experimented with cover crops on a small scale in their garden plots, put up fencing for rotational grazing, and by 2018 were well on their way to changing their relationship with soil and food production.

In fact, Mervin is so committed to cover crops that he started Focus Forage and Consulting, which provides seed to other farmers for cover crop and forage systems. While speaking to the field day participants, the farmer conceded he is very early in his journey, but has already seen some significant benefits to building soil health such as healthier livestock, double the pasture productivity, better water infiltration, and lower stress for him and his family.

"I'm not telling this story because I think everyone should do what we're doing. Every farm is different," he said.

"Isn't that awesome? You would be surprised how many people don't want to share their story," Archuleta said after Mervin finished.

Archuleta is convinced that the soil has a story to tell as well. That's why a mainstay of his presentation on Red Rooster Ranch consisted of four hands-on, tabletop soil demonstrations. With the help of audience members, he showed how building soil biology helps this natural resource manage water better, build its own fertility, and, in general, remain more resilient. The demonstrations compared conventionally farmed soils to those managed using cover crops, no-till, and rotational grazing. The evidence was hard to ignore: the conventionally managed soils that Archuleta exposed to various tests crumbled and dissolved before the audience's eyes, a sure sign they were wasting water and sunlight, and in the process wasting farmers' money by remaining so reliant on purchased inputs to be productive.

"The more sunlight you capture, the more freedom you have," he said during one demonstration. "More freedom from the bank,

freedom from the chemical companies."

After a morning of pure motivation, it was time to get people's hands dirty. When lunch was finished, field day participants headed out into Red Rooster's fields for practical break-out sessions on cover cropping, setting up a no-till planter, monitoring soil health, and using a roller crimper.

At the various learning stations, farmers shot Archuleta, Beachy, and other presenters questions about seed varieties, weed control, forage management, disease issues, and ways to monitor soil health.

Perhaps the best conversations took place as people rotated between stations. While they walked, farmers shared with each other ideas around equipment hacks and seeding tricks, as well as what hasn't worked so well. Sociologists have long studied how innovations in agriculture are germinated and broadcast. A landmark 1941 study conducted in Greene County in central Iowa traced the adoption of hybrid seed corn during the 1930s. On the face of it, this technology appeared to be an overnight success — in 1927 it was considered an experimental product not seen outside of college research plots; a decade later it was almost universally planted by Iowa farmers. But through extensive interviews, rural sociologists discovered that the majority of farmers did not accept the innovation immediately, but rather "delayed acceptance for a considerable time after initial contact with innovation."

That's a key point to keep in mind when considering that one can't pick up a farm magazine these days without seeing an article on soil health — the word on cover cropping and diverse rotations is getting out. However, awareness of an innovation does not always result in immediate adoption — many Iowa farmers who put off planting hybrid seed for years were first made aware of its existence at the same time as their early-innovator neighbors.

Archuleta thinks a lot about how soil health practices catch on. After all, despite all the buzz around soil regeneration, only around 3% of U.S. farm fields are regularly

cover cropped. But he likes to point to statistics showing how that figure was next to zero not so long ago.

"We're gaining," said the eternal optimist after the field day. He's confident it will continue to grow because of what he observes at field days like this one: early innovators — farmers who are constantly pushing the envelope and questioning the status quo — having conversations with the early adopters who will take on a new practice once they see a few thought leaders in the neighborhood making successful use of it. Once those two groups show an innovation like cover cropping works, then the rest follow, with the exception of what Archuleta calls the "incurables" — folks "you will never reach" no matter how much evidence they are exposed to. "I don't worry about them — I get the first 80%, I'm good," he said.

But the key is forging consistent connections between those groups of farmers long after Grandpa Sugar has left the building. Field days like this help, but they tend to be seasonal. The long-term, sustainable way to make regenerative practices as ubiquitous as hybrid corn is for farmers to get together with other farmers on a regular basis — formerly and informally. That's the idea behind LSP's Soil Builders' Network, which is made up of over 800 farmers who regularly trade ideas and resources (see page 13).

Glomalin, a protein produced by fungi, is the "glue" that holds soil aggregates together. In a way, farmer networks are the glomalin that gives the regenerative ag movement the long-term stability it needs.

"I tell farmers, 'Don't do this on your own, you'll spend the rest of your life figuring it out,'" said Archuleta before climbing into his truck and heading back to Missouri. "Community. The collective whole. Criticizing. Working with people that really think like you. That's power." □

For the latest details on field days, workshops, and other events, see page 36 or check out LSP's online events page at landstewardshipproject.org/upcoming-events.

Podcast Series: Out Loud-Out in the Field

A special "field day series" of *Ear to the Ground* podcasts features the voices of farmers, soil health experts, and ecologists. Check out the episodes on Spotify, Stitcher, or other podcasts platforms. You can also find these and other *Ear to the Ground* episodes at landstewardshipproject.org/series/ear-to-the-ground.

- **Episode 255:** What happened when beginning farmers Rachelle and Jordan Meyer started listening to the land.
- **Episode 256:** Soil health cheerleader Ray Archuleta and Iowa farmer Mervin Beachy talk about the importance of farmer learning networks.
- **Episode 257:** Soil without biology is just geology, and that biology needs one thing: plants.
- **Episode 259:** Kaleb Anderson is pushing a plant science breakthrough further using rotational grazing.
- **Episode 260:** Martin Larsen's focus on integrating small grains into his cropping operation is building resilience in the long term.
- **Episode 261:** What happens when operations like Nettle Valley Farm pay attention to neglected corners of the land?
- **Episode 262:** An orchard's search for a side enterprise opens the door for pollinator habitat restoration.
- **Episode 263:** How Waxwing Farm is proving that public goods need a public investment.