

# Effect of Free Stall Pen Design on Feeding Behavior

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## Introduction

Differences in feeding behavior may impact the health and well-being of dairy cows in free stall facilities. Sub-acute ruminal acidosis (SARA) may be induced experimentally by restricting intake and then allowing dairy cows to consume a larger than normal feed meal, which the rumen is unable to buffer. Such a mechanism may result in SARA in dairy cows housed in facilities where intake at certain key periods, such as after fresh feed delivery, is limited by lack of space. The purpose of this study was to determine if a difference exists in group feeding behavior in dairy cows housed in free stall pens with either 2-rows or 3-rows of stalls.

## Materials and Methods

The high yielding, mature cow pens in 12 herds were filmed for a 24 hour period. Six herds had 2-row pen designs (mean 1.52 cows per feed space), and six had 3-row pen designs (mean 2.07 cows per feed space). Video tapes were scanned at 10 minute intervals to produce charts of feed bunk utilization, recording the proportion of feed spaces (24 inches wide) occupied by cows at each time interval. Cows in the feed alley were continuously monitored for physical and non-physical aggressive displacements. Herd feeding behavior data were aligned according to peak feed bunk utilization following fresh feed delivery (primary peaks), and following return from milking without fresh feed delivery (secondary peaks). Comparisons between feeding behavior patterns were made using an autoregressive (AR-1) repeated measures model in SAS (SAS, 1999). Comparisons of cows per feeding space and agonistic interactions per cow in the pen were made using a Mann-Whitney test.

## Results

There was no difference in feed bunk utilization by pen design for the 90 minute period after primary peaks ( $P=0.24$ ). However, feed bunk utilization for 90 minutes following secondary peaks did significantly differ between 2-row and 3-row pens ( $P=0.008$ ). Peak feed bunk utilization did not reach 100% in either pen design, but was greater in 3-row pens and took longer to decline to baseline levels. Although no significant difference in the rate of aggressive displacements was observed after primary peaks between pen designs, cows in 3-row pens experienced significantly more aggressive displacements during the day (0.246 per cow per hour) than cows in 2-row pens (0.128 per cow per hour), ( $P=0.008$ ).

## Significance

Feed bunk utilization is a function of several competing drives, namely hunger and desire to access fresh feed, allelomimetic drive (the desire for all the cows to do the same thing at the same time), and social issues of rank and a desire to maintain space and separation between herd-mates. Restriction to feed access leads to differences in competition at the feed bunk, with cows in 3-row pens needing to occupy the bunk more at times other than after fresh feed delivery. The cost of this behavior is an overall increase in aggressive displacements between cows over that seen in 2-row pens. Differences in feeding behavior in pens with varying feed space allowances may require different management approaches to feeding, in order to ameliorate potential negative effects on health and productivity, such as more frequent delivery of fresh feed, and more frequent push-ups timed to ensure access to feed after returning to the pen from milking.