Dan and Kris Nigg
Sisseton, Roberts County, SD
Reduced tillage and no-till cropping systems with a crop rotation of wheat, corn and soybeans with cover crops mixture.
Soils: Silt-loam and sandy ground

Nigg Builds Soil and Profits with No-Till, Wheat and Cover Crops

Heavy rains last summer washed cornstalks down a rolling field of no-tilled soybeans toward a wetland near Dan and Kris Nigg’s farmhouse east of Sisseton, SD. The cornstalks came to rest where the edge of the field met a buffer filled with Black-eyed Susan, purple cone-flowers and other native flowers and plants.

As the Niggs walked between the flowers and the soybeans, Dan explained how their farming practices have changed.

“Years ago, when we weren’t no-tilling, this wouldn’t have been cornstalks, it would have been topsoil,” says Nigg, Roberts County farmer.

The tillage systems Nigg uses have change drastically since he was a young teenager and the family’s six-bottom plow waiting for him after school. “Every night, what you did was plow,” Nigg says. “Everything got plowed—wheat stubble—barley stubble.”

“These days, advances in planters, row cleaners, and combine chaf spreaders, make the residue much more manageable,” Nigg says. Nigg farms ground that’s spread out over 15 miles and deals with a variety of soil and moisture conditions.

“Most acres I no-till. On other fields, I felt I had to do some tillage to manage residue,” Nigg says. “Now, I’m getting a bit more brave! Since I started using cover crops five years ago, I don’t till the wheat stubble. I don’t work any soybean ground. And last year, I didn’t touch 25 percent of the corn stalks. I think it would be fantastic if I didn’t touch (till) anything. Think of the fuel savings!”
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Conservation Agronomist Eric Barness with the Natural Resources Conservation Service (NRCS), Brookings, SD, says that in addition to the economic benefits, Nigg is changing and improving the biological activity in his soils which is helping more quickly break down the residue left after harvest.

The Yetter Clean Sweep row cleaners on his John Deere split-row Central fill planter make no-tilling corn possible, Nigg says. He also likes being able to manage the width and depth of the wheat straw spread behind the combine. Spreading straw evenly reduces or even eliminates windrows that make the soil colder and wetter when Nigg plants corn the following spring. He also cuts wheat “a little on the low side because I don’t want it to catch a lot of snow” during the winter. This strategy works well, he says.

Building Soil Organic Matter

Wheat plays a key role for Nigg. First, there’s a strong basis around Sisseton, he says. Second, growing wheat allows him to use herbicides with different modes of action than for corn and soybeans. Rotating herbicide modes of action helps Nigg manage herbicide-resistant weeds. Third, wheat helps build organic matter because it’s so high in carbon, Nigg says.

“My Dad was adamant about not baling off the wheat straw,” he says.

Nigg tracks the organic matter in his fields. Over the past 20 years, the organic matter most of the fields he farms exceeds 5.0 percent and in some fields the organic matter is as much as 5.8 percent. Nigg pulls soil samples by soil management zones and he plans to start doing his own soil sampling. He wants to start sampling for P and K in the summer when soybeans are small.

“The more I learn about organic matter and the nutrients, the more important it is to me,” he says.

Nigg also works with the NRCS in Roberts County to evaluate a soil test that measure the biological activity in the soil. It’s called the “Haney Soil Test” and bears the name of its developer Rick Haney, the USDA Agricultural Research Service soil scientist in Temple, Texas.

“The Haney test shows what nutrients will be mineralized after looking at the carbon-to-nitrogen ratio,” says Eric Barness. “Based on the test results, we can suggest a particular cover crop mix high in carbon, or high in nitrogen that can help get the soil in balance,” Barness says. For example, a grass-type cover crop is higher in carbon content while the legumes put more nitrogen back into the soil.

Five Years of Cover Cropping Creates Confidence

Nigg began using cover crops five years ago. Before he tried cover crops, he wondered how he would seed them. “It was so simple,” says Nigg, who seeds cover crops with an air cart.

He usually uses a mix of radishes, flax, turnips and vetch — about 10 pounds per acre — with a John
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Deere air cart. Nigg says he doesn’t include species that overwinter in the mix because in the spring he doesn’t want to deal with any that did not winterkill.

At the suggestion of Kent Duerre, District Conservationist with the NRCS who has worked in Roberts County for 20 years, Nigg decided not to till up the cover crops. Instead he waited to see if the cover crops he seeded would winter kill. And they did winter kill, which is what Nigg was worried about.

Cover crops make sense for Nigg, who focuses on profitability with improving soil quality and soil health.

“I want the cover crops for nitrogen recovery and to build organic matter in the soil and I really do not want anything there in the spring that I may have to mess with (burn down with a herbicide),” Nigg says. He also believes that cover crops help break down wheat stubble.

Eric Barsness says since Nigg has improved the biological activity in his soils, managing residue has been easier. He explains that cover crops can help farmers improve the overall productivity of their soil in many ways. Roots of cover crop help build and maintain soil macro pores which aids water infiltration.

“Many species of cover crops will winterkill,” Barsness says, “So there’s no need to till them in the fall or spring. Producers should see their local NRCS offices for recommendations for species along with their purpose and properties that can help producers meet their goals. Or, use your web browser to search for “South Dakota NRCS Cover Crops.”

“Cover crops like flax and oats support important soil fungi, which improve nutrient up-take,” says Barsness. Flax and oats specifically support arbuscular mycorrhizal fungi (AMF) that has a symbiotic relationship with many plants. AMF attaches themselves either on or inside plant roots to tap into the carbohydrates transported from the plant leaves. In turn, the fungal hyphae (filaments) grow out from the roots and bring water and soil nutrients back to the plant.

These days, Nigg says he fields “tons of questions” about cover crops from farmers who have not tried them. “So many farmers are so gun-shy to leave their cover crops (over the winter versus tilling them out),” he says. “Farmers want to till cover crops before freeze up. Tilling is not needed. The right mix will winter kill and provide benefits of maintaining soil structure and using excess moisture.” Barsness supports Nigg’s comments saying “Better soil structure will help also traffic-ability in the spring.”

Nigg shares this key point about making cover crops work.

“Get cover crops in the ground as soon as you can,” he says. “We are challenged up here with the season.”
Looking Forward

Since Nigg started farming with his Dad, Michael Nigg, after graduating from high school in 1982, he’s seen a drastic increase in yields. Nigg says economics will dictate what he does next because he says things are vastly different with $3 corn than when it was $7. Even with high yields, my reducing tillage, using precision ag and variable-rate technology all save me money. Nigg says. “It’s an economics thing. You’re going to have to figure out a way to make more money with less margin.”

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- Dan and Kris Nigg, Sisseton, SD

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