

## Understanding Soil, Water, and Drought

### AGRI-VIEWS

by Chuck Otte, Geary County Extension Agent

Regardless of any rain that we received this week, it is dry in the northern Flint Hills. How dry? The past ten months have been drier than any similar time in the 1930s or 1950s. In fact it is ranking as one of the driest September through June periods on record (depending of course on any additional rains during the month!) We have been at less than half of normal rainfall for the past several months. When you have had this much dry weather for this long it doesn't turn around overnight.

There are two important considerations when it comes to soil and water. The first is water holding capacity and the second is water infiltration rates. Water holding capacity is how much water, plant available water to be specific, is in an inch or foot of soil. The more sand a soil has the less water it can hold while increasing clay content tends to increase water holding capacity. Many of our more common soil types are going to have one and three quarters to two inches of water per foot of soil available when we are at what's called field capacity. To put this in perspective, plants are going to use a quarter to a third of an inch of water a day during a fairly common summer day. Our rule of thumb is that lawns and gardens need an inch of rain (or irrigation) per week.

Infiltration rate is a measure of how fast soil can take in water. High clay soils will take in rainfall much more slowly than loamy or sandy soils. Sandy soils may be able to take in over five inches of rain per hour where the heavier clays can only take in water at one tenth of an inch per hour. I feel that most of our soils can take in water at the rate of one half inch per hour up to one inch per hour, at least at the start of a rainfall event. Right now, as it's been so dry, there are large cracks in the ground that go quite deep so early rainfall, even heavy rainfall, will not run off very quickly.

In our deeper soils, where we don't run into rock sublayers, we can have four feet of good soil. That soil has been dried out completely. Going off some of my earlier numbers, to fully re-saturate that soil profile it'll take seven to eight inches. The challenge comes in that the first inch of rain during a storm will go into the soil very quickly. But following that the soil's ability to absorb rainfall starts to diminish. Gravity has to pull the water down into the soil and that takes time. A four inch rain overnight will provide about an inch of infiltration and three inches of runoff as the soil surface seals over. In reality, it may take three to four times the water holding capacity needed to fully recharge the soil profile with water. You just can't rush things!

It will be quite some time before we are out of this soil moisture deficit. I'm not too worried about lawns. A new lawn can be established in a couple of months once better weather returns. Trees are another story. Tree roots do not go as deep as most people think. Trees are stressed right now because they don't have adequate moisture. Lawn sprinkler systems are only designed to apply enough water to soak up the surface three or four inches. To provide water for trees you need an open hose running at a slow trickle running for hours. You don't want to apply it too fast as the soil can't absorb it. Root feeders do not do an adequate job of watering trees as they tend to apply water too fast and below the critical root zone. Use an open hose running slow for hours or days. Start with spruce and pines, go to younger plants next and then to junipers last. It's been dry and we'll be dealing with this for a long time even after it starts to really rain again!