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## Effect of energy level during late gestation on the performance of heifers calving for the first time (3 year summary)

### Abstract

Effect of varying energy levels fed during gestation on reproduction and calf performance were studied in three trials involving 266 first calf heifers. Reducing energy during mid-gestation did not adversely affect the performance of the heifers when they were fed properly for at least 50 days before calving. Heifers on restricted levels of energy during mid-gestation and then elevated tended to have both higher first-service conception rates and total conception rates. Restricting energy throughout the gestation period reduced reproductive performance, causing lighter calves at birth and weaning emphasizing the importance of energy in the diet of first calf heifers.

### Keywords

Cattlemen's Day, 1978; Report of progress (Kansas State University. Agricultural Experiment Station); 320; Beef; Energy; Performance; Conception rates

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Effect of Energy Level During Late Gestation On  
The Performance of Heifers Calving For The  
First Time (3 Year Summary)

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### Summary

Effect of varying energy levels fed during gestation on reproduction and calf performance were studied in three trials involving 266 first calf heifers. Reducing energy during mid-gestation did not adversely affect the performance of the heifers when they were fed properly for at least 50 days before calving. Heifers on restricted levels of energy during mid-gestation and then elevated tended to have both higher first-service conception rates and total conception rates. Restricting energy throughout the gestation period reduced reproductive performance, causing lighter calves at birth and weaning emphasizing the importance of energy in the diet of first calf heifers.

### Introduction

Feed is the major cost involved in any cow-herd operation. The most costly nutrient is energy (TDN).

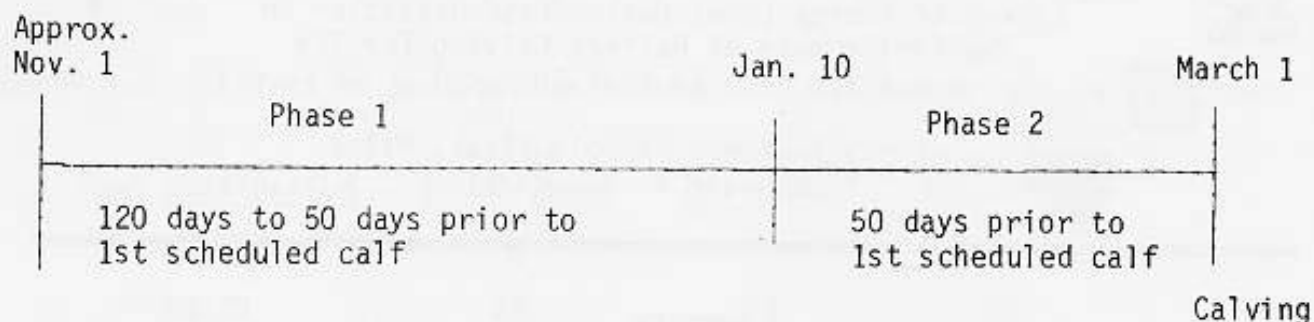
Previous research has clearly shown that cows fed inadequate energy (TDN) after calving have greatly reduced conception rates and calves that grow slower. If inadequate energy (TDN) is fed during gestation, the cows will be slower to show heat after calving, their milk production will be reduced which will decrease calf gains, and calf vigor at birth may be reduced. During gestation the major portion of the fetal development is 50 to 60 days before calving. That leads to the question, could the level of energy (TDN) be reduced during mid-gestation without reducing cow and calf performances provided the cow is properly fed the last 1½ to 2 months before calving.

Three research trials were conducted with first calf beef heifers to study effects of different energy (TDN) levels during gestation on cow and calf performances.

### Experimental Procedure

In all three trials the gestation period of first calf heifers was divided into two phases. As the heifers were fed as a group, the two phases were designed around the start of the calving season (March 1) each year. As can be noted in the following table Phase 1 was from 120 days to 50 days before the first scheduled calf. Phase 2 was the last 50 days before the first scheduled calf or up until the heifer calved which may have been 75 to 100 days in some cases.

Table 4.1. Breaking the last 120 days of pregnancy into two phases.



The heifers in Trials 1 and 2 were fed in small, grass pastures but the grass available for intake was of little effect on the results. In trial 3 the heifers were fed in drylot. In each trial three different levels of energy (TDN) were compared. The energy (TDN) content of the ration was estimated based on the amount of alfalfa hay, milo, or protein supplement fed. Levels of energy (TDN) fed were:

<u>% NRC</u>		<u>Lbs. TDN/head/day</u>
70	=	5.8 Lbs. TDN
100	=	8.5 Lbs. TDN
120	=	10.1 Lbs. TDN

All rations were formulated to be equal in protein and mineral content and after the heifers calved all were fed in one group a balanced ration to meet NRC requirements for TDN, protein, and minerals.

Only two-year-old heifers scheduled to calve for the first time were involved in the study. The heifers were Polled Hereford, Hereford, Angus, or Simmental breeding and were allotted to one of three treatments by breed, weight, and scheduled calving date. All heifer weights were recorded after 15 hours off feed and water. The heifers were bred (A.I.) the first 45 days of the breeding season and exposed to bulls the last 15 days of a 60 day breeding season.

### Trial 1

Trial 1 involved 87 heifers. The trial started on November 7, 1974; the three treatments were:

	<u>Energy (TDN) Level Fed</u>	
	<u>Phase 1</u>	<u>Phase 2</u>
Treatment 1	100% NRC	100% NRC
Treatment 2	70% NRC	100% NRC
Treatment 3	70% NRC	120% NRC

Trial 2

Trial 2 involved 71 heifers. The trial started on November 10, 1975; the three treatments were:

	Energy (TDN) Level Fed	
	Phase 1	Phase 2
Treatment 1	100% NRC	100% NRC
Treatment 2	70% NRC	100% NRC
Treatment 3	70% NRC	120% NRC

Trial 3

Trial 3 involved 108 heifers. The trial started on November 6, 1976; the three treatments were:

	Energy (TDN) Level Fed	
	Phase 1	Phase 2
Treatment 1	100% NRC	100% NRC
Treatment 2	70% NRC	100% NRC
Treatment 3	70% NRC	70% NRC

Condition was visually scored (1 = very thin, 10 = excessively fat) at the start of the trial and at the ends of Phase 1 and Phase 2.

Milk production data was collected from the Polled Hereford heifers (55% of the heifers) by weighing the calves before and after suckling.

ResultsTrial 1

The heifers on the higher level of energy during early gestation (Phase 1) gained more weight, 38 lbs., than those on the low level of energy (70% NRC). During late gestation (Phase 2) heifers on the highest energy level (120% NRC) gained the most weight (Table 4.2).

We observed no effect of energy levels on birth weight. Even though a lower percentage of the heifers in Treatment 2 (70% NRC then 100% NRC) showed heat at the start of the breeding season compared to heifers on 100% NRC throughout, they had the best first-service conception and overall conception rates.

Trial 2

Level of energy had no significant effect on heifer weight gains in this trial, although those heifers on the lowest levels of energy during both phases (Treatment 2) gained the least (Table 4.3).

Again the energy levels had no effect on birth weight of the calves but both the groups of heifers on the low level of energy during mid-gestation and then evaluated in late gestation had a higher percentage of heifers cycling at the start of the breeding season, conceiving at first breeding, and conceiving during the breeding season than heifers fed the NRC recommended level of energy throughout gestation.

Trial 3

As expected, heifers on the highest level of energy during Phase 1 (100% NRC) gained the most, while those heifers on low energy during mid-gestation (Treatment 2) but high energy during Phase 2 gained the most weight during Phase 2. Heifers on low energy throughout gestation gained the least and lost the most condition.

Calf birth weights and cow's milk production tended to be lower for the cows restricted on energy throughout the gestation period. The reduced milk production resulted in the calves being 35 and 42 lbs. lighter than calves in Treatment 1 and 2, respectively.

Conception at first service was inexplicably low in all three groups. Heifers restricted on energy during gestation had the lowest first-service and overall conception rates.

Table 4.2. Effects of indicated energy levels during gestation on cow and calf performance - Trial 1

Phase 1 - 116 to 50 days Precalving	100% NRC	70% NRC	70% NRC
Phase 2 - last 50 days Precalving	100% NRC	100% NRC	120% NRC
Heifer weight change			
Phase 1	38.7	22.7	26.2
Phase 2	63.8	55.2	91.9
Total	102.5	77.9	118.1
Calf birth weights, lbs.	75.9	78.1	77.4
% difficult births	71.4	59.3	67.8
% cycling 1st 25 days of breeding season	84.6	72.4	85.7
% 1st service conception	50.0	63.6	40.0
% conception rate, 60 day breeding season	84.6	93.1	89.3

Table 4.3. Effects of indicated energy levels during gestation on cow and calf performance - Trial 2

Phase 1 - 116 to 50 days Precalving	100% NRC	70% NRC	70% NRC
Phase 2 - last 50 days Precalving	100% NRC	100% NRC	120% NRC
Heifer weight change			
Phase 1	38.5	30.8	32.8
Phase 2	56.8	30.4	50.6
Total	95.3	61.2	83.4
Calf birth weight, lbs.	81.0	81.8	78.5
% difficult births	65.2	66.7	78.3
% cycling 1st 25 days of breeding season	80.0	96.0	92.0
% 1st service conception	40.0	50.0	56.5
% conception rate, 60 day breeding season	72.0	88.0	92.0

Table 4.4. Effects of indicated energy levels during gestation on cow and calf performance - Trial 3

Phase 1 - 116 to 50 days Precalving	100% NRC	70% NRC	70% NRC
Phase 2 - last 50 days Precalving	100% NRC	100% NRC	70% NRC
Heifer weight change			
Phase 1	+60.1	-15.4	+14.6
Phase 2	+85.7	+130.9	+75.6
Total	145.8	115.5	90.2
Heifer condition change			
Start of Phase 1	4.7	4.7	4.7
End of Phase 1	4.7	4.3	4.4
End of Phase 2	5.2	5.1	4.3
Calf birth weight, lbs.	72.9	71.3	69.3
Weaning weight, lbs.	411.4	418	376
% heifers with calving difficulty	45	28	18
% calf survival at birth	85	94	97
Milk production, Lbs./24 hour period	11.1	11.9	9.8
Conception at first service	37	48	25
Conception rate, 60 day breeding season	80	82	68