Nutritional Impacts on Beef Cow Reproduction

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Most research supports a positive relationship between cow body condition score (BCS) and their subsequent reproductive success. However, pregnancy success was not affected by BCS at calving in *Bos taurus* beef females managed and selected for decades to perform in extensive rangeland conditions (Mulliniks et al., 2012). These results indicate that the specific consequences of BCS at calving and BCS change from calving until the start of the breeding season on pregnancy success of beef cows need to be evaluated across multiple cattle breeds, particularly in scenarios of natural breeding when no exogenous hormones and estrus synchronization are implemented.

From 2016 to 2023, our group gathered performance data on 1,180 fall-calving, Brangus crossbred cow-calf pairs. In August of each year (2 weeks after weaning), mature, pregnant cows were assigned to bahiagrass pastures approximately 90 days before calving. From December to March, all cow-calf pairs were offered stargrass hay and 4 lb of sugarcane molasses + urea per cow daily. Calves were weaned at 7 to 9 months of age.

Maternal performance. Fall calving beef herds are often provided relatively high herbage mass during the fall, but forage nutritive value gradually declines as the season progresses (Vendramini et al., 2023). These forage conditions explain the fact that most cows in in these studies calved with BCS ≥ 5 and lost BCS from calving until the start of the breeding season and during the breeding season (Table 1). Cows that calved with a BCS ≥ 5 also had greater BCS during the breeding season and at the time of weaning compared to cows that calved with a BCS < 5; however, cows that gained BCS from calving until the start of the breeding season had the greatest BCS during the breeding season and at weaning and cows that lost BCS after calving had the lowest BCS during the breeding season and at weaning (Table 1).

Our assessment also detected that pregnancy percentage, calving percentage, and percentage of cows calving within the first 30 days of the calving season depended on the combined effects of cow BCS at calving and its subsequent BCS change from calving until the start of the breeding season (Table 2). In cows calving with a BCS < 5, pregnancy percentage was similar between those that maintained or gained BCS from calving until the start of the breeding season but both groups had better pregnancy

percentages compared to cows that lost BCS. However, pregnancy percentage among cows calving with a BCS ≥ 5 was not impacted by their BCS change from calving until the start of the breeding season (Table 2). Our results emphasized the greater importance of nutritional management **before calving** when cows were exposed to bulls for natural breeding.

Calf performance. Cow BCS change from calving to the start of the breeding season did not impact calf growth performance. However, calf body weight at birth increased by 4 lb and calf body weight at weaning increased by 17 lb for cows that calved with a BCS ≥ 5 compared to cows that calved with BCS < 5, respectively (Table 1). Despite the heavier body weight at birth, no signs of calving difficulty were observed. Hence, the increased calf BW at birth and weaning reported herein and by others (Moriel et al., 2021) are probably the result of greater precalving BCS change of cows calving with a BCS ≥ 5 compared to cows calving with a BCS < 5, which is an indicator of improved cow nutritional status during late gestation.

Conclusion

These data reinforce that: cow BCS at calving remains a key indicator of pregnancy success in fall-calving beef cows in Florida; a reduction in cow BCS from calving until the start of breeding season further reduced pregnancy percentage, calving percentage, and calving distribution during the first 30 days of calving in cows calving with when cow BCS < 5; and despite the lower BCS at calving, thinner cows that maintained or gained BCS from calving until the start of the breeding season achieved similar pregnancy percentage, calving percentage, and early calving distribution compared to cohorts that calved with a BCS ≥ 5 and lost BCS after calving. In terms of calf preweaning performance, increasing cow BCS at calving improved calf birth weights and weaning weights, whereas cow BCS change from calving until the start of the breeding season (regardless if they gained, maintained, or lost BCS) had no impact on calf preweaning performance. Together, these results further strengthen the importance of prepartum nutrition and calving BCS on maternal and offspring performance combined.

References

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Upcoming Event

See our website calendar (link below) to register for these events.

May 21, 11:00 – 11:45 a.m. Join us for the Ona Highlight 'Nutritional Impacts on Beef Cow Reproduction' with Dr. Philipe Moriel.

June 27, 8:00 a.m. – 2:00 p.m. 15th Annual Youth Field Day – UF/IFAS Range Cattle REC, in Ona., Questions? Call 863-735-1001 or e-mail ona@ifas.ufl.edu.

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UF/IFAS Range Cattle REC - 3401 Experiment Station Rd., Ona
- http://rcrec-ona.ifas.ufl.edu/

Table 1. Body condition score (BCS; scale 1 to 9) of cows that calved with BCS below (BCS < 5) or equal or above (BCS ≥ 5) and cows that lost, maintained, or gained BCS from calving until the start of the breeding season.

	Calving BCS		Post-calving BCS change		
Item [1]	**BCS < 5**	**BCS ≥ 5**	**Lost**	**Maintained**	**Gained**
Number of cows	208	980	757	271	160
Cow performance					
BCS 2 weeks after weaning (initial BCS)	4.78[a]	5.51[b]	5.05[a]	5.12[b]	5.26[c]
BCS at calving	4.51[a]	5.56[b]	5.21[b]	4.94[a]	4.96[a]
BCS at the start of breeding season	4.51[a]	5.51[b]	4.57[a]	4.96[b]	5.51[c]
BCS at the end of breeding season	4.27[a]	5.15[b]	4.38[a]	4.62[b]	5.13[c]
BCS at weaning	4.77[a]	5.59[b]	4.82[a]	5.11[b]	5.60[c]
Calf performance					
Birth body weight, lb	75[a]	79[b]	79[a]	76[a]	77[a]
Weaning body weight, lb	524[a]	542[b]	535[a]	529[a]	533[a]

[abc] Within a row, means without a common superscript differ ($P \leq 0.05$).

[1] Initial BCS was collected 2 weeks after weaning (August). Cows calved in October/November. Breeding season occurred from January to March (natural breeding; no estrus synchronization and artificial insemination). Calves were weaned in July of subsequent year.

Table 2. Reproductive performance of cows according to their BCS at calving (BCS < 5 or BCS ≥ 5; scale 1 to 9) and subsequent BCS change from calving until the start of the breeding season (lost, maintained, or gained BCS). [1]

Maternal classification				**Calving distribution, % of total**		
BCS at calving	**Post-calving BCS change**	**Pregnant, % of total**	**Calving, % of total**	**Calved 1st 30 days**	**Calved 2nd 30 days**	**Calved 3rd 30 days**
BCS < 5	Lost (n = 93 cows)	74.5[a]	70.6[a]	35.0[a]	51.2[b]	13.7
	Maintained (n = 55 cows)	84.8[b]	80.5[b]	67.2[b]	25.1[a]	7.9
	Gained (n = 60 cows)	83.7[b]	78.6[b]	68.4[b]	26.8[a]	4.9
BCS ≥ 5	Lost (n = 664 cows)	88.3[bc]	85.0[b]	64.2[b]	25.4[a]	10.2
	Maintained (n = 216 cows)	90.4[c]	86.9[b]	68.1[b]	27.3[a]	4.9
	Gained (n = 100 cows)	93.2[c]	87.5[b]	57.6[b]	34.3[a]	8.0
P		0.05	0.10	<0.01	0.02	0.15

[abc] Within column, means without a common superscript differ ($P \leq 0.05$).

[1] All cows were stratified by their BCS at calving and classified as cows calving with BCS < 5 and BCS ≥ 5. Then, within each calving BCS group, cows were classified into those that lost, maintained, or gained BCS from calving until the start of the breeding season.