



The Magic of Cover Crops - Interview with Soil Chemist Rodney Heinen by Dwayne Colvin

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We jumped out of the truck, crawled through a fence and walked out into a field of cover crops. It was looking good: wheat, cereal rye, brassicas. As I was checking things out, the farmer turned to me and said, "We need to farm deeper. Most people are farming the top nine inches, I'm farming four feet deep." It was then, that I knew, that the seven hour drive to talk with Rodney was about to pay off. "It makes a difference. We had a bad year last year with the drought and heat, but I was really pleased with my yields. In the midst of a crop failure, with surrounding fields averaging 35 bu/A, we averaged 106 bushels." I was impressed. "Feel how spongy that ground is under your feet? This farm wasn't like that when I bought it four years ago. It takes about four years of cover crops to get the soil to this condition. This kind of soil holds water. See that neighboring field over there? The other day it was running water onto my place after a half inch of rain. We got five inches total, but these fields never ran any water. The water went deep, following the cover crop roots down. Moisture tests on this farm during dry times have shown 9 ½ inches of water in the top 48 inches of soil. Cover crops are all about harvesting rain."

Rodney Heinen is really an exceptional farmer. A graduate soil chemist, he looks at farming from a different perspective than most. I had driven to eastern Kansas to see cover crops and to hear a little more of his view on good farm management. Cover crops, it turns out, are an important part of his strategy. "A lot of people think cover crops are only for some guy that's farming a 100 acres or so, and could hand weed the place if he wanted, but I'm farming in four states and everything gets cover crops." When I ask him why cover crops, he told me two very profound things. The first, "I'm not just farming, I'm building soil." The second was "I'm trying to harvest what I can't buy. I can buy nitrogen, but I can't buy water, humus, yield."

Rodney has two loves, farming and his baby girl. "Everybody was telling me about this giggle of hers and I'd been too busy to hear it. The other day it rained so I just stayed home with her while Mom went to town. I played and played with her and oh that giggle . . ."

I had to smile as we walked across the field and got him back on topic. "Ok, see these fields, they need water. I could spend \$100,000 on an irrigation system or I can plant cover crops. I could pay to have these slopes terraced to hold soil and water or I can keep doing what I'm doing. With the other benefits of cover crops: better soil, better yield, better forage nutrition, I'd say the choice is obvious." Cover crops are not only a part of soil maintenance program but they can make you money.

Rodney's introduction into cover crops was a field of winter wheat that he'd put in ahead of beans. "My dad warned me not to do it. 'That wheat's taking all the moisture and nutrients,' he told me, and I had to wonder, taking them where?" After more than 15 years of cover crops, Rodney knows the answer to that question. "Most farms have a root zone that goes down about nine inches, but my farms have a four foot root zone." Cover crops allow air and water to penetrate deep into the soil and become a store house of moisture and nutrients because cover crops can drive down roots 50 inches or more. The sponginess of the soil shows that there is air and water penetrating . . . minimizing



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compaction. Oh, and those beans following the wheat? They did 8 bushels better than anything else on the farm.

I wanted him to expand on that statement about building soil so I asked about the organic matter content of his soil. He said that he doesn't test for organic matter. "I don't bother with testing the organic matter because high organic can be misleading. It only means that the microbes in the soil are not converting organic material to humus. On the other hand, if the conditions are right, say after a plow down when there is lots of water, air, and organic material in the soil, microbes can double over night. As a result, organic readings can be deceptive. Humus is more stable so I monitor humus instead." Humus is important both as a nutrient source as well as a reserve for water, holding 80-90% of its own weight in moisture. Other benefits of humus include the buffering effect it has on soil acidity as well as the production of mucilage, (glomulin), during humification. That's the sticky substance secreted by the microbes that glues the soil into crumbs, giving the soil tilth, allowing air and water and roots to penetrate even deeper.

Typical humus readings on an average farm can be as low as 0.2% but, after only four years of cover crops, Rodney's soil tests as high as 2.6-2.8%. "However," he cautions, "just because you put a depleted field into hay or into CRP for 10 years doesn't necessarily mean that it's building humus. Monocultures add very little to building soil. To build soil you need a diversity of species, that's why my cover crops are almost always mixes of up to 7 or 8 species."

Being a soil chemist, Rodney is constantly monitoring the health of his soil. "I track soil health with a refractometer, measuring the sugar brix, (sugar levels), in my crops. I know that, if my ground is in good condition, it's going to produce sugar." High sugar in crops is important because it protects crops from insects and disease and eliminates the need for traits, pesticides, and herbicides. "You can dig in this ground and you won't find a root worm anywhere and we haven't used BT or pesticides on this farm for five years. Once a soil is balanced and you're getting high sugar in the crops, you don't need to spray or use traited varieties. Strong plant vigor resists diseases and the insects don't like high sugars." He laughed and said that, every once in a while, he'll call the co-op and have them test insect and disease pressure in his fields. They'll come back and tell him that there is no need for them to spray because there's no problems. Then they'll ask, "What kind of special traits are you using in that field?"

He told me another fascinating story to emphasize the importance of a having well balanced soil producing high sugars. "My neighbor and I had adjoining alfalfa fields growing the same variety of alfalfa. His field had a bad grasshopper infestation, so we walked out to look things over. When we stepped into his field, swarms of grasshoppers flew up and you could see the damage but when we walked into mine . . . no grasshoppers. We did this five times in five different places with the same results every time. In the end, I harvested a good crop of alfalfa and the neighbor lost his field."

This side by side test is interesting because the two fields were the same except that the neighbor had sprayed for insects and Rodney had not. The only other difference was the brix readings: the neighbor's alfalfa was reading 3-4 brix while Rodney's field had sugar levels of 12-14 brix. Cover



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crops can make that much of a difference: better yields, higher nutritive quality, more meat or milk per acre, and disease and pest resistance.

A lot of farmers say that cover crops won't work into their program because they harvest corn too late to get a cover crop established. Rodney plants 112 day corn instead of 116 day. "I take an 8 bushel hit because of the shorter season corn, but I more than make up for it in the yield increase that follows cover crops. Last year was a hard year but my fields up north produced 60 bushels over the county average."

Rodney had an interesting take on weeds. "Weeds are an indicator that there's something wrong with the ground. Weeds grow to balance the soil. Foxtail tells you calcium is unavailable. Broadleaf weeds tell you the phosphorous to potassium ratio is out of whack. A well balanced soil will not grow weeds like a piece of farmed out ground." Cover crops help put a soil back in balance. For the first four years he that owns a farm, in addition to cover crops, he puts a lot of lime, gypsum, and colloidal phosphate into the ground. "Most farmers are thinking about the top nine inches and so they lime only once. I'm building 4 feet of topsoil so I continue with lime etc for at least four years. After that, the weeds are about gone."

With that, he dropped me off at my car and headed off down the road, "Got to go see my little girl!"