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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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W.C. Ellis, Z.M. Duncan, M.S. Grant, W.R. Hollenbeck, E.C. Titgemeyer, and D.A. Blasi

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 ≥ 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 ± 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 strat-
ified 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 ≥ 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 ≤ 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.

**References**


*Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.*
Table 1. Experimental diet

<table>
<thead>
<tr>
<th>Item</th>
<th>% of Dry matter (DM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn, dry rolled</td>
<td>39.5</td>
</tr>
<tr>
<td>Supplement¹</td>
<td>7.5</td>
</tr>
<tr>
<td>Sweet bran²</td>
<td>40.0</td>
</tr>
<tr>
<td>Prairie hay, chopped</td>
<td>13.0</td>
</tr>
<tr>
<td>Nutrient analysis³</td>
<td></td>
</tr>
<tr>
<td>DM, % as is</td>
<td>76.6</td>
</tr>
<tr>
<td>Organic matter</td>
<td>65.0</td>
</tr>
<tr>
<td>Crude protein</td>
<td>14.8</td>
</tr>
<tr>
<td>Neutral detergent fiber</td>
<td>25.7</td>
</tr>
<tr>
<td>Acid detergent fiber</td>
<td>9.5</td>
</tr>
</tbody>
</table>

¹Supplement 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).
²Cargill Corn Milling (Blair, NE).
³Nutrient analysis by SDK Labs (Hutchinson, KS).

Table 2. Effects of bunk space allotment of growth performance and health of limit-fed growing heifers¹

<table>
<thead>
<tr>
<th>Item</th>
<th>Treatment, in 6</th>
<th>Treatment, in 10</th>
<th>Treatment, in 14</th>
<th>Treatment, in 18</th>
<th>SEM²</th>
<th>P-value³ Linear</th>
<th>P-value³ Quadratic</th>
<th>P-value³ Cubic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of pens</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td>0.09</td>
<td>0.72</td>
<td>0.42</td>
</tr>
<tr>
<td>Number of animals</td>
<td>82</td>
<td>82</td>
<td>83</td>
<td>83</td>
<td></td>
<td>0.29</td>
<td>0.14</td>
<td>0.28</td>
</tr>
<tr>
<td>Morbidity, head</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td></td>
<td>0.48</td>
<td>0.12</td>
<td>0.17</td>
</tr>
<tr>
<td>Mortality, head</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0.30</td>
<td>0.05</td>
<td>0.18</td>
</tr>
<tr>
<td>BW, lb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 0</td>
<td>657</td>
<td>655</td>
<td>655</td>
<td>654</td>
<td>1.75</td>
<td>0.09</td>
<td>0.72</td>
<td>0.42</td>
</tr>
<tr>
<td>Day 56</td>
<td>794</td>
<td>788</td>
<td>778</td>
<td>789</td>
<td>7.23</td>
<td>0.29</td>
<td>0.14</td>
<td>0.28</td>
</tr>
<tr>
<td>Average daily gain, lb/day</td>
<td>2.43</td>
<td>2.37</td>
<td>2.18</td>
<td>2.40</td>
<td>0.116</td>
<td>0.48</td>
<td>0.12</td>
<td>0.17</td>
</tr>
<tr>
<td>Standard deviation of average daily gain, lb/day</td>
<td>0.58</td>
<td>0.68</td>
<td>0.86</td>
<td>0.64</td>
<td>0.10</td>
<td>0.30</td>
<td>0.05</td>
<td>0.18</td>
</tr>
<tr>
<td>DM intake, lb/day</td>
<td>14.51</td>
<td>14.54</td>
<td>14.46</td>
<td>14.51</td>
<td>0.069</td>
<td>0.70</td>
<td>0.88</td>
<td>0.30</td>
</tr>
<tr>
<td>Feed:Gain, lb/lb</td>
<td>6.02</td>
<td>6.14</td>
<td>6.69</td>
<td>6.07</td>
<td>0.303</td>
<td>0.46</td>
<td>0.12</td>
<td>0.12</td>
</tr>
</tbody>
</table>

¹Heifers 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.
²Standard error of the mean.
³P-value associated with linear, quadratic, or cubic effects of bunk allotment.
⁴Number of animals treated for bovine respiratory disease.