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Effects of Supplementing Lactating, June-calving Cows on Second-calf Pregnancy Rates

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Summary

A two year experiment evaluated the influence of supplementation pre-breeding on second-calf pregnancy rates in June-calving heifers. For 60 days before start of the breeding season, heifers were assigned to one of two treatments: supplementation of dried distillers grains (1.5 lb/day) to meet energy and metabolizable protein requirements or unsupplemented control. Supplementation improved body condition score during the supplementation period and resulted in increased body condition score at weaning. In year 1, feeding supplement to the dam did not change calf weight gain but feeding supplement increased calf weight in year 2. Pregnancy rates were 90% and not changed by supplementation.

Introduction

In the Nebraska Sandhills, calving in June matches the cow's nutrient requirements with grazed forage nutrient supply and reduces the need for feeding of harvested forage. Reducing the amount of harvested forage fed improves net returns compared to the traditional March-calving system.

Reproductive performance of mature June-calving cows is comparable to March-calving cows but rebreeding rate of June-calving, two-year-old cows with their second calf is low (*2000 Nebraska Beef Report,* pp. 13-16). Poor reproduction of young cows would negatively impact economic efficiency in the June-calving system.

Nutrient status of lactating, first-calf heifers during the postpartum period has dramatic impacts on subsequent reproduction. Nutrient content of upland native range in the Nebraska Sandhills declines rapidly in late summer and early fall. Objectives of this research were to determine if supplementation to meet energy and protein requirements would improve second-calf conception rates in lactating, first-calf heifers when calving occurs in June.

Procedure

This study was conducted at the Gudmundsen Sandhills Laboratory, near Whitman, Neb., over two years. In each year, 2-year-old, primiparous, June-calving heifers (n= 41, year 1; n = 40, year 2; average calving date June 1, year 1; May 28, year 2) were stratified by calving date and assigned randomly to one of two prebreeding treatments: supplementation to meet net energy and metabolizable protein requirements or non-supplemented control. Loose dried distillers grains was used as the supplement to which an ionophore (equivalent of 150 mg/day rumensin) was added. Cows grazed upland range during the treatment (July 15 to August 30), breeding (September 1 to October 15) and post-breeding to weaning (October 16 to November) periods.

In year 1 diet samples were collected using esophageally fistulated cows before initiation of the trial and results were used to balance diets of cows in the supplement treatment according to NRC (1996) requirements (Tables 1 and 2).

At the beginning and end of the treatment period, cows and calves were weighed and body condition score of cows was determined. On Monday, Wednesday and Friday, cows in the supplement treatment were group fed the daily equivalent of 1.5 lb/cow.

On September 1 of each year, treatment groups were combined for the breeding season and 1.5 lb/day supplement was fed to all cows through the end of breeding (October 15). Weaning occurred the first week of November and heifer pregnancy status was determined by rectal palpation in January.

Significant year by treatment interaction occurred for calf growth, therefore calf weight data are presented by year.

Results

Heifer body weights were similar between treatments upon initiation

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Table 1. Nutrient Requirements of Beef Cattle (NRC, 1996) model inputs

Item	
Animal inputs[a]	
Age, mo	25
BW, lb	1000
Body condition score	5.0
Mature BW, lb	1200
Days in milk	90
Peak milk production, lb/day	15
Diet Inputs	
Forage CP, %	9.4
Forage DIP, %CP	82.0
Forage TDN, %	59.0
Microbial efficiency, % TDN	13

[a]Breed composition: Gelbvieh x Angus x Angus.

Table 2. Average nutrient balance for supplemented (S) and nonsupplemented (NS) lactating, primiparous, June-calving cows during the 45 day period (Jul. 15 to Aug. 30) prior to the breeding season for second calf.

Item	NS	S
Forage intake, lb[a]	22.7	22.5
Supplement intake, lb/day	—	1.4
NEm balance, Mcal[b]	-0.77	0.08
MP balance, g/day[c]	28	191
DIP balance, g/day[d]	1	-123
Days to lose 1 condition score	185	1814

[a]Estimated by NRC (1996) model.
[b]Net energy for maintenance.
[c]Metabolizable protein.
[d]Degraded intake protein.

and termination of the treatment period (Table 3). Body weights were similar at weaning even though heifers in both treatments lost body weight from the end of the supplementation period to weaning.

Heifer body condition score did not differ between treatments upon initiation of the treatment period. Heifers receiving supplement gained condition while heifers not receiving supplement lost body condition during the supplementation period. Heifers in both treatments lost body condition during lactation and overall body condition score loss was not different between treatments.

In year 1, calf weight was not different between treatments at any point during the experiment (Table 4). However, in year 2, calves nursing dams fed supplement were heavier at the end of the supplementation period and tended to be heavier at weaning. This discrepancy in calf growth between years may result from differences in forage quality dynamics.

Dried distillers grains are high in undegraded intake protein. Past research has shown an increase in milk production in cows fed protein supplements containing undegraded intake protein. The increase in milk production in response to undegraded intake protein supplementation is variable and appears to interact with nutrient plane (i.e. forage quality). It is possible that forage quality differences between years altered response to supplementation and increased milk production in year 2 leading to increased calf weight.

Pregnancy rates were similar between heifers fed supplement to meet energy and protein requirements and nonsupplemented heifers. Pregnancy rates of non-supplemented, 2 year old, June-calving heifers averaged 92.5% over two years. These results are markedly better than past observations (*2002 Nebraska Beef Report*, pp. 4-7). Feeding supplement in an effort to improve already acceptable pregnancy rates may not be economical.

Table 3. Effect of prebreeding protein supplementation on body weight, body condition score (BCS) and subsequent pregnancy rate in primiparous heifers

Item	No Supplement	Supplement	SE	*P*-value
Initial wt., lb	1012	1028	12	0.35
Final wt., lb	1021	1041	11	0.22
Wt. at Weaning, lb	981	1009	14	0.16
Initial BCS	5.6	5.6	0.1	0.50
Final BCS	5.4	5.7	0.1	0.001
BCS at Weaning	5.0	5.2	0.1	0.05
Pregnancy rate, %	92.5	88.0	0.4	0.50

Table 4. Effect of prebreeding protein supplementation on body weight of calves born to primiparous heifers

Item	No Supplement	Supplement	SE	*P*-value
Year 1				
Initial wt., lb	165	158	6	0.39
Final wt., lb	249	241	7	0.45
Weaning wt, lb	372	367	9	0.72
Year 2				
Initial wt., lb	149	154	6	0.57
Final wt., lb	270	292	7	0.03
Weaning wt, lb	413	433	8	0.08

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