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January 1996

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Lamb, James; Adams, Don C.; Klopfenstein, Terry J.; and Lardy, Greg, "Range or Meadow Regrowth Grazing and Weaning Effects on Two Year-Old Cows" (1996). *Nebraska Beef Cattle Reports*. 473.

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Range or Meadow Regrowth Grazing and Weaning Effects on Two Year-Old Cows

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meadow regrowth during September and October increased body condition score over cows grazing range or nursing a calf.

improve body condition score of spring calving primiparous beef cows during September and October, and to determine nutrient intakes by dry and lactating cows grazing native range or subirrigated meadow regrowth.

Summary

Eighty two-year-old spring calving primiparous cows and their calves were assigned to two weaning and two grazing treatments (20 cows/treatment) from September 7 to November 7 in 1991, 1992, and 1993. Grazing treatments were: 1) native Sandhills range, and 2) subirrigated meadow regrowth. Weaning treatments were: 1) weaning on September 7, or 2) weaning on November 7. Calves weaned on September 7 grazed subirrigated meadow regrowth after weaning. Diet samples collected from meadow were lower in fiber and higher in crude protein and in vitro organic matter digestibility than diets collected from native range. Forage intake was similar for cows grazing either meadow or range regardless of weaning treatments. Cows grazing meadow with or without calves or cows with calves weaned in September gained body weight and body condition. Cows grazing range with or without calves or cows with calves weaned in November lost body weight and body condition. Calves nursing cows on meadow gained 62.9 lb more than calves nursing cows on range and 54.1 lb more than weaned calves grazing subirrigated meadow. We concluded that weaning in September and/or grazing subirrigated

Introduction

Body condition of cows at calving affects pregnancy rate and breeding date. Body condition at calving of spring calving cows wintered on range is influenced by fall body condition. A Montana study showed that lactating cows grazing range lost body condition during August and September. The loss of body condition was attributed to an inadequate consumption of crude protein. Diet samples of cattle grazing Sandhills range during August to October contain 6% to 8% crude protein. Loss of body condition of spring calving, primiparous cows grazing Nebraska Sandhills range during the fall is a concern. Subirrigated meadow regrowth is a higher quality forage than upland range in the fall. Diet samples collected from cattle grazing regrowth from subirrigated meadow during October contained approximately 11% crude protein.

Two potential ways of maintaining or increasing cow body condition during the fall is to wean the calf, thus reducing the cow's nutrient requirements, or increase the potential to meet crude protein requirements with higher quality forage. Our objectives were to determine if September weaning or grazing subirrigated meadows would

Procedure

The study was conducted at the University of Nebraska-Lincoln Gudmundsen Sandhills Laboratory near Whitman, Nebraska. Eighty, two-year-old crossbred primiparous beef cows and their calves were assigned to two weaning and two grazing treatments from September 7 to November 7 in 1991, 1992, and 1993. Cows were 1/4 Hereford, 1/4 Angus, 1/4 Simmental and 1/4 Gelbvieh. Grazing treatments were: 1) native Sandhills range, and 2) subirrigated meadow regrowth after July haying. Weaning treatments were: 1) weaning on September 7, and 2) weaning on November 7. Calves weaned September 7 grazed subirrigated meadow regrowth after weaning in 1992 and 1993.

The range site was mostly sands. The dominant grass species were: little bluestem, prairie sandreed, sand bluestem, switchgrass, sandlovesgrass and blue grama. Common forbs and shrubs include western ragweed and leadplant.

The subirrigated meadow soils are classified as Gannett-Loup fine sandy loam (course-loamy mixed mesic Typic Haplaquoll). Dominant vegetation in

(Continued on next page)

subirrigated meadows was: smooth bromegrass, redtop, timothy, slender wheatgrass, quackgrass, Kentucky bluegrass, prairie cordgrass and several species of sedges and rushes. Less abundant grass species were big bluestem, indiagrass, and switchgrass; forbs were a minor vegetation component.

Individual cows and calves were weighed and cows scored for body condition after 16 hours without feed or water on September 7 and November 7. Body condition scores (scored from 1, thinnest to 9, fattest) were based on a palpated determination of fleshing over the ribs and thoracic vertebrae.

Voluntary forage intake and digestibility was determined for 40 cows (10 cows/treatment) October 7 through 12, 1991 and October 14 through 19, 1992. To estimate fecal output, each cow on the intake trial was orally dosed with an intraruminal continuous chromium releasing device five days before the 5-day fecal collection period.

Twelve esophageally-fistulated cows (six cows/treatment, average body weight = 1100 lb) were used to obtain diet samples from range and meadow during 1991 and 1992. Diets were collected October 9, 1991 and October 15, 1992. Cows were fitted with canvas, screen bottom-bags, and forage samples were collected from the esophagus during a 30 to 45 minute grazing period.

Eight steers in 1991 and seven steers in 1992 (average body weight = 880 lb) were assigned to each of the range and meadow treatments. Steers were fitted with fecal collection bags for total collection and dosed with the same intraruminal continuous chromium releasing device as the cows to obtain a correction factor for fecal output.

Organic matter, *in vitro* organic matter digestibility (IVOMD), crude protein (CP), neutral-detergent-fiber (NDF) and acid-detergent-fiber (ADF) were determined on all extrusa samples. Fecal samples were analyzed for chromium concentration by atomic absorption spectrophotometry. Fecal output was determined for intake cattle by dividing daily chromium released by the intraruminal chromium releasing device by the concentration of chromium in the feces. Fecal output was then corrected using the correction factor obtained from bag steers.

Forage organic matter intake was calculated by dividing fecal organic matter output by the *in vitro* organic matter indigestibility of esophageal extrusa.

Results

Crude protein and *in vitro* organic matter digestibility were higher, and ADF and NDF were lower in diets

collected from subirrigated meadow than from range (Table 1).

Forage organic matter intake was greater ($P < .10$) in 1992 (23.1 lb/day, 2.3% of body weight) than in 1991 (16.9 lb/day, 1.8% of body weight). Forage organic matter intake was similar for range and subirrigated meadow and for cows nursing calves and dry cows.

Differences in cow body weights and body condition scores occurred between range and meadow and between September and November weaning dates. Cows grazing subirrigated meadow regrowth gained more body weight and were heavier ($P < .01$) at the end of the trial than

Table 1. Crude Protein, *in vitro* digestibility (IVOMD), neutral-detergent-fiber (NDF), and acid-detergent-fiber (ADF) content of diets collected from esophageally-fistulated cows grazing native range or subirrigated meadow.

Item	Forage type	
	Range	Meadow
Crude protein, % of OM ^a	7.6*	12.3*
ADF, % of OM	47.8*	42.9*
NDF, % of OM	79.6*	64.9*
IVOMD, %	55.1*	61.1*

^a OM = Organic matter.

* Range and meadow least squares means differed $P < .01$, year x forage type interaction was non-significant $P > .10$.

Table 2. Body weight, body weight gain, body condition score, and body condition score gain of dry and nursing cows grazing range or subirrigated meadow regrowth during September and October.

Item	Treatments				Contrasts			
	Range		Meadow		Forage type	Weaning	Range	Meadow
	Dry ¹	Nursing	Dry	Nursing	Range vs. meadow	Dry vs. nursing	Dry vs. nursing	Dry vs. nursing
----- Cow body weight -----								
End of trial, lb.	1012.0	956.8	1046.3	1019.3	NS ²	*	*	*
Gain during trial, kg.	92.2	-28.4	206.4	135.7	NS	*	*	*
----- Cow body condition -----								
End of trial	5.3	4.9	5.9	5.2	NS	*	*	*
Gain during trial	0.0	-0.4	0.6	0.0	NS	*	*	*

*Contrast significant $P < .01$.

¹Dry, calves weaned September 7; nursing calves weaned November 7.

²NS, contrasts were not significant ($P > .10$)

Table 3. Body weight and body weight gains of nursing calves grazing range or subirrigated meadow and weaned calves grazing subirrigated meadow during September and October.

Item	Nursing ^a		Weaned
	Range	Meadow	Meadow
End body wt., lb.	511.3 ^b	582.8 ^c	507.3 ^b
Gain during trial, lb.	65.3 ^b	142.3 ^c	73.9 ^b

^a The treatment x year interaction was not significant $P > .10$.

^{b,c} Means in same row with different letters differ $P < .01$.

cows grazing on range (Table 2). Cows which had calves weaned in September gained more body weight and were heavier ($P < .01$) at the end of the trial than cows that had calves weaned in November.

Cows grazing subirrigated meadow that had calves weaned in September gained .6 body condition score, while nursing cows grazing meadow maintained body condition (i.e., no gain or loss) throughout the trial. Cows grazing range that had calves weaned in September, maintained body condition, while nursing cows grazing range lost .4 body condition across the trial. Loss of body weight and body condition of nursing cows on range have been reported during the late fall in other studies.

Calf body weight on November 7 and body weight gains over the trial were greater for calves nursing cows on subirrigated meadow than calves nursing cows on range or weaned calves grazing on subirrigated meadow (Table 3). When quality of diets is compared for range and meadow regrowth it is not surprising that calves on meadow had greater gains, however the magnitude of the difference between weaned and nursing calves grazing meadow is surprising. Ending body weight of calves weaned in September and grazing meadow regrowth was similar to nursing calves grazing range. The increased gain of calves nursing cows and grazing meadow regrowth over calves nursing cows and grazing range is partially explained by the potential difference in chemical composition of diets between range and meadow, especially crude protein. The protein content of the forages would have affected the quality of the calf diets and possibly the amount of milk

produced by the cow and consumed by the calf. The improved body weight gain of nursing calves on meadow over weaned calves on meadow is best explained by more rumen escape protein provided by the milk at the intestines. Work conducted at the Gudmundsen Sandhills Laboratory found that nursing calves grazing native range would be limiting in escape protein before energy or rumen degradable protein. Moreover, it is unlikely that rumen degradable protein would be limiting with a diet of 15% crude protein.

Management Implications

Weaning and(or) forage effects on a production system would be affected by amount of milk produced, body condition score of the cow in late summer and feed resources. Cows with higher levels of milk production have greater nutrient requirements and are more likely to lose body weight and body condition when grazing low quality forages during the fall. If cows are thin in late summer, weaning or grazing subirrigated meadow would likely be beneficial. On ranches where low quality range forage or low quality hay is utilized during winter months, benefits of September weaning and(or) grazing meadow during September and October could be important. Thin cows grazing range during late fall and winter will likely be thin at spring calving. Increases in cow body condition score during winter months should not be expected with or without supplements. Harsh winter weather would also affect the importance of a higher body condition score going into the winter. During harsh weather, cows consume less range forage and digestibility is

reduced. Maintenance requirements of the cow are also increased during cold stress, making it difficult for cows to consume enough forage to meet nutrient requirements. Thinner cows also have a greater energy requirement than fatter cows, which could make it more difficult for thinner cows to consume enough forage to meet their energy demands.

Body condition score is more closely related to reproduction than body weight in beef cattle. Cows in low body condition score (i.e. < 4) at calving may breed later or fewer will breed during a controlled breeding season than cows in higher body condition (i.e., > 5), especially if cows are losing body condition between calving and the beginning of the breeding season. If cow body condition cannot be increased with feed resources on the ranch, cows thin in the fall will likely be thin at calving potentially reducing reproductive performance or creating a need to purchase concentrated feed.

Conclusions

Weaning in September and(or) grazing subirrigated meadow regrowth increased body condition score of 2-year-old cows during September and October. For production systems where cows are wintered on low quality forages, increasing body condition during the fall months could be a benefit. Calf gains were greatest for calves nursing cows on subirrigated meadow, but weaned calves grazing subirrigated meadow had gains in body weight similar to calves nursing cows on range. Where there is not enough subirrigated meadow regrowth to support cows and calves, weaning the calf early and grazing the calf on meadow regrowth and the cow on range offers potential to maintain calf gains while improving body condition of the cow.

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