



Effects of annual and perennial forage systems on plant and soil parameters, grazing animal performance and system economics.

## GRAZING STRATEGIES TO OPTIMIZE FORAGE AND BEEF PRODUCTION



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**LEAD RESEARCHERS:** Dr. Bart Lardner  
(University of Saskatchewan)

**COLLABORATORS:** Jeff Schoenau, Kathy Larson, Terry Fonstad, Bill Biligetu (University of Saskatchewan)

**Background:** Soil, water, plant, animal and economic components all play key roles in a successful grazing system and contribute positive environmental benefits if managed correctly. Many times, these components are examined on an individual basis, instead of as part of an entire ecosystem. While systems research is challenging, it can provide a more realistic interpretation of what is occurring on-farm.

While annual forages often provide higher yields than perennial forages, they also have higher establishment costs and are less effective at sequestering carbon. Very few multi-year Canadian studies exist that compare animal performance on annual and perennial forage mixtures that also include soil, water use, carbon, and greenhouse gas measurements. This project will examine differences between AC Success hybrid brome/PS3006 alfalfa, AC Armada meadow brome grass/AC Glenview sainfoin, Danergo Italian ryegrass/CDC Fatima faba bean, and Winifred turnip/kale/Gorilla forage brassica/Performance 4010 forage pea mixtures on the factors listed above.

**Objectives:** The objectives of this study are to:

1. Evaluate animal performance and kilograms of beef produced per hectare from grazing either perennial or annual forage mixtures that utilize newer forage varieties
2. Evaluate grazing forage production of new and non-traditional annual forages
3. Evaluate grazing dry matter intake and forage persistence under grazing
4. Determine soil water balance under perennial or annual pasture systems under western Canadian growing conditions
5. Determine methane emissions and carbon sequestered under grazing either annual or perennial forage mixtures
6. Determine carbon and nitrogen cycling, along with soil characteristics for each system
7. Determine system costs and net returns for each annual and perennial forage system

**Implications of the Research:** This research will provide producers utilizing perennial or annual forage systems the necessary detailed information on when to integrate an annual or perennial forage mixture to extend the grazing season with adequate yield, quality, and animal performance, while examining the impacts on methane emissions, carbon sequestration, soil nutrient composition, and water cycling, along with the economic impacts of each system.

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