

November 16, 2018

## CROP RESIDUES PROTECT OUR SOILS

Last week I was reminded how wet our soils still are when I saw an anhydrous rig and tractor parked in a soybean stubble field where it was slabbing up wet soil and making soybean residue piles. What has worked in the past was not working now. Farmers in our area will need to adapt to the cards they have been dealt with this fall.

Our silty clay loam soils are low infiltration rate soils or take water in slowly. Residue management of the entire system from the combine, fertilizing, and to the planter is very important as a system. Residue management combined with tile outlet terraces protect our soils from the weather extremes we seem to face each year.

There is a lot of residue out there this fall to protect topsoil. There are four components required for corn, milo, wheat, and soybean residue to break down in our soils. It takes 1) Microbial activity; 2) Warm temperatures; 3) Moisture; and 4) Nutrients; especially nitrogen. Applying extra nitrogen is usually not warranted in our area to break down stalks. The key is if any one of these factors is limited, residue won't decay as it should. For example, if there's plenty of moisture but the temperature is cool, residue won't break down. The same goes if the air temperature is warm but conditions are dry.

Leaving the soil undisturbed already assists microbial activity and helps conserve moisture for the 2019 crop year. Combine headers that leave more residue attached to the plants make no till planting in the spring easier to cut and handle attached residue versus loose residue.

As the soil health improves, the speed of crop residue decay increases even when the soil is not tilled. Tillage destroys the protective soil cover. Tillage destroys the residue which can store up to one inch of rain on the soil surface, allowing time for it to soak into the soil. Tillage is more destructive to earthworm populations than anhydrous ammonia. Tillage damages the entire habitat, while ammonia kills earthworms in a 3-4 inch band out of every 30 inches. Earthworms are Mother Nature's tillage.

A farmer in Thayer County called this week that experienced a wild fire in March of 2017. He farms a quarter section of land where the fire spread in high winds diagonally across his field. He responded by immediately planting wheat to get some residue cover and terminated that before he planted no-till spring crops last year. There was a drought last fall through early spring and soil moisture was at a deficit. He said the yield monitor for his dryland corn this fall was from zero to 100 bushels per acre in the burned area and diagonally, in the unburned, the yield monitor reached 200 bushels per acre. This is probably the most extreme example I have heard with fire in a second cropping year and negative yield effect and it shows how close we were in parts of Jefferson and Thayer County to a very bad year.

Last week I looked at some terraced land under pivot that had a cover crop mixture flown on over standing irrigated corn on September 1<sup>st</sup> with cereal rye, turnips and radishes. He was going to allow a young man going to SCC to graze it and will enhance his ability to go back into that field with no till corn in 2019. Grazing cattle or sheep on crop residue uses some of the carbon,



but also adds a portion back from the manure. Cattle grazing for 30 days does no damage to the crop production potential regardless of weather conditions. Longer grazing days begin to have impact from trail formation, congregation areas (water, salt, feeding locations, of favored resting areas), and differential feeding where animals will grub some sites and thinly graze others.

Chuck Rice, a soil scientist from KSU, reminded students at SCC at the Ag Expo that soil health is vastly improved by no-till farming and can be further enhanced by cover crop use and diverse crop rotation schemes. Getting your soil to increase soil stable aggregates and increasing soil organic matter is the key and will be crucial to have more resilient crops with extreme weather events now and in the future.

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