Beef cattle finishing methods: Forage-based finishing compared conventional feedlot finishing following bale grazing and delayed feedlot entry

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Research Brief:

In a finishing methods systems evaluation, seventy-two crossbred yearling steers (Aberdeen Angus x Red Angus x Angus) that had been wintered for modest gain (1.05 lb/day gain) were assigned to either a grass-fed annual forage (GF-ANN) or a grass-fed native range (GF-NR) systems that were compared to a native range feedlot control system (NR-FLT) in a delayed feedlot entry program. Steers in the systems were weighed and ultrasounded for initial weight, muscle and fat measurements, and turned out on native range until annual forages were suitable for grazing and grazed spring-summer-fall for total period of 176 days. After the 176-day grazing period, the GF-ANN, GF-NR, and NR-FLT steers were transitioned to free-choice cover crop baled hay feeding (Bale Grazing) and fed an average 6.81 lbs. daily of a highly digestible fiber-based supplement for 92 days. The NR-FLT control group grazed bales and received the fiber-based supplement for 69 days before transfer to the University of Wyoming, Sustainable Agriculture Research Extension Center (UWY-SAREC) for final finishing. The grass-fed (GF-ANN, GF-NR) steers continued grazing bales and receiving supplement for an additional 23-days. When forage finishing and feedlot finishing were completed, the grass-fed (GF-ANN, GF-NR) steers were harvested at a federally inspected abattoir in Green Bay, WI, and the feedlot control steers (NR-FLT) were harvested at a separate federally inspected abattoir in Ft. Morgan, CO.

Three steer grazing performance periods are shown in Table 1. The first period was the 176-day period between May 5th and October 28th, when the steers grazed native range and annual forages. The second period was the first 69-day period of bale grazing between October 29 and January 5 (Bale Graze-1, 69 days), when all three treatment groups ranged freely and grazed cover crop bales plus a fiber-based energy supplement. The third period was an additional 23-day period of bale grazing between January 6 and January 30 (Bale Graze-2, total = 92 days), after the feedlot control steers had been transferred to the UWY-SAREC feedlot. For the 176-day grazing season, GF-ANN and NR-FLT steers gained more weight than GF-NR group ($P = 0.02$). During the 69-day bale-graze-1 period the NR-FLT and GF-NR grew at a slower rate compared to the GF-ANN ($P = 0.001$). However, during the bale graze-2 period, which included feedlot finishing steers that were being fed high energy finishing diets in the feedlot, the feedlot control group (NR-FLT) steers gained 442.9 lb compared to an average 207.9 lb; 2.2 times faster than the forage-finished group.

Forage-based cover crop bale graze and feedlot finishing performance, efficiencies and economics are shown in Table 2. Forage-finishing supplement fed consisted of highly digestible fiber ingredients to include wheat-middlings (47.7%), barley malt sprouts (18.0%), soybean hulls (16.0%), beet pulp shreads (10.0%), beet molasses (5.0%), dical phosphorus (2.5%), salt (0.5%), and vitamin ADE & selenium (0.272%), and range trace minerals (0.072%). Highly digestible

fiber supplements are not prone to causing bloat or rapid changes in rumen pH. However, the steers received an initial 1.50 lb/steer/day that was increased 0.50 lb every other day until an average 6.81 lbs. were fed/steer/day. During the 69-day period before transfer to the UWY-SAREC combined with the 90-day feedlot finishing period resulted in enhanced overall performance for the NR-FLT treatment steers. Hay ($90.87), supplement ($28.30), and feedlot ($381.18) costs were greater (P = 0.001) than the forage-finished GF-ANN and GF-NR. The feedlot control steer gain to feed efficiency was greater (P = 0.001) and feed cost per pound of gain was less (P = 0.001) compared to the forage-finished steers.

Forage-based cover crop bale graze and feedlot finishing carcass measurements are shown in Table 3. Selling forage-based grass-fed beef to the grass-fed beef company in Green Bay, WI, was problematic with respect to carcass measurement data received from the company. As shown in Table 3, hot carcass weight (HCW), marbling score, and gross carcass value were the only criterion provided. The company pays a base price for Select quality grade carcasses and does not reward the cattle feeder with quality grade premiums. Therefore, the steers were not fed to attain Choice and Prime quality grade premiums and as such HCW was greater for the NR-FLT steers compared to the GF-ANN and GF-NR in which HCWs were 26.0% and 34% lighter, respectively. Quality grade among the NR-FLT steer group harvested at the Cargill Meat Solutions packing plant was 0.0% Select, 83.3% Choice and 16.7% Prime.

A finishing systems marketing comparison between the forage-based grass-fed finishing system and the feedlot control system has been summarized in Table 4. The economic systems comparison considers cow costs and backgrounding expense, grazing costs, bale grazing and protein energy supplement expenses, and transportation costs. The GF-ANN forage steers lost -$88.25 per steer, which was due primarily to greater annual forage farming costs compared to native range and freight to Green Bay, WI. Compared to the GF-ANN steers' net loss, the GF-NR and NR-FLT steer net returns were $62.70 and $160.22, respectively. In the final analysis, forage finishing was not competitive with delayed entry feedlot finishing, which has repeatedly been proven to be very profitable.

Table 1. Annual, native range, and bale-grazing steer performance.

	GF-ANN	NR-FLT	GF-NR	SEM	P-Value - Trt
Spring-Summer-Fall, 176 days					
Start Wt., lb	757.0	738.7	725.3	20.69	0.13
End Wt., lb	1090.3	1076.2	1033.3	23.99	0.02
Gain, lb	333.3	337.5	308.0		
ADG, lb	1.89	1.92	1.75		
Bale Graze-1 69 days					
Start Wt., lb	1090.3	1076.2	1033.3	23.99	0.02
End Wt., lb	1243.3	1197.3	1164.7	23.93	0.002
Gain, lb	153.1	121.1	131.4	5.84	0.001
ADG, lb	2.22	1.76	1.91	0.08	0.001
Bale Graze-2 92 days					
Start Wt., lb	1243.3	1197.3	1164.7	23.93	0.002
End Wt., lb	1297.3	1558.4	1242.1	31.89	0.001
Gain, lb	207.0	442.9	208.8	9.78	0.001
ADG, lb	2.25	4.98	2.27	0.11	0.001

Table 2. Forage-based cover crop bale graze and feedlot finishing performance and economics.

	GF-ANN	NR-FLT	GF-NR	SEM	P-Value - Trt
Finish Growth					
Number steers	24	24	24		
Days on feed	92	90	92		
Start Wt., lb	1090.25	1115.5	1033.29	23.8692	0.001
End Wt., lb	1297.29	1558.42	1242.08	31.8863	<0.001
Gain, lb	207.04	442.82	208.79	9.775	<0.001
ADG, lb	2.25	4.98	2.27	0.11	<0.001
Cover Crop Hay					
Hay/steer	3280.40	2207.20	3039.13	73.92	0.0001
Hay/steer/Day	34.53	31.99	31.99	0.85	0.13
Supplement Intake					
Lb/steer	647.16	147.0	647.26		
Lb/steer/day	6.81	2.13	6.81		
Feed Cost & Efficiency					
Supplement cost/steer, $	124.57	28.30	124.57	0.00	<.001
Hay cost/steer, $	128.73	90.87	120.33	2.96	0.001
Feedlot cost/steer, $		381.18			
Hay & suppl., lb	3927.58	2354.21	3686.29	73.91	0.001
Hay, suppl. & feedlot (Fd & Ydg) cost, $	253.30	500.35	244.90	2.96	<.001
Hay, suppl. & feedlot cost/day (69 + 90 days; 159 days), $	2.67	3.15	2.58	0.03	<.001
Gain, lb	207.04	563.90	208.80	11.31	0.001
ADG, lb	2.25	3.55	2.27	0.12	<.001
Gain:Feed	0.0527	0.1551	0.0655	0.003	<.001
Feed cost/lb of gain, $	1.22	0.887	1.17	0.05	0.001

Table 3. Forage-based cover crop bale graze and feedlot finishing carcass measurements.

	GF-ANN	NR-FLT	GF-NR	SEM	P-Value - Trt
Number Steers	24	24	24		
HCW, lb	718.96	905.75	675.42	16.3287	<.001
Dressing Percent, %		60.54			
Fat depth, in		0.48			
REA, sq. in		13.7			
REA : HCW ratio, sq. in		0.0151			
Marbling score	515.0	678.33	488.75	14.7523	<.001
USDA Yield Grade					
YG2,%		25			
YG3,%		70.8			
YG4,%		4.2			
Quality Grade					
Choice, %		83.3			
Prime, %		16.7			
Grid Market Price/CWT, $		190.58			
Gross carcass value, $	1483.28	1727.34	1393.45	33.686	<.001

Table 4. Finishing system marketing comparison: Bale-graze and Delayed feedlot entry – Grass-Fed vs. Feedlot

	Grass-Fed			Feedlot
	GF-ANN	**GF-NR**		**NR-FLT**
Cow Cost & Backgrounding				
Annual cow cost, $	642	642		642
Winter feed cost, $	110	110		110
Total, $	**752**	**752**		**752**
Grazing Cost				
Native range pasture cost, $	115.3	207.77		207.77
Pea-barley annual forage, $	74.98			
Unharvested corn, $	108.87			
Cover crop, $	58.82			
total, $	**357.97**	**207.77**		**207.77**
Bale Grazing & Protein/Energy Supl.				
Cover crop hay cost, $	128.73	128.73		90.86
Pasture grazing supplement cost, $	21.52	20.87		
Bale grazing supplement cost, $	124.57	124.57		28.30
Feedlot feed and yardage cost, $				389.24
Total, $	**274.82**	**274.17**		**508.04**
Freight Cost to Packing Plant (Green Bay, WI)	**136.46**	**136.36**		
Freight to UWY feedlot (Lingle, WY)				69.85
Freight Cost to Packing Plant (Ft. Morgan, CO)				29.46
Total Freight	**136.46**	**136.36**		**99.31**
Total Expenses	**1521.25**	**1370.3**		**1567.12**
Gross Return				
(68,784/48 = $1,433)	1433	1433		**1727.34**
Net Return/Str, $	**-88.25**	**62.7**		**160.22**
Difference vs ANN, $		**+150.95**		**+248.47**
Difference vs GrassFed NR, $				**+97.52**