



# RESEARCH REPORTS



## Effects of Bedding Quality on Lying Behavior of Dairy Cows

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A growing body of research now demonstrates that the surface provided for cows is one of the most important factors in designing a suitable lying area. Cows clearly prefer lying surfaces with more bedding and spend more time lying down in well-bedded stalls than those with little or no bedding. Good cow comfort reduces the risk of disease. For example, cows housed in comfortable deep-bedded sand stalls have a lower risk of lameness than cows housed on mattresses with little or no bedding.

Unfortunately, even well designed stalls still need to be well maintained in order for cows to be comfortable. In a previous UBC Research Report we described how the level of sand bedding inside the stall declines over the course of a few days, and showed that cows avoided lying down in these poorly maintained 'bathtubs'. But there is more to stall maintenance than the depth and evenness of the bedding; bedding can also become wet and contaminated with feces and urine. There are lots of good reasons to keep stalls clean and dry – every producer wants clean cows, with clean udders and a low rate of environmental mastitis.

New cow comfort research at UBC has now shown that dry bedding is also a key concern for cows. Wet bedding reduces lying time more than any other feature of stall design or stall maintenance that we have studied.

Maintaining lying times is a priority for dairy cattle; cattle will forgo eating to increase lying times. Cows can cope with some restrictions in lying times by changing body posture to alleviate strain on the legs and hooves while standing, but their motivation to lie down increases after only a few hours of standing. Restricted lying times also increases blood cortisol and other measures of physiological stress. In this study, we used two well-established measures of cow comfort; a test of preference in which cows were allowed to choose between wet and dry stalls, and a test of stall usage in which cows were provided access to only one option at a time.



Figure 1. Testing cow preferences. In this phase of the study cows had the choice between stalls with kiln-dried sawdust, and the same bedding soaked in water. The wet and dry stalls were arranged in a checkerboard pattern. Sure enough, this is how the cows choose their stalls - consistently avoiding the ones with wet bedding.

In the first phase of the study we tested 24 lactating cows from the UBC herd. Cows were tested in groups of six cows with each group housed in a pen containing six wet and six dry freestalls. This under stocking allowed each cow to choose their preferred bedding without having to compete with their herd mates, as illustrated in Figure 1.

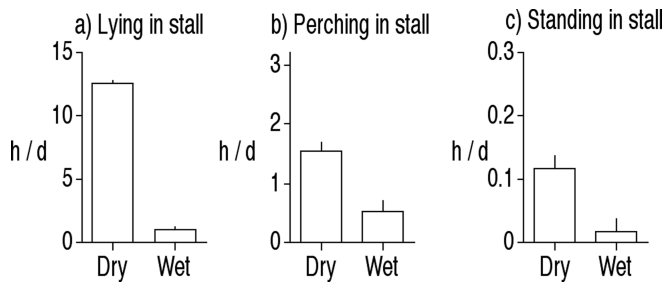


Figure 2. Results of the preference test. The panels show the time in hours per day that cows spent a) lying in the stall, b) perching with their front two hooves in the stall, and c) standing with all four hooves in the stall, when given the choice between stalls with either dry or wet bedding.

All cows showed a strong preference for dry bedding. When allowed the choice between the wet and dry stalls, cows spent almost all their lying time in the dry stalls (see Figure 2). Cows also preferred to perch and to stand fully in the stalls with dry bedding.

These preference measures are convincing evidence of what the cow wants to do, but on most farms cows do not get a choice. From a practical perspective it might be more interesting to ask what cows do when their only choice is a wet lying surface. More specifically, if a cow only has access to wet bedding, does she spend less time lying down than when she has only access to dry bedding?

To answer this question we performed a test. Each group of cows was kept for several days with access to only dry bedding or only wet bedding, and then the treatments were reversed so that we had measures from all cows under both conditions.

Once again the results were clear. All cows spent more time lying down when provided with dry bedding. On average cows spent 4 hours more lying down every day when provided with the dry lying surface. This difference is larger than we have seen in any previous experiment, testing many features of stall design and stall management.

Cows compensated for the reduced lying time in wet stalls by spending more time perching with just the front feet in the stall or by spending more time standing outside the stall. Both of these behaviours increase the risk of lameness.

In conclusion, dairy cows show a clear preference for a dry lying surface, and spend much more time standing outside of the stall when only a wet lying surface is available. This effect of bedding quality is greater than that of any other effect of stall design or management we have studied. In this research our wet bedding was more wet than you would typically find inside a well-managed stall. We do not know how well cows would tolerate bedding that was less wet, or wet only at the back of the stall. However, our other studies on stall maintenance suggest that cows would also avoid these stalls.

Our take home message: if at all possible, use lots of clean, dry bedding in your stalls. The best designed stalls and barn will not help you or your cows unless these stalls are well maintained with bedding kept level and dry.

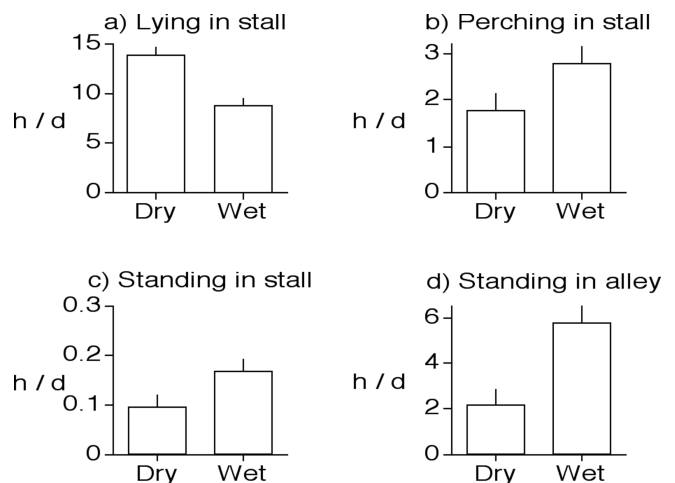


Figure 3. Results from the usage phase of the study. The panels show the time in hours per day that cows spent lying in the stall, perching with their front two hooves in the stall, standing with all four hooves in the stall, and standing in the alley, when cows were kept in a pen with access to only dry or wet bedding.

We thank the faculty, staff and students of the UBC Dairy Education and Research Centre. This report is a summary of work that was first published in the *Journal of Dairy Science* in 2007 (volume 90:5732–5736). Our research is funded by BC's dairy industry, the Dairy Farmers of Canada the Natural Sciences and Engineering Research council of Canada (NSERC), and many contributors listed at [www.landfood.ubc.ca/animalwelfare](http://www.landfood.ubc.ca/animalwelfare)