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

*By Lura Roti for South Dakota Soil Health Coalition*

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 Milbank 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 Milbank, 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.

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 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 the to his crop rotation after wheat…with limited success. 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. "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?"

**Details**
**Corn planted May 4, 2019** : A 10-acre 60-inch test plot was planted to corn at the same seeding rate as 30-inch fields.

**June 5, 2019:** A diverse cover crop mix was interseeded between the rows using a 10-foot drill.
**The mix:** cowpeas, sun hemp, hairy vetch, red clover, oats, annual Oregon ryegrass, winter wheat, buckwheat, flax, millet and rapeseed.

**5-leaf stage:** At 5-leaves, Kruger says even if the drill tires hit a few plants, they rebounded. “Timing was crucial. Early season weed pressure is what hurts corn yields. The corn got a head start on the cover crops, it was 3-4-inches tall before the cover crops were planted.”

**Results**
**Cover crop biomass:** September 27 sample showed 23,000 pounds green weight and 6500 pounds dry weight.

**Organic matter:** “Organic matter is a slow process. It took me 15 years to see a 1.5 percent increase. But, with interseeding the potential is here,” Kruger says. “If I can go to a corn, corn, soybean, wheat rotation and keep the cover crop on the ground three out of four seasons, it just makes sense that it will build organic matter due to the volume of biomass above ground and the roots below.”

**Weed pressure:** Kruger says agronomists would walk into the test plot and just shake their heads. “This should not work. It goes against everything we’ve ever been taught. Our mindset has always been you have to have perfectly clean field,” Kruger says. “It was unbelievable how the cover crop grew and helped hold down the weed pressure. We did not spray this field after the cover crop was planted.”

**Plant health:** Overall plant health was better in the 60-inch corn, with stronger stalks on greener plants. “It was very interesting to see the plant health. It looked so much better. We don’t know why this is. I speculate it was partially due to the fact that the wide rows allowed sunlight to reach the bottom leaves.”

**Yields:** Across the four replicated trials, while the 60-inch plot offered much greater plant biomass, yields were about 12 percent less than corn planted in 30-inch rows.

**2020 trial:** In 2020, soybeans will be planted in the 2019 plots and a second 60-inch corn trial will begin. In an attempt to improve yields, the cover crop blend will be adjusted for the 60-inch corn trials.
“I definitely feel there is potential to improve yields, while maintaining the benefits of reduced weed pressure and overall plant health,” Kruger says.

**Learn more:** The 2020 60-inch trials will be located along Highway 12 west of Milbank. If interested in a plot tour call a coalition team member or visit https://sdsoilhealthcoalition.org/technical-resources/ . Several publications outlining more details of the 2019 trial can be found in the “Additional Resources” section.

**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. “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.”

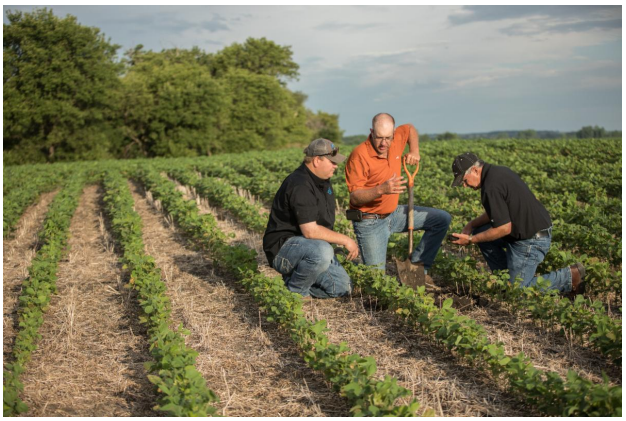
Fertility is another motivator. “This is a risky enough business already. Just because I put fertility out there for 180-bushel corn, if we don’t get the moisture to make uptake work, I won’t get 180-bushel corn,” Boesen explains.

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.”



*Courtesy of USDA-NRCS SD*

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

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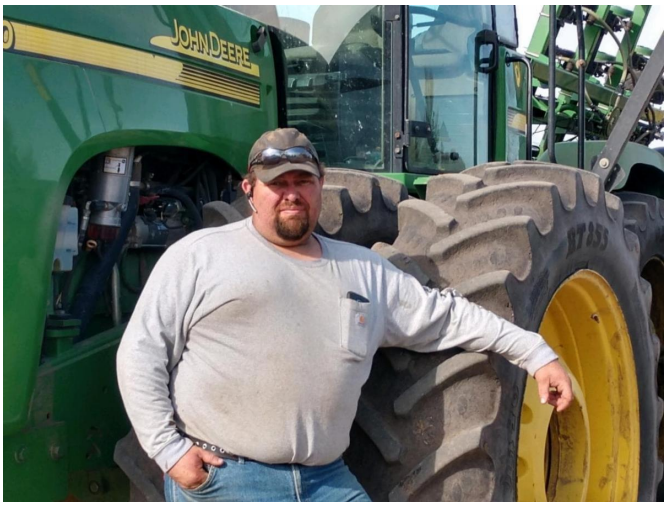


*Courtesy photo*

**Kimball farmer, Todd Boesen.**

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*Courtesy of SDSHC*

**In David Kruger's on-farm test plot, 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.**

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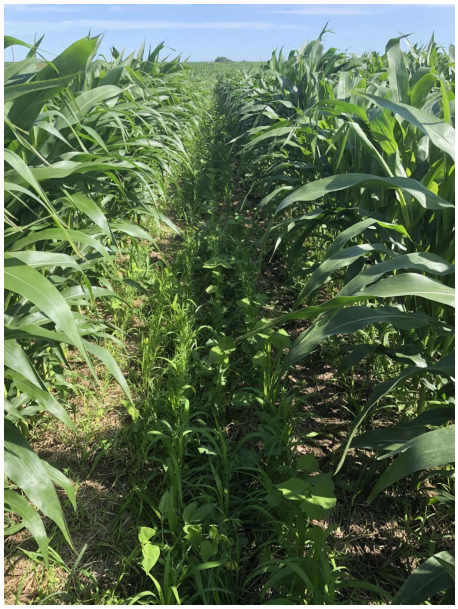

*Courtesy of SDSHC*

**In David Kruger's on-farm test plot, overall plant health was better in the 60-inch corn.**

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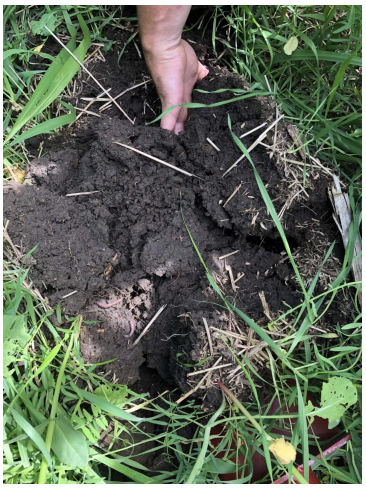

*Courtesy of SDSHC*

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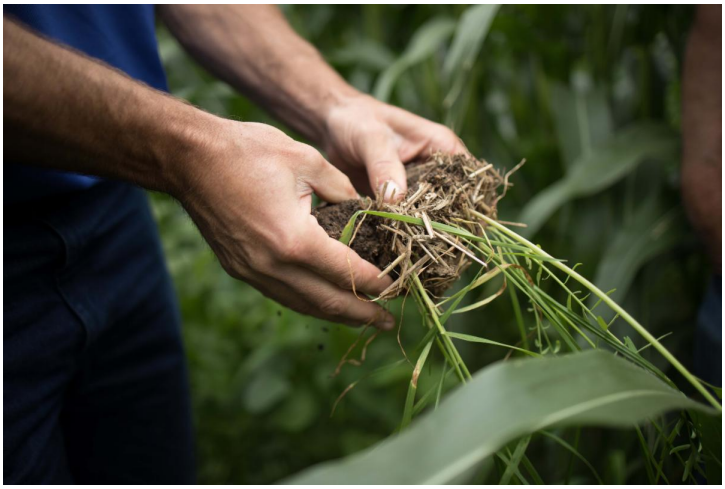

*Courtesy of USDA-NRCS SD*

**The 60-inch plot offered greater plant biomass.**

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