

Making a difference

Will Field Tiling Work for All Soils?

The Situation

The ongoing wet cycle since the mid-1990's has raised water table levels causing excess soluble salts and sodium to accumulate near the soil surface. Whereas, soil water readily evaporates, salts and sodium remain in the soil and can only be leached down through the soil profile at low water table levels with rainfall or irrigation. One way to lower water table levels is to install a field tiling drainage system. Many regional growers approached the Langdon REC seeking information on the feasibility of field tiling.

As soils differ for their chemical properties, fields should be analyzed for "Electrical Conductivity" (for soluble salts) and "Sodium Adsorption Ratio" or "Exchangeable Sodium Percentage" (for sodium). Soils testing high for soluble salts and low for sodium indicate tiling can be effective as salts (mainly Ca^{++} based) promote soil particle aggregation. However, soils testing high for soluble salts and sodium will need sodicity remediation prior to tiling. As high sodium levels can lead to the sealing of soil layers (due to dispersion) above or around the tiles. Remediation of excess sodium requires application of amendments that directly or indirectly supply Calcium (Ca^{++}). Growers need to know this prior to tiling as once a tile drainage system is in place, it may lead to the leaching of soluble salts, making the sodium problem worse.

Extension Response

The Langdon Research Extension Center has a field well suited for the research and demonstration of remediating unhealthy soils. Soil testing on this site indicates areas of excess sodium and soluble salts. Areas with excess sodium will require remediation with soil amendments. In order to replicate field conditions, it was decided to tile the site first and then start the sodium remediation by applying soil amendments that are easily available to northeast North Dakota growers.

Several meetings were held with NDSU Ag. Engineers, tile drainage design engineer, tiling company, local extension agents and Langdon REC staff to begin plans to construct a field tiling research and demonstration project. Area growers quickly endorsed and supported this project and within a six month period over \$80,000 was donated for the project. Installation of the tiles began on July 17th, 2015. The area consists of seven acres dedicated to research, two acres dedicated to extension demonstrations on soil remediation and remaining for foundation seed production.

Impacts

In 2015 a five year study was initiated to begin applying soil amendments to remediate sodic soils that have already been tilled. The amendments gypsum, beet lime (VersaLime) and elemental sulfur were applied to the problem soils. A vegetative cover of salt-tolerant grass mix was planted over the plots with soil amendments. Extension plots were planted in sensitive and salt-tolerant cover crop mixes. Formal education began with an In-service Groundwater Management Extension Agent Workshop in 2015. In addition, the 2015 Cavalier County Soil Health Tour which was open to the public was held in the fall at the project site.

Feedback

"I wish we could have done this 10 years ago".

"I will not tile unless I check my soil for sodium".

"Now I know the difference between salinity and sodicity and what excessive sodium can do to the soils".

Contact

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