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NRCS Takes a New Look at Soil Health
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For over 75 years the Natural Resources Conservation Service (NRCS) along with other agricultural agencies have been working toward improving soil quality by encouraging best management practices such as erosion control and nutrient management. However a shift in viewing soil as a “living” ecosystem with an inherent health is making a difference in the way we care for our nation’s soils. Soil is more than an inert growing medium, it is an ecosystem teeming with billions of insects, earthworms, bacteria, fungi, and other microbes that help sustain plants, animals, and humans. There are more individual organisms in a teaspoon of soil than there are people on earth! Achieving soil health to sustain future generations must include the health of the microorganisms along with its physical and chemical properties. Soil health management can be accomplished by: (1) disturbing the soil as little as possible, (2) growing as many different species of plants as practical, (3) keeping living plants in the soil throughout the year, and (4) maintaining a cover on the soil surface all of the time.

If you consider the natural plant ecosystems that occur across our nation, the two most sustaining ecosystems are forests and prairie regions. Here nutrients are recycled and rainfall infiltrates the soil profile. Tilling the soil, however, is the equivalent of an earthquake, hurricane, or tornado occurring to the world of soil organisms. Tillage results in bare soil surfaces that can reach temperatures of 130°F and higher, causing 100% of moisture to evaporate or soil bacteria to die. Soil pores collapse with tillage increasing the bulk density of the soil, reducing rainfall infiltration and potential storage for plant use. Organic matter in a soil tilled for 75 years measured 0.5-1%, compared to 2% organic matter from a no-till managed soil, and 3-4% in a prairie ecosystem. Compaction layers may also form from repeated tillage equipment compressing the soil. Plant roots or rainfall cannot penetrate these layers, thus decreasing the potential root growing area. The soil may also be disturbed chemically or biologically through the misuse of pesticides that disrupts the symbiotic relationship between plant roots, microorganisms and fungi.

Biodiversity is ultimately the key to success of any agricultural system and holds true for soil organisms too. Sugars made by plants are released through the roots in the soil and traded to soil microbes to support plant growth. Each species of plant supports specific soil microorganisms. Above ground diversity equals below ground diversity and improved sustainability. Soil organisms feed on sugar from living plant roots first. Next they feed on dead plant roots and residues. If living roots or organic residue is always present in the soil profile, there is always a source of food for the soil microbes.

The soil surface should be covered as much as possible with growing plants or residues. This cover protects the soil aggregates from ‘taking a beating’ during rainstorms, keeps the soil surface cooler to reduce evaporation, and suppresses weed germination. Cover crops can aid in shading of the soil to reduce weed germination, decrease erosion, and provide the plant diversity needed to promote soil microorganisms. A six to eight week growth of cover crops is adequate to provide these benefits. “What we’re saying is that if you get the soil healthy and cycling it will cycle the nutrients for you so you don’t have to buy so much fertilizer,” says Ray Archuleta, NRCS Conservation Agronomist, “And when you bring all the diversity and you’ve got the beneficial insects, you’ve got less fungicides, less insecticides, less herbicides because you’re using covers to suppress weeds. The best way to control weeds is biological covers. So you’re synergizing. You’re bringing all these things into synchrony to create synergy in the system.”

For more information about improving your soil health, contact the Newkirk NRCS/Kay County Conservation District office at (580) 362-3362 or 362-2438.

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