

# **Perennial Grass and Legume Species Demonstration across a Salinity Gradient**

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**T**he Carrington Research Extension Center, Foster and Stutsman County Soil Conservation Districts, North Dakota Natural Resource Conservation Service, and the USDA NRCS Plant Materials Center in Bismarck are conducting a demonstration in two locations near Carrington, ND, and one near Buchanan, ND, to evaluate selected perennial grass and legume species across a salinity gradient.

## **Species List**

Smooth Bromegrass - Rebound  
Tall Wheatgrass – Alkar  
Alfalfa – 12 varieties/lines  
Strawberry Clover - O'Connors  
Slender Wheatgrass – Revenue  
Western Wheatgrass - Rodan  
Forage Kochia - two sources  
Hybrid Wheatgrass – NewHy

Green Wheatgrass - AC Saltlander  
AC Saltlander Commercial Mix  
Canada Wild Rye - Mandan  
Beardless Wild Rye – Shoshone  
Creeping Foxtail – Garrison  
Switchgrass – Forestburg  
Prairie Cordgrass - Red River  
Prairie Cordgrass - CREC Germplasm

## **Methods**

Salinity is a soil property referring to the amount of soluble salt in the soil. It is generally a problem of arid and semiarid regions. Electrical conductivity (EC) is the most common measure of soil salinity and is indicative of the ability of an aqueous solution to carry an electric current.

By agricultural standards, soils with an EC greater than 4 dS/m are considered saline. In actuality, salt-sensitive plants may be affected by conductivities less than 4 dS/m and salt-tolerant species may not be impacted by concentrations of up to twice this maximum agricultural tolerance limit.

Sites were mapped for EC with a Verus machine and ground truthed with laboratory testing to determine the field gradient. This information was used to determine the proper placement and orientation of demonstration plots across the salinity gradient prior to seeding. Plots were seeded May 21, May 22, and June 10, 2010. Plots were 10 feet wide by 200 feet long.

## **2010 results**

- Plant germination and stand establishment counts were taken across the gradient for each species. Seedlings emerged in most of the test areas, however many succumbed to the harsh environment in the more saline areas.
- This season the wheatgrasses provided thicker, more consistent stands across the gradient from non-saline to saline soil than the other grasses tested. This may change over time.
- There do not appear to be any clear differences in establishment of the alfalfa varieties tested.

This demonstration will track salinity, stand, and forage production over several seasons to help determine the most appropriate species for various salinity levels and targeted end uses by personnel, landowners, and/or renters.