
Tillage and Carbon

Jim Kinsella of Lexington, Illinois was one of the featured speakers at the No-Till on the Plains conference in Salina, Kansas this week. Jim has been no-tilling his farm since 1974. Most important he has been interested in organic matter levels in his soils and has a history of soil tests conducted by a standard method since 1975. The organic matter of his level prairie soils was 1.9% in 1974. It increased to 3.1% in 1987, 3.4% in 1990, and 3.8% in 1997. His farm has gained about .4 tons per acre per year of carbon in the organic matter.

Soils throughout the United States have lost organic matter since the day they were put into crop production. There are two major causes for the losses. They are soil erosion and oxygen additions to the soil (tillage). We have been blessed in our area that farmers responded to soil erosion in the 1930' and 40's by terracing land in more recent times we are adding no-till farming methods to the terraces. Today 37% of Gage County cropland is farmed using no-till methods. We still have considerable room for improvement.

The Morrill plots on the campus of the University of Illinois have been maintained as continuous corn, corn-soybean rotation, and a corn-soybean-alfalfa rotation since the development of Land Grant Universities. The grass sod surrounding the plots has 4.9% organic matter which would be near pre-development levels. The organic matter level in the continuous corn plots is 1.7%, corn-soy 2.2%, and corn-soy-alfalfa 2.9%. Since these plots are level, the loss of organic matter is almost exclusively due to tillage.

While fertilizer can help to replace nutrients lost from the loss of organic matter, nothing replaces the high quality healthy soil with good organic matter levels. Part of our loss of this organic resource is being masked from us. Organic matter and fossil fuels (historic organic matter) are being oxygenated (burned) which has increased the carbon dioxide levels in the air. These increased carbon dioxide levels are a huge concern for the health of the world. They are also a benefit to plants. Crops grow better at higher carbon dioxide levels. A crop of corn at harvest time will take 5.9 tons of carbon out of the air and add 15.7 tons of oxygen to the air.

Farmers who no-till their crops will for a period of 25 to 50 years increase the organic matter levels in their soils. The carbon gain will be more rapid in earlier years and slow as a new equilibration point is reached. This will remove massive amounts of carbon dioxide from our earth's atmosphere. Farmers should be rewarded for these efforts. They should be rewarded for saving and enhancing the quality soil they are farming. They should be rewarded for the carbon they remove on behalf of industry and car driving-home heating consumers.

Research is needed to define uniform methods to measure carbon in soil and air. We need to develop precise definition of terms for carbon, organic matter, organic materials, and humus. There is no question that carbon will be a leading point of discussion in the 2002 farm bill.

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