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Improving the welfare of artificially-reared dairy calves by modelling rearing practices on natural calf behaviour with conspecifics

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Introduction

The survival strategy of herd formation to reduce the risk of predation is thought to have been responsible for the highly social behaviour of cattle that we observe in herds today (Phillips, 2002). Modern management strategies of dairy farms such as high stocking densities, early weaning, and artificial rearing are focused on productivity and may neglect the innate need for social interaction in dairy cattle (Moran, 2002). These systems can compromise the welfare of calves by restricting their ability to express normal behaviour and communicate with conspecifics.

Utilising natural calf behaviour as a model for artificial rearing can improve calf welfare without compromising productivity. This paper reviews the recent literature investigating the effect of delayed weaning, group-housing, and increased human contact on calf welfare and productivity.

Discussion

In the first two weeks of life, calves reared under natural conditions develop a strong and life long bond with their dam through grooming, suckling, and vocalisation. After this period the dam may leave her calf in a "crèche" facilitating further social development with peers (Phillips, 2002). This is markedly different to the forced separation of dam and calf on commercial farms within three days of birth (Battaglia, 2001). Flower and Weary (2003) examined the effects of this practice on the behavioural responses, health, and production of both cow and calf at several stages post-partum. Through a literature review they highlighted the significance of early rearing experience on both juvenile and subsequent adult social behaviour, noting that early maternal presence lowered stress responses and increased social interactions during encounters with other animals. Additionally, calves kept on dams had a lower incidence of diarrhoea, earlier post-parturient defecation, greater average weight gain, and a better mothering ability than calves separated soon after birth.

Flower and Weary (2003) concluded their study by suggesting the welfare and production benefits of late separation surpass those of early separation. Though implementing delayed weaning would be a challenge to current dairy management strategies, their paper explains how normal social bonding between calf and cow can be used to increase animal welfare and production.

A marked increase in socialisation between calves occurs at around three weeks of age as they spend most of their time away from their dam in crèches (Bouissou et al., 2001). Bøe and Færevik (2003) conducted a review of recent literature highlighting several findings in relation to the early social environment of calves. Like Flower and Weary (2003) they emphasised the importance of early social interaction on both welfare and future social behaviour. In group-housing systems, early social bonds were found to be long lasting, with calves reared together maintaining close proximity when introduced into a larger herd. They used this observation to hypothesise that the problems of stress and aggression when grouping unfamiliar animals together may be mitigated by management practices that introduce familiar animals into the herd at the same time.

In the review, both group-housing and regrouping avoidance were found to have welfare benefits over individual housing. Group-reared calves had lower fear responses than individually housed calves when exposed to novel stimuli at 3 months of age. Additionally in

social testing, group-housed calves sniffed, mounted, and had play-fights with greater frequency than individually housed calves. The outcome of these tests suggest that current commercial practices, such as the recommended practice of rearing calves individually for 10 days post-weaning prior to group housing (Donovan, 1992), may compromise the welfare of calves by inhibiting their natural socialisation patterns such as crèche-forming.

The review was limited by a lack of research into the effect of group size on the social behaviour of cattle. As a result of this omission Bøe and Færevik (2003) launched an appeal for future research to increase knowledge in this area and ultimately improve the social welfare of cattle.

Raussi et al (2003) conducted a similar study to compare the impact of different housing practices on the social behaviour of calves when given novel stimuli. Additionally, and in contrast to previous studies, they tested whether contact with humans could compensate for a lack of contact with conspecifics. In the experiment, sixty-four calves were divided into two groups, with thirty-two calves housed individually, and the other half pair-housed. The calves received either minimal human contact or increased human contact. At monthly intervals from 6 weeks of age, the behaviour of the calves was recorded in their home pens, in an unfamiliar area alone and with another calf, and in a Y-maze with the two arms leading to another calf and human respectively. To assess stress encountered by calves the cortisol response to an exogenous adrenocorticotrophic hormone (ACTH) was used. The findings of the study supported those of Bøe and Færevik (2003) that the pair-housed group were more active in their home pens, spent more time close to the other calf in the Y-maze, and had lower ACTH responses to cortisol than individually-housed calves. Calves with minimal human contact avoided people in the various test situations and had higher heart rates than those that received increased human contact from an early age.

Raussi et al (2003) concluded that paired housing surpassed individual housing by reducing the measurable stress responses of calves to novel stimuli. They related this to natural calf behaviour and an innate need for socialisation. Whilst they also observed that early positive contact with humans reduced their stress response during future encounters, they affirmed that human contact cannot adequately compensate for a lack of contact with conspecifics.

Conclusion

To improve calf welfare, cattle behaviour under natural conditions can be modelled for implementation in commercial management practices. Practices such as delayed weaning, group-housing, regrouping avoidance, and increased human contact can reduce the stress responses of calves and lead to an increase in production and ease of future handling. There is a need for future research into the social behaviour of cattle, with particular scope for studies investigating the effect of group size, breed, and age of calf.

References

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