Effect of Implanting During Summer Grazing and (or) Finishing on Feedlot Performance and Carcass Characteristics of Steers.

L.J. McBeth, D.R. Gill, C.R. Krehbiel, J.B. Morgan, C.E. Markham, R.E. Peterson, R.L. Ball and S.S. Swanek

Story in Brief

One hundred eighty steers (BW=280 kg) grazing mixed native range from April 27 through July 7, 2001 near Arnett, OK were randomly assigned to one of three treatments including no implant during summer grazing or finishing, no implant during summer grazing and RevalorÒS during finishing, or RalgroÒ implant during summer grazing and RevalorÒS during finishing. Steers that were implanted on grass had higher rates of gain and greater BW upon entry to the feedlot, but this effect was compensated for by d 56 of the finishing period by contemporaries that were not implanted on grass but received an implant in the feedlot. Feedlot performance was greater for steers that were implanted in the feedlot with no significant effect on carcass quality. This study suggests that with the use of retained ownership strategies, growing costs may be reduced with the exclusion of an implant during the grazing period if compensatory growth can be attained in the feedlot.

Keywords: Implants, Steers, Feedlot, Grazing, Steers

Introduction

Implanting grazing cattle is a profitable management tool that generally increases weight gains 8 to 18% during the grazing period (Kuhl, 1997). However, the use of implants in grazing situations appears to be related to the subsequent production situation. Bodine et al. (2001) reported similar daily gain (approximately 1 kg/d) during summer grazing for steers not implanted during winter grazing vs steers that were implanted when summer forage (Old World bluestem) was adequate. However, previous implantation increased BW at the end of the summer grazing period when steers were grazed at a low (approximately .65 kg/d) summer gain. This difference is attributed to compensatory gain when adequate feed resources are available for high levels of subsequent production. As cattle enter the finishing period there is ample opportunity for compensatory gain and previous implant status can affect performance and carcass characteristics (Mader et al., 1997). Depending on the aggressiveness of the implant strategy, use of implants in the feedlot is often accompanied by decreased tenderness and percent carcasses grading choice, and increases in measures of leanness and red meat yield (Duckett et al., 1997). The objective of this study was to determine the effects of implantation with RalgroÒ during summer grazing and (or) a Revalor®S during finishing on feedlot performance and carcass characteristics.

Materials and Methods

Crossbred steers (n=180; BW=280 ± 17 kg) were randomly assigned to three treatments: No implant during summer grazing or finishing (CON; n=20); no implant during summer grazing and Revalor S during finishing (IMPLF; n=80); Ralgro (Schering Plough, Kelinworth, NJ) during summer grazing and Revalor S (Hoecst Roussel Vet, Summerville, NJ) during finishing (IMPLGF; n=80). Steers were grazed in a common pasture on mixed native range near Arnett, OK from April 27 to July 9, 2001. At the beginning of the grazing period steers were weighed, dewormed with Ivomec® Plus (Merial Animal Health, Duluth, GA), and vaccinated for IBR-PI_3-BVD-BRSV with BRSV-Vac 4 (Bayer Animal Health, Shawne Mission, KS). Steers were transported (~ 250 km) to the Willard Sparks Beef Research Center near Stillwater, OK on July 10, 2001 and allowed to settle overnight. At processing, steers were individually weighed, ear tagged, implanted with Revalor S (as per treatment designation), horn tipped as needed, vaccinated with IBR-PI_3-BVD-BRSV (F3Lp, Bayer Animal Health, Shawnee Mission, KS), and treated for control of external and internal parasites (Ivomec®). Steers were harvested by respective weight block with the heavy block being fed for 131 d and the light block being fed for 148 d. All steers were harvested by Excel Corp., Dodge City, KS.

Basal diets were formulated to meet or exceed NRC (1996) nutrient requirements (Table 1). Monensin (33 mg/kg of the diet) and tylosin (11 mg/kg of the diet) were fed. Cattle were gradually adapted to the final diet by offering 65, 75 and 85% concentrate diets for 7, 7 and 7 d, respectively. Steers were fed twice daily at 0800 and 1400. Cattle were weighed individually before feeding once every 28 d throughout the trial. Initial weight was analyzed as taken, whereas all interim weights were analyzed with a 4% pencil shrink. Final live weight was calculated by dividing hot carcass weight by a common dressing percentage (63%). Feed intake was measured and feed efficiency (DMI:ADG) was calculated every 28 d. Hot carcass weight was determined following harvest, and carcasses were evaluated after a 24-h chill for subcutaneous fat depth at the twelfth rib, longissimus muscle area, percentage kidney, pelvic, and heart fat, yield grade, marbling score, and quality grade (USDA, 1997). Longissumus dorsi muscle sections were sampled from a sub-sample of steers (n=20/trt) for Warner Bratzler shear force determination.

Cattle performance data were analyzed using PROC MIXED for repeated measures (SAS, 1999). Class variables included in the model as fixed effects were treatment and time period. Weight replicate was also considered as a class variable and was included in the model. Cumulative feedlot performance and carcass data were analyzed as a randomized complete block design using the GLM procedure of SAS (1999). Treatment and weight replicate were included in the model as class variables. Pen was considered the experimental unit for all cattle performance data (n = 4, 15, and 15 for CON, IMPLF, and IMPLGF, respectively) and individual animal was the experimental unit for carcass data. Carcass quality and yield grades as assigned by USDA were examined on an individual animal basis using the Chi-square analysis technique (SAS, 1999).

Results and Discussion

Steers that were implanted during the grazing period had approximately 9% greater ($P<.01$) ADG and were approximately 8 kg heavier ($P<.01$) at the end of summer grazing (Table 2). However, during the first 27 d of the finishing period, IMPLF and IMPLGF steers had greater ($P<.01$) ADG than CON (Table 3). From d 28 to 56, IMPLF steers had the greatest daily gain and gained significantly greater ($P<.01$) than CON (Table 3). By d 56 there was no difference between BW for IMPLF and IMPLGF steers while both were greater than CON. For the entire feeding period (P<.01), IMPLF had the greatest ADG, IMPLGF were intermediate and CON had the lowest ADG (Table 2); steers that were implanted in the feedlot were more efficient (P<.01) than CON (Table 2).

Table 1. Dry matter and nutrient composition of basal finishing diets	
Diet ingredient	% of diet DM
Rolled Corn	76.50
Cotton seed hulls	10.00
Yellow grease	3.00
Soybean meal	5.30
Wheat midds	1.23
Cottonseed meal	1.00
Limestone 38%	.90
Urea	.85
Di-calcium phosphate	.50
Cane molasses	.40
Salt	.25
Rumensin 80	.019
Tylan 40	.013
Vitamin A-30,000	.011
Manganous oxide	.003
Nutrients	
Dry matter, % as fed	87.65
NEm, Mcal/100lbs	97.17
NEg. Mcal/100lbs	61.86
Crude protein, % of DM	13.50
Crude fiber,% of DM	6.90
Calcium, % of DM	.52
Phosphorus, % of DM	.39
Potassium, % of DM	.57

Table 2. Effect of implant during the pasture and feedlot phase on feedlot performance					
Item	CON[a]	IMPLF[a]	IMPLGF[a]	SEM	P < F
Grass init wt, kg	284	280	280	3	0.39
Grass final wt, kg	370[b]	369[b]	378[c]	2	< .01
Grass daily gain, kg	1.15[b]	1.21[b]	1.32[c]	.07	< .01
Transport shrink, %	7.89	7.43	8.08	.61	.61
Initial wt., kg	338[b]	337[b]	346[c]	2	< .01
Adjusted end wt, kg	552[b]	594[c]	590[c]	8	< .01
Daily gain, kg					
d 0 - end	1.46[b]	1.85[c]	1.74[d]	.07	< .01

DM intake, kg					
d 0 - end	10.48	11.11	10.81	.43	.36
DMI:ADG					
d 0 - end	7.24[b]	6.02[c]	6.25[c]	.25	< .01

[a]CON = no implant during summer grazing or finishing; IMPLF = no implant during summer grazing and Revalor S during finishing; IMPLGF = Ralgro during summer grazing and Revalor S during finishing

[bcd]Means in a row with different superscripts differ P<.05

Table 3. Effects of implant and period on performance in the feedlot

Item	CON[a]	IMPLF[a]	IMPLGF[a]	SEM	Imp[b]
Body wt., kg					
d 0	338[c]	337[c]	346[d]	6	<.001
d 27	384[cd]	386[c]	397[d]		
d 56	429[c]	445[d]	450[d]		
d 84	471[c]	499[d]	501[d]		
d 112	516[c]	555[d]	554[d]		
d end	542[c]	595[d]	589[d]		
Daily gain, kg					
d 0 - 27	1.63[c]	1.77[d]	1.82[d]	.19	<.001
d 28 - 56	1.55[c]	2.02[d]	1.83[cd]		
d 57 - 84	1.54[c]	1.92[d]	1.80[cd]		
d 85 - 112 112112112112	1.61[c]	2.02[d]	1.94[cd]		
d 112 - end	.90[c]	1.50[d]	1.35[d]		
DM intake, kg/d					
d 0 - 27	9.86	9.59	9.69	.46	<.001
d 28 - 56	10.62[cd]	11.41[d]	11.03[c]		
d 57 - 84	10.64[c]	12.04[d]	11.45[cd]		
d 85 - 112	11.80[c]	13.04[d]	13.20[d]		
d 112 - end	10.95[c]	12.51[d]	12.37[d]		
DMI:Gain					
d 0 - 27	5.46	4.96	4.83	.70	.20
d 28 - 56	6.24	5.17	5.69		
d 57 - 84	6.44	5.90	5.99		
d 85 - 112	6.93	5.96	6.36		
d 112 - end	8.12	8.30	8.77		

[a]CON = no implant during summer grazing or finishing; IMPLF = no implant during summer

grazing and Revalor S during finishing; IMPLGF = Ralgro during summer grazing and Revalor S during finishing

[b]Probability of an implant effect

[cd]Means in a row with different superscripts differ P<.05

Hot carcass weight was significantly greater (P<.01) for IMPLF and IMPLGF vs CON. However, other carcass characteristics were not affected by implant treatment (Table 4). Control steers had a higher percent USDA choice (79%) than IMPLF (65%) or IMPLGF (64%) (Table 5), but differences were not significant (P>.10). Similarly, no difference was detected for frequency distribution of yield grade of steers by implant treatment (Table 5).

Table 4. Effect of implant during the pasture and feedlot phase on carcass characteristics

Item	CON[a]	IMPLF[a]	IMPLGF[a]	SEM	P < F
HCW, kg	340[d]	374[e]	370[e]	6	< .01
Dressing %	61.71	63.09	62.93	.53	.18
Ribeye area, cm^2	78.56	83.15	82.35	2.04	.20
12[th] Rib fat, cm	1.39	2.11	2.14	.26	.18
KPH	2.46	2.39	2.19	.17	.34
Marbling[b]	468	429	424	24	.17
Quality grade[c]	306	298	294	12	.42
Yield grade	3.60	3.64	3.61	.18	.13
Shear force, kg	3.16	3.28	3.28	.13	.88

[a]CON = no implant during summer grazing or finishing; IMPLF = no implant during summer grazing and Revalor S during finishing; IMPLGF = Ralgro during summer grazing and Revalor S during finishing

[b]Practically devoid = 100; traces = 200; slight = 300; small = 400; modest = 500; moderate = 600; slightly abundant = 700

[c]Standard = 100; select = 200; choice = 300; prime = 400

[de]Means in a Row with different superscripts differ P<.05

Table 5. Frequency distribution for various individual carcass measurements by implant in steers (Trial 1)

	CON[a]	IMPLF[a]	IMPLGF[a]
N	19	77	77
USDA Quality Grade[b]			
Prime	0	0	0
Choice	15	50	49
Select	4	27	27
Standard	0	0	1
USDA Yield Grade[c]			

One	0	0	0
Two	0	2	2
Three	9	32	36
Four	9	34	32
Five	1	8	8

[a]CON = no implant during summer grazing or finishing; IMPLF = no implant during summer grazing and Revalor S during finishing; IMPLGF = Ralgro during summer grazing and Revalor S during finishing

[b]Chi square value = 2.80; Probability = .89

[c]Chi square value = 1.33; Probability = .97

Implications

Steers that were implanted on grass had higher rates of gain and greater BW upon entry to the feedlot, but this effect was compensated for by d 56 of the finishing period by contemporaries that were not implanted on grass but received an implant in the feedlot. Feedlot performance was greater for steers that were implanted in the feedlot with no significant effect on carcass quality. This study suggests that with the use of retained ownership strategies, growing costs may be reduced with the exclusion of an implant during the grazing period if compensatory growth can be attained in the feedlot.

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