Control foxtail barley and downy brome on saline soils

CATEGORY weeds | July 31, 2019

Where the saline forage site contained root zone salinity approaching severe, the best forage control treatments were AC Saltlander green wheatgrass seeded on 15 or 30.5 cm row spacing. The next best option was alternating rows of AC Saltlander green wheatgrass with slender wheatgrass seeded 15 cm apart. On negligible to moderately saline soils, smooth bromegrass and Orbit tall wheatgrass seeded on 30.5 cm row spacing also adequately control foxtail barley.

Research was conducted at two sites to determine the effectiveness of different forages to suppress foxtail barley and downy brome invasions in two saline pastures with different ranges of soil salinity.

The Chilian site located near Alsask in west central Saskatchewan was rated as moderately-to-severely saline with a mean saturated soil paste extract Electrical Conductivity (EC) of 9.11 dS m\(^{-1}\) at the 0–61 cm depth in the first year and increasing to 13.84 dS m\(^{-1}\) over 5 years.

The second site at Hal Peterson’s farm at Warner in southern Alberta near the U.S. border was rated as negligibly-to-moderately saline with an EC of 5.89 dS m\(^{-1}\) for the 0–61 cm soil depth zone.
Foxtail barley dominated at both sites, with downy brome included as a co-dominant species at the Peterson site. The plots were treated with glyphosate, double-disced, rototilled, and harrow-packed. Both study sites were selected and designed to ensure an annual source of wind-blown foxtail barley seed could re-infest plots.

Ten forage treatments were seeded into the tilled plots on 30.5 cm row spacing (except where noted below) to compare their ability to control foxtail barley and downy brome on saline soils along with an unseeded comparison plot.

- Spredor 4 alfalfa
- Alternating 15.2 cm spaced rows of AC Saltlander green wheatgrass and common slender wheatgrass
- AC Saltlander green wheatgrass, 15.2 cm rows
- AC Saltlander green wheatgrass, 30.5 cm rows
- Nuttall’s salt-meadow grass
- Polar northern wheatgrass
- AC Rocket smooth bromegrass
- Saltmaster seed blend (20% each of tall fescue, tall wheatgrass, slender wheatgrass, smooth bromegrass, and alfalfa)
- Orbit tall wheatgrass
- Poole western wheatgrass.

**AC Saltlander green wheatgrass among the best options**

At the negligibly-to-moderately saline Peterson site after three growing seasons, smooth bromegrass, Orbit tall wheatgrass, AC Saltlander green wheatgrass/common wheatgrass, 15 cm row spaced AC Saltlander green wheatgrass, and 30 cm row spaced AC Saltlander green wheatgrass treatments provided statistically similar suppression of foxtail barley ranging from 95.6% to 99.5% based on shoot biomass production. The same forage treatments provided statistically similar control of downy brome ranging from 96.2% to 98.2%.

The remaining forage treatments each resulted in shoot biomass controls <95% and proved statistically less effective.
The Chiliak field site 3 years after seeding:
Left Plot: Unseed plot with foxtail barley
Right: Green/slender wheatgrass treatment in alternating 15 cm rows.

At the moderately-to-severely saline Chiliak site, six years were required to reach similar foxtail barley suppression as the Peterson site. Adequate foxtail barley control only occurred with the AC Saltlander green wheatgrass/common wheatgrass on alternating rows (82%), 30 cm AC Saltlander green wheatgrass (92%), and 15 cm AC Saltlander green wheatgrass (95%) treatments. The remaining treatments provided 57% or less control.

Using the data generated, the researchers calculated that 95% control of foxtail barley could only be achieved at Chiliak by seeding AC Saltlander green wheatgrass in 15- or 30-cm rows or in 15-cm alternating rows with slender wheatgrass.

The researchers concluded:

- The severity of the root zone salinity can significantly determine the efficacy and years required to suppress foxtail barley and downy brome;
- The salinity tolerance of the forage crop in moderately and severe saline soils determines its weed control effectiveness;
- Although AC Saltlander green wheatgrass and Orbit tall wheatgrasses feature similar salinity tolerances, Orbit controls less foxtail barley because it is a bunch grass;
If a saline forage site contains root zone salinity approaching severe, the best forage control treatments are 15- and 30-cm row spaced monocultures of AC Saltlander green wheatgrass followed by alternating rows of this grass with slender wheatgrass.

Financial support came from a consortium consisting of the Alberta Beef Producers, the Alberta Livestock and Meat Agency, the Chinook Applied Research Association, Miller Seeds, the Warner County Ag Service Board, Proven Seed, the Alberta Dryland Salinity Control Association, and the Semiarid Prairie Agricultural Research Centre. This study was conducted on the farms of the Chiliak family (Red Wing Farms) and H. Peterson, and the researchers gratefully acknowledge and thank these land owners. Semiarid Prairie Agricultural Research Centre has now changed to Swift Current Research and Development Centre (SCRDC).