



Department of Animal and Range Sciences
CLAYTON LIVESTOCK RESEARCH CENTER

PROGRESS REPORT

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Progress Report No. 78

Effects of Varying the Pattern of Feed Consumption on Performance by Programmed-Fed Beef Steers¹

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Wide variation in feed intake by cattle fed high-concentrate diets is presumed by most nutritionists and feedlot managers to either predispose or cause digestive disturbances like bloat and acidosis. Hence, large swings in intake could lead to decreased performance or mortality. Despite this commonly held belief, little data are available to support negative effects of intake variation on cattle performance. Our objective was to evaluate effects of daily and weekly fluctuations in feed intake on performance by programmed-fed beef steers. Use of a programmed-feeding approach allowed us to hold constant the total intake of feed, while varying the pattern of consumption.

One hundred eight medium-framed steers (Angus x Hereford or Angus x Hereford x Longhorn) were adapted to free-choice consumption of 90% concentrate diet for at least 2 weeks before starting the trial. On the day before the 84-day trial began, each steer was weighed, and body weight (BW) data were ranked from low to high. Steers were assigned randomly to one of three treatment groups such that average BW was approximately equal for each treatment. Within treatment, steers were further assigned to one of three pens. Treatments were 1) constant amount of feed per day for a 28-day period, 2) daily variation of 10% relative to the constant group in feed intake and 3) weekly variation of 10% in feed intake. The pattern of feed intake by treatment is shown in Figure 1. Average BW of each pen was used to calculate the amount of feed required for 2.76 pounds per day gain, assuming that the diet had a dry matter content of 85%. Steers were weighed individually after 28, 56 and 84 days. All steers had been implanted approximately 56 days before starting the trial and were reimplanted with Synovex S at day 28. For each new 28-day period, the amount of feed offered to each pen was adjusted for the current BW. Steers in the daily and weekly treatment groups started each 28-day period at a level of feed intake that was 10% greater than the constant group; this allowed these treatment groups to end each 28-day period at the same relative level of intake as the constant group, which would presumably reduce effects of feed intake differences on digestive tract fill. The 90% concentrate diet fed during the trial contained (dry matter basis) 61.47% steam-flaked milo, 15.87% whole-shelled corn, 5.18% sudangrass hay, 5.17% alfalfa hay, 5.06% molasses, 2.07% animal/vegetable fat, 1.04% limestone, .66% dicalcium phosphate, .51% salt, .5% urea, .51% ammonium sulfate and 1.96% hominy-based premix.

Premix supplied Rumensin, Tylan, vitamins A and E and trace mineral. Data were analyzed as a completely random design with pen as the experimental unit.

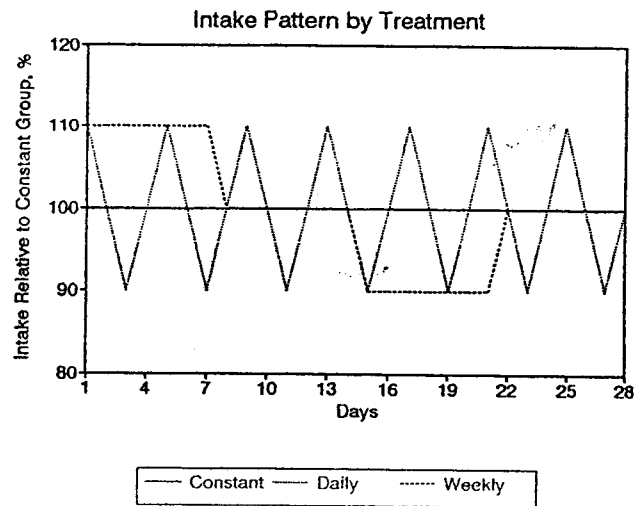


Figure 1. Daily intake patterns by treatment group. Total feed consumption during each 28-day period was constant among groups.

During the first 28 days, varying feed intake by 10% on a daily basis decreased daily gain ($P < .05$) compared with weekly feed intake variation or constant intake (Table 1). From days 0 to 56, daily cattle gained the least ($P < .05$), weekly cattle were intermediate and constant cattle gained the most ($P < .05$). Daily gain did not differ among treatments for days 29 to 56 or days 57 to 84. For the entire 84-day period, daily intake variation decreased daily gain ($P < .10$) by approximately 7% compared with feeding a constant amount. Varying feed intake on a weekly basis did not affect daily gain for the overall 84-day period. Because dry matter intake was constant among treatments for each 28-day period, differences in gain were reflected in differences in feed-to-gain ratio. Based on the actual dry matter intake, an average BW of 964 pounds and the medium-framed yearling equation from the NRC (1984), constant, daily and weekly steers gained 12.5, 5 and 10.8%, respectively, more than expected from the net energy available for gain.

Our results suggest that within a programmed- or limit-feeding management system, daily variation in feed intake decreases daily gain. Whether these results can be applied to cattle that have ad libitum access

¹We thank Syntex Animal Health, Inc., for supplying Synovex S and Elanco Products, Co., for supplying Rumensin and Tylan.

to feed is open to question. Differences among our three treatments narrowed as the steers increased in BW. Feed intake also increased as BW increased, and presumably approached ad libitum consumption with each successive period. Further research will be needed to determine effects of variation in feed intake on performance by feedlot cattle with ad libitum access to feed.

Literature Cited

NRC. 1984. Nutrient Requirements of Beef Cattle (6th Ed.). National Academy Press, Washington, DC.

Table 1. Effects of variation in feed intake on feedlot performance by programmed-fed beef steers during an 84-day period

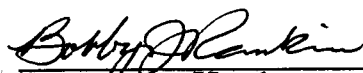
Item	Treatment ^a			SE ^b
	Constant	Daily	Weekly	
No. of steers(pens)	36(3)	36(3)	36(3)	-
Initial BW, lb	829	835	832	3.9
Final BW, lb	1,100	1,089	1,100	3.5
Daily gain, lb				
Days 0 to 28	2.75 ^c	2.37 ^d	2.64 ^c	.07
Days 29 to 56	3.49	3.31	3.34	.07
Days 0 to 56	3.12 ^c	2.84 ^d	2.99 ^c	.04
Days 57 to 84	3.45 ^e	3.37	3.56	.16
Days 0 to 84	3.23 ^f	3.02 ^g	3.18 ^f	.05
Daily DM intake, lb/steer				
Days 0 to 28	16.2	16.3	16.2	.05
Days 29 to 56	17.0	17.1	17.1	.08
Days 0 to 56	16.6	16.7	16.7	.06
Days 57 to 84	18.4	18.2	18.3	.07
Days 0 to 84	17.2	17.2	17.2	.06
Feed-to-gain ratio				
Days 0 to 28	5.89 ^c	6.85 ^d	6.15 ^c	.16
Days 29 to 56	4.89	5.16	5.13	.09
Days 0 to 56	5.32 ^c	5.86 ^d	5.58 ^e	.06
Days 57 to 84	5.36	5.43	5.15	.25
Days 0 to 84	5.33 ^f	5.70 ^g	5.42 ^f	.10

^aConstant = same amount of feed offered each day; Daily = 10% increases and decreases in intake each day; Weekly = 10% increases and decreases in intake each week.

^bStandard error of treatment means; n = 3 pens/treatment.

^{c,d,e}Row means that do not have common superscripts differ (P < .05).

^{f,g}Row means that do not have common superscripts differ (P < .10).


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