Effect of Postweaning Health on Feedlot Performance and Quality Grade

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Summary

A total of 6,618 calves fed at eight Iowa feedlots were used to evaluate the effect of postweaning health on feedlot gain and carcass quality grade. The calves, representing 12 states, were consigned to the Iowa Tri-County Steer Carcass Futurity and were weighed upon arrival, after 35 days, at re-implant, and prior to harvest. A common dietary energy level was utilized at each feedlot. Calf health was classified as no treatment (NT; N=5,500), single treatment (ST; N=575), or two or more treatments (2T; N=543). The predominant cause of treatment was respiratory problems. Calves were sorted and harvested when they were visually evaluated to have 0.4 inches of fat cover. Feedlot ADG was 3.06, 2.93, and 2.87 lb/day for the NT, ST, and 2T calves, respectively. Calf sex, origin of calf (Southeast vs. Midwest), season of delivery (fall vs. spring), and color (black vs. red vs. white) all affected feedlot gain. The percent USDA Prime, Choice, Select, and standard for NT, ST, and 2T calf carcasses were 1.87, 70.3, 25.3, and 2.6; 1.05, 62.9, 30.1, and 5.9; and 0.9, 57.9, 30.6, and 10.6, respectively. A total of 4,499 calves were Angus-type calves eligible for *Certified Angus Beef* ® (CAB®) acceptance. CAB® acceptance percentages for NT, ST, and 2T carcasses were 27.1, 24.2, and 18.7, respectively. CAB® acceptance rates were also impacted by calf sex (steers = 14.7% vs. heifers = 23.7%) and season of feedlot delivery (spring = 14.5% vs. fall/winter = 23.8%). Calves treated two or more times upon feedlot arrival had reduced feedlot gain, reduced quality grade, and reduced CAB® acceptance rate compared to untreated calves.

Introduction

The devastating economic effect of calf health at weaning and upon entering the feedlot is well documented.

The key economic effects relate to death loss, but not to be overlooked are the lingering performance reductions in those treated calves that lived. Most of the documentation shows reduced feedlot performance, but more recent data is suggesting reduced carcass quality may be an added lingering effect.

With more finished cattle marketed on value-based grids, the potential negative impacts on quality grade could result in significant losses in sale value.

The objective of this report was to determine the effect of health upon arrival at the feedlot on 1) feedlot performance and 2) carcass quality grade.

Materials and Methods

Data on 6,618 calves, fed at eight Iowa feedlots in 2002-03, was used to determine the effect of postweaning calf health on feedlot performance and carcass quality grade.

The calves represented 12 states with 4,627 calves from states in the Southeast and 1,990 calves from states in the Midwest. These calves were consigned to the Iowa Tri-County Steer Carcass Futurity Program. The time of arrival was classified as Spring (April-June), Summer (July-September), or Fall/Winter (October-December).

All calves were weighed upon arrival, after 35 days, at re-implant, and prior to harvest. All calves were vaccinated upon arrival, implanted, and placed on a starting feedlot diet. A common dietary energy level was used at all 12 feedlots.

Detailed health records were kept at each feedlot with calves classified as non-treated (0), single treatment (1), or treated two or more times (2).

Calves were sorted and harvested when they were visually assessed to have 0.4 inches of fat cover. Upon harvest, detailed carcass data was collected.

Results and Discussion

Least square means for average daily gain (ADG) during the feeding period is shown in Table 1. Calves not treated for health problems gained significantly faster (P<.0001) than calves treated one or more times. Steer calves out gained heifers and cattle from the Southeast gained slightly, but significantly less weight/day than Midwest calves. Calves arriving at the feedlot in the Spring gained 0.25 lbs./day less (P<.0001) than Summer or Fall/Winter arriving calves. Calves with black hair coats out gained those with red, white, or other colored hair coats (Table 1.)

The pattern for feed to gain followed the growth pattern with health treatment, calf sex, calf origin, and season of delivery affecting feed efficiency (Table 2).

The major reason for health treatment was respiratory problems with 1,118 (16.9%) calves requiring treatment. Calves not requiring treatment had a significantly higher (P<.001) marbling score than those treated once, which also have a higher marbling score than those treated twice (Table 3). Table 4 shows the effect of treatment on actual quality grade percentages. Treating two or more times reduced percent Prime, CAB® acceptance (black hided), and low Choice by 52%, 45.8%, and 12.3%, respectively, when compared to non-treated calves.

Quality grade was also affected by calf sex, origin of calf, and season of delivery.

A total of 4,499 calves were black hided Angus-type cattle eligible for *Certified Angus Beef* ® (CAB®) acceptance (Table 5). The greatest impact of postweaning health on acceptance rates was in calves treated two or more times.

This data would suggest that the greatest impact of postweaning health is mainly in those cattle eligible for Prime or CAB® with the effect on low Choice present, but less dramatic.

The mode of action of how health affects marbling deposition could not be determined by this study. However, recent research is suggesting that a critical early window in a calf's life for marbling deposition is 4-8 months. A possible loss in performance could cause a translocation of energy prioritization reducing lipid deposition in muscle tissue.

Implications

Postweaning calf health clearly reduced feedlot performance and carcass quality grade resulting in lost weight gain and reduced carcass value.

Acknowledgement

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Table 1. The effect of the number of times beef calves were treated for disease conditions on overall average daily gain in the 2002-03 Iowa Tri-County Steer Carcass Futurity.

Factor	Number of calves	Least squares means of ADG	Regression coefficient	P value
Number of treatments				<.0001
0	5500	3.06[a]	0.19	
1	575	2.93[b]	0.06	
2 or more	543	2.87[b]	0.00	
Calf sex				<.0001
Steers	4857	3.10[a]	0.29	
Heifers	1761	2.81[b]	0.00	
Origin of calf[c]				<.0001
Southeast	4627	2.92[a]	-0.06	
Midwest	1991	2.98[b]	0.00	
Season of delivery[d]				<.0001
Spring	374	2.76[a]	-0.28	
Summer	1738	3.05[b]	0.01	
Fall/Winter	4506	3.04[b]	0.00	
Color of calf				<.0001
Black	4603	3.07[a]	0.19	
Red	1054	2.91[b]	0.03	
White	267	2.96[b]	0.08	
Other color	694	2.87[b]	0.00	

Calves were fed in eight feedlots in Iowa. The model was adjusted for the effect of feedlot.

[a,b]Values within a factor without a common superscript differ (P<.05).

[c]Calves that originated in the Southeast were from the states of Alabama, Georgia, South Carolina, and Virginia. The Midwest calves originated from Indiana, Iowa, Minnesota, and Missouri.

[d]The months of delivery represented in each season were: Spring – April, May, and June; Summer – July, August, and September; Fall/Winter – October, November, December, and January.

Table 2. The effect of the number of times beef calves were treated for disease conditions on feed to gain in the 2002-03 Iowa Tri-County Steer Carcass Futurity.

Factor	Number of calves	Least squares means of FTOG	Regression coefficient	P value
Number of treatments				<.0001
0	5500	7.11[a]	-0.15	
1	575	7.23[b]	-0.03	
2 or more	542	7.26[b]	0.00	
Calf sex				<.0001
Steers	4857	6.97[a]	-0.46	
Heifers	1760	7.43[b]	0.00	
Origin of calf[c]				<.0001
Southeast	4627	7.34[a]	0.29	
Midwest	1990	7.05[b]	0.00	
Season of delivery[d]				<.0001
Spring	374	7.53[a]	0.52	
Summer	1737	7.05[b]	0.04	
Fall/Winter	4506	7.01[b]	0.00	

Calves were fed in eight feedlots in Iowa. The model was adjusted for the effect of feedlot.
[a,b]Values within a factor without a common superscript differ (P<.05).
[c]Calves that originated in the Southeast were from the states of Alabama, Georgia, South Carolina, and Virginia. The Midwest calves originated from Indiana, Iowa, Minnesota, and Missouri.
[d]The months of delivery represented in each season were: Spring – April, May, and June; Summer – July, August, and September; Fall/Winter – October, November, December, and January.

Table 3. The effect of the number of times beef calves were treated for disease conditions on carcass quality grade in the 2002-03 Iowa Tri-County Steer Carcass Futurity.

Factor	Number of calves	Least squares means of carcass quality grade	Regression coefficient	P value
Number of treatments				<.0001
0	5490	6.45[a]	-0.42	
1	574	6.65[b]	-0.22	
2 or more	540	6.87[c]	0.00	
Calf sex				<.0001
Steers	4855	6.86[a]	0.41	
Heifers	1749	6.45[b]	0.00	
Origin of calf[d]				.0131
Southeast	4615	6.70[a]	0.09	
Midwest	1989	6.61[b]	0.00	
Season of delivery[e]				<.0001
Spring	374	7.05[a]	0.66	
Summer	1731	6.53[b]	0.14	
Fall/Winter	4499	6.39[c]	0.00	
Color of calf				<.0001
Black	4593	6.23[a]	-0.52	
Red	1052	6.81[b]	0.06	
White	267	6.83[b]	0.08	
Other color	692	6.75[b]	0.00	

In order to perform analysis of variance, quality grades were given the following numeric values: Prime+ = 1, Prime = 2, Prime- = 3, Choice+ = 4, Choice = 5, Choice- = 6, Select+ = 7, Select- = 8, Standard+ = 9, Standard = 10, Standard- = 11, and Commercial = 12.

Calves were fed in eight feedlots in Iowa. The model was adjusted for the effect of feedlot.

[a,b,c]Values within a factor without a common superscript differ (P<.05).

[d]Calves that originated in the Southeast were from the states of Alabama, Georgia, South Carolina, and Virginia. The Midwest calves originated from Indiana, Iowa, Minnesota, and Missouri.

[e]The months of delivery represented in each season were: Spring – April, May, and June; Summer – July, August, and September; Fall/Winter – October, November, December, and January.

Table 4. The effect of the number of times beef calves were treated of disease conditions on the percentage of calves in each carcass quality grade in the 2002-03 Iowa Tri-County Steer Carcass Futurity.

	Number of treatments		
Quality grade	0	1	2 or more
Prime	1.86%	1.05%	0.93%
Choice	70.27	62.89	57.96
Select	25.28	30.14	30.56
Standard	2.59	5.92	10.56

Table 5. The effect of the number of times beef calves were treated for disease conditions on CAB acceptance rate among black claves in the 2002 Iowa Tri-County Steer Carcass Futurity.

Factor	Number of calves	Least squares means of CAB acceptance rate	Regression coefficient	P value
Number of treatments				<.0051
0	3790	27.1[a]	8.4	
1	361	24.2[ab]	5.5	
2 or more	348	18.7[b]	0.00	
Calf sex				<.0001
Steers	3353	17.7[a]	-11.3	
Heifers	1146	29.0[b]	0.00	
Season of delivery[d]				<.0001
Spring	231	15.8[a]	-14.4	
Summer	1238	23.9[b]	-6.3	
Fall/Winter	3030	30.2[c]	0.00	

Calves were fed in eight feedlots in Iowa. The model was adjusted for the effect of feedlot.
[a,b,c]Values within a factor without a common superscript differ (P<.05).
[d]The months of delivery represented in each season were: Spring – April, May, and June; Summer – July, August, and September; Fall/Winter – October, November, December, and January.