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Using Partial Confinement Systems for Beef Cattle Production

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Why would we ever consider
confining production cows?



Availability of Grass Reduced

- Chronic Drought Conditions
- More crop production acres
- Urbanization
- Increased value of grass

Availability of Grass Reduced

- Increased Value of Grass
 - Rethinking the utilization of grass
 - High quality grass for gain
 - Residues for maintenance

Confinement Feeding Cows



Research vs. Production

- First two years research study was total confinement
 - Studied all phases of the production cycle in confinement
- Last year and this year research is a systems approach
- Every producer has a unique system and therefore must determine what will work best for any given operation

Thinking Outside the Box



Thinking Outside the Box



Thinking Outside the Box



Thinking Outside the Box



Limit Feeding Confinement Cows

- Energy dense by products can be mixed with low quality crop residues
- Dry matter intake can be limited
- Cow condition can be maintained because nutrient needs are being met

Key Concepts for Limit Feeding Cows in Confinement



Knowing the Nutrient Content of Feedstuffs



TDN of common by-products and Forages

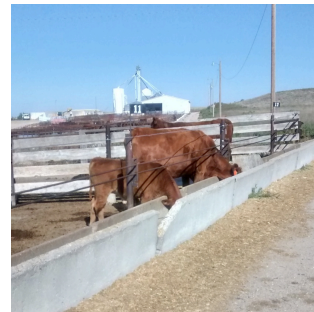
Ingredient ¹	TDN (%DM)
Corn distillers grains (wet, dry, modified) and solubles	108
Sugar beet pulp	90
Soyhulls	70
Synergy	105
Corn gluten feed	100
Midds	75
Corn	83
Wheat straw/corn stalks	43
Meadow Hay	57

¹Feeding trials reported in NE Beef Report 1987, p.4; '88 p. 34; '93, p. 46; midds data from KSU Research Report

Understanding Nutrient Requirements



Accounting for the Dry Matter Intake of the Calf



Manipulating Diets To Meet Changing Needs of the Cow and Calf



Diet (DM ratio)	Ingredients	Late Gestation Cow	Lactating Cow	Cow with 60 d old calf
		Dry matter intake, lb		
57:43	Distillers grains:straw	15.0	18.0	20.0
30:70	Distillers grains:straw	19.2	23.0	25.6
40:20:40	Distillers grains:straw:silage	15.4	18.5	20.6
20:35:45	Distillers grains:straw:beet pulp	14.6	17.5	19.4

Limit Feeding Lactating Cows in Confinement



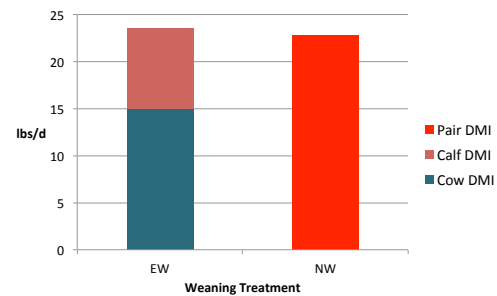
Year 1

- Lactation diet after 90 days (DM basis)
- 60% Wet Distillers
- 40% Straw/stalks
- Early weaned cows 15 lb DM
- Late weaned pairs 22 lb DM

Year 2

- Lactation diet after 90 days (DM basis)
- 40% Wet Distillers
- 20% Straw/stalks
- 40% Corn silage
- Early weaned cows 15.5 lb DM
- Late weaned pairs 24.9 lb DM

Daily DMI By Weaning Treatment



Performance of cows by location and weaning treatment. Yr 1&2

Item	ARDC		PREC		P-value		
	EW ¹	NW ²	EW ¹	NW ²	Weaning	Location	W x L
Cow BW, lb							
Prebreeding	1200 ^{ab}	1180 ^b	1227 ^a	1212 ^a	0.27	0.07	0.89
Ending	1205 ^{bc}	1165 ^c	1302 ^a	1232 ^b	0.02	<0.01	0.48
Cow BW change, lb	6 ^{bc}	-15 ^c	74 ^a	20 ^b	<0.01	<0.01	0.14
Cow BCS ³							
Prebreeding	5.5 ^a	5.5 ^a	5.2 ^{ab}	5.2 ^b	0.92	<0.01	0.63
Ending	5.4 ^{ab}	5.3 ^b	5.6 ^a	5.6 ^a	0.42	0.03	0.42
Cow BCS ³ change	-0.1 ^b	-0.2 ^b	0.4 ^a	0.4 ^a	0.38	<0.01	0.38

¹EW = early weaned at 90 d of age.

²NW = normal weaned at 205 d of age.

³BCS on a 1 (emaciated) to 9 (obese) scale.

Performance calves by location and weaning treatment. Year 1 & 2

Item	ARDC		PREC		P-value		
	EW ¹	NW ²	EW ¹	NW ²	Weaning	Location	W x L
Calf BW, lb							
Early weaning	274	285	283	271	0.95	0.78	0.21
Normal weaning	470 ^b	518 ^a	494 ^{ab}	465 ^b	0.38	0.18	<0.01
Calf ADG, lb	1.73 ^{bc}	2.06 ^a	1.86 ^b	1.70 ^c	0.09	0.02	<0.01
	EW		NW				
	1.80		1.88				

¹EW = early weaned at 90 d of age.

²NW = normal weaned at 205 d of age.

Energy Savings vs Management Tool

- Similar performance at equal intake suggests early weaning did not result in feed energy savings but may allow more flexible management options



Impact of Early Weaning on Pregnancy Rate

Treatment	ARDC		PREC	
	EW	NW	EW	NW
% Pregnant	89.9	85.4	92.5	95.2
$P > 0.88$				

Calf Health in Confinement

- Modified Sandhills Calving System
- Calves with 2 week age difference not allowed in the same pen
- No co-mingling of calf ages until after the youngest calves were over 4 weeks old

Calf Health Issues

- Minimal Health Issues prior to early weaning
- Shade is important for summer calves
- Exposure to temperature changes, newly arrived feeder calves, and decreased passive immunity caused respiratory challenge at both locations in different years

Considerations for Breeding in Confinement

- Cows may be close to handling facilities
 - Incorporating synchronization and AI
- Bulls need 15-18 lb TDN and another 2 ft. of bunk space



Our Experience

- Calves learned to eat with their mothers
- Learned what the feed truck was



Management Considerations

- Water
 - Calves learned to drink from trough within a few days of age.
 - No cases of calves dehydrating during summer.
- Bunk space
 - 2 ft/hd (adult cattle) & 1-1.5 ft/hd (calves).
- Pen space
 - 350 – 400 ft²/hd.



Confinement Feeding outside the Feedlot

- Limit feeding on pasture
 - Cattle will continue to consume forage if allowed
 - Pastures could continue to suffer overgrazing
 - Use winter feeding ground, crop ground, pivot corners



Supplement fed to cow-calf pairs on cornstalks^{1,2}.

Ingredient, %	
Dried distillers grains plus solubles	94.51
Limestone	3.50
Pelleting binder	1.88
Vitamin A,D,E	0.11

¹All values presented on a DM basis.

²Fed at 5.2 lb per pair per day (DM).



Cow BW by location and wintering treatment, lb.

Item	ARDC		PREC	
	CS	DL	CS	DL
Initial	1222	1217	1257	1247
Ending	1125	1339	1271	1307

ARDC	
Initial	SEM = 80 P = 0.83
Ending	SEM = 64 P = 0.03

PREC	
Initial	SEM = 137 P = 0.69
Ending	SEM = 145 P = 0.34

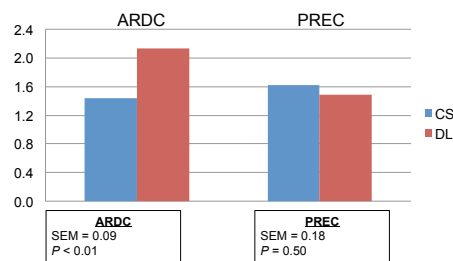
Calf BW by location and wintering treatment, lb.

Item	ARDC		PREC	
	CS	DL	CS	DL
Initial	319	320	306	312
Ending	558	672	525	512

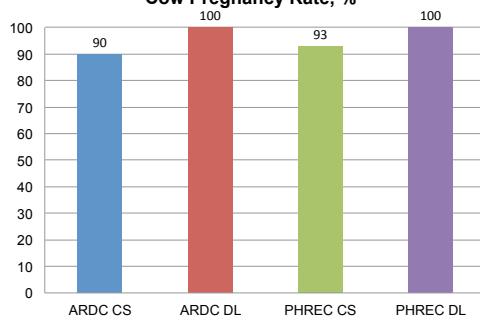
ARDC	
Initial	SEM = 9 P = 0.93
Ending	SEM = 19 P = 0.02

PREC	
Initial	SEM = 22 P = 0.27
Ending	SEM = 45 P = 0.57

Calf ADG, lb



Cow Pregnancy Rate, %



Base Analysis Prices									
Grass	\$/d	1.67	\$50/mo/pair						
Cornstalks	\$/d	0.89	\$18/ac						
Distillers	\$/lb DM	0.086		172.00	base price of \$150/ton at 90% DM + \$5 for delivery				
Hay	\$/lb DM	0.047		94.00	base price of \$80/ton at 90% DM + \$5 for delivery				
Stalks/Straw	\$/lb DM	0.05		100.00	base price of \$85/ton ground at 90% DM + \$5 for delivery				
Mineral	\$/yr	10							
Cow cost	\$/yr	250							

Scenarios		GSL		GSL		Confinement		Confinement/Stalks	
		March Calving		June Calving					
Grazing	Grass d	180		215					
	cost		300.60		359.05		0.00		0.00
Grazing	Stalks d	120		195				130	
	cost		106.80		173.55		0.00		115.70
	Hay lbs	1645							
	cost		77.32		0.00		0.00		0.00
Baled	Straw/sta lbs					2738		1763	
	cost		0.00		0.00		136.90		88.15
	DGS lbs	45		270		4106		3294	
	cost		3.87		23.22		353.12		283.28
	Supp. Day d	45	9.00	270	54.00			130	26.00
	Mineral		10.00		10.00		10.00		10.00
	Labor d	320	32.00	95	9.50	365	164.00	235	118.75
	Weaning lbs	521		557		480		580	
	Cow cost		250.00		250.00		250.00		250.00
Total Cost per Cow			789.59		879.32		914.02		891.88
UCOP at 100% weaned/exposed			1.516		1.579		1.904		1.538
UCOP at 95% weaned/pregnant			1.595		1.662		2.004		1.619
UCOP at 85% weaned/exposed			1.783		1.857		2.240		1.809

Summary

- Energy density is the key to limit feeding
- Lactation increases energy needs considerably
- Consider early weaning options
- Confined calves must be able to reach water and feed
- Limit fed cows need ample bunk space and a consistent feeding routine

Summary Cont.

- Each producer needs to evaluate their resources and system options to see what might work best
- As prices change systems should be re-evaluated

