

Intensive dairy systems: health implications of confined housing and the influence of stress management on welfare

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Introduction

Intensive dairy systems impose considerable stress on cattle contained within them. In addition to a confined environment, cows are regularly exposed to potentially aversive stimuli, such as human contact, milking, and veterinary procedures. Stress from such sources may negatively affect welfare and productivity (Hemsworth et al., 2000) so research that may help to develop guidelines for housing design and stress management techniques may significantly improve welfare standards and profitability within intensive systems.

Discussion

Regula et al. (2004) studied the effect of confinement on dairy cows kept in three intensive husbandry systems: tie stalls with regular exercise during summer but not during winter; tie stalls with regular exercise year-round; and loose-housing with regular outdoor access. The study showed that loose-housing and regular exercise throughout the year had a positive effect on lameness, teat injuries, and lying-down behaviour. Loose-housing systems were generally associated with improved welfare, while the welfare of those within tie stalls was somewhat compromised. Although limitations existed (the effect of housing on individual cows could not be easily evaluated), the findings of this study are supported by Gustafson (1993), who demonstrated that regular outdoor exercise significantly enhances welfare of cows in intensive dairy systems. Regula et al. (2004) also found that welfare standards varied significantly within husbandry systems, concluding that "the management skills of the farmer seemed to be of similar importance to the housing system itself" in maintaining welfare standards. Management of stress is particularly important in intensive environments in which welfare is already compromised by confinement and animals are exposed to potential stressors such as human-animal interaction, veterinary procedures and milking.

Stress reduction may be achieved by increasing positive human-animal interactions. Waiblinger et al. (2004) studied the effect of positive handling of dairy cows on stress reactions during artificial insemination. While beneficial effects of positive handling on stress during aversive procedures have been shown in other species (Hennessey et al. (1998) showed that gentling after venipuncture prevented cortisol concentration increases in dogs), no similar study in cattle existed. Waiblinger et al. (2004) found that cows regularly stroked at the neck by a specific handler in the four weeks prior to insemination exhibited lower heart rates and less restless behaviour during the procedure than controls that received no such positive interaction. Stroking at the neck throughout the procedure further decreased stress reactions of both experimental and control animals. Further, subject responses to this positive interaction were reminiscent of those displayed during allogrooming, simulations of which have been shown to reduce heart rate in horses by Feh and de Mazieres (1993). This suggests that handling techniques analogous to natural behaviours may be important in stress reduction in cattle also (Waiblinger et al., 2004).

Positive handling by one individual may also contribute to reducing fear of humans in general. As experimental animals showed fewer stress reactions than controls when gentled by individuals other than the specific handler during insemination, Waiblinger et al. (2004) concluded that some generalisation of positive interaction with the handler to other humans existed. However, the stress-reducing effect of the person on the animal varied directly with the amount of their previous positive interaction. This supports the findings of Munksgaard et al. (1997) whose study demonstrated that cattle discriminate between people based on previous interactions. The specific handler of the experimental group was also shown to be more effective in stress reduction in control animals than other individuals, despite a lack of previous interaction; some characteristic of the handler was then particularly effective in stress relief. That said, this study could not discern specific characteristics that caused

differing responses, and the authors appealed for further investigation in this area. Overall, however, positive handling resulted in increased confidence and decreased stress in all situations. Hemsworth et al. (1996) had previously shown that positive human-animal interaction in naive animals reduces stress caused by human contact. However, Waiblinger et al. (2004) studied subjects already habituated to human interaction, concluding that additional positive handling is then beneficial even in "tame" animals. This is reinforced by the positive correlation between conception rate and positive cow-stockperson interaction found by Hemsworth et al. (2000), which further demonstrates the significance of positive handling for profitability and welfare.

While consistent positive handling generally may contribute to stress reduction, particular techniques may also be beneficial. Das and Das (2004) studied the efficacy of pre-partum udder massage in primiparous cows in stress reduction during milking. The study found that primiparous cows subjected to as few as fifteen sessions of manual udder manipulation in the last month of gestation showed better temperament, less eliminative behaviours (urination and defecation), faster milk letdown times and faster milk flow rate than non-massaged controls, reflecting an increase in productivity and decreased stress levels. There are no previously published data available to support these findings but their application within the industry could have significant benefits. While further research into the stress-reducing mechanism of udder massage is required, this study nonetheless shows that only fifteen sessions in the month pre-partum are sufficient to decrease stress and improve production, with 30 sessions in the last two months being optimal for improved milk letdown times and flow rates. So, this technique may be used to simultaneously increase milk production and animal welfare by reducing stress during milking in primiparous cows. It may also promote cleaner milk production by decreasing contamination of the milking parlour through a decrease in eliminative behaviours (Das and Das, 2004).

Conclusion

The research carried out in the past twelve months demonstrates how management and husbandry significantly influence the welfare of cows in intensive dairies. Adoption of loose-housing systems in conjunction with stress management techniques, as suggested by this research, could enhance welfare significantly. While alteration of husbandry systems in existing dairies may not be feasible, the strategies for stress management provided by this research may be applied in any future systems and, even in highly confined housing, may significantly enhance profitability and dairy cow welfare.

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