Transitioning Cattle from RAMP® to a Finishing Diet on Feedlot Performance and Feed Intake Variance

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Summary

Individually fed cattle were adapted to high grain diets with a traditional grain adaptation program or one of two RAMP® adaptation programs. RAMP programs adapted cattle to a finishing diet gradually over 28 days in four steps or directly without an adaptation. Feed intake variance among d was greater for traditionally adapted cattle compared to either RAMP program, but DMI was not different during the adaptation period. Over the 138-day period, feedlot performance and carcass traits were not affected by adaptation treatment. Cattle fed RAMP for 10 days can be transitioned to a finishing ration containing 47.5% Sweet Bran® abruptly without affecting performance.

Introduction

RAMP is a complete starter ration which contains a high level of Sweet Bran and a minimal amount of forage. Adapting cattle to high grain diets with RAMP increased ADG and improved F:G over the entire finishing period compared to traditional grain adaptation (*2012 Nebraska Beef Cattle Report*, pp. 85-86). Previous work has suggested starting cattle on RAMP may eliminate the need for an adaptation period (*2013 Nebraska Beef Cattle Report,* pp.80-81). However, a metabolism trial showed that a system of transitioning cattle from RAMP to a finishing diet without an adaptation period decreased ruminal pH and increased time below a pH of 5.6 compared to cattle adapted using a four-step system (*2013 Nebraska Beef Cattle Report,* pp. 82-83). The lower pH suggests that eliminating the adaptation period may have increased acidosis. Therefore, the objective of this experiment was to determine the effect of transitioning cattle from RAMP to a finishing diet with or without an adaptation period on DMI variation and feedlot performance compared to a traditional grain adaptation program with alfalfa hay.

Procedure

Sixty yearling steers (BW=844 ± 33 lb) were used in a completely randomized design study. Steers were trained to the Calan gate system and adapted to the facilities for a 28-day period. Eight days before trial initiation, steers were limit-fed (at a targeted 2% of BW daily) a diet containing 47.5% Sweet Bran, 47.5% alfalfa hay, and 5% supplement (DM basis) to minimize variation in gut fill before collecting BW. Steers were consecutively weighed over three days and the average of three weights was used as initial BW. Using the average of BW collected over the first two days, steers were stratified by BW, and assigned randomly within strata to one of three treatments.

Treatments consisted of three grain adaptation systems imposed during the first 28 days of the feeding period. Steers on traditional adaptation treatment (TRD; Table 1) were adapted to a finishing diet by feeding 4-step diets for 4, 6, 6, and 6 days. Alfalfa hay inclusion was gradually decreased from 45 to 7.5% while inclusion of a blend of 60% high-moisture corn (HMC) and 40% dry-rolled corn was increased from 25 to 62.5% (DM Basis). The RAMP adaptation treatments (Table 2) involved transitioning cattle from RAMP to a finishing diet containing 47.5% Sweet Bran in either four steps or one step. The four-step system (4-STEP) gradually decreased dietary RAMP inclusion (100 to 0%) while increasing finishing ration inclusion (0 to 100%) equally over four periods (4, 6, 6, and 6 days) by mixing RAMP with finishing ration 1 (F1, 47.5% Sweet Bran, 40% HMC, 7.5% alfalfa hay and 5% supplement, DM basis) with the blend fed as a single diet. The one step adaptation system (1-STEP) involved feeding RAMP for 10 days and switching directly to F1 on day 11. All step rations, RAMP, and the first finishing ration contained 25 g/ton Rumensin® and 12 mg/lb thiamine (DM basis).

On day 29 and through the remainder of the finishing period, cattle were fed a common diet which contained 40% HMC, 25% Sweet Bran, 22.5% modified distillers grains with solubles, 5% wheat straw, and 5% dry supplement on a DM basis (F2; Table 2). The second finishing diet was formulated to contain 30 g/ton monensin and provide 90 mg per steer daily of Tylan® (DM basis). After cattle were on a common finishing diet for two weeks (day 42), BW were collected to evaluate performance over the adaptation period, and steers were

Table 1. Adaptation diets for the traditional (TRD) adaptation program (DM basis).

Item	Step 1	Step 2	Step 3	Step 4	Finisher
Ingredient, %					
Alfalfa hay	45.0	35.0	25.0	15.0	7.5
High-moisture corn	25.0	35.0	45.0	55.0	62.5
Sweet Bran[1]	25.0	25.0	25.0	25.0	25.0
Dry supplement[2]	5.0	5.0	5.0	5.0	5.0
Chemical composition, %					
DM	74.7	72.8	70.9	69.1	67.9
CP	15.2	14.5	13.9	13.2	12.7
NDF	38.9	33.7	28.5	23.4	19.5

[1]Sweet Bran, Cargill Corn Milling, Blair, Neb.
[2]Supplement formulated to contain 25 g/ton Rumensin and 12 mg/lb thiamine (DM basis).

Table 2. Adaptation diets for the 4-STEP treatment[1] where RAMP[2] was blended with a finishing diet 1(F1) to create 4 step diets or the 1-STEP treatment.[1]Following the adaptation system a common finishing ration (F2) was fed.

	Ratio of RAMP:F1					
Item	100:0	75:0	50:50	25:75	0:100	F2
Ingredient, %						
RAMP	100.0	75.0	50.0	25.0	—	—
High-moisture corn	—	10.0	20.0	30.0	40.0	42.5
Sweet Bran	—	11.9	23.8	35.6	47.5	25.0
MDGS	—	—	—	—	—	22.5
Alfalfa hay	—	1.9	3.7	5.6	7.5	—
Wheat straw	—	—	—	—	—	5.0
Dry supplement[3]	—	1.2	2.5	3.8	5.0	5.0
Nutrient composition, %						
DM	65.6	65.8	65.9	66.1	66.2	65.2
CP	22.5	20.9	19.2	17.5	15.9	16.4
NDF	36.9	34.1	31.3	28.4	25.6	24.9

[1]Treatment were as follows: 4-STEP blends 100:0, 75:0, 50:50, 25:75, and 0:100 were fed for 4, 6, 6, 6, and 6 days, respectively; 1-STEP fed 100:0 for 10 days and 0:100 day 11 to 28.
[2]RAMP is a complete starter feed (Cargill Corn Milling, Blair, Neb.) consisting of wet corn gluten feed, alfalfa hay, minerals, and vitamins.
[3]Supplement formulated to contain 25 g/ton Rumensin and 12 mg/lb thiamine (DM basis). The supplement for F2 was the same but was formulated to contain 30 g/ton Rumensin and provide 90 mg of Tylan per animal daily.

Table 3. Feedlot performance and carcass characteristics of steers adapted to a finishing diet using a traditional grain adaptation program or RAMP.

	Treatment[1]				
Item	TRD	4-STEP	1-STEP	SEM	*P*-value
Performance					
Initial BW, lb	842	842	843	7.6	0.99
Final BW, lb[2]	1404	1382	1419	17.2	0.31
DMI, lb/day					
42 days	25.9	26.3	26.7	0.45	0.50
Final	24.1	23.5	24.5	0.50	0.39
Night intake[3], %	13.6	16.8	15.8	1.21	0.18
ADG, lb					
42 days	3.60[a]	3.75[ab]	4.07[b]	0.13	0.05
Final	4.07	3.91	4.17	0.09	0.14
F:G[4]	5.88	5.99	5.85	—	0.59
Carcass traits					
LM area, in[2]	14.6	14.0	14.9	0.33	0.88
12 rib fat, in	0.48	0.51	0.51	0.03	0.77
Yield Grade[5]	2.90	3.10	2.90	0.17	0.63
Marbling[6]	456	445	445	14.7	0.82

[a,b]Within a row, means with different superscripts are different ($P < 0.05$).
[1]Treatments were a traditional adaptation system (TRD), or two RAMP treatments where cattle were adapted in 4 step diets (4-STEP) or transitioned directly to a finishing diet (1-STEP).
[2]Final BW was calculated from HCW using a common dressing percentage of 63%.
[3]Night intake = percentage of total DMI consumed after 2100 h.
[4]Statistics performed on G:F, inverse of G:F presented.
[5]Calculated as 2.5+ (2.5 x 12th rib fat) + (0.2 x 2.5[KPH]) + (0.0038 x HCW)-(0.32 x LM area).
[6]300 = Slight, 400 = Small, 500 = Modest.

implanted with Revalor®-S. Among day DMI variance (DIV) and DMI for each steer were calculated for three time periods (day 1-28 before feeding a common finishing diet, the first six days of finishing diet 1, and the first six days on the common finishing diet) to assess DMI variation.

On the first day of feeding, steers were fed at 2.3% of BW (DM basis). Ration was increased by 2 lb DM each day until feed remained the following day. Throughout the feeding period, cattle were offered ad libitum access to feed and water and fed once daily at approximately 0900 hour. Feed consumption at night was estimated during two time periods (day 35 to 49 and day 61 to 74) during the trial. These estimates were conducted by evaluating feed bunks at 2100 hour and again at 0600 hour the following day. The amount of feed consumed overnight divided by DMI were used to calculate the percentage of feed consumed at night for each steer over the two periods.

All cattle were fed Zilmax® at a level of 7.56 g/ton DM for 20 days followed by a three-day withdrawal before harvesting the animals. On day 138, cattle were individually weighed and transported to a commercial abattoir (Greater Omaha Packing, Omaha, Neb.) to be slaughtered. Hot carcass weight (HCW) and liver abscess scores were obtained on the day of slaughter. Following a 48-hour chill, USDA marbling score, 12th rib fat thickness, and LM area were recorded. Yield grade was calculated using HCW, 12th rib fat thickness, LM area, and an assumed 2.5% KPH. Carcass adjusted performance was calculated using a common dressing percentage (63%) to determine final BW, ADG, and F:G. Final live BW were shrunk 4% and used to calculate dressing percentage.

Performance and carcass characteristics were analyzed using the MIXED procedure of SAS (SAS Institute, Inc., Cary, N.C.). Pair-wise comparisons for treatments were determined by Fisher's LSD method when the F-test statistic was significant at $P \leq 0.10$. Among day DMI variance (DIV) and DMI for each animal were analyzed for three time periods. Period was analyzed as a repeated measure using the GLIMMIX procedure of SAS using first order autoregressive.

Results

During the 28-day adaptation period, steers on both RAMP treatments consumed more feed ($P < 0.03$) compared to cattle on the TRD treatment (data not shown). No treatment differences were observed for DMI over the first six days F1 was fed ($P = 0.84$), the first six days F2 was fed ($P = 0.31$; data not shown), or over first 42 days of the experiment ($P = 0.50$; Table 3). Feed intake variance among days for steers was greater

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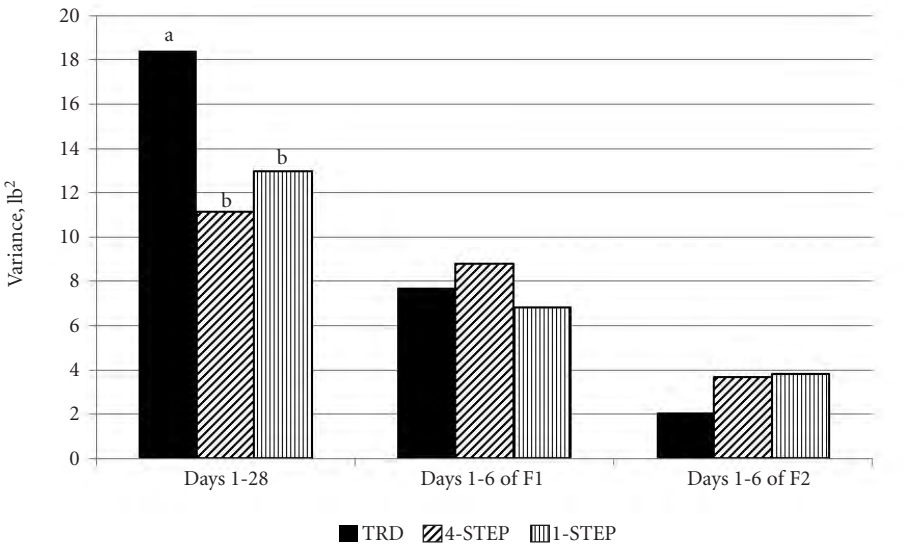
for TRD compared to 4-STEP ($P < 0.01$) and 1-STEP ($P = 0.04$) during the 28 d adaptation period (Figure 1). No differences in DIV were observed among treatments for the first six days F1 was fed ($P = 0.69$) or for the first six days F2 was fed ($P = 0.39$). Although not significant ($P = 0.18$), there was a numeric trend for cattle fed RAMP to consume a higher percentage of feed at night compared to TRD over the two time periods (Table 3). High variation associated with subjective visual estimates of feed remaining may have limited detection of treatment differences.

Gain during the first 42 days was affected by treatment ($P = 0.05$; Table 3) as 1-STEP cattle had greater (P=0.02) ADG compared to TRD and tended to have greater (P=0.10) ADG compared to 4-STEP. Improvements in ADG resulted in a tendency for treatment differences ($P = 0.09$) in F:G. Over the entire 138-day feeding period, no differences were observed among treatments for carcass adjusted ADG ($P = 0.14$) or F:G (P=0.59; Table 3). In contrast a previous trial reported improvements in ADG as a result of grain adaptation programs using RAMP when compared to traditional grain adaptation programs (2012 *Nebraska Beef Cattle Report*, pp. 85-86). Similarly, another trial reported improvements in ADG and F:G as a result of using Sweet Bran for grain adaptation (2009 *Nebraska Beef Cattle Report*, pp. 53-54).

Carcass characteristics were not affected by adaptation treatment (Table 3) as there were no differences among treatments for LM area ($P = 0.19$) or 12th rib fat thickness ($P = 0.78$). Calculated yield grade and marbling score were similar among treatments ($P > 0.64$). The incidence of liver abscesses was low in this trial (5%) and was not analyzed.

Transitioning cattle directly to a finishing diet from RAMP did not affect feedlot performance or alter carcass characteristics. Similarly, another trial showed no differences in performance over the entire feeding period between cattle that were transitioned from RAMP to a finishing diet either directly or gradually using a four-step system (*2013 Nebraska Beef Cattle Report*, pp.80-81). Cattle fed RAMP for 10 days can be transitioned to a finishing ration containing 47.5% Sweet Bran abruptly without affecting performance.



[ab]Means with different superscripts differ ($P < 0.05$).
[1]For period SEM = 0.367; *F*-test *P*-value = 0.02.
[2]For period SEM = 0.335; *F*-test *P*-value = 0.69.
[3]For period SEM = 0.210; *F*-test *P*-value = 0.39.

Figure 1. DMI variance for three time periods: all days before feeding a common finishing diet[1] (day 1-28), the first six days of finishing diet 1[2] (F1), and the first six days on the common finishing diet[3] (F2). Treatments shown left to right in chart: TRD, 4-STEP, and 1-STEP.

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