Cull Cow Finishing Performance

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Introduction

On average, cull cows produce ten to twenty percent of the total revenue in the beef cow-calf enterprise (Sawyer et al., 2004). Feeding cows culled from the breeding herd, whether dairy or beef, prior to slaughter is a common practice in many areas of the country; however, it has not been a widely accepted practice in Florida. Because of the availability of many by-product feedstuffs that are economical and accessible in Florida, feeding cows is a viable way to add value to an animal that has otherwise held only salvage value. Improvements in meat volume and quality among fed cows has been observed and documented in literature (due to continually increasing beef consumption and a coincidental short supply of lean meat products for various consumer sectors including value cuts especially, carcasses from cull cows fed a high-energy concentrate diet can help to bolster beef supplies and meet the growing domestic demand). Since carcass weights of fed cows are heavier compared with non-fed cows, an incremental increase in meat supply can benefit the beef industry directly. There is the potential for improved profit margins at the ranch level, as well. Generally, dollars are left on the table when it comes to marketing cull cows. Sawyer et al. (2004) indicated that only a ten percent increase in net income from the sales of cull cows would nearly double the overall ranch profit margin.

The National Market Cow and Bull Quality Audit (CBBQA; Roeber et al., 2001) found that ninety percent of cow carcasses were lightly muscled which was a nearly twenty-two percentage-point increase from the 1994 audit. Further, they found that more carcasses had substantially less fat, 72.3% (1999) vs 57.4% (1994), with a Finish Score of 1 or 2 (a subjective score of 1 to 9 for external fat, 1 having no external fat and 9 having excessive external fat). Compared with cows fed forage-based diets, those fed high-energy concentrate diets theoretically have improved carcass composition, increased intramuscular fat deposition, and improved steak palatability (Schnell et al., 1997). Cows with a higher body condition score, and thus weight, optimized the economic return having both a higher carcass value and a higher live value within a particular study (Apple, 1999). Cull beef cows fed at least 28 days had carcasses with improved longissimus muscle marbling and quality grades, lower Warner-Bratzler shear force values (more tender), and improved sensory panel traits (Cranwell et al., 1996b). Cows fed for at least 56 days produced carcasses that also had improved visual lean color, texture, and firmness, as well as improved carcass fat color (Cranwell et al., 1996b). Cranwell et al. (1996a) further concluded that cows on full feed for at least 28 or 56 days had higher carcass weights, which is logical, but that those increases were due to an increase in carcass soft tissue, or lean as well as carcass fat. Although feeding cull cows may not alleviate all issues detailed in the recent CBBQA, it does take action on the issues of improving carcass weight, muscling, and fat color.

Finally, and perhaps more relevant to Florida, Brown and Johnson (1991) conducted research prior to the original CBBQA in 1994. They found, as did other researchers who followed and are cited above, that feeding cull cows increased carcass weight, marbling score, and USDA quality grade, as well as 9-10-11 rib section lipid concentration compared with cows slaughtered at the beginning of the experiment (i.e., non-fed). Further, they concluded that including more energy dense feeds in the diets fed to cull cows would improve cows' performance. They also caution, as do I, that the expected profit of any feeding program must be measured carefully against current market conditions including cattle prices, transportation costs, and the cost of gain.

Feeding Cull Cows

Two experiments have been conducted recently over two consecutive years feeding cull cows from the same herd in south Florida. In both years, cows were similar in genetics and age. Although the feedlot entry weights were slightly different from Experiment 1 to Experiment 2, body condition scores (BCS) were similar. The textured and mixed basal diet offered in both years was fed ad libitum in self feeders and was composed primarily of the following ingredients: soybean hulls, citrus pulp, cracked corn, wheat middlings, cottonseed hulls, cottonseed meal, molasses, tallow, and urea. All nutrients were balanced to meet the requirements of this class of cattle. The diet also contained sodium bicarbonate and monensin (Rumensin™, Elanco Animal Health, Greenfield, IN). The diet contained approximately 87.6% dry matter, 14% crude protein (DM basis), and 79.5% TDN. Cows were fed in Williston, FL; carcasses were harvested in Center Hill, FL. In each experiment, an approved feed additive (Optaflexx 45™, Elanco Animal Health, Greenfield, IN) was tested for its effect on animal performance, carcass yield and quality, and any potential economic impacts. In Experiment 1, Optaflexx was added to the diet (200 mg•hd^{-1}•d^{-1}) of two pens of cows on day 55 and fed for the remainder of the feeding period (35 days); two pens of cows received the basal diet the entire 90 DOF. In Experiment 2, Optaflexx was added to the diet of three pens of cows at progressively higher rates (R-100 = 100 mg •hd^{-1}•d^{-1}; R-200 = 200 mg •hd^{-1}•d^{-1}, and R-300 = 300 mg •hd^{-1}•d^{-1}) on day 21 and fed for the remainder of the feeding period (28 days); one pen of cows received the basal diet the entire 48 DOF. All cows were dewormed on arrival with a generic ivermectin at label rates

Experiment 1

Animal Performance and Economic Analysis. On arrival, crossbred cows (n=92) essentially had little or no rumen fill and were uniformly thin (BCS = 4.2 ± 0.3). A BCS of 4.0 indicates a borderline productive condition. Cows with this score often become pregnant only 50 to 75% of the time. However, cows were otherwise very healthy and only four treatments with antimicrobial drugs (4.8% morbidity) were required. Starting body weight was similar (Table 1) between our treatment groups by design; there was also no difference in the average estimated age of cows between treatments. Final or ending body weight, ADG, total gain, and BCS did not differ by treatment. Over time (i.e., from d0 to d90), we observed an implant effect for ADG (2.9 lb/d vs 2.6 lb/d; *P = 0.009)* and total gain (260.0 lb vs 232.0 lb; *P = 0.009)* indicating that cows implanted on d0 gained more total weight and gained weight more rapidly than cows not implanted. On average, the interim weight (d54) and the ending or final weight (d90) were similar indicating that 90 DOF was sub-optimal for these cows.

Carcass value was not significantly different due to our dietary treatment; however, cows receiving Optaflexx produced carcasses that, on average, were worth $24.96 more than cows that did not receive the feed additive. From our serial slaughter procedure, we observed that carcass value was increased (*P < 0.0001)* by $248.09 when cows were fed for 90d compared with selling them thin on day zero (Table 2). Again, when harvest date was considered, both Optaflexx (+$24.75/hd) and implant status (+$28.54/hd) tended to increase carcass value when cows were fed or otherwise received these treatments. Approximately 114 tons of feed were delivered with an average value of approximately $166.25 per ton. On average, the cost of feeding (feed only costs) these cows was approximately $230.67 per head. The net result is a difference of $17.42 per head profit ($248.09 [carcass value increase when cows were fed] - $230.67 [feed costs only]).

Carcass characteristics. Twenty-nine variables associated with carcass yield and quality were measured and analyzed in this experiment. None of these important characteristics were adversely, or otherwise directly and significantly affected by Optaflexx or implant status.

Ultrasound predicted measures. There were no direct significant differences among any of our carcass measurements predicted by ultrasound data capture.

Experiment 2

Animal Performance and Economic Analysis. On arrival, crossbred cows (Beefmaster- and Brangus-based; n=95) were uniformly thin (BCS = 3.5 ± 0.3); however, the two breed types were different in weight initially (995 lb and 905 lb, respectively) and thus, throughout the experiment. Therefore, even distributions of both breed types were allocated to each pen and dietary treatment. None of these cows were treated for respiratory or other diseases in the feedlot. All cows were similar in weight at the interim weight taken on day 20 (987 lb ± 115). Cows were healthy and morbidity was nil. The ending weight on feed averaged 1067 lb (±121); our dietary treatment did not have an impact on the cows in any treatment group. However, all cows gained an average of 116 lb during the 48 day feeding period (ADG = 2.4 lb per day).

Carcass value was not affected by our dietary treatments. By harvest date, however, carcass values differed by $160.19 per head (day 0 = $521.81; day

48 = $682.00). Although some costs of feeding had increased from the previous year, especially fuel and thus delivery, we assumed the same cost per ton as in Experiment 1. The net result of feeding these cows for 0 days compared with 48 was $106.33 in additional revenue.

Carcass characteristics. Twenty-nine variables associated with carcass yield and quality were measured and analyzed in this experiment. Dressing percentage was slightly lower ($P = 0.12$) for both the R-100 (51.3%) and R-300 (51.9%) Optaflexx dietary inclusion levels compared with the Control treatment group (53.6%). Otherwise, no other variable measured was affected by our dietary treatment.

Ultrasound predicted measures. There were no direct significant differences among any of our carcass measurements predicted by ultrasound data capture.

Conclusions

These data indicate a monetary benefit from feeding cull cows a concentrate diet for approximately 50 to 90 days, depending on diet (energy level) and cow condition at the inception of feeding. The true optimal and maximum days on feed with regard to profitability may vary within that time frame, and will likely depend on current conditions of commodity feed prices and cattle prices alike. At minimum, cows should be implanted with an appropriate growth promoting implant to maximize feed energy intake and promote the conversion of same to lean muscle and thus, final live and carcass weights. A complete and well balanced diet should be provided and should include an ionophore to improve feed conversion. We found no evidence from these data to recommend any other feed additives for the improvement of carcass yield or quality, or profitability.

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Table 1. Animal performance, HCW, and carcass value: Experiment 1

	Dietary Treatments[a]			
Item	**BASAL**	**Optaflexx**	**SEM**	**P>F**
Age, yr	11.0	11.0	---	---
Starting wt, lb	868.8	867.9	7.5	0.93
Ending wt, lb	1100.9	1128.1	21.0	0.38
ADG, lb/d	2.6	2.9	0.2	0.15
Total gain, lb	233.4	259.4	18.8	0.15
Starting BCS	4.2	4.2	0.07	0.65
Ending BCS	5.8	6.0	0.13	0.20
HCW	589.7	610.9	14.0	0.23
Carcass value, $/hd	689.13	714.09	16.73	0.24

[a]Least squares means.

Table 2. Serial slaughter carcass results: Experiment 1

	Harvest Date[1]			
Item	**Day 0**	**Day 90**	**SEM**	**P>F**
Carcass value, $/hd	473.8	722.8	17.9	0.0001
HCW, lb	412.2	617.8	15.3	0.0001
Marbling[2]	134.9	348.8	13.0	0.0001
Rib-eye area, sq. in.	7.2	11.1	0.3	0.0001

[ab]Means in the same row with different superscripts are different.
[1]Least squares means.
[2]100 = Practically devoid; 200 = Traces; 300 = Slight; 400 = Small.

Table 3. Animal performance, HCW, and carcass value: Experiment 2

	Dietary Treatments[a]					
Item	**CON**	**R100**	**R200**	**R300**	**SEM**	**P>F**
Age, yr	10.1	11.2	10.3	9.4	0.51	0.10
Starting wt, lb	939.8	963.4	923.2	967.8	18.3	0.28
Ending wt, lb	1080.2	1065.0	1028.8	1097.5	24.6	0.25
ADG, lb/d	2.8	2.1	2.2	2.6	0.32	0.43
Total gain, lb	131.9	102.6	103.8	124.4	15.2	0.43
Starting BCS	3.5	3.6	3.5	3.6	0.07	0.40
Ending BCS	6.0	5.7	6.1	6.0	0.14	0.32
HCW	591.57	560.13	558.29	578.13	14.55	0.32
Carcass value, $/hd	591.57	560.13	558.29	578.13	14.37	0.32

[a]Least squares means

Table 4. Serial slaughter carcass results: Experiment 2

	Harvest Date[1]			
Item	**Day 0**	**Day 90**	**SEM**	**P>F**
Carcass value, $/hd	**521.81**	**682.00**	**13.7**	**0.0001**
HCW, lb	**453.75**	**583.05**	**13.7**	**0.0001**
Marbling[2]	**210.0**	**245.35**	**15.0**	**0.14**
Rib-eye area, sq. in.	**10.6**	**10.6**	**0.34**	**0.96**

[ab]Means in the same row with different superscripts are different.
[1]Least squares means.
[2]100 = Practically devoid; 200 = Traces; 300 = Slight; 400 = Small.

Notes: