

Cover Crop Species and Mixtures Demonstration Across a Salinity Gradient

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The Carrington Research Extension Center and the Foster and Stutsman County Soil Conservation Districts conducted a demonstration in locations near Carrington and one near Buchanan evaluating selected potential cover crop species across a salinity gradient.

Species List:

Treatment	Species or Mixture	Treatment	Species or Mixture
1	Sweet clover	11	Sugarbeet
2	Sesbania	12	Yellow mangle
3	Amaranth	13	Detroit Dark Red (Table Beets)
4	Quinoa	14	Early Wonder (Table Beets)
5	Camelina	15	Siberian millet
6	Rape	16	Sunflower
7	Ethiopian cabbage	17	Barley
8	Spinach	18	Rye
9	Kale	19	Sorghum-sudangrass
10	Borage		

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 Veris 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 across the salinity gradient prior to seeding. Plots were established by planting 200 ft. strips across the gradient on June 10.

Results:

- ◆ Plant germination and stand establishment counts were taken across the gradient for each species. Seedlings did not emerge for all of the test area. Many either did not germinate or succumbed to the harsh environment in the more saline areas prior to emergence.
- ◆ This season the sugar beets, mangles (fodder beets), and table beets had some establishment up to ECs 7.1, 6.7, and 6.8, respectively. However, full stands were achieved at ECs near 3 to 4.
- ◆ Barley and sorghum-sudangrass with an EC up to 4.4 provided the thicker, more consistent stands across the gradient from non-saline to saline soil.
- ◆ The brassicas provided very consistent stands at ECs near 3 to 4.
- ◆ Sesbania appears to be the best legume candidate for saline plantings tested to date with plants surviving to an EC of 10.5. However, it is a warm legume and the seed cost is prohibitive to use on any large scale.