



NORTH PLATTE
Natural Resources District

Press Release

100547 Airport Rd, PO Box 280 Scottsbluff, NE 69363-0280
PH: 308-632-2749 FAX: 308-632-4346 www.npnrd.org

FOR IMMEDIATE RELEASE

For the week of May 11, 2008

No-Till Notes:

Soil Quality Indicators

By Kathy Buttle

NRCS Resources Conservationist

This week's column is written by Kathy Buttle, Resources Conservationist specializing in soils. Kathy is based out of the USDA-Natural Resources Conservation Service (NRCS) office in Scottsbluff.

Soil quality is the capacity of the soil to function, or in other words, do what you want it to do. This article will deal with the capacity of the soil to sustain or enhance agriculture productivity, maximize profit, and maintain the soil resource for future generations.

There are three indicators of soil quality; chemical, physical and biological. These often have an influence on one or both of the other indicators. At the Natural Resources Conservation Service, we have a soil quality test kit that can help assess the soil quality on your farm.

The chemical factor of soil quality includes organic matter, pH, electrical conductivity or salt content, and cation exchange capacity. The most important of these is organic matter. Tillage speeds the decomposition and loss of organic matter. Increases in organic matter means increases in nutrients in your soil and higher water holding capacity. No till systems increase fungi in the soil. The fungi will keep the pH levels lower. As soil quality levels increase, the cation exchange capacity also increases. CEC levels are listed on soil tests results. CEC is the amount of negative charges available on clay and humus to hold positively charged ions. In other words, the cation exchange capacity is the ability of the soil to hold nutrients for plant use. When the wind blows, and we see dirt in the air, we are seeing the clay particles that are holding onto the nutrients we need to grow our crops.

Water is our limiting factor in this area for growing crops. The soil structure or the physical indicator is essential to using what precipitation we do get to our best advantage. Soil structure or the crumbly particles we see in the top few inches of native rangeland or in long term no till fields let the rain we get infiltrate into the soil. The crumbly makeup is soil particles held together by glue

produced by the soil organisms. A mistaken concept is that we need to till the soil to let the rain soak in. When we till we destroy the structure which decreases the aggregate stability. Aggregate stability is the ability of the soil to resist degradation. A rain drop can break apart the soil particles, making them more susceptible to wind and water erosion. The clay and silt particles will seal the pores, blocking rain from entering the soil. Good soil structure will also help alleviate compaction. The Rainfall Simulator demonstration that has been shown at many of the no till events is a very good illustration of this.

The third indicator, biological, is perhaps the least understood and the most interesting. According to Kris Nichols, microbiologist with the Agriculture Research Service, there are more living organisms in a spoonful of soil than there are people on earth. As stated before, those organisms can affect the pH of the soil and bind soil particles together into stable aggregates. Soil organisms get water and nutrients into the crop roots, convert organic matter into plant available, and create pores for water to enter soil profile.

Soil quality indicators are important. They help us focus on conservation efforts that maintain and improve the condition of the soil, evaluate our management practices and guide land management decisions.

There are several no-till field days, tours, and events coming up this summer. The Upper Niobrara-White NRD will host their no-till field days on June 24 at Watson Brothers' farm and June 25 at the Roth farm. Field days are also being planned for Garden County and Cheyenne County. The No-till On the Plains bus tour will be held June 17-19. The UN-L Extension Canada Grazing Tour is scheduled for June 25-26 and the No Till On the Plains Whirlwind Tour will make a stop at Watson Brothers farm near Alliance September 3. For more information on these events contact Kathy Buttle at 635-2513 Ext. 3 or Mark Watson at (308) 760-5259 or view the No-till on the Plains website at <http://www.notill.org/>

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