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Effects of pregnancy in feedlot heifers on performance and carcass characteristics

Abstract

Sixty-eight, spring-born, yearling heifers were raised, estrous synchronized, artificially inseminated once, and then finished at the Kansas State University Western Kansas Agricultural Research Southeast Agricultural Research Center Center at Hays to determine the effects of pregnancy status on feedlot performance and carcass traits. To achieve a common endpoint at slaughter, heifers were allotted to one of two slaughter dates to achieve a backfat measurement of 0.5 inch. Therefore, both open and pregnant heifers were slaughtered at either 105 or 147 days (fetal age averaged 174 days for the pregnant heifers). Initial weight, rate of gain, and final weight were similar between open and pregnant heifers ($P>0.36$). Dressing percentage and ribeye area were lower ($P<0.05$) for pregnant than open heifers. Hot carcass weight tended ($P=0.13$) to be greater for open heifers. No differences between treatment groups were observed for fat thickness, percentage kidney, pelvic, and heart fat, yield grade, marbling score, or maturity score ($P>0.16$). However, even though only small differences were recorded in carcass weights, yield grades, and quality grades, their impact on carcass value and cattle feeding profits may be important.

Keywords

Cattlemen's Day, 2003; Kansas Agricultural Experiment Station contribution; no. 03-272-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 908; Beef; Pregnancy; Heifers; Performance; Carcass characteristics

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EFFECTS OF PREGNANCY IN FEEDLOT HEIFERS ON PERFORMANCE AND CARCASS CHARACTERISTICS

G. L. Bishop, J. R. Brethour, T. T. Marston, and T. E. Lawrence

Summary

Sixty-eight, spring-born, yearling heifers were raised, estrous synchronized, artificially inseminated once, and then finished at the Kansas State University Western Kansas Agricultural Research Center at Hays to determine the effects of pregnancy status on feedlot performance and carcass traits. To achieve a common endpoint at slaughter, heifers were allotted to one of two slaughter dates to achieve a backfat measurement of 0.5 inch. Therefore, both open and pregnant heifers were slaughtered at either 105 or 147 days (fetal age averaged 174 days for the pregnant heifers). Initial weight, rate of gain, and final weight were similar between open and pregnant heifers ($P>0.36$). Dressing percentage and ribeye area were lower ($P<0.05$) for pregnant than open heifers. Hot carcass weight tended ($P=0.13$) to be greater for open heifers. No differences between treatment groups were observed for fat thickness, percentage kidney, pelvic, and heart fat, yield grade, marbling score, or maturity score ($P>0.16$). However, even though only small differences were recorded in carcass weights, yield grades, and quality grades, their impact on carcass value and cattle feeding profits may be important.

Introduction

There are unique challenges associated with finishing heifers. There are several options for management of the pregnant feedyard heifer including: diagnosis of pregnancy at or soon after arrival and subsequent treatment with an abortifacient to end pregnancy; treatment of all heifers to terminate pregnancy; or shipping heifers prior to calv-

ing. There may be costs associated with aborting heifers beyond the initial cost of diagnosis and treatment of pregnancy. The objective of this study was to conduct an initial investigation of the effects of mid-term pregnancy on growth rate and carcass characteristics in yearling heifers.

Experimental Procedures

Sixty-eight, spring-born, yearling heifers were raised and fed at the Kansas State University Western Kansas Agricultural Research Center at Hays. Prior to the feeding period, the heifers were estrous synchronized and artificially inseminated upon observation of standing heat. Heifers were classified as open ($n=43$) or pregnant ($n=25$) based on ultrasound diagnosis 60 days after breeding. Heifers were immediately placed on feed and provided a common diet. No growth implants were given. The finishing diet consisted of feeding 10 lb/heifer daily of corn silage (as fed), finely ground grain sorghum ad libitum, and a supplement (Table 1).

Table 1. Composition of the Supplement Used in the Finishing Diet

Ingredient	Pounds per heifer daily
Soybean meal	0.51
Urea	0.11
Ammonium sulfate	0.11
Trace mineral/vitamin premix	0.11
Limestone	0.22
Sodium chloride	0.07

In an effort to harvest heifers at a common backfat endpoint (0.5 inch), ultrasonic estimates of backfat were used to assign heifers within each pregnancy status into two harvest groups (105 and 147 days on feed). All pregnancies were visually confirmed at the abattoir.

Results and Discussion

Table 2 shows the feedlot performance of the heifers. Initial weight was not different for open or pregnant heifers. During the initial 90 days on feed, the open heifers had greater gains than their pregnant contemporaries ($P < 0.01$). However, live weight recorded just prior to slaughter revealed no effects of pregnancy status on live selling weight or overall average daily gain.

An intermediate ultrasound estimate of marbling score and 12th rib fat thickness was taken after 90 days on feed. No difference was noted in back fat between the open and pregnant heifer ($P > 0.44$), but pregnant heifers tended ($P < 0.21$) to have more intramuscular fat than the open heifers at that time.

Final carcass characteristics are presented in Table 3. Dressing percent was 2.3 percentage units lower ($P < 0.01$) for pregnant heifers. Because the reduction in dressing percent is directly related to fetal age, it would be anticipated that the decrease observed in this trial would continue to increase in magnitude as the heifers were fed to heavier weights and longer term pregnancies.

Pregnant heifers tended to have lighter carcasses ($P = 0.13$). Although not statistically significant, the reduction in carcass weight of 22 lb could result in significantly less revenue in marketing systems that pay according to dressed weight.

Ribeye muscle area was greater in open heifers ($P < 0.05$). No differences were observed in 12th rib fat thickness; percent kidney, heart, and pelvic fat; and calculated yield grade. In each case, pregnant heifers had numerically greater values, suggesting fatter carcasses, although these differences were not statistically significant ($P = 0.17$). Neither marbling nor maturity scores were different due to pregnancy in this trial ($P > 0.16$). However, there were slight differences in the distribution of USDA quality grades that favored the pregnant heifers (Table 4).

Table 4 describes the distribution of yield and quality grades for open and pregnant heifers. If sold on a value-based marketing grid, open heifers would have benefited from a greater percentage of carcasses falling within yield grades 1 and 2 (63% vs. 43%). There was no difference between groups in the percentage of carcasses falling into the heavily discounted yield grade 4 category. These results indicate that although actual measured backfat thickness may not be different, the cutability (yield grade) as assigned by USDA graders may favor carcasses of open heifers.

Table 2. The Effects of Pregnancy on Feedlot Heifer Performance

Item:	Pregnancy Status		Standard Error	P-value
	Open	Pregnant		
No. of heifers	43	25		--
Starting weight, lb	915	920	11.0	0.85
Gain (first 90 days), lb/day	3.30	3.08	0.07	0.01
Final weight, lb	1276	1287	15.2	0.65
Overall weight gain, lb	361	368	6.4	0.45
Overall daily gain, lb/day	2.86	2.86	0.04	0.43

Table 3. Carcass Traits of Pregnant and Open Feedlot Heifers

Item	Pregnancy Status		Standard Error	P-value
	Open	Pregnant		
Hot carcass yield, %	62.6	60.3	0.24	0.01
Hot carcass wt, lb	799	777	9.9	0.13
Ribeye area, inch ²	13.9	13.3	0.22	0.05
12th rib fat thickness, inch	0.54	0.56	0.03	0.45
Kidney, pelvic, and heart fat, %	2.15	2.28	0.05	0.28
USDA Yield grade	2.85	3.07	0.11	0.17
Marbling score ^a	5.97	6.26	0.24	0.45
Maturity score ^b	1.75	1.69	0.024	0.16

^aMarbling score scale: 5.00=Small⁰⁰, 6.00=Modest⁰⁰.

^bMaturity scale: 1.00=A⁰⁰, 2.00=B⁰⁰.

Table 4. Distribution of Yield and Quality Grades of Pregnant and Open Feedlot Heifers

USDA standards	Pregnancy Status	
	Open	Pregnant
<u>Yield grade</u>	----- % -----	
1	7	0
2	56	40
3	33	56
4	4	4
<u>Quality grade</u>		
Prime	12	16
Upper 2/3 of Choice	25	28
Lower 1/3 of Choice	40	36
Select	21	20
Standard	2	0