The Effect of Postpartum Supplementation Strategy on Performance in May-Calving 2- and 3-yr-old Range Cows

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Summary with Implications

Reproductive performance in young 2- and 3-yr-old cows are often the lowest in the cow herd, which is due to their inability to consume enough energy and protein to meet their requirements for growth and lactation. A 3-yr study was conducted to evaluate the effects of postpartum supplementation strategy on reproduction, cow body weight, and calf performance in lactating young 2- and 3-yr-old May-calving range cows. Supplementation was initiated 30 d prior to the start of the breeding season (45-d postpartum) and continued throughout the 45-d breeding season (125-d postpartum). Supplementation was provided daily with treatments being: 1) mineral supplement alone, 2) mineral with an additional 0.5 lb/d of a high rumen undegradable protein source (porcine blood meal and hydrolyzed feather meal), or 3) dried distiller grains. Supplementation strategy did not influence changes in cow body weight or body condition score. However, reproductive performance in cows receiving either the mineral with RUP and the dried distiller grains cows were increased over the mineral alone, which demonstrates the need to increase metabolizable protein supply during the breeding season to positively impact reproduction in young, May calving cows.

Introduction

Young May-calving cows grazing primarily native upland range in the Nebraska Sandhills can experience a negative energy balance (NEB) postpartum and throughout the breeding season, which can lead to a decrease in reproductive performance. Historically, pregnancy rates in young May-calving cows at GSL have been low, averaging 74%, which creates long-term profitability challenges. As summer months progress, maturing native upland range forages lead to deficiencies in both energy and metabolizable protein (MP) (*2019 Nebraska Beef Cattle Report*, p. 5–7). In addition, meeting nutrient requirements of summer calving herds can be a challenge due to the location of summer grazing pastures. Therefore, the objective of this study was to determine the effects of supplementation strategy on reproduction, cow body weight, and calf performance in lactating young May-calving range cows.

Procedure

This study was conducted over a three-year period (2020 to 2022) utilizing 2- and 3-yr-old range beef cows from the May-calving herd at the University of Nebraska Gudmundsen Sandhills Laboratory (GSL) located near Whitman, NE. Cows (n = 167) were Husker Reds (5/8 Red Angus, 3/8 Simmental) and were stratified by calving date, cow body weight, and age, and assigned randomly to a supplementation treatment. Supplementation was initiated 30 d prior to the start of the breeding season (45-d postpartum) and continued throughout the 45-d breeding season (125-d postpartum). Supplementation was individually fed and daily with treatments being: 1) mineral with no additive for a negative control at a targeted rate of 4 oz/d (**MIN**; Ag Valley CO-OP, North Platte, NE), 2) MIN (4 oz/d) with an additional 4 oz/d of porcine blood meal and 4 oz/d of hydrolyzed feather meal with a total daily target of 12 oz/d (90% CP, **SMP**; Ag Valley CO-OP, NE), or 3) dried distiller grains at a rate of 2 lb/d (30% CP, **DDG**; Central Valley Ag, Ainsworth, NE). The SMP and DDG supplemental treatments were designed to provide similar amount of crude protein with DDG supplying increased dietary energy and SMP supplying increased RUP supply. The rationale for the design of SMP was aimed to establish a protein-dense self-fed supplement that could substitute hand feeding DDG multiple times per week.

Approximately d 40 postpartum, cow body weight (BW) and body condition score (BCS; 1 = emaciated, 9 = obese) by palpation were measured and recorded biweekly. Approximately d 80 postpartum, cows were synchronized with a controlled internal drug releasing (CIDR) device (Eazi-Breed CIDR, Zoetis Inc, Kalamazoo, MI) with a 7-d CO-Synch + CIDR protocol. On d 0 of the synchronization protocol, cows received 2 mL i.m. of GNRH (Fertagyl, Merck, Kenilworth, NJ) and a CIDR insert. On d 7 CIDR inserts were removed and 5 mL of $PGF_{2α}$ (Estroplan, Parnell Technologies, Overland Park, KS) was administered. Artificial insemination (AI) was conducted approximately 65 hr after CIDR removal, with administration of 2 mL GnRH for fixed time AI. Fertile bulls were introduced 7 d after AI for natural service and removed d 45 of the breeding season. Cow pregnancy diagnosis was detected via transrectal ultrasonography and rectal palpation 35 d following bull removal. Calves were weighed at birth, ~ 60 d of age, and at weaning. Calf BW at 60 d and weaning were adjusted for a 60-d and 205-d BW with no adjustments for sex of calf or age of dam.

Data were analyzed as a randomized block design using the MIXED procedure (SAS Inst. Inc., Cary, NC, USA) with cow as the experimental unit using the Kenward-Roger degrees of freedom method. The model included fixed effects of year, age, treatment, calf sex, and their interactions. Separation of least squares was performed by the PDIFF option in SAS when a significant ($P \leq 0.05$) effect was detected. Significance level was set at $P \leq 0.05$.

Results

Cow BW and BW change were not influenced ($P \geq 0.52$) by postpartum

Table 1. Effect of postpartum supplementation strategy on cow BW, BW change, BCS, reproductive performance, and calf performance in young range May-calving cows

	Supplement[1]				
Measurement	MIN	SMP	DDG	SEM	*P*-value
Cow body weight, lb					
Start of supplementation	949	947	948	17	0.72
Begin of breeding	972	988	980	16	0.92
End of supplementation	951	964	958	17	0.92
Weaning	908	926	922	16	0.84
Cow body weight change, lb					
Begin of supplementation to breeding	23	41	32	19	0.95
Begin of supplementation to end of supplementation	2	17	10	13	0.88
Begin of supplementation to weaning	-41	-21	-26	12	0.52
Body Condition Score					
Begin of supplementation	5.5	5.5	5.5	0.04	0.39
Begin of breeding	5.6	5.5	5.5	0.05	0.47
End of supplementation	5.5	5.4	5.5	0.05	0.14
Weaning	5.2	5.2	5.3	0.06	0.31
Reproductive Measurements					
AI conception rate, %	50	52	55	3	0.37
Pregnancy rate, %	84[a]	93[b]	93[b]	2	0.04
Calf body weight, lb					
Birth	65	67	65	2	0.24
60 d	206	220	207	12	0.79
205 d	447	453	461	11	0.71

[1]Supplements: MIN =4 oz/d of mineral; SMP = 4 oz/d blood meal + 4 oz/d feather meal + 4 oz/d mineral; DDG = 2 lb/d dried distiller grains

supplementation strategy from start of supplementation until weaning. Cows in all treatments maintained a positive energy balance (i.e., gained or maintained BW) until the end of supplementation where cows lost BW until weaning. Similar to cow BW, cow BCS was not influenced ($P \geq 0.14$) by supplemental strategy. Postpartum supplementation did not influence ($P = 0.37$) fixed time AI pregnancy rates. However, overall pregnancy rates were influenced ($P = 0.04$) by postpartum supplementation. Cows that received SMP or DDG had the greatest pregnancy rates, whereas MIN cows had the lowest. Calf BW at birth, 60 d, and 205 d were not influenced ($P \geq 0.24$) by dam's supplemental treatment.

Conclusion

Supplementation strategy did not influence any changes in cow BW or BCS. Therefore, the increase in reproductive performance in SMP and DDG cows were uncoupled from changes in BW or BCS. Comparing SMP and DDG, the additional energy in the DDG did not result in increased performance, which illustrates the benefit of increasing metabolizable protein supply on reproduction. These results illustrate that a self-fed high RUP supplement mixed with a mineral supplement can be strategically utilized in cow-calf operations that have challenges in feeding young range cows multiple times per week to increase reproductive performance.

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