

Come Wind, Come Weather

Hal and Ty Brown, Windy Lane Farms, Mulberry, IN

Christened after the Palm Sunday tornado that tore through the Clinton County, Indiana farmstead in 1965, the 152-year-old Windy Lane Farms is now run by the fifth and sixth generations of the Brown family: Hal Brown and his son, Ty. Both are Purdue alumni.

Tillage on the farm has evolved from the moldboard and chisel plows to ridge till and, finally, the vertical tillage and no-till that is used on 6,500 acres today. Soil that has been farmed since 1864 is now being restored with cover crops, microbes and residue management.

Microbials form the basis of the in-furrow treatment. "Everything else revolves around that," says Hal, who formulates the mixes himself. Also key is the symbiotic relationship between low soil disturbance and cover crops, which Windy Lane Farms began using in 2006. Cover crop blends are tweaked annually based on soil needs and the season. Organic matter, tested every four years, is trending up, "something we were not able to say before," Ty observes.

The system acts as a buffer against extreme weather situations. Wet and dry years — and windy ones — are manageable events, because the soil handles and retains water better, is supported by more roots and soil life, is building organic matter and is not lost to erosion, all of which preserves it for future generations.

Q: What are some "aha" moments that have changed or supported your program?

A: In the mid-1980s, some hogs broke out of their pen and knocked over a bucketful of nitrogen (N) stabilizer through the slats in the hog pit. I (Hal) always carefully maintained that pit with microbes to keep it liquid, but my pit soon went graveyard dead — a rat could have run on the crust from one end to the other. It took about a year of effort to get it active again.

All the articles recommended N stabilizer. But after that, I looked at my soil like that pit — I didn't want to kill any microbes in the soil, either. I had always thought about soil biology, but ever since I really saw the "bad guys," it's been ingrained in me to turn to the "good guys." So I started formulating and applying my own biological products.

In the mid-1990s, we formazan-tested soil samples from our virgin fencerow, our conventional farm field with microbes applied in-furrow and a neighbor's conventional field with a hog manure history. Microbial soil life respiration tested 1,200 from our fencerow, 1,000 from our field and 200 from the neighbor's. Our soil was well aerated with excellent tilth; the neighbor's soil was hard and cracked.

It's now easy for a farmer to do this on his own with a color-coded Solvita test, right in his own shop, within 24 hours. That ought to turn a farmer on — seeing is believing!

Q: How do you determine your cover crop, residue and nutrient management strategy?

A: Microbes are our first priority, and no till and cover crops are as good as you can get for nutrient management. We adjust cover crop blends based on the situation, and they improve every year. For example, for wheat acres going into 2017 corn, we'll plant oats, crimson clover, alsike clover, flax, sunflowers, sorghum Sudangrass, radish, turnips, sunn hemp and buckwheat at 32 lb. per acre. For soybean acres going into corn, we'll mix oats, radish, turnips and hairy vetch. Cereal rye is always our program going into soybeans — it just works. One challenge is finding a mix that does not rob so much N ahead of corn.

Soil tests are showing a much faster-than-expected increase in available nutrients, especially for phosphorus (P), considering the amount of nutrients commercially applied. One field has had no P or potassium (K)

Vol. 2, No. 3

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commercially applied over the last four years, and yet P has risen 20% and K has remained steady. Pesticide use and labor are also steady compared to our past no-till practices without cover crops.

In terms of residue mass, we had our best-ever cover crop this spring. In July, you can't even see it – it's all being digested, and the earthworm middens are everywhere. Once you start getting into a certain era with your cropping system, the night crawlers take over and do your tillage for you, getting the soil ready.

We also use the Y-Drop and Undercover system on our sprayer for more targeted applications. We were fully prepared to use more N in corn this year, but after checking our levels, we found it wasn't necessary. That's saved about 50,000 gallons of 28% over 3,500 acres, over seven days with two people.



Top left: Earthworms, abundant in the farm's soil, are key players for digesting residue. Bottom left: Cereal rye is applied with a Horsch seeder mounted on a Claas 760 combine. Right: On April 1, 2016, Hal Brown checks a cover crop mix of triticale, rape, barley, oats and camolina going into corn.

Q: What is the most important component of your soil health program?

A: Our soil health is not due to one individual thing – it's the whole system working together. The night crawlers are building organic matter (OM) and helping N mineralization, and then there are the biologicals, starters and sugars. There are still more fields to gather data from, but so far, OM results are encouraging. In some fields, OM has risen by as much as 0.9% in four years. When the soil is "cooking" – the biology and cover crops are working – it feels like a plush carpet under your feet.

Cover crops are an annual expense, but you still come out ahead through increased fertility and biological activity.

Q: Does your program provide a buffer against weather challenges?

A: When we took wheat out in July, it was very wet. But having no-till was extremely helpful because we don't rip or have a 12" layer of goo to fall into.

We are able to use slightly less herbicides in soybeans if we have a very good stand of covers. Some soybean fields that did not have a cereal rye cover crop required a burndown, and then we couldn't get back in to spray

because of rain. They were very weedy. But in the soybean fields that did have the rye, the weeds were held back.

During corn root digs in July, we hope to see larger root systems; our biologicals can grow amazingly large roots. While more roots doesn't necessarily equal more yields, if you come into a stress situation, it's like having insurance.

Tillage turns the soil life's whole world upside down. We hear, "You can till this soil – it's flat and black, and we don't have erosion." But they have vertical erosion, because the rainfall will take the smallest particles of soil through the cavities made by the ripper and deposit them at the bottom of the ripper point. If they had compaction up on top before, it will soon be on the bottom.

Q: What does the future hold for Windy Lane Farms?

A: This year I (Hal) put out my 59th crop. Since tillage was done from day one, this farm has lost 50% of its OM. Soils of area farms that were black when I was a kid have changed to various shades of brown. The only way to pass this soil on to the seventh generation is to know what took away that 50%, then build better crops with more fertility and no erosion. Instead of peeling an onion, we're building an onion – one layer at a time.