

have reduced reproductive performance, then cooling should be supplied to shade boars when ambient temperature is greater than 86°F, or black globe temperature is greater than 88°F or the THI is greater than 78.

These data indicate that ambient temperature, black globe temperature and THI are all significantly correlated with RR in boars receiving only shade during July and August in Oklahoma. Furthermore, these data suggest that ambient temperature, black globe temperature, THI or RR could be used to determine when boars are cooled adequately to prevent heat stress. However, the minimal amount of heat stress that will alter reproductive performance of boars is not known.

Literature Cited

Ingraham, R.H., R.W. Stanley and W.C. Wagner. 1976. *J. Dairy Sci.* 59:2086.

Influence of Winter Weight Loss on Calf Birth Weight and Reproductive Performance of Range Cows

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Story in Brief

Eighty Hereford cows were maintained in two groups under range conditions. One group of cows (moderate level) was given supplemental feed (41 percent protein cottonseed meal pellets) so that only 3.5 percent of the November body weight was lost prior to calving in March. The other group of cows (low level) was fed the same supplement at a level that resulted in a loss of 14 percent of the fall weight prior to calving. Body condition scores were similar in November and March for the cows on the moderate level of nutrition but decreased 1.7 units for the cows on low nutrition. Birth weight of the calves from cows on the low level of nutrition was significantly less than the birth weight of calves from moderate cows. During the breeding season, 20 percent more of the cows on the moderate level of nutrition exhibited estrus by 80 days postpartum compared to the cows on low nutrition. Pregnancy rate for the moderate cows was 85 percent, compared to only 71 percent for the cows on the low level of winter nutrition.

Introduction

Many factors influence the interval from calving until the first heat and ovulation in beef cows. This anestrus interval is longer for cows suckling calves than for non-suckled cows. Separation of cows and calves for intervals as short as 48 hours may decrease the anestrus interval. Level of winter nutrition greatly influences postpartum reproduction. Energy intake during late pregnancy is related to pregnancy rate in the subsequent breeding season.

The current experiment was designed to determine the relationships between pre-calving winter weight loss, body condition score, calf birth weight and reproductive performance of range cows.

Materials and Methods

Hereford cows were maintained in two groups under tall grass native range conditions during the winter of 1978-9. One group of 40 cows (moderate level) was fed so that the November body weight was maintained through the winter until the time of calving. The other group of 40 cows (low level) was fed so that they would lose 10 to 15 percent of the November weight by the time of calving. The amount of supplement (41 percent protein, cottonseed meal pellets) that was group-fed 6 days a week was adjusted for each group when the animals were weighed every second week. Cows had access to dry native range, and prairie hay was fed during periods when the grass was covered by snow or ice. After calving, all cows were fed the same level of supplement (35 lb of 41 percent protein pellets per week).

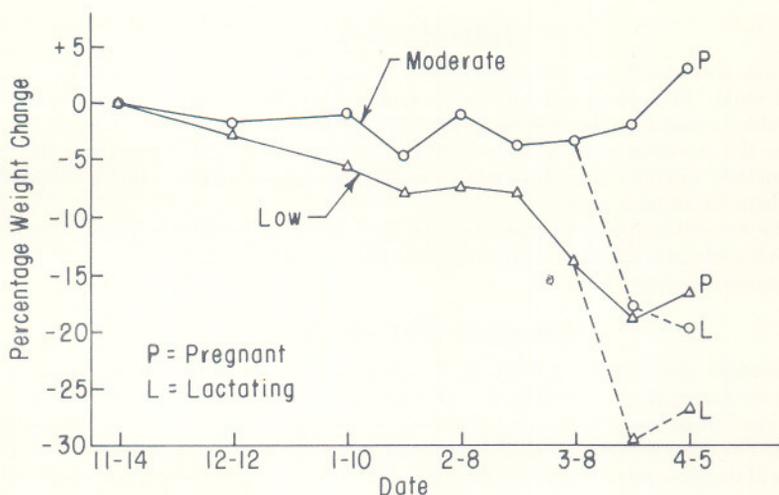
Body condition scores, based on visual observations, were determined independently by three individuals on November 14, February 8 and March 8. The scores were based on a scale from 1 = very thin, to 9 = very fat. Cows were exposed from April 20 until July 30 to bulls wearing chin-ball markers to aid in detecting breeding activity.

Results and Discussion

The winter feeding program achieved approximately the weight losses that were desired (Figure 1). Body weight losses for low and moderate level cows differed by 6 percent or less through the middle of February. But by the beginning of the calving season (March 8, 1979), cows on the moderate level of nutrition had lost 3.5 percent of their November weight, and low level cows had lost 14 percent. By late March, moderate cows had lost 18 percent (including calving loss) of their November weight, and low cows had lost 30 percent (including calving loss).

Body condition scores were similar for both treatment groups on November 15, the start of the winter feeding period (Table 1). However, by February the moderate cows had a condition score 0.9 greater than the low cows, and by March the difference between the two groups was 1.5. These differences in body condition reflect the differences in weight lost by the cows on the two treatments.

Birth weights of the calves from cows maintained on the low level of nutrition were significantly reduced compared to cows on the moderate level (Table 2). Bull calves from moderate cows weighed 75.6 pounds, compared to 69.1 pounds for bulls from low cows. Weights of the heifer calves from cows on the low level of nutrition were similarly reduced by 2.6 pounds compared to calves from moderate cows. As would be expected, average birth weight of the bull calves was 4.6 pounds greater than the average weights of the heifer calves. The 205-day adjusted weaning weights were 10 pounds greater for the calves from moderate cows compared to calves from the low nutrition cows, but this difference was not significant.



Percentage Body Weight change for Hereford Cows maintained on a moderate or low level of nutrition. (1978-'79)

FIGURE 1.

Table 1. Body condition score^a and pregnancy rate for cows maintained on either a moderate or low level of winter nutrition.

	Level of nutrition	
	Moderate	Low
Number of cows	40	40
Date:		
Nov 14	6.0	6.0
Feb 8	5.7	4.8
March 8	6.0	4.5
Pregnancy rate (%)	85.0	70.6

^a1 = very thin, 9 = very fat.

During the breeding season, 20 percent more of the cows on the moderate level of winter nutrition were observed in estrus by 80 days after calving. Pregnancy rate for the moderate cows was 85.0 percent, in contrast to only 70.6 percent for the cows on the low nutrition treatment.

This study clearly illustrates the influence of the level of winter nutrition on body weight loss, condition score, calf birth weight and reproductive performance of range cows. These data, as well as results of other trials, demonstrate that prepartum weight loss of cows is an important factor that influences the subsequent calf crop. The goals of

Table 2. Birth weights and 205-day adjusted weaning weights of calves from cows maintained on either a moderate or low level of winter nutrition.

Criteria	Level of nutrition			
	Moderate		Low	
	(no)	(lb)	(no)	(lb)
Birth wt ^a Bulls	23	75.6	17	69.1
Heifers	14	69.7	17	67.1
Weaning Wt (Adjusted 205-day)	35	413.3	32	403.1

^aSignificant nutrition ($P < .025$) and sex effect ($P < .05$).

a good supplemental feeding program are to increase the number of cows pregnant and to decrease the interval from calving to first estrus. If cows are in moderate body condition at the beginning of the winter feeding period and their body weight is maintained until the time of calving in the spring, the next calf crop will be increased in number and weaning weight compared to cows fed a lower level of nutrition.