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## Dietary Management for Starting Finishing Yearling Steers on Feed

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**Table 4. Interactions of Rumensin level and bunk management strategy on intake behavior and ruminal pH in steers fed a high-grain diet during the post-challenge phase.**

Item	Rumensin level <sup>a</sup>				SEM
	CON	30	30/40	40	
Average meal size <sup>b</sup> , lb DM					
CLEAN <sup>c</sup>	8.2 <sup>d</sup>	4.4 <sup>e</sup>	4.5 <sup>e</sup>	5.4 <sup>e</sup>	.78
ADLIB <sup>c</sup>	3.5	3.3	3.5	4.0	.78
Ruminal pH change <sup>f</sup>					
CLEAN <sup>c</sup>	1.53 <sup>g</sup>	1.21 <sup>h</sup>	1.24 <sup>h</sup>	1.51 <sup>g</sup>	.13
ADLIB <sup>c</sup>	1.08	1.27	1.22	1.28	.13
Ruminal pH variance <sup>i</sup>					
CLEAN <sup>c</sup>	.213 <sup>d</sup>	.119 <sup>e</sup>	.116 <sup>e</sup>	.194 <sup>d</sup>	.021
ADLIB <sup>c</sup>	.055	.080	.066	.094	.021

<sup>a</sup>CON = 0 g/t Rumensin, 30 = 30 g/t Rumensin, 30/40 = 30 changing to 40 g/t Rumensin the day of the challenge, 40 = 40 g/t Rumensin.

<sup>b</sup>Rumensin x bunk management interaction (P = .10).

<sup>c</sup>CLEAN = Clean bunk management strategy, ADLIB = Ad-libitum bunk management strategy.

<sup>d,e</sup>Means in a row not bearing a common superscript differ (P < .05).

<sup>f</sup>Rumensin x bunk management interaction (P = .08).

<sup>g,h</sup>Means in a row not bearing a common superscript differ (P < .10).

<sup>i</sup>Rumensin x bunk management interaction (P = .04).

ance (P < .05) than steers fed 30 or 30/40 g/t Rumensin. Ruminal pH change and variance were similar across Rumensin levels for steers on the ADLIB.

Intake was similar across bunk management strategies; however, intake rate was faster (P < .01) for steers on the

CLEAN than those on the ADLIB (Table 3). The total number of meals was greater (P < .01) for steers fed on the ADLIB compared with CLEAN. Steers on the CLEAN tended to spend a smaller (P = .13) portion of the day eating, but their average meal length was longer (P = .07)

than steers on ADLIB. Average ruminal pH and area below pH 5.6 were unaffected by bunk management strategy.

Rumensin was effective at decreasing meal size and increasing number of meals consumed per day without affecting feed intake. These changes in consumption patterns should be effective in managing acidosis, especially for feedlot cattle with limited exposure to feed. Effects of Rumensin during the post-challenge phase were greater for steers on the CLEAN compared with ADLIB. It is unclear why differences exist between feeding 40 g/t Rumensin continuously compared with 30 g/t or 30/40 g/t for steers having limited access to feed. Steers on the CLEAN had an increased rate of intake and meal size as well as ruminal pH change and variance. Steers with limited exposure to feed are at a greater risk for subacute acidosis.

<sup>1</sup>Ki Fanning, graduate student; Todd Milton, assistant professor; Terry Klopfenstein, professor Animal Science, Lincoln; D. J. Jordon and Rob Cooper, research technicians; Cal Parrott, Elanco Animal Health, Greenfield, Indiana.

## Dietary Management for Starting Finishing Yearling Steers on Feed

**Burt Weichenthal  
Ivan Rush  
Brad Van Pelt<sup>1</sup>**

Limit-feeding of high-grain diets can be used to start finishing yearlings with minimal problems from acidosis and intake variation, resulting in less roughage needed and improved feed efficiency.

*stepped-up in grain over 23 days or with limit-feeding of the final diet over three weeks. Limit-feeding during start-up improved overall feed efficiency, carcass dressing percentage and fat thickness, but did not affect daily gain or carcass quality and yield grades. In this small pen research trial, steers reached ad libitum intake of the final diet by limit-feeding of this diet during start-up without major problems from acidosis or related intake variation.*

with increasing grain levels to allow the rumen microorganisms to gradually adjust to higher grain levels, attempting to minimize acidosis and intake variation that can occur with overeating of grain. Limit-feeding of high-grain diets throughout the finishing period has been used to improve feed efficiency, but little research has been done on limit-feeding of the final diet during the start-up period. Use of limit-feeding in the start-up period could eliminate higher roughage diets and get cattle adjusted to the final diet quickly without causing acidosis which can lead to severe intake variation or death.

The objective of our study was to

### Summary

*Angus crossbred yearling steers were started on a finishing program with diets*

### Introduction

Traditionally, starting cattle on a finishing program involved using diets

**Table 1. Step-up diets fed ad libitum and final diet limit-fed to yearling steers during start-up.**

Ingredient	Step-up diets				Final diet
	1	2	3	4	5
Calculated diet composition, dry matter basis					
Rolled corn, %	45.3	54.0	63.6	73.1	82.8
Corn silage, %	31.4	28.8	22.8	16.7	10.0
Alfalfa hay, %	18.6	11.2	7.2	3.3	0
Supplement, %	4.8	6.0	6.4	7.0	7.3
Calculated nutrient analysis, dry matter basis					
Crude protein, %	12.5	12.5	12.5	12.5	12.5
UIP, %	3.74	3.90	4.13	4.36	4.61
NE <sub>m</sub> , Mcal/lb	80.6	83.7	86.7	89.6	92.6
NE <sub>g</sub> , Mcal/lb	52.4	55.0	57.5	59.9	62.4
Salt, %	.19	.24	.26	.28	.29
Calcium, %	.82	.83	.81	.79	.77
Phosphorus, %	.30	.31	.32	.33	.34
Potassium, %	1.09	.95	.84	.73	.63
Rumensin, g/ton	20.0	25.1	27.0	29.1	30.5
Tylan, g/ton	6.7	8.4	9.0	9.7	10.2

**Table 2. Performance of yearling steers for 123 days when step-up diets were compared to limit-feeding of the final diet during the first 23 days on feed.**

Diets	Ad libitum-fed step-up diets	Final diet limit-fed in start-up	P-value
Number of pens	6	6	
Number of steers	48	46	
Initial weight, lb	839	851	
Final weight <sup>1</sup> , lb	1186	1203	NS <sup>2</sup>
Daily gain <sup>1</sup> , lb	2.92	2.96	NS
Feed DM/day, lb	20.6	19.4	.06
Feed/gain ratio	7.05	6.54	.009
Gain/feed ratio	.142	.153	.004
Hot carcass weight, lb	736	746	NS
Dressing percentage	61.7	62.3	.05
Fat thickness, in	.53	.58	.03
Marbling score <sup>3</sup>	5.53	5.51	NS
Quality grade <sup>4</sup>	19.3	19.2	NS
Ribeye area, sq in	12.8	13.1	NS
USDA yield grade	3.0	3.0	NS

<sup>1</sup>Final weight and daily gain calculated by dividing hot carcass weight by a common dressing percentage (62).

<sup>2</sup>NS = non-significant P-value.

<sup>3</sup>Marbling score: Small = 5.0-5.9.

<sup>4</sup>Quality grade: Choice = 19.0-19.9.

compare feedlot performance and carcass traits of steers limit-fed the final diet during the start-up period to ad libitum feeding of traditional step-up diets of finishing cattle.

### Procedure

Angus crossbred yearling steers averaging 845 pounds were randomly allotted to 12 pens of eight steers for a 123-day finishing trial. There were six pens assigned to each of two start-up

treatments, which were: 1) ad libitum feeding of four step-up diets over 23 days with dry-rolled corn levels increasing from 45 to about 83 percent of diet dry matter and 2) limit-feeding of the final diet with programmed increases for about three weeks until steers reach ad libitum intake. The increases in energy in the step-up diets were accomplished by increasing corn by 10 percent for each step-up. Diets are shown in Table 1, with the final diet consisting of dry-rolled corn, corn silage and supplement. Steers

limit-fed the final diet were initially fed 15 pounds of dry matter per day which was increased by 0.5 to 1 pound per day until they reached ad libitum intake of this diet in about three weeks. Steers were fed once a day.

Steers were implanted with Synovex S at the start of the trial and were fed Rumensin/Tylan throughout the trial. They were weighed twice on succeeding days at the beginning of the trial. Final weights were calculated by dividing hot carcass weights by a common dressing percentage (62). Performance and carcass data were analyzed by using the GLM model of SAS. The start-up period was in late May and early June when temperature swings are usually not large and feed intake, along with cattle performance, tends to be more uniform.

### Results

Daily gains were not different among treatments, but dry matter intake was lower ( $P = .06$ ) and feed conversion improved ( $P < .01$ ) for the steers limit-fed the high-grain diet initially (Table 2). Limit-fed steers also exhibited slightly higher dressing percentage and fat thickness than those started traditionally, but quality and yield grade comparisons were similar for the two start-up treatments. Results of this study suggest limit-feeding of high-grain diets could avoid the traditional use of higher roughage levels in step-up diets to bring yearling steers up to full-feed. However, the authors recognize that research pens with eight steers per pen and 20 feet of bunk space may improve the chances for successful start-up with limit-feeding of the final diet. Programmed increases of the final diet during start-up may be a faster method for adapting rumen microorganisms to grain levels that can often cause acidosis and intake variation when cattle approach full feed with diets stepped-up in grain.

Feed dry matter intakes by day are shown in Figure 1. Limit-feeding of the final diet during start-up did cause a drop in intake after day five for a couple days, but then gradual increases of less

(Continued on next page)

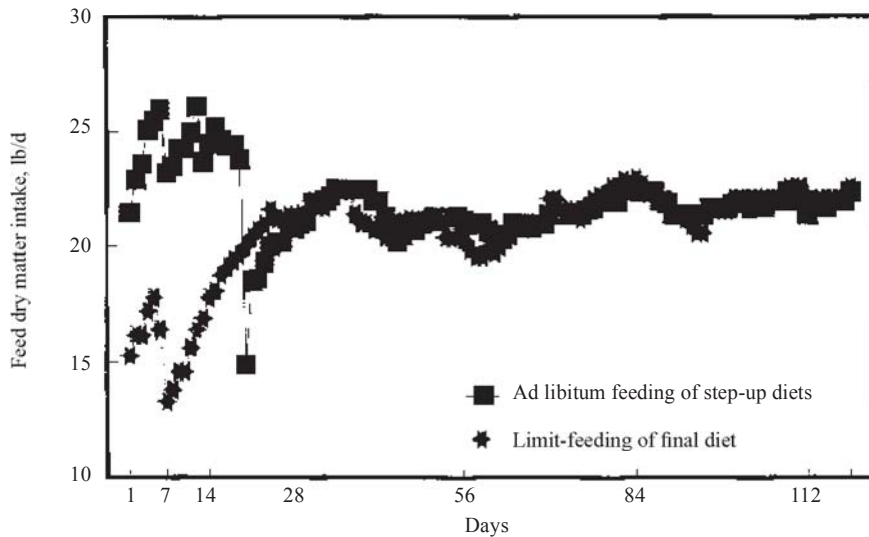


Figure 1. Feed intake variation by start-up method followed by ad libitum feeding to all steers.

than 1 pound of dry matter per day after day seven resulted in ad libitum intake after two to three weeks. Conversely, the feeding of diets stepped-up in grain caused two intake drops during the first two weeks and a severe drop during week three. Intakes for both groups were similar by day 28 and remained similar for the remainder of the trial when all groups were fed the final diet ad libitum.

<sup>1</sup>Burt Weichenthal and Ivan Rush, professors, Animal Science, Brad Van Pelt, research technician, Panhandle Research and Extension Center, Scottsbluff, Nebraska.

## Effects of Programmed Gain on Performance and Carcass Characteristics in Calves

Tony Scott  
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A programmed gain phase in the feeding period reduced total feed consumed but did not improve performance. Economics favored ad libitum feeding due to differences in carcass weight.

### Summary

One hundred sixty crossbred steer calves were used to evaluate the efficacy of including a programmed gain phase in the feeding program and to evaluate effects of rate and duration of programmed gain on finishing performance. Including a multiple phase programmed gain period with two rates of gain resulted in performance similar to a single period of programmed gain. Increasing length of the programmed gain period resulted in higher gains and dry matter intakes

after steers were switched to ad libitum feeding. Cumulative daily gain and dry matter intake were decreased by the programmed feeding strategies. Net return per animal was lower and cost of gain higher when a period of programmed gain was part of the feeding program.

### Introduction

Limit feeding of high concentrate diets as part of a finishing system has been researched for many years. In most cases, previous research has focused primarily on maintaining some degree of intake restriction throughout feeding. Improvements in feed efficiency have been demonstrated as a result of feed restriction. However, daily gain, carcass weight and carcass fatness tend to decrease with feed restriction. Consequently, time required to reach similar final weights increases.

Recent studies restricted energy intake so animals were “programmed” to gain at a certain rate for a given period of time. The underlying theory to this practice: some compensatory growth will occur when animals are given full access

to feed, resulting in similar cumulative daily gains. The reduced feed consumption accompanying the programmed gain period, coupled with compensatory growth, serves to enhance efficiency in programmed gain animals. Also, it has been suggested that the possibility exists for promoting multiple periods of compensatory growth by including multiple periods of programmed gain in the finishing program. However, little is known about the optimum rate or duration of programmed gain.

The objectives of this research were to evaluate both rate and duration of programmed gain in finishing calves while assessing the efficacy of including a programmed gain strategy in the feeding program.

### Procedure

One hundred sixty steer calves (656 lb) were blocked by weight into five weight blocks and randomly assigned within block to one of four pens (eight steers/pen). Each pen was randomly assigned to one of four treatments based on rate and duration of programmed