

The saying that 'everything old is new again' is true in spades for crop rotation. The benefits of the diverse rotations used by farmers fifty years ago are becoming clear today as input costs erode profit margins and weed and pest resistance grows. This realization has some growers looking to the past to help bolster their farm's future.

"There are clear indications that systems specializing in one or two crops—like the corn/soybean rotation—are unstable, easily disrupted by weather, insects, and disease, and rely heavily on technological advances and fossil fuel-based inputs," says Joe Lauer, corn agronomist with the University of Wisconsin. "But the age-old practice of rotating crops, which for a while was considered unnecessary, is returning to today's agriculture with proven benefits."

Lauer says though the corn/soybean rotation is good for a 10 to 20% yield increase to both crops, more could be had by stretching rotations further. "Adding a third crop like wheat adds even more to yields, especially for soybeans," he says.

Wisconsin research has shown that this rotation effect is not diminished

►Left: Ralph Holzwarth and his wife Betty (not shown) farm with their son Ted (left), daughter Bobbi, and her husband Jeremy Schmidt.

by technology. "We've tried transgenic hybrids and varieties, more fertilizer, fungicides, insecticides, and other inputs and we can't outpace the benefit of crop rotation—it's simply the gift that keeps on giving and we really don't understand why," he says.

Gettysburg, South Dakota, farmer Ralph Holzwarth doesn't understand the rotation effect either, but knows its advantage is allowing his farm to prosper. "We began no-tilling about 25 years ago and quickly saw a boost in yields because the surface residue and improved soil structure increased water infiltration. A second yield gain occurred later when we diversified our rotations to reduce plant disease problems while also improving soil quality," says Holzwarth.

Crops in the mix. Holzwarth's rotations now include from four to six crops with a 'basic' track of spring wheat/winter wheat/corn and a broadleaf crop (sunflowers, soybeans, field peas or lentils). "We alter this to match market conditions and to target specific production problems in individual fields, which makes crop rotation another aspect of precision farming," says Holzwarth.

Randy Anderson, research agronomist with the USDA-ARS in South Dakota, did an extensive analysis of Holzwarth's farm and took the rotation effect even a step further. "We

confirmed findings of earlier research that showed a synergistic effect some crops have on the crop that follows. That benefit goes beyond even the rotation effect and it results in corn that yields 12-15% more when planted after field peas. That's in addition to the increase from the rotation effect."

Holzwarth has noted this response to field peas and includes them in his rotations whenever market conditions allow. "We're growing crops that we never imagined we could produce here because of no-till and crop rotation. It's how we're keeping the farm profitable enough to retain the next generation," Holzwarth adds.

He's quick to credit Dwayne Beck, manager of the nearby Dakota Lakes Research farm, for the sustainability he's put in place. Extensive presentations of Beck's research into no-till and crop rotations are available at the farm's website, dakotalakes.com.

Breaking the habit. Attica, Indiana, farmer Dan DeSutter farms in an ocean of corn and soybeans, but believes wheat has a role in making his farm more sustainable. "By adding wheat to our crop rotation we open a window of opportunity for cover cropping, and that is emerging as the fast track to a healthy soil," he says.

DeSutter says his goal is to return soil organic matter levels on his farm to their native level of 6-8%. "Increasing soil organic matter levels from 2% back to 6% means 120 more units of nitrogen is made available every year, and that's \$60 worth of fertilizer I don't have to buy. And, it also means the top foot of soil will hold 100,000 more gallons of water, and that's 4 inches of rain for our crop to use."

"Our approach is to use a crop rotation that allows us to have something green and growing that puts carbon back into the soil whenever possible. If I can retire knowing I've restored the health of our soils, then I would be thrilled to death," he adds. ■

►Left: Dan DeSutter is adding wheat to his corn/soybean rotation to reduce mounting problems with those crops and to provide an opportunity to plant cover crops that will improve soil health.



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