Methods for Establishing Forages in Saline Soils

Objectives:

1. evaluate seeding perennial forages with a barley companion crop in saline soils for improved forage establishment, yield, nutritive value, and net returns
2. assess perennial forage mixtures for pollinator habitat in saline areas

Trial Design:

- The study was conducted from 2022-2023
- The study was established at three saline sites across Saskatchewan: Redvers (2.2-4.2 dS/m), Clavet (0.4-6.4 dS/m), and Scott (0.4-0.9 dS/m)
- Four forage mixtures (salt-tolerant mixture, pollinator mixture, hybrid wheatgrass, salt-tolerant alfalfa) were seeded with and without a barley companion crop

Results:

- All forage mixtures established successfully at saline sites (>80%), regardless of companion crop.
- At Clavet, forage mixtures with grass species resulted in greater establishment (>80%) than alfalfa (60%) (Figure 1).
- Barley companion crop increased yields by approximately 50% in the establishment year without hindering forage growth in the following year at Clavet and Redvers.
- Forage mixtures resulted in 53-96% higher yields than the annual grain crops (Figure 2)
- Forage nutritive value was sufficient for all forage mixtures and varied based on species composition.
- The pollinator mixture resulted in 42-82% greater inflorescence and 10-66% greater honey bee abundance compared to other forage mixtures.
- Companion crops improved net returns by approximately $150/ha, and forage mixtures improved net returns by $500 - $700/ha compared to the annual grain crops.

Conclusion:

Overall, this study would suggest that it is more profitable to grow perennial forages in saline areas compared to an annual grain crop rotation. Based on the results of this study, producers would benefit agronomically and economically from seeding their saline areas to perennial forages and can improve their net returns with a barley companion crop.

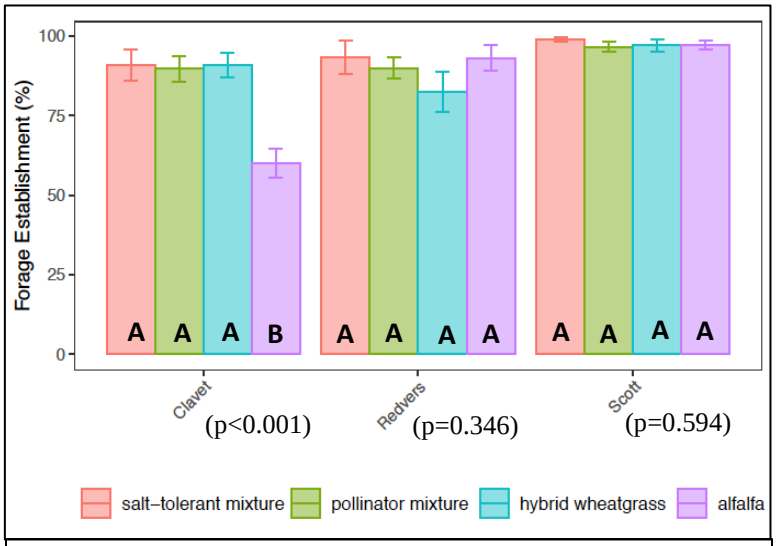

Figure 1. Mean forage establishment (%) of forage mixtures at three saline sites across two years (2022, 2023).

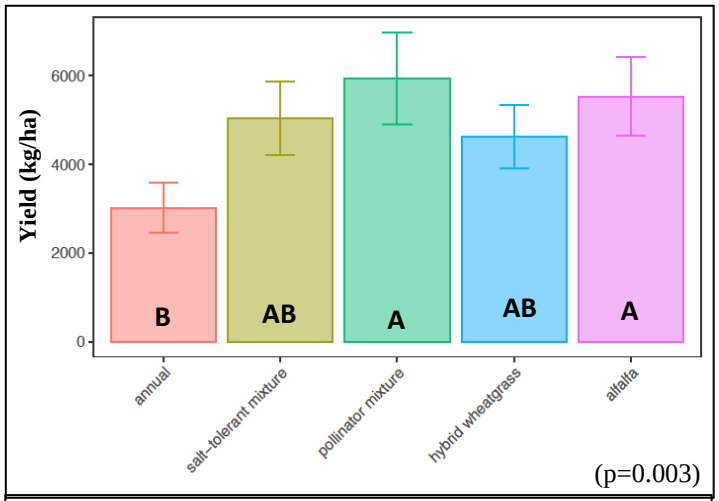

Figure 2. Mean yield (kg/ha) of forage mixtures and annual grain crop rotation at three saline sites across two years (2022, 2023).

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