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Effects of Supplemental Protein During Gestation and Grazing Sub-irrigated Meadow During the Postpartum Interval on Pregnancy Rates of Spring Calving Cows and Calf Growth

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Summary

A two year experiment evaluated the influence of supplemental protein during the last trimester of gestation and grazing sub-irrigated meadow during the postpartum interval on pregnancy rates and calf growth in a March calving production system. Supplemental protein during the last trimester did not improve subsequent pregnancy rate but resulted in increased carcass weight. Allowing cows to graze sub-irrigated meadow during the postpartum interval improved pregnancy rates but did not change steer performance in the feedlot. Feeding supplemental protein during the last trimester of gestation and allowing cows to graze sub-irrigated meadow were both economical methods of improving production.

Introduction

One goal of cow / calf production systems is to optimize economic efficiency. A commonly recommended method of improving economic efficiency is to reduce cost of production. Integrated resource management data shows that the most profitable cow / calf producers are those with the lowest variable costs; however, incurring variable costs is justified if the increased

cost yields returns of greater value.

Two key times in extended grazing cow / calf production systems are the last trimester of gestation and the postpartum interval. During the last trimester of gestation, nutrient requirements increase due to fetal growth and forage quality may not adequately meet requirements in spring calving systems. Additionally, postpartum conception is influenced by nutritional status at the start of the breeding season. Producers may choose to intervene by supplementing the diet with protein (the most limiting nutrient in dormant range) or allocating high quality forage resources to the cow / calf enterprise.

Our objectives were to determine if the additional costs of supplemental protein during the winter and high quality forage during the postpartum interval were justified by increased pregnancy rates and calf growth performance throughout its life.

Procedure

This study was conducted at the Gudmundsen Sandhills Laboratory, near Whitman, Nebraska over two years. One-hundred-thirteen cows per year were divided into eight native upland pastures (80 + 15 acre) during the winter in equal stocking rates. Half the cows were fed the equivalent of 1 lb / head / day of supplemental protein (32% CP) three times per week from December

1 through February 28.

Cows were managed in a common group during the calving season (March 1 to April 30) and fed 28 lb cool season grass hay. Average calving date was March 23. During the interval between calving and start of breeding (May 1 to May 31), half the cows were fed cool season grass hay and half grazed sub-irrigated meadow. At the start of breeding (June 1), treatment groups were combined and cows were managed as a single group for the remainder of the production cycle.

Calves were weaned the first week of October and two weeks later all steers were shipped 104 miles to a feedlot. Steers were fed in eight pens that corresponded to the winter pasture until the average 12th rib back fat of all steers was 0.5 inches.

Data were analyzed as a 2X2 factorial. No winter by spring treatment interactions were observed, therefore only main effects are reported.

Partial budgets were employed to examine the economic efficiency of both production practices and included only costs that differed between treatments. For both production practices, two budgets were created. One used value at weaning and one used carcass value so that differences in returns between treatments could be assessed at both endpoints. Ten year average prices were used to value calves, hay

(Continued on next page)

(Crop and Livestock Prices for Nebraska Producers, 2003) and grazing fee (Nebraska Farm Real Estate Market Developments, 2002-2003). Actual delivered price was used to value supplemental protein.

Results

Effects of supplemental protein during the last trimester of gestation and plane of nutrition during the postpartum interval on cow body condition score throughout the year are presented in Figures 1 and 2, respectively. Feeding supplemental protein during the last trimester of gestation increased body condition pre-calving ($P = 0.02$) and pre-breeding ($P = 0.005$) but did not change pregnancy rates ($P = 0.87$; Table 1). Cows grazing sub-irrigated meadow during the postpartum interval had greater body condition pre-breeding ($P < 0.01$) which resulted in a tendency for increased pregnancy rates ($P = 0.13$; Table 1).

Calves born to cows fed supplemental protein during the last trimester of gestation were heavier at weaning ($P = 0.08$), and had heavier carcass weights ($P = 0.07$; Table 1). No differences were observed in ADG ($P = 0.41$), DMI ($P = 0.24$), efficiency of gain ($P = 0.20$) or carcass quality (data not shown). It is possible that the increased weaning and carcass weights resulted from permanently changing the endocrine system of

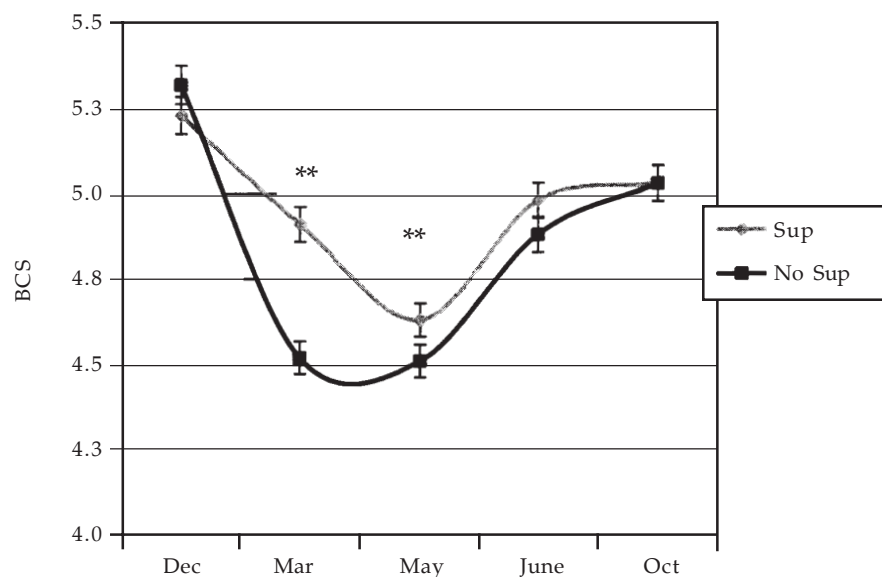


Figure 1. Effect of supplemental protein during the last trimester of gestation (December 1 to February 28) on cow body condition score (BCS).

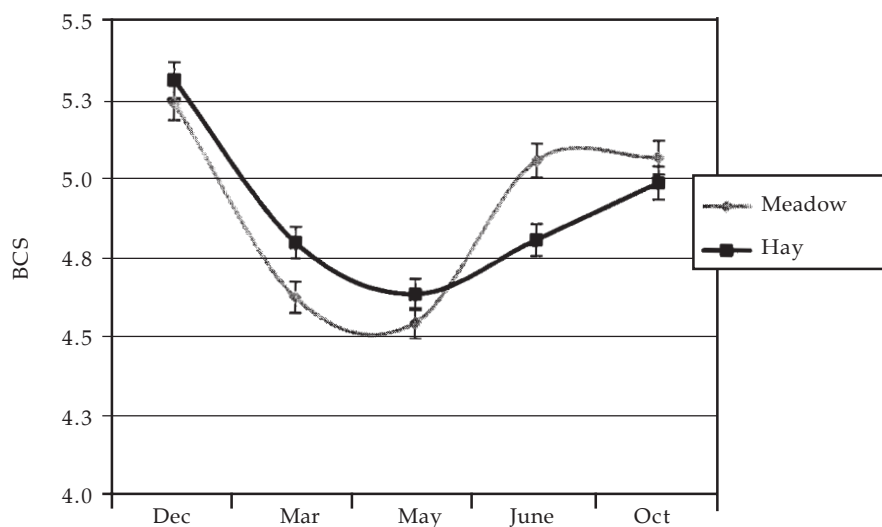


Figure 2. Effect of grazing sub-irrigated meadow or feeding grass hay during the postpartum period (May 1 to May 30) on cow body condition score (BCS).

Table 1. Effects of supplemental protein during the last trimester of gestation and grazing sub-irrigated meadow during the postpartum interval on pregnancy rates and calf growth.

Item	Treatment Main Effects ^a				SEM	Effect P-values	
	Supp	No Sup	Mead	Hay		Winter	Spring
Cow Performance							
Pregnancy Rate	0.906	0.901	0.928	0.880	0.021	0.87	0.13
Weaning Wt	469.6	455.0	469.5	455.0	5.28	0.08	0.08
Feedlot Performance							
Carcass Wt	810.5	788.8	802.2	797.1	9.83	0.14	0.72
ADG	3.51	3.46	3.47	3.49	0.06	0.41	0.74
DMI	18.8	18.0	18.5	18.4	0.43	0.24	0.87
Feed Efficiency	0.190	0.195	0.192	0.193	0.002	0.20	0.63

^aNo winter by spring treatment interactions were observed therefore only main effects are reported. Treatments were 1 lb/hd/day protein supplement vs. no supplement and grazing sub-irrigated meadow vs. feeding cool season grass hay.

the calf during gestation. The fetus is sensitive to the nutritional status of the mother and adjusts its development accordingly. Further research is addressing this issue. Weaning weight was increased ($P = 0.08$) but carcass weight was not different ($P = 0.72$) in calves that nursed cows grazing sub-irrigated meadow compared to calves nursing cows fed hay during the same time period. No differences were observed in ADG ($P = 0.74$), DMI ($P = 0.87$), efficiency of gain ($P = 0.63$) or carcass merit (data not shown).

Partial budget analysis showed that incurring both additional costs of feeding supplemental protein and grazing sub-irrigated meadow was profitable, regardless of end-

point. In the case of supplemental protein, returns were \$4.66/head and \$22.83/head greater at weaning and carcass endpoints, respectively. A dramatic increase in profit when calves were taken through the feedlot is a result of greatly increased carcass weight in steers born to cows fed supplement. The profit difference between endpoints shows that the majority of return on the investment in supplemental protein occurs in the feedlot. In the case of meadow grazing, returns were \$30.48/head and \$28.98/head greater at weaning and carcass endpoints, respectively. Increased returns were strictly a function of the increased pregnancy rate in meadow grazing cows.

Conclusion

Feeding supplemental protein during the last trimester of gestation to cows grazing dormant rangeland may be an economical method of increasing calf weight and the advantage is maximized when a carcass endpoint is used. Using sub-irrigated meadow to improve the nutritional plane of cows during the postpartum interval is an economical method of improving pregnancy rates in cows.

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