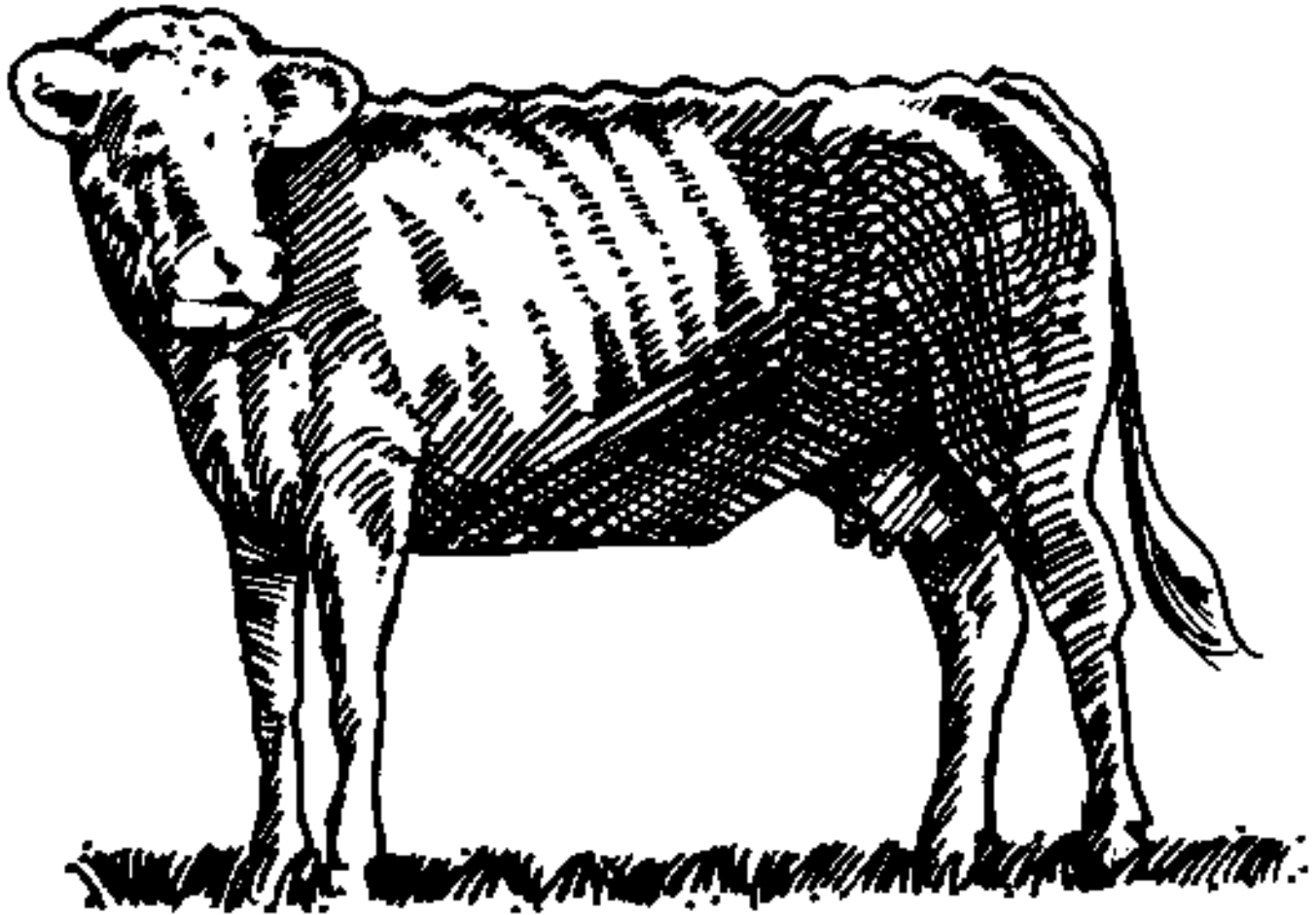


Body Condition Score and Breeding Back

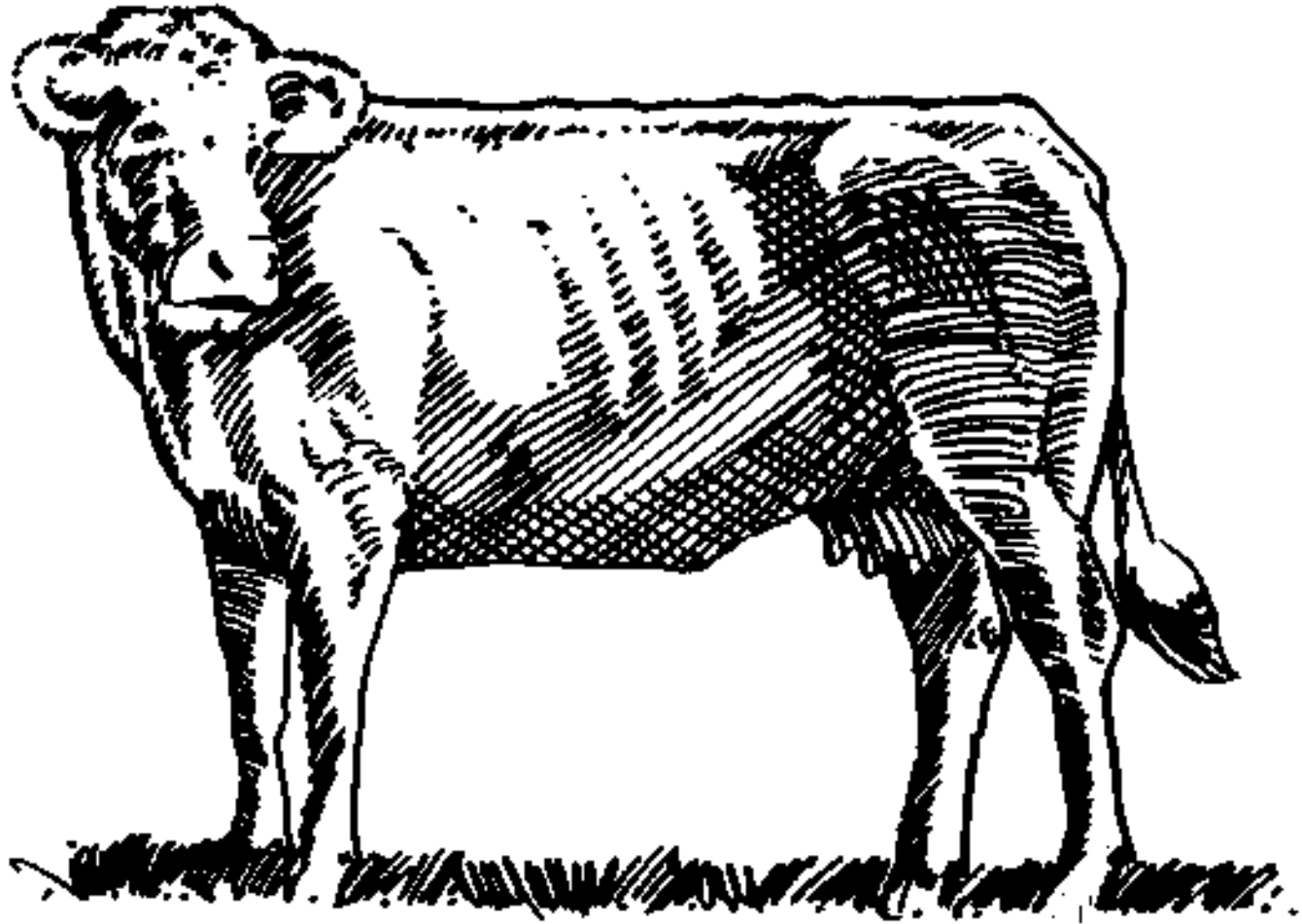
Steven E. Myers, Ph.D.
Technical Sales Specialist
Purina Animal Nutrition
Edmond, OK

Body Condition Score 3



Very thin, no fat on the ribs or brisket, and some muscle still visible. Backbone is easily visible.

Body Condition Score 4



Thin, with ribs easily visible but shoulders and hindquarters still showing fair muscling. Backbone is visible.

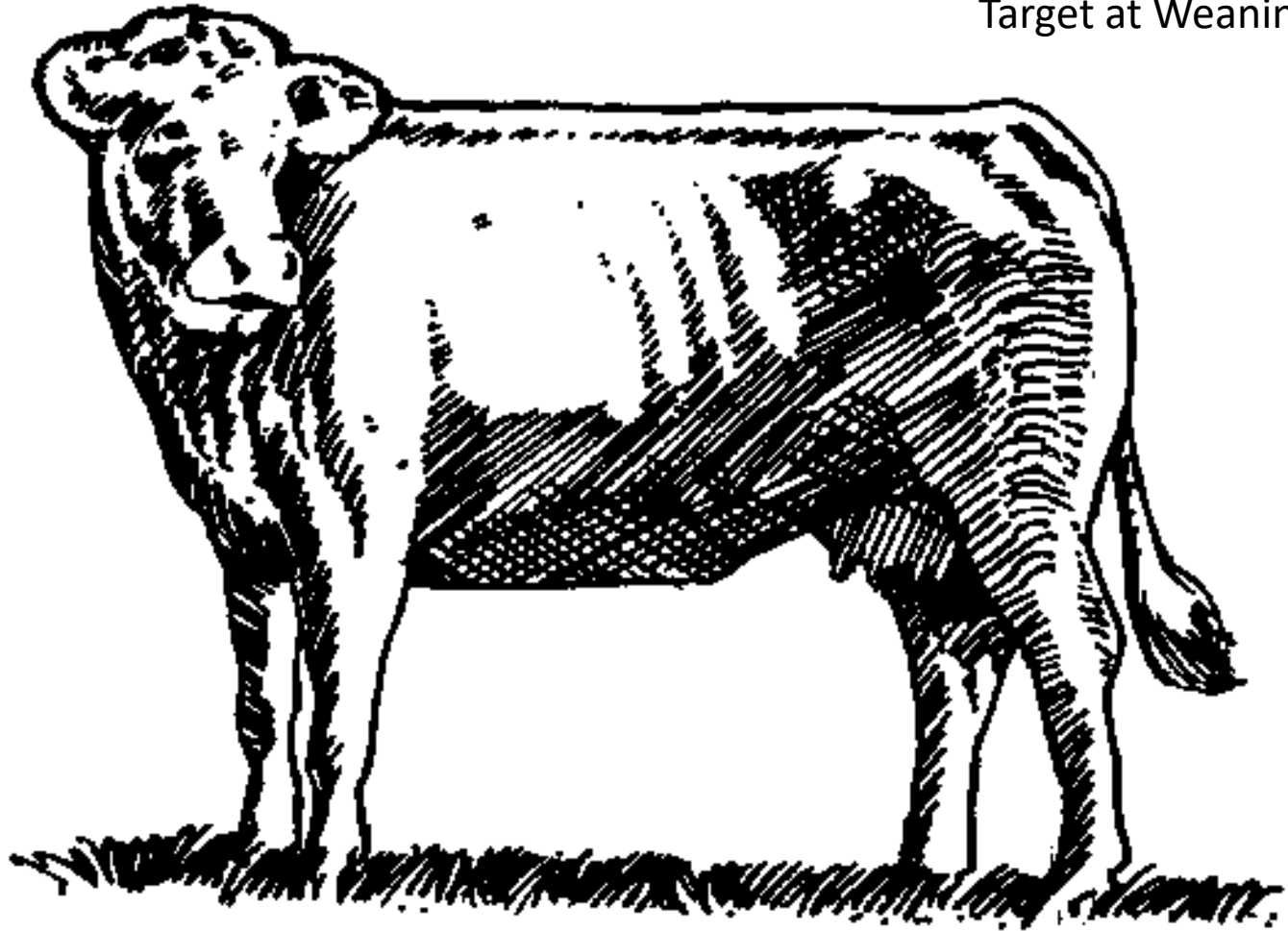
Body Condition Score 4

www.cowbcs.info/index.html



Body Condition Score 5

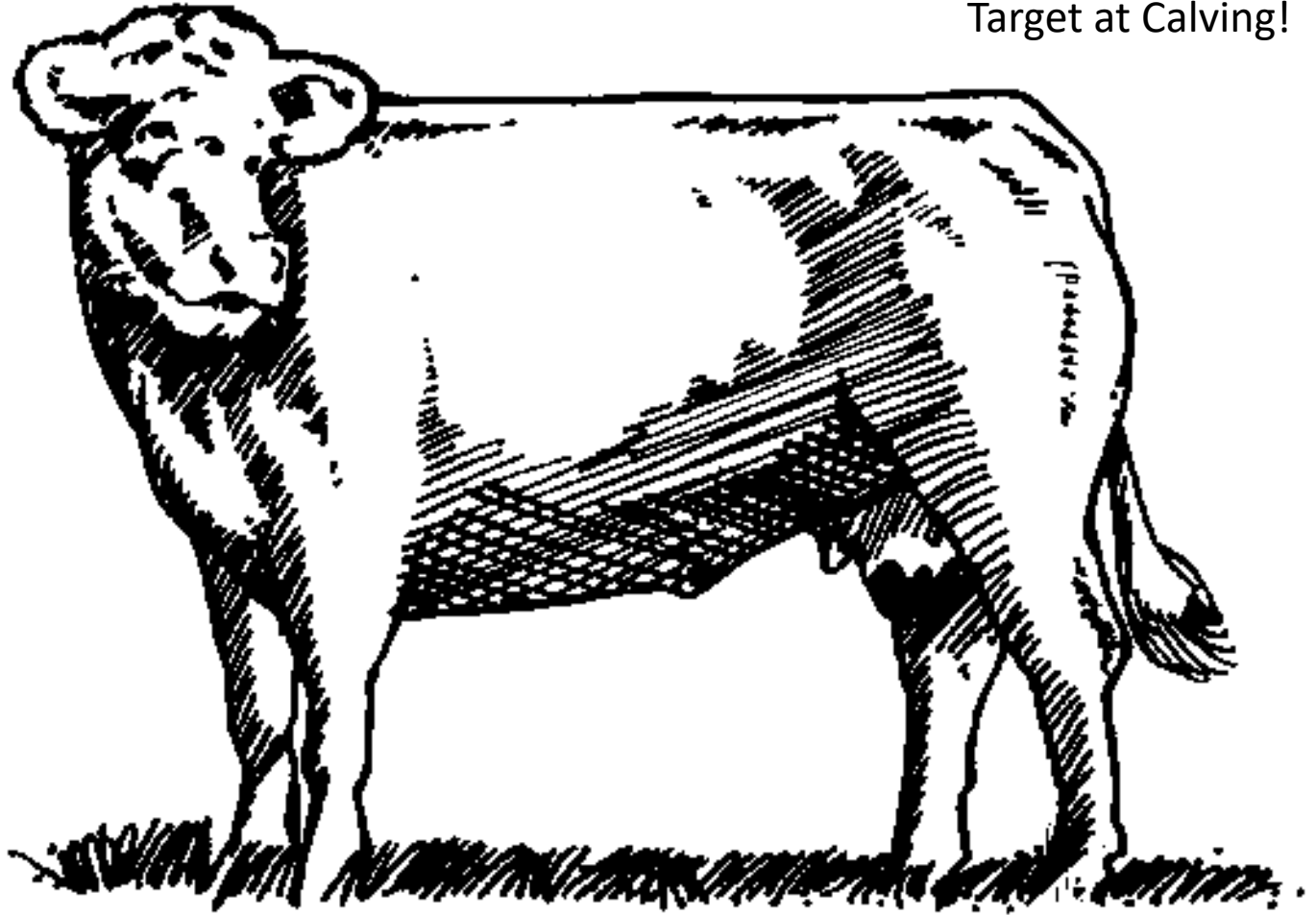
Target at Weaning!



Moderate to thin. Last two or three ribs can be seen. Little evidence of fat in the brisket, over the ribs or around tailhead.

Body Condition Score 6

Target at Calving!



Good smooth appearance throughout. Some fat deposition in the brisket and over the tailhead. Ribs are covered and the back appears rounded.

Body Condition Score 6

www.cowbcs.info/index.html







Effect of BCS at Parturition on Postpartum Interval (PPI)

BCS *	PPI (DAYS)
3.5-4.0	88.5
4.5	69.7
5.0	59.4
5.5-6.0	51.7
6.5	30.6

* **Body Condition Scores have been converted to the 1-9 scoring system.**
(Houghton, *et al.*, 1990)

Reproductive Performance of First Calf Heifers Dependent upon BCS at Calving

BCS at Calving	Pregnancy Rate, %	Days to Pregnancy
4	64.9	92
5	71.4	82
6	87.0	74
7	90.7	76

(Coombs *et al.*, 1996)

Evaluate in more detail...

- Effect of Body Condition Score on:
 - Neonatal health
 - Pre-weaning performance
 - Post-weaning performance
 - **Reproductive performance**
- Is it BCS or strategic supplementation during gestation (or both)?

Neonatal Period

- The calf is born “naïve” to pathogens
- Immune system functional at 2 months of age
- Colostrum
 - Provides for ingestion of immunoglobulins
 - Means of providing passive immunity
 - 22% solids in colostrum vs. 12% in whole milk
 - 2 quarts within 6 hours; 4 quarts within 12 hours
- Concentration of immunoglobulins in colostrum begins 5 weeks pre-partum

Effects of Body Condition at Calving on Calf Vigor and Calf Serum Immunoglobulin Concentrations

	Heifers' Condition Score					P =
	2	3	4	5	6	
Interval from calving to standing for the calf (min)	--	59.9	63.6	43.3	35.0	.24
Colostrum prod., ml	750.0	1525.0	1111.5	1410.9	--	.19
Calf Serum IgG ₁ (mg/dl)	1787.6	1998.1	2178.8	2309.8	2348.9	.23
Calf Serum IgM (mg/dl)	159.5	145.9	157.2	193.1	304.1	.05

(Odde *et al.*, 1986)

Effect of Condition of the Cow on Calf Serum Concentrations

	Cows' Condition Score					P =
	3	4	5	6	7	
Calf Serum IgG ₁ (mg/dl)	1020.6	1360.8	1349.4	1485.3	1554.1	.19
Calf Serum IgM (mg/dl)	106.8	103.0	129.2	123.3	128.9	.55

(Odde, 1988)

Nutrition & Perinatal Immunity/Health

- Calf serum IG levels improved when 1st calf heifers were in moderate BCS.
 - Less of an effect in older cows?
- Increased calving difficulty significantly reduced calf serum IG levels (Odde *et al.*, 1986)
- Calf serum IG levels positively correlated with calf weights at 60, 180, and 240 days of age (Odde *et al.*, 1986).
- Calves born to heifers fed protein-restricted diets required more time to stand and produced 11% less body heat (Carstens *et al.*, 1987).

Effects of Prepartum Nutrition on Calving Difficulty and Calf Performance*

Item	High ^a	Low ^b	P <
Heifer wt change, lbs	79.4	-12.8	.05
Birth weight, lbs	67.3	62.9	.05
Assisted births, %	27	28	
Calves alive at birth, %	97	90	
Calf weaning wt, lbs	353	325	.05

*First-calf heifers

^a 100% of the recommended level of prepartum energy

^b 65% of the recommended level of prepartum energy

(Corah et al., 1975)

Effects of Gestation Nutrition on Calving Difficulty and Calf Performance ^a

Item	Low	High ^b
Calf birth weight, lbs	63	69
Dystocia, %	35	28
Calf Survival, %		
At Birth	93	91
At Weaning	58	85
Scours, %		
Incidence	52	33
Mortality	19	0
Dam Pregnancy Rate, %	65	75

^a Averages from 7 studies; cows and heifers combined.

^b Diet level fed from up to 150 days precalving.

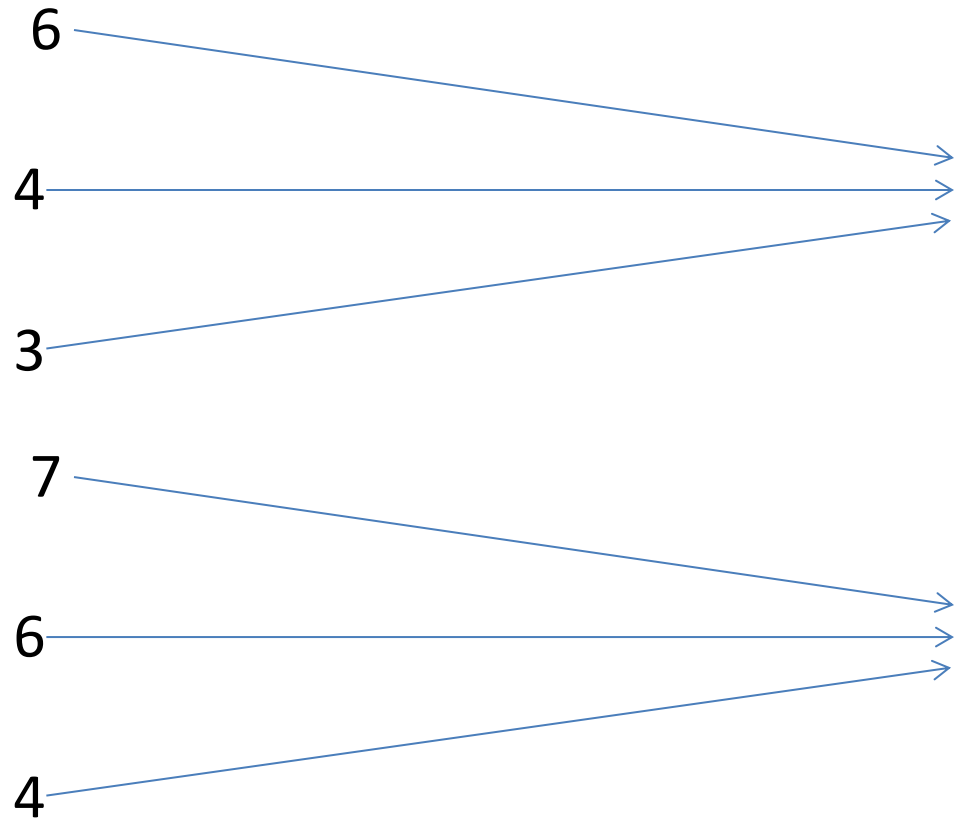
(Bellows, 1993)

Heifer Nutrition & Dystocia

- Final Word:
- “Reducing the birth weights of calves from first calf heifers by nutritional restrictions does not decrease the incidence of calving difficulty but greatly reduces postpartum reproductive performance.”
 - Dr. Robert Wetteman, Oklahoma State University
 - 1993 Range Beef Cow Symposium

Effect of Cow BCS on Calf Performance

How/when is the restriction or gain program imposed?



Effects of Pre- and Postpartum Energy Intake on Calf Weaning Weight and Reproductive Performance

Item	Pre- and Postpartum Energy Combinations			
	LE-LE ^a	LE-HE ^a	ME-LE ^a	ME-HE ^a
205-d calf wt, lbs	409 ^b	455 ^{bc}	444 ^{bc}	482 ^c
PPI, days	72.6 ^b	54.3 ^c	65.7 ^b	68.4 ^b
In estrus w/in 60 days, %	33.3 ^b	56.3 ^c	52.9 ^{bc}	54.3 ^{bc}

^a Prepartum nutrition program imposed on day 190 of gestation. Postpartum nutrition program imposed for 60 days. LE = 70% NRC, ME = 100% NRC, HE = 130% NRC.

(Houghton *et al.*, 1990)

Effects of low or moderate nutrition¹ of dams during 32 to 115 d of gestation on Body Weight and BCS

Item	Treatment		P-value
	55% NRC ¹	>100% NRC ¹	
Number	7	7	
Day 32 BW, lbs	849	803	.31
Day 103 BW, lbs	792	924	.01
Day 262 BW, lbs	1100	1124	.63
Day 262 BCS	4.9	5.2	.04

Calf Results:

Prenatal nutritional treatment did not affect weaning weight, ADG from birth to weaning, or 15 month weight of calves.

(Long *et al.*, 2010)

Effect of Restricting Energy During the 2nd Trimester on Cow & Calf Performance

Item	BCS 4	BCS 6	P-value
Third trimester BCS	4.3	5.4	
Parturition BCS	4	6	.001
Cow BW change, lbs (to day 60 PP)	-13	-23	.09
Milk production, lbs	18.9	19.3	.71
Calf birth weight, lbs	89.5	90.2	.83
Calf ADG, lbs (to day 60 PP)	1.91	2.00	.48
Average calf weight, lbs	168	177	.09
First-service conception, %	36.1	50.0	.22
Overall pregnancy, %	63.9	88.9	.01

Cows were targeted to BCS 4 or 6 during the second trimester. Nutritional adjustments continued in the third trimester.

(Lake *et al.*, 2005)

Effects of Late Gestation Energy Level Fed to 1st Calf Heifers

Item	Energy Level	
	100% NRC	65% NRC
Calves alive at birth, %	97	90
Birth weight, lbs	67 ^a	63 ^b
Weaning weight, lbs	353 ^a	324 ^b
Milk production, lbs/day	10.6	11.0
Percent showing estrus 40 days PP	41	26
Age at puberty of F ₁ heifer calves, days	318	337

Energy level changes imposed on day 180 of gestation.

(Corah *et al.*, 1975)

Effects of Late Gestation Energy Level Fed to 2nd Calf Cows

Item	Energy Level	
	High	Low
Calves alive at birth, %	100	90
Birth weight, lbs	77 ^a	59 ^b
Calves alive at weaning, %	100	71
Weaning weight, lbs	320 ^a	294 ^b
Milk production, lbs/day	12.1 ^a	9.0 ^b
Percent showing estrus by 40 days PP	48	38

Energy level restricted to both sets of cows on day 180. At day 250, High cows were fed 19.3 Mcal DE versus 8.4 Mcal DE for the Low cows. Both groups were fed 28.8 Mcal DE after calving.

(Corah *et al.*, 1975)

Effect of BCS of Mature Cows on Cow & Calf Performance

Item	Cow Body Condition Score		
	4	5	6
Calf birth weight, lbs	63.6 ^a	66.9 ^b	71.3 ^c
Dystocia score	1.2	1.2	1.2
Adjusted 205 day calf weight, lbs	411	425	436
Percentage of cows pregnant, 60-d	56 ^a	80 ^b	96 ^b

Nutritional management to achieve BCS 4, 5, or 6 occurred 90 days prior to parturition.

(Spitzer *et al.*, 1995)

Effect of Postpartum Cow Weight Gain on Calf Weaning Weight

Item	Targeted Postpartum Cow Gain	
	1.0 lbs/day	2.0 lbs/day
Adjusted 205 day calf weight, lbs	414 ^a	433 ^b
Percentage of cows pregnant, 60-d	70 ^a	84 ^b

(Spitzer *et al.*, 1995)

Calf ADG and Milk Production of Brahman Cows Losing or Maintaining Body Condition/Weight From Calving to 50 Days Postpartum

Group	Calf ADG, lbs	Milk Production, lbs/4 hours
Cows losing weight (- 88 lbs postpartum)	1.91 ^a	2.42 ^a
Cows maintaining weight (+16 lbs postpartum)	2.31 ^b	2.95 ^b

(Bastidas *et al.*, 1990)

Summary Points

- Limited data imply that energy restriction to cows in 1st/2nd period has minimal effects on calf birth weight or weaning weight.
- Late gestational energy restriction resulting in BCS 4 cows compared to BCS 6 cows:
 - Reduces birth weight, but with no effect on dystocia
 - Tends to reduce weaning weights
 - Reduces rebreeding performance
- Milk production seems dependent on late gestation and early postpartum energy levels rather than BCS at parturition.
- What about late gestational supplementation on post-weaning calf performance independent of BCS?

Effect of Late Gestation Supplementation on Performance of Heifer Progeny

- 3-year study with heifers born from dams who received the nutritional treatments.
- Half of the cows received 1 lb/d of a 42% CP supplement during the last trimester.
- Remaining cows were not supplemented.
- No other treatments were assigned to the heifer calves.

(Martin *et al.*, 2007)

Effect of Late Gestation Supplementation on Performance of Heifer Progeny

Trait	PS Dams	NS Dams	P-value
Dam BCS at calving	5.2	4.6	.001
Birth wt, lbs	79.2	77.0	.25
Wean wt, lbs	466	455	.14
Adj. 205-d wt, lbs	497	480	.02
Prebreeding wt, lbs	607	585	.04
Preg check BW, lbs	880	849	.03

(Martin *et al.*, 2007)

Effect of Late Gestation Supplementation on Performance of Heifer Progeny

Trait	PS Dams	NS Dams	P-value
Age at puberty, d	339	334	.70
Calved in first 21 d,%	77	49	.005
Overall pregnancy rate, %	93	80	.05
Calf birth wt, lbs	73	73	.94
Unassisted births, %	78	64	.24

(Martin *et al.*, 2007)

Effect of Late Gestation Supplementation on Calf Performance

Item	PS Dams	NS Dams	P-value
Pre-calving BCS	5.1	4.7	.001
Pre-breeding BCS	5.1	4.9	.01
Weaning BCS	5.1	5.1	.21
Weaned calf %	98.5	93.6	.02
Pregnancy rate %	93	90	.46

(Stalker *et al.*, 2006)

Effect of Late Gestation Supplementation on Calf Performance

Item	PS Dams	NS Dams	P-value
Calf birth wt, lbs	81.4	79.2	.29
Calf weaning wt, lbs	480	464	.02
Feedlot ADG, lbs	3.52	3.52	.89
Hot carcass wt, lbs	812	799	.23
Choice grade, %	96.4	85.4	.16

(Stalker *et al.*, 2006)

Effect of Late Gestation Supplementation on Calf Performance

- Similar experimental design to the two previous Nebraska studies.
- Prepartum supplementation did not affect cow pregnancy rate.
- Steers from supplemented dams had less sickness in the feedlot (1.5% vs 11.5%, $P < .05$)
 - Increased marbling and % choice grades ($P < .05$).
 - No effects on YG or carcass weights.

(Larson *et al.*, 2009)

Late Gestation Supplementation and Cow BCS Effects on Cow & Calf Performance

- Combination study of cow BCS at calving and late gestational supplementation.
- Study design:
 - Cows were fed to achieve BCS 4 or 6 during second trimester.
 - During last trimester, half of the cows in each BCS group were supplemented while the other half was not.
 - After calving, cows were managed similarly.

(Bohnert *et al.*, 2010)

Late Gestation Supplementation and Cow BCS Effects on Cow & Calf Performance

Item	<u>BCS 4</u>		<u>BCS 6</u>		<u>P-Value</u>	
	Supp	No Supp	Supp	No Supp	4 vs 6	Supp or not
Initial BCS	4.32	4.39	5.67	5.75	<.001	.14
Calving BCS	4.57	4.33	5.51	5.18	<.001	<.001
Weaning BCS	4.74	4.61	5.30	5.19	<.001	.02
Calving %	86.7	93.3	100	100	<.001	.22
Weaning %	85.0	91.7	98.3	100	<.001	.16
Preg. Rate %	77.2	80.7	92.8	90.0	.005	.93

(Bohnert *et al.*, 2010)

Late Gestation Supplementation and Cow BCS Effects on Cow & Calf Performance

Item	<u>BCS 4</u>		<u>BCS 6</u>		<u>P-Value</u>	
	Supp	No Supp	Supp	No Supp	4 vs 6	Supp or not
Calf BW, lbs	85.8	84.7	93.7	88.4	.002	.05
Calf WW, lbs	414	394	422	409	.05	.01
Growing ADG, lbs	1.39	1.32	1.41	1.30	.97	.26
Feedlot ADG, lbs	4.03	4.20	4.18	4.14	.84	.71
HCW, lbs	814	803	823	803	.79	.32
Choice, %	57.6	38.6	65.7	62.4	.13	.28
Yield Grade	3.4	3.4	3.3	3.4	.49	.86
Feedlot Health Costs	.58	4.59	2.72	11.98		

(Bohnert *et al.*, 2010)

Summary Points

- Late gestational supplementation did not affect pregnancy rates of cows.
- Some evidence that late gestation supplementation may:
 - ✓ Increase weaning weights
 - ✓ Improve replacement heifer fertility
 - ✓ Lower feedlot morbidity in steer calves
 - ✓ Improve quality grade

Sustained Nutrition™

- Cow Nutrition Program
- Provides consistent nutrition over the production cycle
- Supplement intake varies based on:
 - Cow BCS and requirements
 - Forage quality and quantity
- In multi-year evaluations, ranchers have reported:
 - Increased conception rates
 - Increased weaning weights
 - Less supplement usage and cost

Body Condition Score and Breeding Back

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