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## Restricting Bunk Space Allotments to 6 or 10 Inches has Minimal Impact on Growth Performance in Limit-Fed Receiving Cattle

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### Abstract

A 56-day experiment was conducted to determine the effects of bunk space allotment on growth performance of limit-fed growing cattle. Three-hundred thirty-two crossbred heifers [initial body weight (BW) = 659 ± 34.2 lb] were blocked by origin, stratified by arrival BW, and assigned to pen within block. Pens were randomly allocated to one of four treatments, providing either 6, 10, 14, or 18 inches of bunk space per head for a total of four pens per treatment (16 total pens). Heifers were limit-fed at 2.0% of BW daily [dry matter (DM) basis] for 56 days. Individual BW were measured at the start and end of the feeding period. Pens weights were measured weekly and used to adjust feed delivered for the following week. At the completion of the feeding period, final BW did not differ ( $P = 0.23$ ) among treatments. In addition, average daily gain, DM intake, and feed-to-gain ratio did not differ ( $P \geq 0.16$ ) among calves allotted 6, 10, 14, or 18 in of bunk per head. Overall, bunk allotments of 6 to 18 in of bunk per head had minimal impact on growth performance of limit-fed growing heifers.

### Introduction

Limit feeding a high-energy diet based on corn and corn co-products can improve feed efficiency, reduce manure output, and improve health detection in growing cattle (Spore et al., 2019). One concern associated with limit-fed diets is the potential need to increase bunk allotments to allow all cattle to eat at one time. Current industry recommendations for growing cattle fed once a day are 18 to 22 in of bunk per head (FASS, 2020); however, we recently reported that growth performance of limit-fed steers allotted 10 to 25 in of bunk per head did not differ following a 58-day receiving period (Duncan et al., 2022). An additional concern associated with reducing bunk allotments for limit-fed cattle is that aggressive cattle will consume a majority of the feed provided and less aggressive cattle will not have the opportunity to consume their intended allocation. Overconsumption by aggressive calves and underconsumption by non-aggressive calves will potentially create differences in growth performance within the pen. In our previous experiment, the overall variation in average daily gain (ADG) within pen was not influenced by bunk allotment; however, pens only contained 12 to 14 head. Increasing the head count within a pen could potentially increase competition at the feed bunk and increase variation in weight gains within the pen. In addition, much of the work evaluating the effects of bunk allotments on growth performance of limit-fed

cattle has been done in pens containing fewer than 14 head; therefore, the objective of the study was to determine if bunk allotments of 6, 10, 14, or 18 in per head in pens containing 18 to 28 head impacts growth performance of growing calves limit-fed a high-energy diet based on corn and corn co-products.

## Experimental Procedures

A total of 332 crossbred heifers [initial body weight (BW) =  $659 \pm 34.2$  lb] were purchased in Texas, Kansas, and Missouri and shipped to the Kansas State University Beef Stocker Unit between March 1, 2023, and March 10, 2023. Heifers were blocked by origin (3 blocks) and stratified by individual arrival BW to pens within block. Two blocks were stratified across four pens (19 to 28 head per pen), and one block was stratified across eight pens (18 head per pen). Within block, pens were randomly assigned to one of four bunk allotment treatments: 6, 10, 14, or 18 in of bunk space per heifer. Overall, there were four pens per treatment and a total of 16 pens. Bunk ends were measured and marked with movable concrete bunk dividers. In addition, panels were fastened along the bunk line in each pen to control where cattle could access the bunks. Pens were identical in size (60 × 50 ft) with a packed soil floor, a concrete bunk apron (60 × 12 ft), and one automatic water tank.

Upon arrival, heifers were individually weighed off the truck (day -1), assigned a visual identification tag, and allotted to pens of equal headcount. Following initial processing, heifers were offered prairie hay at 1% of BW [dry matter (DM) basis], had *ad libitum* access to water, and were allowed to stand overnight. The following day (day 0) calves were individually weighed, treated for internal (Valbezen; Zoetis, Kalamazoo, MI) and external (Clean-Up II; Elanco, Greenfield, IN) parasites, and assigned a pen tag. When processing was complete, heifers were allocated to their respective treatment pens. On day 1, cattle were fed the experimental diet (Table 1) at 1.5% of the average pen BW (DM basis). The following day, cattle were stepped up to 2% of BW daily (DM basis) where they remained for the duration of the experiment. Pen weights were measured weekly (days 0, 14, 21, 28, 35, 42, 49, and 56) and were used to adjust weekly feed calls. Calves were fed once daily beginning at 7:00 a.m. using a Roto-Mix feed wagon (Model #414-14B; Roto-Mix, Dodge City, KS) for a 56-day period. At the completion of the 56-day receiving period, heifers were individually weighed.

## Results and Discussion

At the conclusion of the 56-day receiving period, final BW did not differ ( $P = 0.23$ ; Table 2) among calves allotted 6, 10, 14, or 18 in of bunk per head. In addition, ADG, DM intake, and feed-to-gain ratio did not differ ( $P \geq 0.16$ ) among treatments. Although we did not observe a statistical difference, ADG were numerically lower for calves allotted 14 in of bunk per head compared with those allotted 6, 10, or 18 in of bunk per head ( $P \leq 0.13$ ). The overall incidence of respiratory morbidity and mortality in our experiment was low. In total, five calves were treated once for bovine respiratory disease: one from the 6-in treatment, one from the 18-in treatment, and three from the 14-in treatment. Additionally, one calf from the 14-in treatment was treated a second time for respiratory illness 4 days after the initial treatment. Numerically greater morbidity in the 14-in treatment could have potentially contributed to reduced growth performance. On average, the three calves treated for respiratory disease in the 14-in treatment gained 0.13 lb/day. If these animals were not included in the analysis, ADG for the 14-in treatment increases from 2.18 to 2.23 lb/day. We observed a quadratic

effect ( $P = 0.05$ ) of bunk allotment on the standard deviation of ADG within pens. Overall, within-pen variation in ADG was greater for pens allotted 14 in of bunk per head compared with pens allotted 6, 10, or 18 in of bunk per head. Taken together, it appears that in limit-fed growing heifers in pens of 18 to 28 calves, bunk space allotment can be reduced to as little as 6 to 10 in with minimal impact on performance.

## Implications

These data suggest that bunk allotments as low as 6 inches per head do not reduce the growth performance of limit-fed growing cattle during a 56-day receiving period.

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**Table 1. Experimental diet**

Item	% of Dry matter (DM)
Ingredient	
Corn, dry rolled	39.5
Supplement <sup>1</sup>	7.5
Sweet bran <sup>2</sup>	40.0
Prairie hay, chopped	13.0
Nutrient analysis <sup>3</sup>	
DM, % as is	76.6
Organic matter	65.0
Crude protein	14.8
Neutral detergent fiber	25.7
Acid detergent fiber	9.5

<sup>1</sup> Supplement pellet formulated to contain (DM basis) 11.5% crude protein, 0.60% phosphorus, 4.7% salt, 0.80% potassium, 2.5% fat, and 307.2 g/ton monensin (Rumensin; Elanco, Greenfield, IN).

<sup>2</sup> Cargill Corn Milling (Blair, NE).

<sup>3</sup> Nutrient analysis by SDK Labs (Hutchinson, KS).

**Table 2. Effects of bunk space allotment of growth performance and health of limit-fed growing heifers<sup>1</sup>**

Item	Treatment, in				SEM <sup>2</sup>	<i>P</i> -value <sup>3</sup>		
	6	10	14	18		Linear	Quadratic	Cubic
Number of pens	4	4	4	4				
Number of animals	82	82	83	83				
Morbidity, head <sup>4</sup>	1	0	3	1				
Mortality, head	1	1	0	0				
BW, lb								
Day 0	657	655	655	654	1.75	0.09	0.72	0.42
Day 56	794	788	778	789	7.23	0.29	0.14	0.28
Average daily gain, lb/day	2.43	2.37	2.18	2.40	0.116	0.48	0.12	0.17
Standard deviation of average daily gain, lb/day	0.58	0.68	0.86	0.64	0.10	0.30	0.05	0.18
DM intake, lb/day	14.51	14.54	14.46	14.51	0.069	0.70	0.88	0.30
Feed:Gain, lb/lb	6.02	6.14	6.69	6.07	0.303	0.46	0.12	0.12

<sup>1</sup> Heifers were allotted 6, 10, 14, or 18 in of bunk per head and limit-fed at 2.0% of body weight (BW) daily [dry matter (DM) basis] for 56 days.

<sup>2</sup> Standard error of the mean.

<sup>3</sup> *P*-value associated with linear, quadratic, or cubic effects of bunk allotment.

<sup>4</sup> Number of animals treated for bovine respiratory disease.