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Keeping It Interesting: SD Farmers Test Interseeding & Other Soil Health Practices

By Lura Roti for SDSHC

David Kruger and Todd Boesen don't know each other. But these two South Dakota farmers share a desire to test out practices on their farms. "I guess I'm a tinkerer," explains Boesen, a Kimball crop and cattle producer. "It's fun to try things out. If I hear it won't work here, I want to see if I can make it work."

Kruger, who raises crops near Millbank agrees. "If I learn about something that sounds like it might work on my farm, why not give it a try in my fields and see if it will?"

Both farmers have experimented on small manageable acres with different ways to introduce cover crops into their rotations. Read on to learn what they discovered.

Interseeding cover crops into 60-inch corn

Improving soil health wasn't the reason David Kruger began no-till farming in 1993. His decision had more to do with moisture, labor, economics and rocks.

When his yields remained about the same, but his cost of production went down, Kruger stuck with it. "For me, no-till is not about yields. It is about the bottom line. It's the benefit of having less inputs to increase profits," explains the Millbank, S.D. farmer. He adds that his yields have not suffered from soil health practices.

Overtime, his fields began to realize additional benefits – increased organic matter led to better water infiltration and holding capacity and less variability. "Our farm has many different soil types. No-till took the ups and downs out of the equation.," Kruger explains.

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Millbank farmer, David Kruger (center), interseeded cover crops into 60-inch corn as part of a 2019 trial sponsored by the SDSHC.



Grazing Livestock on Cover Crops Improves

Soil Health & Quality of Life

By Lura Roti for SDSHC

The 2016 drought forced Shawn Freeland to make a difficult decision. "I sold two-thirds of our replacement heifers. It was the hardest thing to do because we had put a tremendous amount of work into their genetics," says the 45-year-old Caputa, S.D. rancher. He based his decision off of what he

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Soil Health News

Excerpts below were originally featured in:

[Managing 2020 Cash Crops In Prevented Plant Fields, SD Feature News Release](#)

By Kurt Lawton for the USDA Natural Resources Conservation Service

From field condition and weed control planning to fallow syndrome, fertility, green planting, and interseeding cover crops—check out current advice compiled by agronomists and soil scientists from USDA Natural Resources Conservation Service (NRCS) and SDSU Extension, with involvement from South Dakota's Conservation Districts, South Dakota Soil Health Coalition, South Dakota Grassland Coalition, and South Dakota Corn Growers.



Be Aware of Potential Fallow Syndrome on Corn

If no cover crops were seeded on your conventional-tilled or minimum-till Prevented Plant field (or only brassica cover crops like radish, turnip, mustard or rapeseed), the soil might lack key beneficial organisms, e.g., mycorrhizae fungi, that support early corn growth. Details [here](#):

Some agronomists and long-term no-till farmers believe that no-till fields are probably less susceptible to fallow syndrome due to better soil health. “We know that mycorrhizal fungi are greatly reduced in tilled systems, and I think our soil health systems [no-till, strip-till] are going to show more resilience,” says Anthony Bly, SDSU Extension soils field specialist agronomist.

To overcome this potential soil biology challenge, some agronomists recommend the addition of phosphorus (P) and chelated zinc in-furrow as a pop-up starter or a banded application to minimize early-season growth challenges and potential yield loss from fallow syndrome. If that's not an option, broadcast application rates that include an additional 15-20 pounds P per acre will also help, according to Antonio Mallarino, Iowa State University Extension.



Soil Test to Learn Fertility Levels

Any nitrogen or sulfur applied in the spring of 2019 is gone unless a [cover crop](#) was seeded before summer. Collect new soil tests to determine your ever-changing nutrient availability. Don't rely on 2018 or 2019 tests. Watch saturated soil test results for accuracy. Mobile nutrients, like nitrogen and sulfur, require a deeper soil test – down to 24 inches. Phosphorus, potassium, and zinc only need a 0-6-inch deep soil test.



Prevented Plant Forced Again?

If the weather prevents another cash crop from being planted:

Have a plan ready for possible PP fields. Decide your cover crop goals by field first (building soil structure, live-stock forage, weed suppression, fixing N, prep for next year's cash crop, etc.). Then match multiple diverse species to [fit the goal](#); assign a budget; learn best planting timing, seeding depths, application methods, soil limitations, etc.

Check with USDA's [Farm Service Agency](#) (FSA) and [Risk Management Agency](#) (RMA) on prevented planting requirements and harvest restrictions for cover crops.



When selecting cover crop species for PP fields, limit species of the same type as next year's cash crop. **If 2021 crop is corn:** limit warm-season grasses, use low C:N ratio species like brassicas and a few legumes, add flax and oats that feature high mycorrhizal fungi association to build soil structure. To help manage water, seed winter cereals so living roots can uptake water in fall and spring—just need to terminate two weeks before planting corn. **If going to soybeans:** limit broadleaves in the mix, use warm and cool-season grasses, and some brassicas. Seeding only one crop type (like brassicas) is not recommended. To optimize soil benefits, seed more overwintering crops like cereal rye (not annual rye) or triticale.



Instagram Experimental Plot Updates: [Follow us on Instagram: sdssoilhealthcoalition](#). Check out the Story Highlights we are creating to house regular updates on each of our experimental plots. Our Soil Health Technicians will be posting photos and videos as they visit each of the sites, our first 60-nch-Corn-Test-Plot has already been planted!

New Website: We've updated our website to a more user-friendly format, have you taken a look? Explore the huge variety of technical, educational and other soil health resources!
www.sdssoilhealthcoalition.org

Soil Health Resources

You Are Not Alone: Mental Health Resources

During these extremely difficult times it's important to know that local mental and behavioral health resources are available if they become needed. The SD Department of Social Services website includes a section where local offices and direct contact information are listed, by [city](#) or [county](#).

DSS Mission: "Strengthening and supporting individuals and families by promoting cost effective and comprehensive services in connection with our partners that foster independent and healthy families."

Additional information and resources can be found on the South Dakota Suicide Prevention website <https://sdsuicideprevention.org/> and "The Helpline Center" which is staffed 24/7 can be reached by dialing 1-800-273-8255. "As part of the National Suicide Prevention Lifeline network of crisis centers, the Helpline Center provides a connecting point for people 24/7 who are in suicidal crisis, know someone in a suicidal crisis, or have lost a loved one to suicide."



Crop Residue, Cover Crops Impact on Soil Health Parameters

SDSU Researchers David Karki, Anthony Bly, Sandeep Kumar and Shannon Osborne collaboratively published an article about a recent study that looked at crop residue, cover crops and their impact on soil health.

Study Details: The study site and specific treatments were selected to achieve the objectives of this study. The experiment was conducted at the USDA-ARS laboratory located in Brookings, S.D. on a no-till field rotated to corn and soybean since 2000. The field was divided into two residue treatments- i) all crop residues retained on the field after harvest, and ii) crop residues removed from the field leaving about 6" corn stalks in the field. In 2005, each residue block was divided to include cover crops (and no cover crops) following grain harvest. A mixture of cereal rye and hairy vetch (20 lbs rye + 10 lbs hairy vetch) was planted following corn and hairy vetch alone was planted following soybean. Measurements were collected in the summer during the soybean phase of the rotation from 2014-2016.

Major Observations:

1. The soil organic carbon and total nitrogen in top two inches in fields left with crop residue was about 22% and 17% higher than the fields where the crop residue was removed. However, just adding cover crops to the residue treatments did not influence soil organic carbon.
2. In the fields where crop residue was retained after grain harvest, the soil penetration resistance was reduced by 24% and 27% respectively in depths 0-2 inches and 2-6 inches. Adding cover crops also reduced soil penetration resistance significantly at both depths.
3. In most cases, soil bulk density was significantly lower on fields with crop residue and cover crops.
4. Fields with cover crop and crop residue showed significantly higher water retention capacity compared to the fields where the residue was removed and no cover crops.
5. Drastic differences were observed for soil water infiltration rate between fields with and without crop residue and cover crops.
6. Depending on the trial year and treatment, the soil water infiltration rate was observed to be 22.5% to 80% higher in fields with crop residue and cover crops.

To read the rest of this article, [click here](#).



Tune In For Profiles In Soil Health Videos

In the first Profiles In Soil Health video release of 2020 David Kruger describes his experiences transitioning to no-till, a process he began slowly in 1993. He outlines some of the initial reasons he decided to pursue the practice as well as different benefits and opportunities that have arisen as a result of his now operation wide management.

View this and videos from the past [here](#).



Upcoming Soil Health Events

[August 31st-September
2nd](#)

2020 Soil Health School
Mitchell, SD

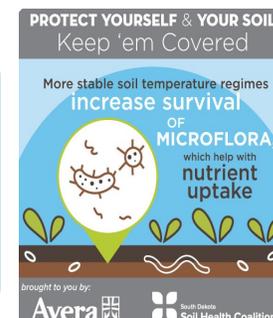
[March 30-August 21](#)

Signup for the pilot new Conservation Reserve Program (CRP) Soil Health and Income Protection Program (SHIPP) is open and available to South Dakota producers.

[January 6-7
2021](#)

Save the Date!
2021 Soil Health
Conference

Access Our Events
Calendar [HERE](#).



Keeping It Interesting Continued from pg 1

Nearly three decades later, he is playing with reduced nitrogen rates, realizing his acres maybe don't need as much fertilizer. And because no-till, combined with his three-crop rotation of corn, soybeans and wheat has greatly reduced weed pressure, he didn't need to apply as much herbicide either. "I haven't used pre-emergence herbicide on the ground with the three-crop rotation since Eradicane and Extrazine were on the market. That was 20 years ago."

Year 15 his organic matter quit increasing on fields. By this time, he was hooked on the soil health benefits of no-till. "I was going to meetings and learning more about soil health and



Cover crops were seeded between the 60-inch corn rows using a 10-ft. no-till drill while the corn was at the V-3 to V-4 growth stage.

finding out how organic matter could increase with cover crops." In an attempt to further improve organic matter, he began experimenting with cover crops, adding them to his crop rotation after wheat... with limited success.



Overall plant health was better in the 60-inch corn

So, when South Dakota Soil Health Coalition (SDSHC) staff members, asked if he would participate in a 60-inch SDSHC corn trial with interseeded cover crops, Kruger was eager to see if he could get better results.



The 2020 60-inch trials will be located along Highway 12 west of Milbank. If interested in a plot tour please call a member of our SDSHC staff.

"If I could keep yields competitive, then maybe long-term, I could move to a four-year rotation: 60-inch corn, 60-inch corn moving over 30 inches, soybeans and wheat with cover crops growing three out of the four years. I'm eager to see if I do this, what will the organic matter do, and what would be the value of that?"



60-inch plot offered greater plant biomass.

For plot details, results and more on the 60-Inch Corn Trial, visit our [website](#).

Why should I buy fertility when I can grow it?

A fifth-generation farmer, Todd Boesen always wanted to try new and different practices. But it wasn't until he and his wife, Kayla, took over the family farm that he had the freedom to.



Kimball farmer
Todd Boesen

"It was hard to get my dad and uncle to consider anything new, like no-till. I always thought, how do we know something else won't work unless we try it?"

Today, with the aid of GPS records, Boesen tries new ideas out all the time. "With GPS, you can turn your whole farm into a test plot and GPS records what you do."

Five years ago, Boesen converted his acres to no-till. He says he didn't need GPS records to tell him the soil health-building practice was working. "We were in a D4 drought and I combined corn, but my neighbor had to cut his for silage."

Moisture retention was a big reason Boesen wanted to implement no-till. It also motivated him to try his hand at interseeding cover crops. "During a drought, we can get a decent crop as long as we have enough residue to hold moisture."

Fertility is another motivator. "This is a risky enough business already. Just because I put fertility out there for 180-bushel corn, if we don't get the moisture to make uptake work, I won't get 180-bushel corn," Boesen explains.

In a few of his on-farm trials, Boesen did see yield bumps from synthetic fertilizer. But the bump barely covered the cost.

The last three years, he has tried interseeding milo in 30-inch rows. 2019 was the first year the cover crop was able to flourish. Corn yields were within 3 to 5 bushels of his average and he says his cows appreciated his efforts, so he is going to continue to experiment in 2020, his plan is to interseed in 60-inch rows.

For as long as he can remember, cover crops have been a part of the cropping system. After small grains, his dad and uncle used to broadcast oats. In recent years he no-till planted marginal crop acres to a diverse mix of cover crops. "We have gotten to the point where we are rarely feed any hay throughout the year. This has also cut down on equipment costs. In the winter I start the side-by-side and check water." A father of two school-age children, Boesen says there's an added benefit to testing management practices that cut expenses and build soil health. "There's a lot of talk these days that agriculture is a lot of risk and hard work with less reward. I'm making things better. And by reducing input costs I hope to leave something that the kids are willing to come back and do."

Grazing Continued from pg 1

learned about rangeland management while attending a Grassland Coalition Grazing School. In addition to reducing his stocking density on rangeland, he no-till drilled a diverse cover crop mix on irrigated hay acres.

"It was like tearing the Band-Aid off. My passion was the cattle. And I did a really good job of making nice cows, but they were super hard on the ground," he explains. "Since then, I have learned it is the land that I am making money from, not the cows."

All told, by focusing on rangeland and soil health, since 2016 Freeland has been able to cut his expenses by about \$120,000 a year. "Profit isn't the money you take off the top, it is the money that you save."

Freeland explains that by not tilling or haying, the ranch saves a lot on fuel and equipment.

Grazing cover crops instead of feeding hay

Freeland's operation, Dry Creek Farm & Ranch, is located 12 miles east of Rapid City. Depending on growing conditions, his herd numbers fluctuate between 300 and 400 cow/calf pairs. Throughout the spring and summer, he rotates pairs through rangeland at multiple locations: Caputa, Enning and the Buffalo Gap National Grasslands. Soil health goals and nutritional needs of the herd determine whether or not Freeland grazes cattle on cover crops in July and August.

"My grazing plan is not set in stone. I keep my options open. I don't use the cows as a cash crop, we use them as a tool to achieve our goals – ultimately to improve the soil," he says, explaining that sometimes he utilizes his cattle to trample a growing plant, like triticale or rye, into the ground to create residue which he can no-till plant into. Other times he uses the herd to help with erosion or hardpan issues by strategically locating their feed. "It is a different mindset. Instead of thinking, 'I have to have these cows on this pasture by this date,' it's like, 'oh, there's bare soil over here, lets put cattle on it and see what happens.'"

Typically, anytime from October to May, instead of feeding hay, his cows graze cover crops. "I used to spend the day doing endless chores. I learned if I focus on the ground and making it better, it will cut back on labor. I still spend time each day managing my cattle, it's just less time."

Using polywire electric fence, he moves pairs about every three days through paddocks filled with diverse mixes containing as many as 15 warm and cool season species. "A couple feet of snow doesn't affect them, and a diverse mix, with different heights, seems to break up the crust."

In five short years, the land has responded. "Now there's extra grass and I now see all kinds of different native species on the



October through May he mainly grazes cover crops. This photo was taken January 20, on the first day of grazing the stockpiled warm season cover crop mix.

rangeland," he says. Since he changed his grazing and land management, he also noticed improved herd health. "Think about it, each plant is doing something different. Each one is reaching down and getting a different mineral and making that available to the cows."

In the past, Freeland used to finish up to 50-head each year on corn and direct market them under the Dry Creek Beef label. Today, he is able to finish the cattle on grass and his customers haven't complained.

Recently, he began resting sections of rangeland. It is his goal to rest 320 acres of rangeland every 18 months.

Setting goals and developing grazing management plans is among a long list of things he now has time to do because his days are not taken up with feeding chores. "Quality of life has been huge," he says, explaining that he has more time to spend with his wife, Kristy and their teenage daughters.

Changing his herd and land management was not an easy decision. "It was like jumping off a cliff," Freeland recalls. "It was a very scary deal for me to throw hay away and go with cover crops for grazing. I was extremely skeptical."

The changes he made worked for him, and they can work for other livestock producers, says Sean Kelly, SDSU Extension Range Field Specialist.

On rangeland, Kelly explains by implementing a rotational grazing system where cattle never graze the same pasture during the same time of year, two years in a row, producers can stimulate species diversity. And a diverse mix of warm and cool season plants not only bolsters range health, but cattle also glean greater nutritional value.

"Healthy and diverse native rangeland has plants in their most nutritious growth curve," says Kelly.

He explains cool season plants are more nutritious in the spring and fall, while warm season plants are more nutritious mid-summer.

To view an expanded version of this article which includes a testimonial from David Ollila, a Newell sheep producer and SDSHC Soil Health Specialist as well as Shawn Freeland's cover crop mix-es, visit this [link](#).



Pictured here with sons, Finn (far left) and Tate, David Ollila practices rotational grazing on rangeland and no-till plants cover crops. Connect with Dave or other producers in your area who are implementing practices discussed in this article and serve as a Soil Health Mentor [here](#).



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Here To Assist You In Whatever Way Possible

SD Soil Health Coalition staff members are still hard at work advancing the message and application of soil health and we want to hear from you!

Although we may not be able to visit in the normal manner at the moment, [contact us](#) to set up a phone call, video meeting, or socially distanced farm or ranch visit. We are eager to answer any questions you may have and to continue to provide you with any technical or educational resources that may assist you in improv-ing your soil health.

Several new programming initiatives we are working to implement, in order to stay connected with you include: Instagram “Story Highlights” to follow each of our experimental plots, live video updates with our Soil Health Technicians out in the field, as well as the pro-motion of virtual events and educational webinars. Visit our [Calendar of Events](#) or social media accounts regularly to see when these are scheduled to occur!



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