Soil Microbiology Research
Kellogg Biological Station, Michigan State University

I write this column from Hickory Corners, Michigan. This is the one-time summer home of W.K. Kellogg the founder of Kellogg Foods near Battle Michigan overlooking Gull Lake. The Kellogg foundation donated this estate for environmental and biological research in the production of healthful foods and sustainable food production management systems. It is the soil microbiology research which I want to learn more about to help Southeast Nebraska farmers. I was pleased to receive a Nebraska SARE (Sustainable Agriculture Research and Education) grant to attend this conference.

How fast can we build soil organic matter or store carbon in the soil? In one rotational study here they have been adding five tons per acre per year of compost as a fertility source to compare to organic, limited fertility and conventional fertilizer plots. In sixteen years these tilled plots increased from 1.3 percent to 2.0 percent organic matter. In another 20 year no-till plot rotating corn, soybeans and wheat with no compost additions they increased organic matter from 1 percent to 1.2 percent. These are sandy loam soils in a 40 inch rainfall area. Yields soybeans in the no-till plots were similar to conventional tillage. Corn yields were 20 percent higher in the no-till and wheat had even more response. Soil organic matter, soil structure, and water storage in the soil are likely factors. It shows that our Southeast Nebraska silty clay loam soils can continue to improve for many years in no-till systems.

There are two exciting new studies here that will yield valuable information for our future. One is an instantaneous measurement system of in field losses of nitrous oxide out of the soil to the air from crop fertilizer applications. This is important work for agriculture, because nitrous oxide is a powerful greenhouse gas. If we can understand the kind and timing of soil losses, we will be better able to tailor future fertilizer materials and application methods to help the crop and reduce nitrogen losses.

The other study is looking at the soil microbiological diversity in soils under very diverse cropping systems down to a simple corn soybean rotation. We are more and more faced with this situation in Southeast Nebraska as we see milo acres crash and wheat acres struggle. This study will give us a glimpse in a few years of the stability of the soil life beneath our feet for our crop production system stability. How much life are we talking about? Draw an outline around your foot on the soil, dig down six inches, then count all living things in the soil you collected. You will find more living things then the current, plus all the past humans who have ever lived on this earth. Yes, that's Billions!

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