

Soil Salinity

Good soil is one of the most important aspects to any agriculture practice. Good soil not only creates healthy crops, but also increases agricultural land value. It's amazing how big of a role soil plays when it comes to food production across the World. A quote from Paul Harvey illustrates this perfectly "Despite all of our accomplishments, we owe our existence to a six-inch layer of top-soil and the fact that it rains." However, being in Utah, we do run into soil problems, one of which is soil salinity. A great resource on soil salinity, that was used to help write this article, is a USU factsheet by Vernon Parent and Rich Koenig titled *Solutions to Soil Problems – High Salinity*.

Salinity measures the amount of soluble salts in the soil. Because of Utah's arid climate we often have higher salt concentrations because we lack the precipitation to leach salts out of the plant root zone. As salts increase in the soil, it diminishes the ability of plants to extract water from the soil. This condition is referred to as chemical drought, as the affected plants will show the same symptoms as drought. Commonly we see plants begin to wilt and start turning brown, even though adequate water is available for these plants. Some other conditions that cause saline (high salt) soils include irrigation water with high salt levels (water softener), excessive amounts of fertilizer or manure, de-icing salts that run off of roads and sidewalks, poor soil drainage, and improper irrigation (short increments often).

In order to know if your soils have high salinity they need to be tested and analyzed by a lab. At the moment there are no take home test kits available to measure salinity. If you have questions about how to take soil samples, or where to send soil samples for analysis please contact me at the Juab County Extension office and I can help you. Salinity results are measured as decisiemens per meter (dS/m) which is a measurement of electrical conductivity. Values above 4 dS/m will cause problems for most gardeners and home owner's plants. Values below 2 dS/m are ideal, values above 2 dS/m will cause problems among salt-sensitive plants.

If you find that you have saline soils, the following method is a good way to reduce salinity and reclaim your soil. Salts can be leached from the soil as long as soils have adequate drainage and there is a clean source of irrigation water to do the leaching. Compaction can reduce drainage, so you may consider trying to aerate the soil with tillage or an aerator to loosen the soil and add some organic matter to increase drainage. In crop fields you may consider putting in a tile or subsurface drain, especially if you have high clay soils or a high water table.

After adequate drainage is secured, next you will begin to irrigate your soils to begin the leeching process. The rule of thumb states that applying 6 inches of water will reduce salinity by 50%, 12 inches will reduce salinity by 80% and 24 inches will reduce salinity by 90%. Your soil test will be the best resource to determine the amount of water you will need to reduce your soil salinity to proper levels. The total amount should not be applied all at once, rather it should be applied over a period of several days. You can use sprinklers for your irrigation method, but the system should be cycled off and on to avoid runoff. Flood irrigation also works if the area is level and there is a method to contain the water to avoid runoff.

If you have further questions about soil salinity, or plants that are more salt-resistant please contact the Juab County Extension Office. We would love to help out.

