

Cattle Feeding: Limiting Intake and Adding Corn Grain

Producers need options for wintering their cattle herds when fibre is in short supply. Feeding cows limited dry matter intake (DMI) rations may be one answer for Alberta's beef cattle herd.

U.S. research shows that feeding reduced dry matter intake (DMI) rations with corn grain for the beef cow is a possible option to help winter the Alberta cattle herd. The U.S. findings are very positive but, Alberta Agriculture wanted to see if these U.S. findings would hold true under Alberta conditions and if straw could be used as a fibre source with corn grain and limited DMI rations.

Kinsella trial

In August 2002, Alberta Agriculture and the Alberta Cattle Commission launched the Kinsella Corn Grain and Limited Intake Trial using the cattle herd at the University of Alberta's Kinsella Ranch. The trial was to find out whether Alberta beef cows fed limited dry matter (DM) rations could maintain their body condition scores if protein, energy, mineral and vitamin requirements were met. Another goal was to see if whole corn grain could be effectively used as an energy source for beef cows.

For the trial, 75 cows were selected by age, health and frame size. These animals were split into five dietary groups. The control group was given a traditional diet of straw, hay and pellet. The other four groups were fed:

- 0.5% DM hay, corn, pellet
- 0.75% DM hay, corn, pellet
- 0.5% DM straw, corn, pellet
- 0.75% DM straw, corn, pellet

The figures 0.50 per cent and 0.75 per cent DM (dry matter) refer to the per cent of the cow's body weight (on a dry basis) to which fibre is fed. For example, a 1,000 pound cow x 0.75 per cent = 7.5 lbs

of dry matter hay fed per day. The control group was fed 2.25 per cent DMI daily, a level accepted as the industry standard.

Table 1. The Rations

Ingredients	(Dry Matter, lbs/cow/day)				
	Control Cows	Hay Cows 0.75%	Hay Cows 0.5%	Straw Cows 0.75%	Straw Cows 0.5%
Grass Hay	7.00	10.00	7.00		
Straw	15.09			10.00	7.00
Corn		6.96	8.80	9.34	10.75
Pellet	4.40	1.10	1.10	1.10	1.10
Total	26.49	18.06	16.90	20.44	18.85

Whole corn grain was used as the energy source while the pellet was used to supplement the ration for protein, energy, minerals and vitamins. The cows were fed once daily in the morning, with a corn/pellet mix first, followed by the fibre component an hour later. The test lasted 56 days, with the animals being weighed every two weeks and condition-scored every four weeks.

All cows in the trial were also given the ionophore Rumensin to help them adjust to the diet and to help with overall digestive health.

Results

Table 2. Final Data Summary

	Start Weight	End Weight	Weight Change	BCS Change*
Control	1129	1256	127 ^d	-0.1
.75 Hay	1099	1150	51 ^c	0
.50 Hay	1123	1155	32 ^b	-0.1
.75 Straw	1163	1168	5 ^a	-0.2
.50 Straw	1147	1170	23 ^{ab}	-0.2

* No statistical difference in body condition score (BCS) change a,b,c,d indicate statistical differences

While cows in the control group did gain more weight, the trial showed that this result was because their rumens were fuller. Researchers narrowed the difference in weight gains between the control cows and the other dietary groups from an average 99 lbs to 55 lbs by giving all cows full-feed access for three days at the end of the trial.

The trial showed no difference in body condition score among all five groups; the animal's fat cover did not change even if the animals gained weight.

Recommendations

The trial supports the feeding of limited DMI maintenance rations to healthy cows.

- The recommended ration is 1 per cent of the cow's weight in dry matter roughage. This figure is 40 per cent of the normal fibre requirement.
- With superior management and facilities, this ration can be lowered to .75 per cent of the cow's body weight.

Healthy animals can survive on a maintenance diet of much less fibre than they are normally given. In years where fibre is short, healthy animals can survive on a smaller maintenance DMI diet, and herds may not need to be liquidated.

Other recommendations:

- As the trial showed little difference between the condition scores of hay and straw-fed cows, the choice between feeding straw and hay should be based on what is available to the producer and at what price.
- Chop length may be an issue when feeding silage instead of straw or hay. Feeding fine chopped silage reduces the effect of the fibre. Producers should provide long fibre with the chopped silage – a minimum of 0.25 per cent of the cow's body weight in fibre should be in pieces of at least one inch.
- As far as energy sources are concerned, the Kinsella trial showed whole grain corn to be an effective energy source. However if feeding corn, a fusarium management plan must be followed. If feeding barley instead of corn, coarse roll the kernel into three pieces to improve the feed efficiency. Feed wheat is not recommended in limited DMI rations.
- No matter what the energy source, the recommended maximum is 10 pounds of grain per cow per day. If feeding over 10 pounds, consider feeding the cows twice per day instead of just once.

- During cold periods, cows will need more energy to keep warm. Additional feed will be needed when temperatures fall to -20 degrees Celsius or lower, or when other weather conditions warrant, such as cooler temperatures combined with high winds.
- Adequate bunk space is important when the cows all come together to feed. Each cow will need at least three feet of bunk space; in the trial, each animal was given four feet of space.
- When using a reduced DMI diet, it is important to monitor the animal's protein, energy and mineral levels carefully, especially the magnesium levels. Any supplements given must be force-fed to ensure all cows consume adequate levels.
- As with any major shift in a nutrition program, a move to a reduced DMI diet must be brought in slowly, following deliberate step-up procedures. Consult with a nutritionist before implementing trial results on individual operations.

Additional benefit

Though lowering the cost of beef cow rations was not the objective of the trial, the table below shows the results that indicate significant cost savings can be achieved from using reduced DMI diets. The costs were based at Kinsella, Alberta, in early September 2002. Clients are encouraged to calculate ration costs using their own input prices.

Trial results indicate that healthy cows can survive on a maintenance diet of much less fibre than they are normally given. In years where fibre is in short supply, healthy cows can survive on a lower DMI diet, and herds may be maintained instead of reduced.

Table 3. Ration Costs

Treatment	Feed Cost/day (includes waste)	Feed	Cost/lb As Fed
Control	\$1.90	Grass Hay	7.5 cents
0.75% Hay	\$1.80	Straw	3.6 cents
0.50% Hay	\$1.72	Corn	8.9 Cents
0.75% Straw	\$1.62	Pellets (3 Different Pellets)	12-17 cents
0.50% Straw	\$1.64		

For more information, contact the Alberta Ag-Info Centre at 1-866-882-7677.