

# Housing dairy cows

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## Introduction

In the dairy industry, cows are often housed in an intensive system, especially in cold climates during winter. This raises many concerns regarding the welfare of the cows. In particular, issues regarding the cows' resting behaviour will be discussed here. In the past twelve months, several studies have been performed relating to these areas of concern in order to improve the welfare of the dairy cow. Feddes, Robinson, and Borg (1995) suggest that cows should be either eating or lying down, and a lack of cow comfort is evident when cows increase their time spent idle. Deprivation of lying is considered to be aversive to cows (Metz, 1985). Depriving cows of the opportunity to lie down for 3 hours significantly increases their motivation to lie down to the extent that lying takes priority over the basic needs such as eating (a form of post-inhibitory rebound). When deprived of lying for longer periods, Metz (1985) observed cows performing behaviours indicative of frustration. They concluded that reducing the lying time of cows is likely to have adverse effects on their welfare and productivity.

## Discussion

In order to determine the extent to which stall design can affect the resting behaviour of dairy cows, Haley, Rushen, and de Pasille (2000) conducted a study over six weeks during which eight Holstein cows spent three weeks in two different pen types thought to represent a large difference in cow comfort.

In one pen, cows were housed in 4.2 x 3.9m stalls, which had soft mattress flooring. The second pen design were standard 1.8 x 1.3m tethered stalls on concrete. The cows were monitored by video and records made on time spent eating, lying, and standing idle. According to Galindo, Broom, and Jackson (2000) the time spent standing idle may also contribute to lameness. The susceptibility of a cow to lameness depends on how the environment influences the location and duration of standing time. This complements the theory of Feddes et al (1995) who suggested that idle standing time could be used as a measure of cow comfort.

Results show that the cows on mattresses spent more time lying down, and less time standing idle than cows on concrete. The extra time spent lying was replaced in the tethered stalls by time standing idle, however, the time spent eating, feed consumed and milk production was not significantly different. The authors of this study conclude that a poorly designed stall could substantially reduce the time that dairy cows spend resting and, cows are more comfortable when able to lie down in individual pens than when kept in tethered stalls.

In this study, there seems to be no relationship between lying time and productivity. However, Metz (1985) observed that a significant decrease in the lying time of a dairy cow substantially reduced its milk production. This difference may be due to the fact that Haley et al (2000) conducted their experiment for only six weeks; possibly too short a time to see an effect in milk production. Further studies are needed to confirm long term effects.

In a cubicle system, bedding materials currently of interest include straw, where the cubicles are filled with a thick layer of straw and changed daily; soft lying mats or mattresses, which essentially consist of tubes made of polypropylene and nylon, filled with granulated rubber and covered with a layer of propylene; or rubber mats made of ethylene vinyl acetate. Studies have been conducted in the past year to investigate how different bedding materials affect the resting and welfare of cows.

In order to investigate the relative merits of mats and mattresses in terms of cow comfort, production and performance, Chaplin, Tierney, Stockwell, Logue and Kelly (2000) conducted

a study of 29 cows housed on mats and 29 cows housed on mattresses at each of two different dairy units. This eliminated any biased results due to one individual dairy as the location. The study was conducted over a whole lactation period, in an attempt to evaluate long term performance of the products.

Milk yield, body weight, feed intake and condition were recorded and cows were monitored by an observer. The two farms were entirely synchronised, and notes were made on the time spent standing, feeding, lying and idling.

Results show that there was no significant difference in milk production, weight or condition. This however, does not necessarily mean that the products provided equal comfort for the cows. This is supported by Johannesson and Sorensen (2000) who say cattle might have a preference for considerably more space, and softer bedding, even though this would not affect feeding, growth rate or feed conversion rate.

The results from the study by Chaplin et al was that, cows on mattresses spent more time lying and less time idling than those on mats. Those on mattresses settled into a plateau of resting behaviour early, whilst those on mats continued to improve, suggesting that cows adapted to mattresses more quickly than to mats. The authors of this study conclude that the welfare and comfort of the dairy cow is improved when provided with mattresses for bedding instead of mats.

Wechsler, Schaub, Friedli and Hauser (2000) conducted a study comparing mattresses with traditional straw bedding regarding resting behaviour and leg injuries. Data was collected on ten cows from five farms with straw bedding and ten cows on thirteen farms with mattresses. A belt with a sensor was fitted to the cows 4-6 hours before the study, in order to allow the cows to become habituated. The belt took automatic readings on the position of the cows in relation to lying behaviour. The cows were also given three months prior to the study to adapt to their designated bedding [in contrast to Chaplin et al (2000) whose study involved cows that adapted during the study].

Results show that mattresses are equivalent to straw bedding in terms of lying behaviour but less favourable with respect to leg injuries. Leg injuries may result in pain and suffering if severe, and changes in duration and frequency of lying bouts may be a consequence of pain experienced by cows while lying. However, the injuries observed in this study were reasonably superficial. The authors of this study conclude that the performance of the mattresses was considered equivalent to traditional straw bedding. This is significant because straw is both cost and labour expensive.

## Conclusions

Further testing needs to be done to evaluate the performance of mattresses long term, but from these studies it can be seen that a cubicle design in which a dairy cow can rest individually on either straw or a mattress improves the cow's welfare and comfort, when housed inside for lactation.

## References

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