‘Wheat is still king’ but

multi-year rotations

pay off in West River

by Lance
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Cair Stymiest, SDSU agronomist who will retire this summer, is a strong proponent of longer rotations with a broader variety of crops. His reasons: they fight diseases and pests better and they use moisture and nitrogen more efficiently.

Clair Stymiest knew crop rotations would be a priority when he began work as West River agronomist for the South Dakota Cooperative Extension Service in 1978.

The dry country west of the Missouri River grew fine wheat, but farmers who planted it year after year ran into problems with diseases such as common root rot caused by the fungal organisms *Cochliobolus sativus* and *Helminthosporium sativus*.

The logical solution, in Stymiest’s view, was to grow a broader variety of crops, including broadleafs such as safflowers and sunflowers, so that the disease-causing organisms couldn’t build up in the soil.

“But then I ran into that old stone wall of the farm program,” Stymiest recalls. “I could put out a test plot and folks would say, ‘Boy, that corn looks good,’ or ‘The sunflowers look great.’ And then they’d say, ‘I’d like to grow some of those things, but I just don’t have those crops in my farm base acres.’”

Farmers trying to farm within the guidelines of the farm program typically ended up letting a portion of their land sit fallow in years they weren’t growing wheat. That practice was much cheaper when fuel, land, and machinery were all less expensive than they are today.

Stymiest adds that producers sometimes had misconceptions about the benefits of fallow and its ability to conserve moisture as compared to more diverse crop rotations.

In a typical winter wheat/fallow cycle, land is in crops 45% of the time, Stymiest said. In a typical rotation that includes winter wheat, sunflowers, millet, winter wheat, and fallow, the land is cropped 50% of the time, or only slightly more than under the winter wheat/fallow pattern. With modern farming and no-till technology, Stymiest said, farmers are able to trap more moisture and more than make up for the added moisture requirement of the diverse crop rotation.

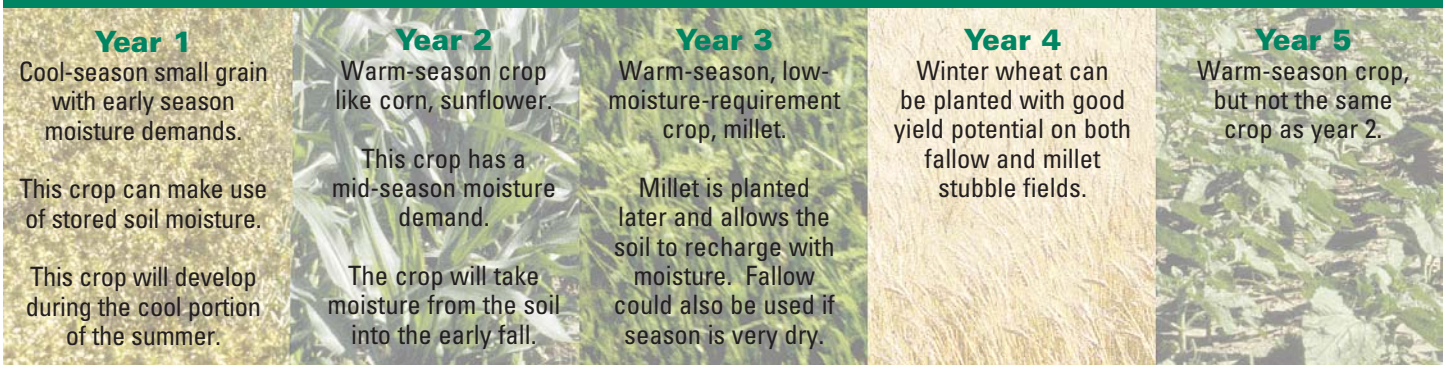
Stymiest adds that crop rotations pay off in several ways:

- There’s less carryover of crop disease from one crop to the next.
- Weed control is better because more diverse herbicides are used.
- Rotations allow better use of moisture and deep nitrogen.
- Rotations allow for better use of farm machinery and labor.

That’s why Stymiest was happy to see a major policy change in the 1996 farm bill, commonly called Freedom to Farm. The new policy let growers plant whatever they chose to grow without penalizing them with reduced program payments if they used new crops on their farm.

“I would say producers are able to do a better job now using more diverse rotations,” says Stymiest. “Wheat is still king as far as number of acres in western South Dakota. It’s in every rotation.”

Selecting complementary crops for rotations requires flexibility



Stymiest says several crops have wide adaptation to West River conditions: alfalfa, wheat, oats, barley, sunflowers, millet, field peas, and forage sorghum.

Crops with limited adaptation to West River conditions are canola, chick peas, corn, grain sorghum, safflowers, and soybeans.

Stymiest said West River geography and climate are generally the limiting factors for crops. For example, grain sorghum is a tropical plant that does well in places such as Lyman, Jones, Stanley, and Haakon counties, which are generally not much above 2,000 feet in elevation. But at higher elevations farther west, cool nights send sorghum into a partial dormancy from which it doesn't recover until temperatures warm up the next day.

Similarly, soybeans have limited adaptation in West River rotations because the crop likes rain in August—something the region rarely delivers. Crops that thrive under hot, dry August conditions are chickpeas and safflowers; the dry weather limits disease pressure on those crops.

Stymiest says that since 1996 more acres of sunflowers, corn, field peas, millet, and some soybeans are being grown in western South Dakota. The change isn't solely a result of Freedom to Farm; producers also are seeing better economic returns from crops other than winter wheat.

Stymiest adds that SDSU's ongoing work with crop rotations illustrates why local research is so important.

Data from Kansas and Nebraska indicate that in rotations that include sunflowers, subsequent wheat yields are less than in other rotations. In South Dakota that's not the case. The West River studies suggest farmers can use safflowers, sunflowers, and peas strategically in their rotations and do very well with wheat.

Winter wheat in a rotation that includes sunflower with a millet transition crop has had a 3-year average yield of 51 bushels an acre in the SDSU studies. Its production cost, at $2.27 a bushel, was the lowest of any wheat in the crop rotation study, Stymiest said.

Stymiest believes winter wheat fares better in sunflower rotations in western South Dakota because the region sees considerably less evaporation than Nebraska or other states farther south. And no-till technology lets the soil recharge faster.

"We have been recording crop budgets for the rotations. This helps determine how much it cost to grow each crop and the returns for the total rotation," Stymiest says.

"The benefit of long-term studies is that we can evaluate the total effect of the crop rotation rather than only consider one season's results. We would not be able to evaluate the effects on crop yields, weed control, and plant diseases over a single year. Crop rotations must be carried out for more than one cycle to get the full benefit."

Stymiest's current studies began in 1994 and are located at Wall. The research has had multiple sources of funding: SDSU, the South Dakota Wheat Commission, and the South Dakota Oil Seeds Council.

Previous crop rotation studies were conducted at Winner 1980-1986 and Hayes 1987-1995.◆

The effect of crop rotation on winter wheat yields 1998-2000

- Winter wheat following millet in broad leaf crop rotation. Average 51 Bu/A. Average cost/Bu $2.27
- Winter wheat following millet with corn rotation. Average 43.8 Bu/A. Average cost/Bu $2.69
- Winter wheat / millet no-till continuous crop. Average 36.5 Bu/A. Average cost/Bu $2.70
- Winter wheat following spring wheat in sunflower rotation. Average 39.0 Bu/A. Average cost/Bu $3.23
- Winter wheat / fallow reduced tillage. Average 64.8 Bu/A. Average cost/Bu $2.53