2002 Annual Report

Beef Section

Dickinson Research Extension Center
1089 State Avenue
Dickinson, ND 58601

Dietary supplementation on stockpiled native range [1]

W. Poland, J. Nelson, L. Tisor and G. Ottmar

Dickinson Research Extension Center
North Dakota State University

[1] *This material is based upon work supported by the Cooperative State Research, Education, and Extension Service and U.S. Department of Agriculture, under Cooperative Agreement number 99-COOP-1-7686 (Special Grants - Alternative Crops). Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S.. Department of Agriculture.*

Preliminary data suggests that dry beef cows can be maintained with dietary supplementation on stockpiled native range in the Northern Great Plains during late fall and early winter. Economics of these wintering systems will be largely dependent upon appropriate stocking rates and level and composition of required daily supplementation.

Introduction

Cost associated with winter feeding the cow herd is a major expense (approximately 38% of the total production costs) associated with cow/calf operations in North Dakota. Procurement and feeding of harvested forages account for a large portion of this total expense. Reducing the use of harvested forages while maintaining cow performance could substantially lower overall operating costs of beef production and increase profitability of cow/calf enterprises. Lengthening the grazing period and/or reducing a reliance on harvested forage has been suggested as one method for reducing winter feeding costs.

Western North Dakota has a variety of forages that could be utilized by grazing cows in late fall and early winter when daily nutrient demands are relatively low. Two of the more noticeable of these are stockpiled perennial forage (ungrazed forage that is allowed to accumulate for support of grazing at a later date; Forage and Grazing Terminology Committee, 1992) and annually-seeded forages.

However, a deficit of one or more dietary nutrients may limit the effective utilization of these forages by dry, pregnant cows. Providing small quantities of an appropriately formulated dietary supplement to animals consuming lower quality forages has been shown to be an effective mechanism for improving animal performance by enhancing forage utilization (digestibility and/or intake).

As grain producers contemplate the benefits of crop rotations, cow/calf operators can provide a viable, local market for alternative crops and co-products. This interaction, in many cases, would establish a floor price on a potential feedstuff that otherwise may have little marketable value. Besides being able to use fibrous residues, cows also offer the potential for using alternative grains and grain co-products as base ingredients in supplement formulations. Historically, a marriage between crop and beef producers has been mutually beneficial.

Data from other Great Plains states suggest that extending the grazing season, with appropriate supplementation regimes, is an effective mechanism for reducing the winter feeding costs and increasing profit potential of beef cow operations. Appropriately formulated supplements, utilizing locally available feedstuffs, seem key to the success of these endeavors. Data from the Northern Great Plains regarding the composition and availability of forage and grazing animal performance during the late fall and early winter period is limited. Data specific to North Dakota is severely limited. The generation and distribution of this type of information are essential if the cow/calf producers of North Dakota are to continue to operate in the increasingly competitive environment present in the beef industry today.

Objectives

i. Determine whether late fall/early winter grazing and supplementation is a feasible mechanism for reducing winter feeding costs and increasing the net value of the cow/calf enterprise.

ii. Determine whether either energy or protein is the first-limiting nutrient for beef cows grazing stockpiled perennial forage in late fall and early winter grazing.

Procedures

In each of two year (2000 and 2001), summer-calving cows will graze stockpiled winter range in western North Dakota. Grazing will begin in late October and continue until late January. Cows will be randomly allotted into one of 4 supplemental treatment groups. Each group will consist of 6 dry, pregnant cows. Treatments will include an unsupplemented control and 3 supplemented groups. Supplemental treatments will be formulated to supply additional energy and gradient levels of rumen-degradable protein. Supplemental formulations will be based upon combinations of barley, field pea and sunflower meal. Supplements will be available daily to individual animals, with supplemental intake limited to 2.5 - 3.0 lb/d by using a computer-controlled automatic feeder wagon (Cyber feeder, Sheyenne Advanced Feeding Systems, Cooperstown, ND; Nelson and Ringwall, 1996).

At the end of grazing, all animals within a treatment group will be moved to drylot at the DREC ranch headquarters. Cows will remain in

this facility until grazing commences the following spring. Ration formulation and feed delivery to each treatment group while in drylot will be based upon a targeted body condition using standardized nutrient requirements (NRC, 1996).

On each system, the cows will be weighed and condition scored on 14-day intervals throughout the course of the winter. Other animal data to be recorded will include days to first postpartum heat, response to synchronization and artificial insemination, and subsequent breeding performance. Herbage available for grazing will be sampled at 28-d intervals to detect changes in dry matter yield and composition (botanical and chemical). In addition, annual exclosures will be established in each pasture to allow sampling of ungrazed herbage. Chemical composition of herbage (available for grazing and ungrazed) will be determined by an independent laboratory.

All feed deliveries and refusals for respective treatment groups within year and experiment will be recorded. Feed recording will begin at weaning in each year and end as cattle move to spring calving pastures. After moving to pasture, all cows will be managed similarly until weaning the next fall.

Animal and herbage data will be analyzed utilizing a split-plot in time arrangement in sample collection. Within experiment, whole plots will be arranged using a completely random design, blocked across years. Treatment will represent a fixed effect within the whole plot. Animal within year and treatment combinations will serve as the experimental unit in the analysis of the whole plot. Sampling date will be treated as a fixed effect and be used as the split-plot factor.

In 2000, cattle that were to graze native range were weighed and body condition score in mid October and allotted to treatments on November 2. Serious complications were encountered with the automated feeding wagon that was to be used in delivering supplements in this study. Specific experiment was terminated this year due to a lack in ability to consistently delivery of supplemental treatments on November 29. Cows were maintained on winter pastures and group fed an equal mixture of three supplements at a rate of 3 pounds of total supplement per head per day three times weekly (7 pounds of total supplement per head per feeding). Rate was increased to 4 pounds per head per day on January 3, 2001, to counteract abnormally cold weather experienced in the preceding November and December. Despite weather conditions (below normal temperatures and excessive snow cover), body condition scores did not reach the level necessary to require early removal of cattle from pastures. Cattle will remain on pastures until January 31, 2001. An individual feeding facility will need to be constructed in the summer of 2001 to accommodate the continuation of this study. Experiment will need to be replicated in winters of 2001-2002 and 2002- 2003 to achieve desired replication.

Results

Given the difficulties in implementing this experiment and the especially severe early winter conditions in November and December, results should be received as preliminary. Effects of grazing date on body weight and condition score of mature beef cows receiving protein supplementation grazing stockpiled native range are shown in figure 1. Both body weight and condition score declined through early to mid January. With increased supplementation levels after the first of the year, both criteria began to improve by the end of January and steadily improve through 56 days of drylot feeding. Forage dry matter available for grazing (lb/ac) is depicted in figure 2. Grass and forb dry matter declined dramatically between the initiation of grazing in late October and early December. Most of this decline appeared to relate to

extensive snow and ice cover reducing the amount of forage available for grazing. Subsequent declines in forage dry matter were minimal through the end of January. The nutritional composition of available forage is shown in table 1. The nutritional composition of available forage was relative stable across the grazing season.

Discussion

Preliminary data suggests that dry beef cows can be maintained with dietary supplementation on stockpiled native range in the Northern Great Plains during late fall and early winter. Economics of these wintering systems will be largely dependent upon appropriate stocking rates and level and composition of required daily supplementation.

Literature cited

None

Figure 1. Effect of date on body weight and body condition score of mature beef cows grazing stockpiled native range and receiving protein supplement.

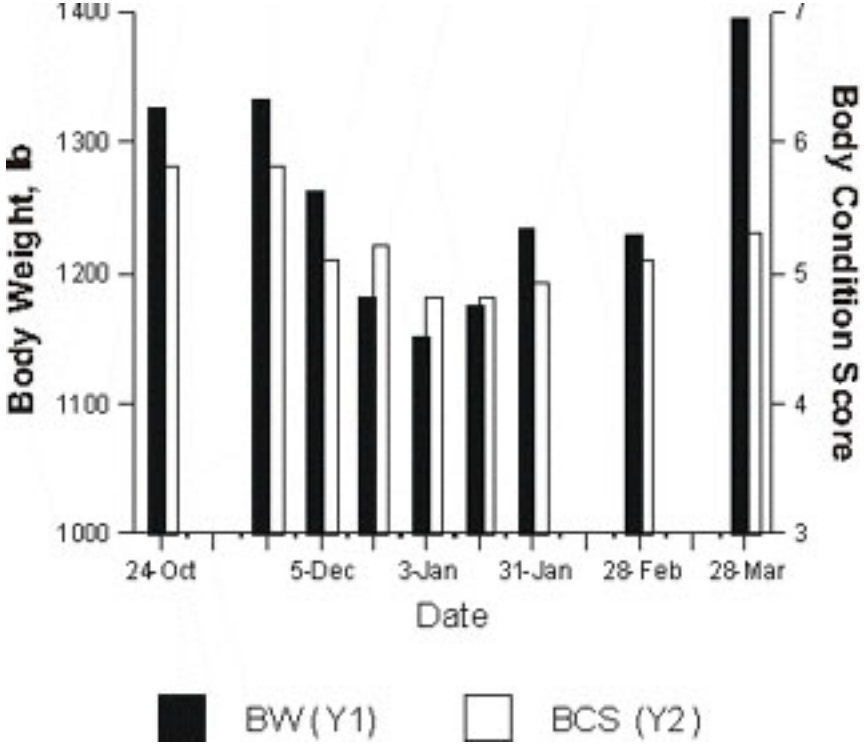

Figure 2. Effect of date on grass and forb dry matter (lb/ac) from stockpiled native range grazed by mature beef cows receiving protein supplement.

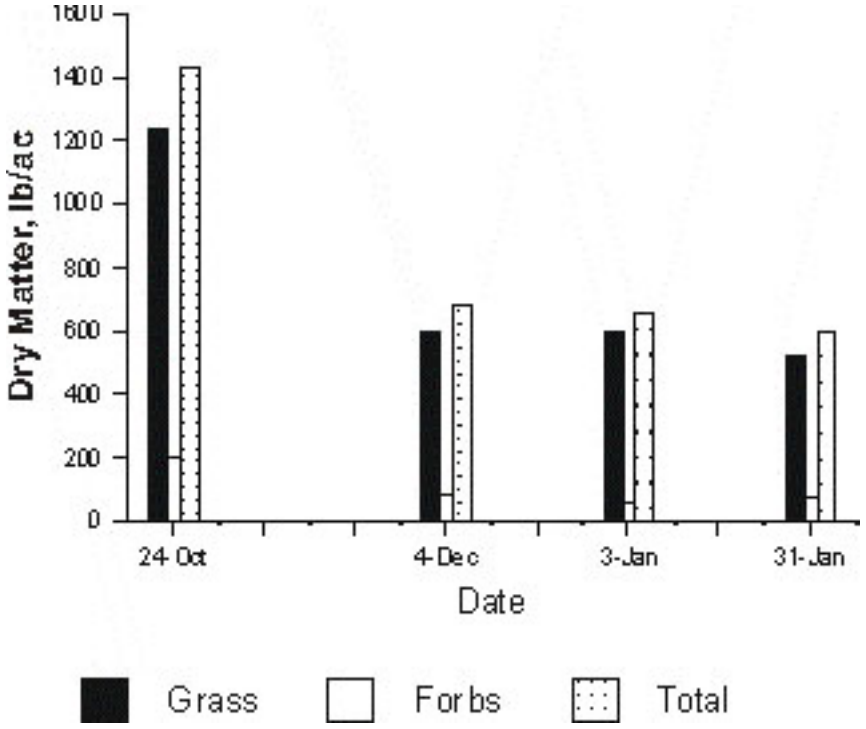

Table 1. Effect of date on nutritional composition (% DM) of available forage from stockpiled native range grazed by mature beef cows receiving protein supplementation.

	Date			
	24-October	4-December	3-January	31-January
Crude Protein (CP)	5.40	4.10	4.50	4.55
Acid detergent fiber (ADF)	50.1	50.7	50.3	51.3
Neutral detergent fiber (NDF)	68.6	71.2	71.2	71.3
Total digestible nutrients (TDN)	36.7	36.0	36.5	35.1
Calcium (Ca)	.64	.54	.57	.64
Phosphorus (P)	.05	.05	.05	.05
Magnesium (Mg)	.09	.08	.08	.07

[Back to 2002 Annual Report Index] [Back to Beef Reports]

[DREC Home] [Contact DREC] [Top of Page]