RESEARCH FACTS

UNIVERSITY OF SASKATCHEWAN
Livestock and Forage Centre of Excellence
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IN PROGRESS

Evaluating preference grazing and persistence of new forage varieties, and the effect of animal temperament on grazing behavior

PROJECT TITLE

Preference grazing evaluation and persistence of new forage varieties, and the effect of animal temperament on grazing behavior

In progress:

Results expected in January 2022

RESEARCHERS

Dr. Bart Lardner (PhD), College of Agriculture and Bioresources, University of Saskatchewan
bart.lardner@usask.ca

USask AgBio: Dr. Bill Biligetu (PhD), Kathy A. Larson
USask Western College of Veterinary Medicine: Dr. Diego Moya (DVM, PhD)
Master of Science student: Cassidy Sim

Background:

A producer's decision to rejuvenate a stand or establish a new forage stand involves substantial up-front cost with anticipated use of seven to 10 years. A forage species' value in a pasture grazing system is determined by a number of factors, including yield, persistence, nutritive value and animal preference, all of which will influence intake and utilization and, hence, pasture and grazing animal performance. Current recommendations for these factors are based on results from older alfalfa and grass varieties from across Canada. However, today we have a new generation of legume and grass varieties that have been selected and sold without a rigorous study comparing their persistence under grazing conditions. Forage yield, persistence and animal preference must be determined under grazing in conjunction with small-plot studies because grazing introduces unique stressors to forages; frequent defoliation may result in different yield rankings compared to infrequent defoliation. The mob grazing technique can be used to evaluate grazing persistence and productivity. In this technique, paddocks containing several forage species are stocked heavily to ensure that all forage species are grazed uniformly within a few days. As a result, only plants with a high degree of inherent persistence will continue to survive.

Objectives:

The objective of this study is to evaluate the effects of several new legume and grass cultivars as monoculture or binary

mixtures on forage persistence, carbohydrate reserves, productivity, quality, grazing animal preference and behavior, and cost-benefit ratio of stand establishment.

What They Will Do:

A three-year study will be conducted at USask's Livestock and Forage Centre of Excellence, south of Clavet, Sask. A 40-acre (~16 ha) field located at Section 8 will be used in this proposed study.

Study 1: Determine grazing preference, behavior and forage persistence
Recently released forage varieties will be obtained from forage breeders and seed companies. Six legume cultivars - Cronus alfalfa, Foothold alfalfa, 3006 alfalfa, Veldt cicer milkvetch, AC Mountainview sainfoin, Exact birdsfoot trefoil and two grass cultivars (Armada meadow bromegrass, Killarney orchardgrass) - will be established as monoculture and grass-legume binary mixtures and seeded in spring 2018 into replicated (n = 3) 25 × 100 m (0.25 ha) strips for a total of 20 treatments per paddock (block) and 60 strips in total. After the site is seeded and plant establishment has been determined to be satisfactory, each paddock (block) perimeter will be fenced and water lines to the site will be installed. Beginning in the spring of 2019, detailed plant cover will be determined via leaf area index and botanical composition for each paddock strip. Pre-graze forage yield will be determined by quadrat sampling and rising plate meter techniques prior to each grazing event each year

Cattle preference data will be recorded using visual counts and drone footage over seven days or 50 per cent utilization of forages. Following preference data collection, grazing intensity will be increased to prevent selection and the cattle will graze until 90 per cent of above-ground biomass on strips has been removed each year. Plant persistence will be determined by comparing forage performance between grazes and years.

The effect of animal temperament on their grazing behaviour will also be monitored. Grazing animals will be labelled based on their individual temperament (bold versus shy) and their position within the paddock recorded throughout the study.

Study 2: Estimate response of grazing on forage carbohydrate reserves
Etiolated growth represents the potential contribution of stored organic reserves to respiration and shoot growth without photosynthesis. Etiolated regrowth of each treatment foragewill be determined in spring 2020 and 2021.

Study 3: Identify and select persistent legume varieties for forage breeding
Based on animal performance and preference data, new legume cultivars will be ranked. In the fall of 2021, individual vigorous plants with high biomass, plant height and size will be selected from the best ranked varieties. The alfalfa plants will be further evaluated for bacterial wilt resistance in the greenhouse. The resistant plants will be transplanted to a breeding nursery and evaluated for rapid growth, persistence, disease and plant size under frequent cut system as compared to check cultivars.

Study 4: Economic cost-benefit analysis
Stand establishment costs and cost-benefit ratios will be calculated. The forage mixtures with the best cost-benefit ratios will also be ranked.

Implications:

New forage legumes and grass-legume mixtures with high persistence, nutrient profiles and preference will be identified in this trial for the information of Saskatchewan livestock producers.

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