METHODOLOGICAL ASPECTS FOR THE ASSESSMENT OF SOCIAL BEHAVIOUR AND AVOIDANCE DISTANCE ON DAIRY FARMS

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Abstract *Animal Welfare 2003, **12**: 579-584*

Some aspects of on-farm assessment of social behaviour and avoidance distance were investigated on 20 Austrian dairy farms. The avoidance distance of at least 75% of cows was assessed. Social behaviour of the cows was observed for one hour and the number of animals standing was recorded every 10 min. Lameness of each animal was scored, and Spearman correlations were calculated. Generally, the avoidance distance of the cows was very low. Lameness did not correlate significantly with avoidance distance. The number of agonistic interactions with body contact per cow correlated negatively with the percentage of lame animals ($r_s = –0.49$; $P = 0.029$). However, this correlation was no longer found ($r_s = –0.22$; not significant) when calculated on the basis of standing animals only. The total number of social interactions correlated highly with the number of social interactions when interactions in the feeding rack were disregarded. The present study suggests that lameness confounds the assessment of social behaviour but not that of avoidance distance of cows, and that social interactions of animals standing in the feeding racks can be disregarded without decreasing the reliability of the assessments.

Keywords: *animal welfare, avoidance distance, cattle, lameness, on-farm assessment, social behaviour*

Introduction

Although it is widely accepted that a valid welfare-assessment tool should include animal-related parameters (eg Sandøe *et al* 1997; Waiblinger *et al* 2001), there is still a lack of validation for a number of short-term animal-related recordings. Two important animal-related parameters in dairy cows are the animals' reactions to humans, reflecting the human–animal relationship on the farms (Waiblinger & Menke 1998), and the social behaviour. Little is known about the relationship of social behaviour or reactions to humans with health. Lameness and mastitis are the most important diseases of dairy cattle (Kerr 1998). The social conditions (Broom & Galindo 1997) and the behaviour of the stockperson toward the cows (Chesterton *et al* 1989) influence the risk of lameness. It is also possible that lame cows alter their behaviour in order to rest their feet. They may hesitate to move and may lie down more often and for longer periods (Ward 2001), which in turn might affect their reactions to an approaching human and their social behaviour. Consequently, lameness may confound the assessment of these parameters.

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When recording social behaviour on farms, it can be very difficult to monitor the whole barn. In particular, simultaneous observation of the interactions of animals standing in the feeding rack and elsewhere in the barn may be problematic, as the best view may be obtained from different positions within the barn. It may be possible to simplify welfare assessments by foregoing the recording of interactions in the feeding rack, but data on the possible effects of this on the reliability of the assessments are lacking.

The aims of this study were to investigate whether lameness is a confounding factor when assessing avoidance distance and social behaviour, and to determine whether social interactions in the feeding rack can be disregarded without decreasing the reliability of the assessments.

Animals, materials and methods

Out of 366 Austrian dairy farms with cubicle loose-housing and herd sizes of 24–60 Simmental cows, 20 farms were selected randomly. The farms were visited once between February 2002 and April 2002. All measures were taken by the same experimenter in the same order on all farms.

The avoidance distance (AD) of the cows toward an unknown person was assessed for at least 75% of animals in the herd at the beginning of every farm visit, just before evening milking. Standing cows were approached slowly (one step per second) from the front by the experimenter. The distance between the experimenter's hand and the animal's head was estimated at the moment of the cow's withdrawal (stepping away or turning away of the head). The AD of each cow tested was assessed at least once and the average AD per animal was calculated. For each herd, the median of the avoidance distance (ADME) and the percentage of animals which could be touched on the head (Touch %) was calculated. For further analysis, Spearman rank correlation coefficients with lameness scores were calculated both at the herd level (ADME, Touch %) and at the animal level. The latter was performed within herds to exclude farm influences on AD.

The social behaviour of the animals was observed directly by continuous behaviour sampling for one hour in the evening. Agonistic interactions with body contact (AgIB: pushing away, chasing away, chasing up, butting), threat, and affiliative interactions (social licking, head play) were recorded, noting also the area where these interactions took place. Furthermore, every 10 min the number of standing (ie not lying) cows was counted. The frequency of social interactions per cow was calculated for all recorded behaviours, both including the interactions of animals standing in the feeding rack (Iin), and excluding the interactions of the animals in the feeding rack (Iex); these values were then correlated (Spearman). In addition, data on agonistic interactions (Iex) were calculated per total number of cows in the herd and per standing cows only, and then correlated (Spearman) with lameness scores. Here, data on affiliative interactions were excluded, because these were performed also by lying cows.

The next morning, lameness of each cow was scored after the animal had been individually released from the feeding rack, using a five-point scoring system according to Winckler and Willen (2001). Lameness data were analysed either at animal level or at herd level. At herd level, scores 3, 4 and 5 were grouped together as 'lame', because scores 4 and 5 were seen rarely, and the percentage of lame cows was calculated.

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Results

Lameness

Lameness was a common health problem on the 20 farms (Figure 1). The median percentage of lame animals was 38.5%, ranging from 14.3% to 57.6% lame cows per herd.

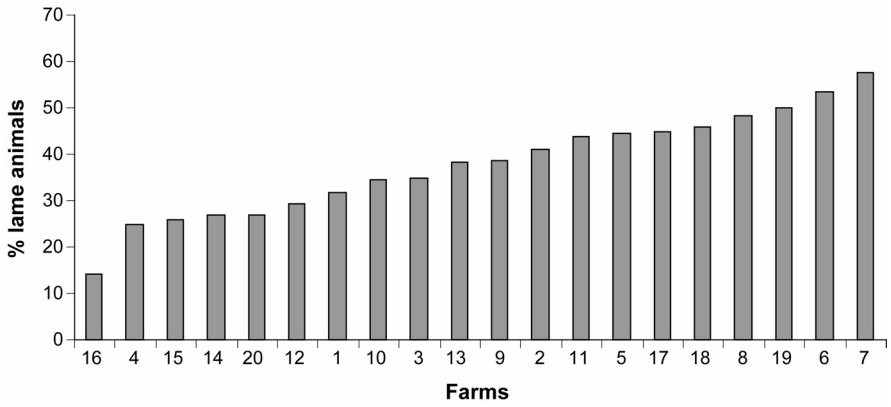

Figure 1 Percentage of lame animals on the 20 Austrian dairy cattle farms.

Avoidance distance

The AD of the individual cows ranged from 0 m to 2.6 m. ADME was very low (median: 0.05 m; range: 0–0.64 m). The farms varied very little in ADME. No correlation was found between AD and lameness either at the animal level or at the herd level.

Animal level: On none of the farms did AD correlate significantly with lameness. Spearman correlation coefficients ranged from $r_s = –0.37$ to 0.30. Testing only animals that could not be touched also did not lead to a consistent correlation with lameness (–0.51 to 0.35).

Herd level: Neither ADME ($r_s = 0.11$, not significant; n = 20) nor Touch % ($r_s = –0.11$, not significant; n = 20) were related to lameness.

Social behaviour

Generally, the 20 herds differed distinctly in their initiation of social behaviour. Interactions in the feeding rack were observed rarely (Figures 2 and 3). Iin data correlated very well with Iex (AgIB: $r_s = 0.98$, $P = 0.00$; threat: $r_s = 0.98$, $P = 0.00$; affiliative interactions: $r_s = 0.87$, $P = 0.00$). The number of AgIB (per total number of cows) correlated negatively with the percentage of lame animals ($r_s = –0.49$, $P = 0.029$), whereas threat did not ($r_s = –0.17$, not significant). When calculating the number of agonistic interactions for standing animals only, AgIB no longer correlated significantly with lameness ($r_s = –0.22$, not significant) and neither did threat ($r_s = –0.06$, not significant).

Discussion

On the 20 Austrian farms assessed in this study, lameness was a health problem. There was considerable variation between farms, supporting the importance of the question of the present study.

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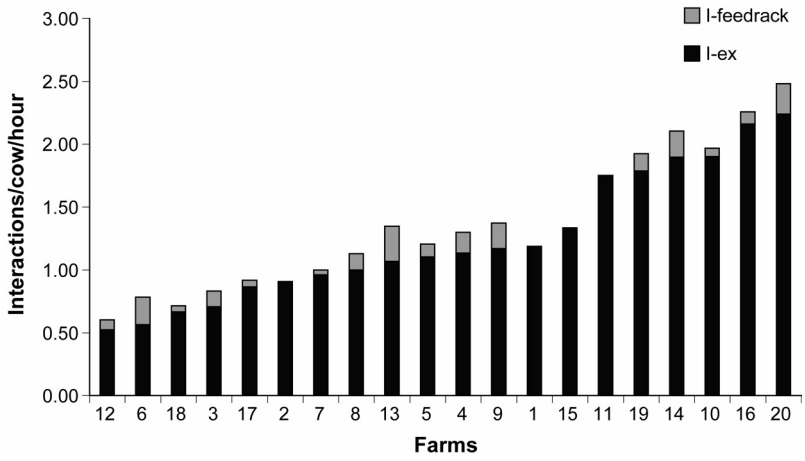

Figure 2 **Frequency of agonistic interactions with body contact in the feeding rack (I-feedrack) and of interactions in the barn minus those in the feeding rack (I-ex) per cow per hour on the farms.**

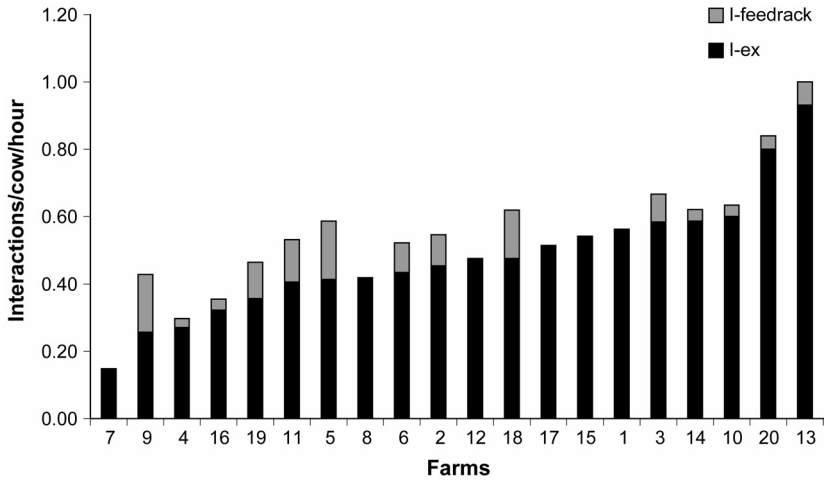

Figure 3 **Frequency of affiliative interactions with body contact in the feeding rack (I-feedrack) and of interactions in the barn minus those in the feeding rack (I-ex) per cow per hour on the farms.**

The hypothesis was that lame cows would show a lower AD, because of a conflict in their motivations to withdraw from humans and to remain standing in order to avoid pain during moving. The results did not support this notion. No correlation between lameness and AD was found. AD was generally very low on the farms. On farms similar with respect to selection criteria, Waiblinger *et al* (2002) found a higher variation in AD between farms, with few farms having as low an ADME as those in the present study. The reasons for this are not clear. The low AD itself and the subsequent small variation of AD between cows and between herds could be one reason for the lack of correlation with lameness. At herd level, interpretation of the correlation is difficult, since different effects on AD might override each

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other. However, the inconsistent and insignificant correlations at animal level within farms strongly suggest that lameness is not confounding AD, at least in cows with comparably low AD.

With respect to social behaviour, the results suggest that the percentage of lame cows influences the number of agonistic interactions with body contact (AgIB). This can be explained by the fact that lame animals lie down more often and for longer periods than healthy ones (Ward 2001), and they do not take part in social interactions for the period during which they are lying down. This explanation is supported by the loss of a correlation between AgIB and lameness when taking into account only standing animals. However, threat never correlated with lameness. Perhaps in lame animals there is a shift in social behaviour, favouring threatening behaviours over agonistic interactions with body contact that would strain the claws much more. Although our results are preliminary, they suggest that social behaviour is related to lameness in some way.

Our results also reveal that disregarding interactions in the feeding rack does not lead to a loss of information, particularly because those interactions in most cases constituted a small fraction of all interactions performed. As interactions in the feeding rack can only be observed correctly from the raised feeding place, this might be a worse point from which to observe other areas, such as the lying area. With this knowledge, the observer's choice of an optimal position from which to record social behaviour is less restricted.

Conclusions and animal welfare implications

An appropriate welfare-assessment tool for use on individual farms requires that measures are valid, reliable and feasible. In order to achieve this, knowledge about methodological aspects when assessing ethological parameters is necessary. The present study suggests that lameness confounds the assessment of social behaviour, but not that of the AD of cows. Furthermore, our study shows that social interactions of animals standing in the feeding racks can be disregarded without decreasing the reliability of the assessments. Further investigations are necessary to clarify how lameness is related to AD in herds that experience human contact and the ways in which lameness influences social behaviour.

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