

Agronomy Agent's Corner #10

Todd Ballard

Saline and Sodic Soil Conditions

One limitation of our irrigation capacity is the potential to create saline, sodic or saline-sodic soil conditions. A saline soil has excessive water-soluble salts in the soil solution. This inhibits the plants ability to uptake water. A sodic soil has excessive cations bound to exchange sites. This condition degrades soil structure, eventually forming large hardened clods. If both conditions are present the soil is called saline-sodic. Our alkaline soils are susceptible to both conditions. Some wells have high calcium and/or sodium concentrations. Irrigating without regard to the risk of creating adverse soil conditions can leave land unproductive for many years. To overcome the risk of introducing excessive cations into the soil irrigation water should be filtered, limited to a sustainable level of introducing cations to the soil, or both.

Water testing

Testing your irrigation water will reveal the contents to let you know which impurities are of high enough concentration to be of concern. The impurities can be cations or pathogens. Cations will contribute to soil salinity. Some pathogens can infect your crop or the consumers of your crop.

Reverse osmosis

Reverse osmosis can reduce the cation content of your irrigation water. Investment in a reverse osmosis filter will show improvement in the efficacy of herbicides and fungicides quicker than mitigating soil salinity. A movement of spray tank water toward a neutral pH, will reduce the tank water's cation interference with the chemical activity. The procurement cost of a reverse osmosis filter large enough to consistently supply a sprayer with filtered water is about \$10,000. The setup for this type of filter would be on a truck carrying the day's chemical supply. To have a reverse osmosis filter large enough to clean water on a center pivot irrigation system would be more costly.

Hydraulic conductivity test

Soil physicists are familiar with the hydraulic conductivity of several soil series. If a soil core moves water slower than established expectations, it is likely sodic or saline-sodic. Crops will not be able to uptake adequate water under these conditions. Irrigation will need to stop on land with sodic soil until several years of rain can reduce the condition. During this time some rangeland use may be possible, but CRP is a more reliable option.