

75. Broom, D.M. 1987. The influence of the design of housing systems for cattle on lameness and on behaviour: summary of discussion on behavioural and veterinary aspects. In *Cattle Housing Systems, Lameness and Behaviour*, ed. H.K. Wierenga and D.J. Peterse, *Curr.Top.vet. Med. Anim. Sci.*, 40, 179-181. Dordrecht: Martinus Nijhoff.

THE INFLUENCE OF THE DESIGN OF HOUSING SYSTEMS FOR CATTLE
ON LAMENESS AND ON BEHAVIOUR: SUMMARY OF
DISCUSSION ON BEHAVIOURAL AND VETERINARY ASPECTS

D.M. Broom

Department of Pure and Applied Zoology
University of Reading
P.O. Box 228
Reading RG6 2AJ, U.K.

GENERAL POINTS

There was general agreement that both detailed studies of behaviour and veterinary surveys are essential if production and welfare are to be improved in housing systems for cattle. Since lameness is a major welfare problem, as well as having adverse effects on production, its incidence should be carefully monitored when any housing system is being assessed. Observational studies of behaviour provide information about why lameness occurs, why some individuals, or whole systems, are not very productive and which are the individuals whose welfare is poor. Other indicators of welfare, in addition to clinically diagnosable lameness and measures of behaviour, also exist. Whilst poor conditions usually result in increased clinical lameness and increases in behavioural indicators of poor welfare, the tethered cows showed a lower incidence of lameness in the Danish study. Several speakers expressed the opinion that prolonged tethering is bad for welfare even if lameness is reduced, however. The only evidence available in relation to dairy cows concerns the reduced opportunity for many behaviours but physiological and behavioural studies on fattening bulls indicate adverse effects of such confinement on welfare. Further study is desirable on this question.

LOCOMOTION

The value of measuring the duration of locomotion, both as a symptom of lameness and as a direct indicator of welfare, was discussed. There was some disagreement as to how much could be deduced from the overall locomotion score of a herd, like that described by Zeeb, but there were two useful points of agreement. Firstly, reduced locomotion is often a symptom of lameness and the quality and duration of locomotion can be used in quanti-

fyng degree of lameness, as in the work of Manson and Leaver (in press) at the West of Scotland College of Agriculture. Secondly, as shown by Albright (1969) and in the paper by Boxberger and Kempkens, low ranking animals whose movement is restricted by social factors are often much lower than average in the duration of their locomotion. Such an effect may not always be apparent as a negative correlation between social rank and duration of locomotion. This is because social restriction of locomotion may affect only a small proportion of the herd. Further discussion concerned whether large amounts of locomotion in a cubicle house might have adverse effects but there was no evidence about this.

DESIGN OF CUBICLE HOUSE

The design of cubicles and the lay-out of cubicle houses requires further investigation in order that welfare and production can be improved. The issues raised by Čermák's paper concerning rail positions, cubicle length, presence or absence of a kerb at the back of the cubicle, floor slope, the effects of litter and dung disposal methods were discussed. There is interaction, as regards the optimum design, among factors such as presence or absence of a pipe at the back of the cubicle, amount of bedding and dung removal methods. The optimum position of the front rail in a cubicle might be lower for new animals in the cubicle house which could slip under this rail. Work on bone disorders in cubicle systems with different designs was advocated.

The dependence of social interactions on cubicle house lay-out and the social structure of the group, as reported by Potter and Broom, was confirmed by the observations of several discussants. Any of several possible inadequacies of design might lead to problems. Following questions about social facilitation and synchronisation of feeding, the work of Barton on calves (Barton 1983, Barton and Broom, in press) and of Benham (1982) on grazing cows was mentioned. The possibility of synchronising behaviour in the herd was regarded as very important to cows by several speakers. It was pointed out, however, that the effects of preventing synchrony have not been adequately assessed and that automatic feeding systems often do not allow it.

SURVEYS OF LAMENESS

The value of analyses of the incidence of the various forms of lame-

ness in different systems, like those reported by Maton, Brochart and Thysen, was emphasised in discussion. Problems with the interpretation of such studies included variation in details of housing and stock from one survey area to another. Sometimes the results from a survey in one country or area might be difficult to use in another where some aspects of the conditions are different. For example modern slatted floors may be much better than older ones. It is clearly necessary to view lameness as a disease of multifactorial origin and the assessment of metabolic variables may help in understanding some of the variation in its incidence. The interpretation of measurements such as blood glucose level was discussed in relation to stage of lactation and dietary variation. Factors which may have important effects on the incidence of lameness include the presence or absence of rubber mats or straw and the duration of periods when the hoof remains wet. The possibility of using a mixture of small slats and solid flooring in the walking area was discussed.

REFERENCES

- Albright, J.L. 1969. Social environment and growth. In "Animal Growth and Nutrition". (Ed. E.S.E. Hafez and I.A. Dyer). (Lea and Febiger, Philadelphia).
- Barton, M.A. 1983. Behaviour of group-reared calves fed on acid-milk replacer. *Appl. Anim. Ethol.* 11, 77.
- Barton, M.A. and Broom, D.M. (in press). Social factors affecting the performance of teat-fed calves. *Anim. Prod.*
- Benham, P.F.J. 1982. Synchronization of behaviour in grazing cattle. *Appl. Anim. Ethol.*, 8, 403-404.
- Manson, F.J. and Leaver, J.D. (in press). Effect of hoof trimming and protein level on lameness in dairy cows. *Anim. Prod.*