

Crowding Affects Dry Cows, Too

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Over the past few years, multiple research trials have shed light on the potential effects of stocking density on health, productivity and behavior of lactating dairy cows. This effort has recently started to include dry cows, both in the far-off and close-up periods. Early indications are that there are likely negative effects on these groups from overcrowding as well, but quite a few unknowns remain. This publication will focus on what we think we know, what we do not know, and where we should focus our next efforts.

What is considered overstocking during the dry period?

The introduction of 30-inch headlocks has changed this a bit. With 24-inch headlocks, the recommendations were to keep stocking density at 85 percent to avoid reduced dry matter intakes. With the wider option, a shift has occurred. The current Canadian Code of Practice recommends providing 30 inches, i.e. one headlock or space within a post-and-rail barrier. The FARM program in the US simply recommends providing sufficient room to avoid competition for feeding space.

Recommendations for resting space are similarly limited. The Canadian Code of Practice recommends the provision of 160 square feet per cow within a maternity pen. The only other general recommendation for stocking density within these guidelines is to not exceed 120 percent stocking density of the freestall or 120 square feet per cow, which is more applicable for lactating cows rather than those in

the transition period. On the US side, the FARM program only recommends that clean, dry resting space is available. There are a variety of recommendations within Extension publications, but nothing consistent or strongly supported by research.

How much of an issue is overstocking during the dry period?

The short answer to this is we do not know. The research efforts evaluating farm management strategies or the USDA surveys have not specifically looked at stocking density during the dry period or transition period. The extent that lactating cows are overstocked suggests that cows are likely overcrowded throughout the dry, or transition, periods, but we really have no idea to what extent. The lack of an answer to this is fundamental question affects dairy production in a variety of ways that are somewhat intertwined. First, not having a clear concept of what is common on commercial farms makes it impossible to design applied research trials evaluating the effect of stocking density during this time. The lack of research prevents the development of data-driven recommendations for the spatial needs of these at-risk cows. Our limited understanding of this aspect of managing cows through the transition into lactation may explain why metabolic diseases remain problematic for dairy cows. It also makes planning transition cow facilities very difficult. Too little space likely contributes to the common issues of the transition period. Too much space is a poor use of economic

resources that could be used elsewhere. Survey data from the USDA-NAHMS will likely address this, but the cow comfort results have not been released.

What is known?

With the importance of dry matter intake during the transition period, much of the recent research on stocking density using dry or transition cows focused on feeding space. Some consistent trends have emerged. When feeding space is limited, cows respond by increasing aggressive behaviors to gain access to feed, and mature cows will increase their feeding rate to compensate for less access. Studies from the University of British Columbia and Cornell University suggest that the increased aggression will occur regardless of when the overstocking occurs, i.e., the response is consistent regardless if the focus is on the far-off, close-up or fresh periods. The cost to cows from this behavior is not quite clear. It is expected that increased aggression would serve as a social stressor with negative consequences. Recent work from Cornell University established that fecal cortisol metabolites, an indirect means to assess the presence of a stress response, were higher when far-off dry cows were housed at 0.5 freestalls per cow and 13 inches of feed bunk space (equivalent of a stocking density of 200 percent at both the free stalls and feed bunk) compared to 1 freestall per cow and 26 inches of bunk space. Interestingly, the overstocked cows in this study consumed about 2 pounds more dry matter per day on average, but also had indicators of decreased energy balance (i.e., increased concentrations of non-esterified fatty acids were evident in their blood samples). This could mean that the demands of fighting for feeding space come with an energy cost. The increase in feeding rate is important for two reasons. First, slug feeding could have negative effects on rumen health. Second, heifers are unable to increase their feeding rate, which is one reason that this group of animals is among

the most susceptible to the effects of overstocking.

This behavioral limitation is one reason why heifers are not well equipped to thrive in an overstocked housing environment. The other primary reason is that they tend to be at the bottom of the social hierarchy, meaning they have the least access to resources in competitive situations. Again, work from Cornell University that calculated a competitive index based on the ratio of success in a competitive situation relative to the total number of aggressive encounters, found that heifers typically had the lowest success rate. Of the total number of cows classified as “low” success, 79 percent were heifers. They only made up 7 percent of the “high” success group. The animals in the low success group had higher non-esterified fatty acids and fecal cortisol concentrations. While not statistically different, the “low” success animals also spent numerically less time feeding and more time waiting to gain access to a freshly delivered total mixed ration. Data from the University of British Columbia indicates that heifers in a competitive housing environment were three times more likely to be removed from their feeding space by another cow compared to those in a noncompetitive situation.

Despite the previously discussed differences in feeding behavior, two key responses do not seem to be affected. Looking at the studies across the far-off, close-up and fresh periods, the total amount of time spent feeding and dry matter intake were not affected. Work from the University of Minnesota comparing cows and heifers housed at 80 or 100 percent (at both the freestalls and feed bunk) reported differences in feeding time that were parity specific. Cows spent more time feeding when housed at 100 percent while the opposite was true for the heifers. However, it is critical to note that the differences in feeding time were only 7 to 12 minutes per day with total feeding times ranging from 225 to 325 minutes per day (3.75 to 5.4 hours per day). It is unlikely that a 2 to 5 percent change in feeding time over the course of 24

hours was sufficient to have negative effects on these cows.

A few potential reasons exist for the limited effect of stocking density on feeding time or intake. In two of these studies, only healthy cows were enrolled, which could have influenced their ability to adapt to the competitive situation. The work at the University of British Columbia has focused on stocking density at the feed barrier while the freestalls were understocked. Cows place a greater priority on rest, relative to feeding or socializing, when access to all three are limited. In these studies, the lack of competition for resting space may have provided these cows with more flexibility in feeding behaviors to accommodate the reduced access.

What to consider on the farm?

While there is still a considerable amount of work to do for us to fully understand the ramifications of stocking density during the dry/transition periods, this should not prevent you from taking a proactive approach to managing these cows' spatial allocation. Providing at least one freestall (probably 150 square feet should be the minimum on a bedded pack) and 30 inches of bunk space is a good place to start, but the best stocking density on a given dairy will need to be worked out by tracking the success of the dry cow and transition cow programs. Consideration also needs to be given to the heifers about to enter the lactating herd, who will likely transition the best in an undercrowded, noncompetitive environment.



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