



# RESEARCH REPORTS



## Overstocking: At the Stall and the Feed Bunk

Overstocking typically occurs in two areas of the barn: at the freestall and at the feed bunk. Producers overstock dairy cattle to save building costs, or because herds grow before barns can be expanded to accommodate more cows. Overstocking can also occur unintentionally; even when each cow has access to a freestall (i.e. one-to-one, or 100% stocking rate, for cows-to-stalls). Differences in barn layout can mean that cows have adequate feeding space in barns with two rows of freestalls but too little feeding space in barns with three rows of stalls in each pen. This is because two-row pens have to be longer in order to house the same number of cows as a three-row pen, providing approximately 50% more bunk space per cow.

Researchers at UBC have completed a series of studies designed to provide producers with science-based recommendations for stocking rates. These studies have addressed overstocking at both the stall and the feed bunk. To assess the effects of overstocking stalls, 48 Holstein cows were housed in pens containing one stall for every cow (i.e. 100% stocking rate), or overstocked at 109, 120, 133, and 150% (Figure 1). Cows were tested in groups of 12, and each group of cows was exposed to each stocking density treatment. Video was used to record the amount of time cows spent lying in the stalls and standing in the alley as well as latency to lie down after returning from milking. Additionally, aggressive interactions or “displacements” between cows were recorded to identify whether aggression would increase when cows were forced to compete for lying space.

Cows spent less time lying down and more time standing outside the stall when overstocked. For example, cows housed at 100% stocking density averaged 13 h/d lying in the stall, but lying time decreased to just 11 h/d when cows were housed at a stocking density of 150%. Cows compensated for reduced lying time by spending more time standing in the alley. The effects of overstocking were greatest

during the period of the day when most cows were lying down, such as in the early morning between 2 and 5 am (Figure 2).

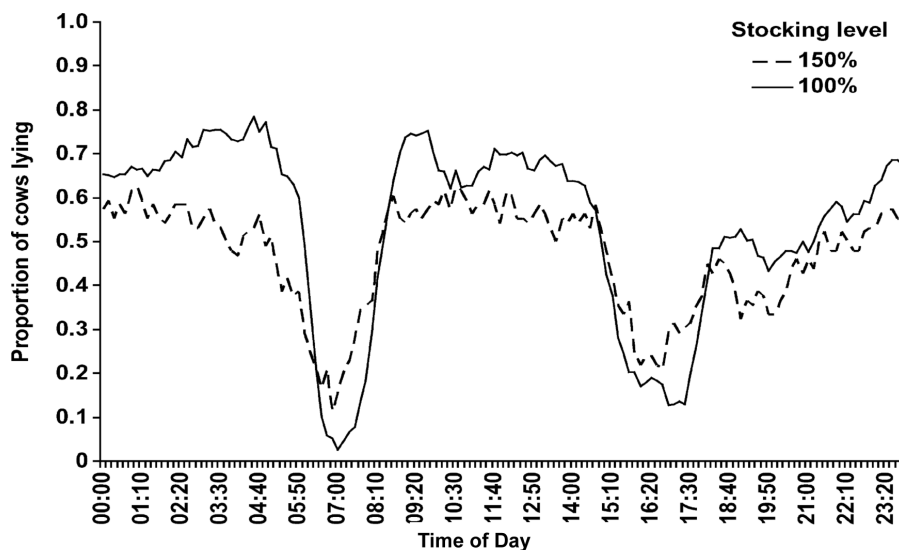
Fresh feed is often delivered to the pens when cows are away for milking. The delivery of fresh feed is known to motivate cows to spend time feeding after milking, and allow time for the teat ends to close before they lie down in the stalls. Overstocking interferes with this response as overstocked cows often chose to lie down when they returned from the parlour instead of eating fresh feed. This result tells us that cows are highly motivated to lie down and will forgo eating time to ensure that they secure a freestall. This decline in the time cows remain standing after milking may also increase the risk of environmental mastitis.

For some cows, overstocking may not be a problem; they can simply make another cow get up and then take her stall. These displacements are much more common at higher stocking densities, and may help explain why submissive cows, or those that are displaced frequently, are at a higher risk of becoming lame than more dominant cows.

Other research has also shown how overstocking at the feed bunk increases competition among cows. Competition at the feed bunk increases the time cows

Stocking Density (%)	Ratio of Cows : Stalls
100	12 : 12
109	12 : 11
120	12 : 10
133	12 : 9
150	12 : 8

Figure 1. Stocking density expressed as a percentage with the corresponding ratio of cows to stalls.



**Figure 2.** Proportion of cows lying down over a 24-hour period shown for cows housed at 100% (12 cows: 12 stalls) versus 150% (12 cows: 8 stalls) stocking density. Cows on the overstocked treatment could not synchronize behaviour and lie down at the same time as much as cows that were not overstocked.

spend standing in the feed alley, presumably waiting to obtain access to feed. Transition cows may be especially susceptible to negative consequences of competition with decreased feed intake and high standing times increasing the risk of postpartum disease and lameness.

A recent UBC study assessed the effects of overstocking at the feed bunk on transition cows. Cows were assigned to either an individual electronic feed bin or had to share access to their feed bin with a second cow. These treatments provided cows with the equivalent of 0.3 and 0.6 m of linear feed space per cow; the recommended amount of bunk space is between 0.6 and 0.8 m per cow, but 0.3 m per cow is not uncommon on commercial farms.

Over 100 cows were tested in this trial. All were assigned to treatments approximately 18 days before calving and remained in the experiment until 18 days after calving. Feed intake and feeding rate, displacements between cows at the feed bins and the amount of time cows spent standing were recorded in the periods before and after calving. First lactation (primiparous) and older (multiparous) cows were housed within the same pens.

Overstocking at the feed bunk decreased feed intake before calving for multiparous cows, and increased the number of displacements for both multiparous and primiparous cows. We saw the greatest increase in feeding rate of submissive cows (displaced more often from the feed bunk) compared to more dominant cows.

Another consequence of overstocking at the feed bunk was that multiparous cows increased the time they spent standing (but not eating) during the week after calving. This increase in time spent standing was most likely driven by cows waiting for access to the feed bunk, and is a known risk factor for lameness.

In summary, these studies illustrate the effects of overstocking at the freestalls and the feed bunk; overstocking reduced the time cows (especially subordinate animals) can access the resource (i.e. lying space or feed), and increases unwanted behaviours (i.e. standing and competition for feed). Transition cows are more vulnerable to these effects, especially in terms of reductions in feed intake (that increase the risk of transition diseases) and increased standing time (that increase the risk of lameness). The effects of overstocking at both the freestalls and the feed bunk on displacements are also more harmful for submissive cows. Submissive cows may be especially at risk for disease during the transition period because they show reduced intakes, stand more and lie down less. Whether these cows are submissive by nature, or temporarily submissive due to their ill health, is not known and is a focus of future research.

These results provide a scientific basis for the recommendations in Canada's new Recommended Code of Practice for the Care and Handling of Dairy Cattle. Specifically, the code recommends that producers provide each cow with one lying stall and one feeding position (typically 60 cm of bunk face). The code emphasises this space allotment is most important during transition. Adopting these practices can improve cow comfort and cow health.