

Liveweight and behavioural responses in cattle ingesting snow as their water source

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Concurrent with other studies on the ingestion of snow by cattle during the winter of 1979-80, trials were conducted to determine liveweight and behavioural responses in groups of calves and pregnant cows which were denied access to liquid water and forced to obtain their water source from field snow. Two trials were conducted. The first at The University Farm, Edmonton, utilized 9 to 12 month old calves and, the second, at The University Ranch, Kinsella involved 2 groups of pregnant beef cows. The meteorological records for both these sites are contained in the previous Feeders' Day article, see page 58.

Materials and methods

Experiment I

Ten calves born March/April 1979 from beef synthetic cows used in the 1978-79 snow studies were used. These calves were weaned from their mothers in November and kept on pasture till the occurrence of permanent ground snow in December. On December 19th, the calves were divided into 2 groups balanced for sex and age and put into a feedlot with the feed trough in an open front shed. One of the pens opened into an adjacent small field to which the calves had access. There was no pasture available to the calves from the snow covered field. The calves with access to this field were denied liquid water whereas the other group had

continuous access to liquid water from a heated water bowl. The same amount of a ration of barley grain and brome grass hay was offered daily to both groups and was at a level for the calves to have average daily gains of about 0.75 kg/day. The trial was terminated after 98 days. The calves were weighed at 14-day intervals and body water turnover was measured on 4 of the calves on each treatment during the last 14 days of the trial.

Experiment II

This experiment was conducted at The University Ranch, Kinsella. One hundred pregnant cows of Hereford, beef synthetic and dairy synthetic strains were selected from the main Ranch herd on January 22, 1980 and separated into 2 balanced treatment groups (*water, snow*). Except for the experimental treatments both groups of cows were managed and received rations similar to that for the main University Ranch breeding herd. The 2 adjacent fields (approximately 30 ha) in which the cows were kept provided some tree shelter. The ration the cows received was equivalent to 3.05 kg of grain mixture, 2.79 kg of hay and 1.79 kg of straw/head/day.

The cows were weighed at the start of the treatment periods (January 22) and when they were removed from treatments (March 18, 1980). Behavioural observations were made on the cows in Experiment II for 10 days immediately after imposition of the treatments and periodically thereafter. Behavioural observations were also made on the calves in Experiment I as well as on the cows in Experiment I and Experiment II of the previous article (page 57).

Results and discussion

Experiment I

The liveweights of both groups of calves are presented in Table 1. The calves receiving water had an average gain of 0.70 kg/day while those which were forced to obtain their water as snow gained at a rate of 0.60 kg/day. The difference was, however, not statistically significant. The feed to weight gain ratio was 8.8:1 and 10.2:1, and the average daily water turnovers for the calves was 68.4 and 61.7 cc/kg, or liveweight respectively, for the water and snow treatment groups.

It was observed that the calves which were denied water ate their daily ration more slowly than did the calves with access to water. Those denied water tended to eat intermittently, alternating feeding periods with bouts of snow ingestion. The different eating behaviour and slightly lower water turnover of the snow calves may have caused their slightly poorer average daily weight gain.

Experiment II

On the 2nd and 3rd day of treatment, chinook conditions raised air temperatures to the unusually warm high of 11°C. During these 2 days some liquid water was available on the ground in the field due to the melting of snow. Eating of snow was not observed in any of the cows till the 3rd day on the snow treatment. Two cows were observed to be eating snow on the 3rd day. By the 4th day air temperature had dropped to -18°C and by the 5th day to -30°C. On the 4th day 10 of the 50 snow treatment cows were eating snow and by the 5th day

Table 1. Liveweight of the growing calves (Experiment I) and pregnant cows (Experiment II) with access to liquid water or only on field snow.

	Experiment I		Experiment II	
	Water	Snow	Water	Snow
No. of animals	5	5	50	50 ¹
Days on test	98	98	60	60
Liveweight (kg)				
Pretreatment	200.9	206.4	503.1	500.5
Posttreatment	269.6	265.2	499.6	501.7
Liveweight change (kg)	+68.7	+58.8	-3.5	+1.2

¹ One cow died.