

2018 USAFRI Research Project Objectives

Impacts of Winter Grazing on Alfalfa Production Montana State University - Meccage

Project Award: \$17,221

Justification:

- Grazing alfalfa in the fall and winter is a common practice for many producers in Montana, and is a common recommendation (Cash and Ditterline, 2005). Particularly in dry years when forage is scarce, many are forced to turn their animals onto alfalfa for lack of other available forage. Additionally, dormant and preserved alfalfa are high-quality forage sources, providing large amounts of protein and energy to cattle that are often in mid- to late-gestation during the winter months (Cochran et al., 1986; DelCurto et al., 1990; Vanzant and Cochran, 1994). However, little research has been done to evaluate impacts of grazing on production of alfalfa in the following growing season.

In a preliminary project conducted by Meccage et al (unpublished) in the winter of 2017 and 2018, they found a positive effect of grazing on subsequent year alfalfa production. The original objectives of this project were to evaluate impacts of spring harrowing on alfalfa production, but when a subset of data were evaluated comparing grazed to non-grazed areas, a significant impact ($P = 0.02$) of grazing was found on production. A single field had been split in half the previous fall with temporary fence, and areas of the field that were grazed had an average production of 4947 kg/ ha, while un-grazed areas had an average production of only 3029 kg/ ha. Additionally, plant heights prior to first harvest were also higher in the grazed portion ($P < 0.01$), averaging 70.6 cm compared to only 58.42 cm in the un-grazed areas. There were no other reported differences in management between the two areas.

We evaluated root health score differences (scale 0-4; Undersander et al., 2011) between the two areas and while production and height was improved, root scores tended to be poorer ($P < 0.02$) under the grazed treatment. Grazed areas averaged a root score of 3.8 (out of 4), while un-grazed areas averaged a score of 2.7. This shows that while nutrient cycling from animal grazing may help to improve production by adding additional available nutrients, the hoof traffic and compaction produced by grazing may harm plant persistence, leading to early declines in stand health. However, these results were only taken from one field which was a mature stand (> 10 years old), and so further investigation is warranted to evaluate impacts on younger, more productive, stands as well.

To the author's knowledge, there is currently no other research evaluating impacts of winter grazing and feeding on alfalfa yield, health, and longevity. Other projects like Larson, et al (2009) evaluated supplementation impacts on animal performance when fed on alfalfa fields, however no data was presented evaluating impacts on alfalfa persistence and production.

This project meets several of the outlined industry needs, including agronomic management, yield improvements, as well as fertility and soil management. We will be evaluating how current livestock and alfalfa management practices can impact overall production. It is our hope that this will become a multi-year project to better evaluate how these practices can impact alfalfa persistence. By evaluating the impacts of grazing and manure deposition via soil monitoring, we will get a better picture for how this nutrient cycling during the "dormant season" can impact the following year's growth. By monitoring the impacts on yield and soil nutrients, we will be better able to provide management recommendations to producers for future grazing.

Information obtained from this project will help in developing recommendations for producers that will help improve alfalfa production and persistence. Having data to estimate potential impacts of winter grazing is important for many when evaluating what sort of management system to employ.

This information will also be used to expand the potential research projects, which in the future could look at not only impacts of winter grazing overall, but also impacts of stocking rates as well as timing and duration of grazing. The authors hypothesize that winter grazing will improve production of alfalfa in the short term due to increased nutrient cycling, but will decrease plant health and persistence in the long term due to increased trampling and hoof traffic impacts on alfalfa crowns.

Objectives:

- The objectives of this project are to 1) Evaluate the impacts of winter grazing and hay feeding on alfalfa production, and persistence as estimated by crown and root health, stem density, plant height, and yield; and 2) Disseminate project findings to producers and alfalfa growers in Montana and the surrounding region.