

Title: Impacts of winter grazing on alfalfa production
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Abstract:

Grazing alfalfa in the off-season is a common practice for many Montana producers. Dormant alfalfa is a high-quality forage source, providing large amounts of protein and energy to cattle that are often in mid- to late-gestation during the winter months. However, little research is available that documents the impact of winter grazing on alfalfa production during the following growing season. The objectives of this project were to evaluate the impact of winter cattle grazing on subsequent harvest alfalfa production. Two fields, one located in southwest MT (Dillon) and one in eastern MT (Ft. Keogh) were evaluated in this study. Each field included four grazing enclosures and four paired grazed plots per field. Plant height, stem density, root score, and production were evaluated at green-up and immediately prior to first harvest the following year. All data was analyzed using the Proc GLM procedure in SAS 9.4. Statistical significance was set at $P \leq 0.05$, with a trend being recognized at $P \leq 0.10$. There were no significant differences observed at either location for density, root score, production, or pre-harvest height at the Dillon location, but there was a trend ($P = 0.099$) for a difference in height at the Ft. Keogh location, with the ungrazed plots averaging 68 cm and the grazed plots averaging 50.5 cm. Based on these results, it does not appear that grazing has a negative impact on alfalfa production in the following year. However, more long-term research is warranted to determine the overall impacts of this type of grazing system.

Introduction:

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. 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In a preliminary project conducted by Meccage et al (*unpublished*) in the winter of 2017 and 2018, they found a positive effect of grazing on subsequent year alfalfa production. To the author's knowledge, there is currently no other research evaluating impacts of winter grazing and feeding on alfalfa production. 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.

Materials and Methods:

In November, 2018, three fields were identified in two counties in Montana: Beaverhead County (SW MT), and Custer County (E MT). All fields included in this year of study were at least 2 years old, and >90% alfalfa. Both sites in Miles City are dryland sites, while the field in Dillon is irrigated. One site in Miles City had to be eliminated as the producer terminated his stand in early 2019 without alerting project researchers.

Four randomly-placed enclosures in each field which included a paired grazed plot. At Ft. Keogh there were 142 cattle, averaging 269 kg that were grazed for 118 days. At the Dillon location there were 81 cattle averaging 500 kg that were ran on the study field and adjacent pivot from November 17, 2018 through January 3, 2019.

In April 2019, soil penetrometer readings, plant height, stem and plant density, and root scores were collected within the exclosures, as well as paired grazed locations outside of the exclosures. Grazed samples were at least 6 meters away from the perimeter of the exclosure to avoid any confounding effects of cattle congregating near the fenced areas. Soil compaction readings were taken using a Dickey-Johnson soil compaction meter. Root scores were evaluated by harvesting several plants, cutting the roots in half, and assigning a score of 0-5 (0- healthy root; 5- dead root) based on coloration and texture.

Immediately prior to the first harvest in June 2019, plant biomass and height samples were collected. These samples were immediately weighed and weight recorded, then dried at 60⁰ to estimate dry matter production.

Project Objectives and Corresponding Results:

Project Objectives:

1. To evaluate the impacts of winter grazing and feeding on alfalfa production and persistence
2. Disseminate project findings to producers and alfalfa growers in MT and surrounding region.

Project Results:

1. There were no negative impacts of winter grazing observed on subsequent year alfalfa production
2. Results will be included in Extension field days in 2020

Results and Discussion:

	Ft. Keogh			Dillon		
	Grazed	Un-grazed	P value	Grazed	Un-grazed	P value
April						
Stems/ m ²	416	448	0.82	373	392	0.75
Plants/ m ²	24.8	25.9	0.86	24.8	37.8	0.12
Height (cm)	10.9	12.2	0.63	8.4	9.9	0.24
Penetrometer	15.3	15.0	0.94	19.5	16.1	0.24
Root Score*	1.75	2.0	0.75	1.75	2.0	0.62
June						
Production (kg/ ha)	7337	5448	0.44	7006	6602	0.39

*Based on a 0-4 scale with 0 being a healthy root and 5 being a dead root

There were no significant differences observed in any of the observed variables at either location, except for a trend for significance in height at the Ft. Keogh location, with the un-grazed plots being taller than the grazed plots at the June sampling.

This data supports the common practice of winter grazing, with no significant impacts of grazing on subsequent year production, height, plant root score, or soil compaction. This allows producers more flexibility when deciding how to manage their animals over the winter, particularly in years where forage may be in short supply.

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Keywords: alfalfa, winter grazing, bale grazing, alfalfa production

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