125. Broom, D.M. 1992.

In Proc. Soc. vet. Epidemiol. Prev. Med., 10, 10-12, ed. M.V. Thrusfield, Edinburgh, 1992.

CURRENT ATTEMPTS TO IMPROVE WELFARE AND POSSIBLE LINKS WITH FARM ANIMAL DISEASE

D.M. Broom*

Much of the legislation whose aim is to improve the welfare of animals includes reference to the necessity to reduce disease incidence. This is logical since the welfare of diseased animals is clearly not as good as that of those which are not diseased and indeed welfare is very poor if clinical disease is severe (Broom 1988a, b, Fraser and Broom 1990). Hence in this way, general improvement and disease reduction change in parallel.

If changes are made in animal husbandry methods and in housing conditions which result in better welfare they will sometimes affect the functioning of the immune system. A variety of difficult conditions result in immunosuppression (Kelley 1985) and it is certain that there are far more examples of this than have so far been demonstrated. Housing conditions in which animals live for a long time and frequent aggression by others can both lead to impaired immune system functioning and it is likely that such effects are widespread. If disease challenge occurs then serious clinical effects are more likely in an immunosuppressed individual and as a consequence, disease spread is also more likely.

One change in the housing of farm animals which may have epidemiological consequences is the housing of animals in social groups rather than in individual crates, stalls or pens. The fact that our farm animals are social and show abnormalities of behaviour and physiology when housed for a long period in conditions which do not allow social interaction. Another factor has been the inability of animals in small crates or stalls to groom themselves adequately or obtain sufficient exercise. Once crates and stalls are large enough to allow such freedom of movement, it is cheaper to keep the animals in groups.

The consequence of abolishing the use of small crates for veal calves in the United Kingdom are not yet fully known. Young calves have to obtain and absorb enough colostrum and absorption is known to be affected by the presence of the mother. Absorption may be improved by the presence of other calves but in general this will not be of great importance where calves are left with their mothers for the first 24 hours of life. Calves are susceptible to respiratory and gastrointestinal disorders and some of these are transmitted by close contact. However it has been demonstrated by the work of Webster and others that both respiratory and gastrointestinal infections are very rapidly transmitted through buildings containing only individually housed animals. There is a considerable prejudice amongst farmers and some veterinary surgeons in favour of individual

* Department of Clinical Veterinary Medicine, University of Cambridge, Madingley Road, Cambridge CB3 OES

penning of calves during the first few weeks of life. Some even advocate the extreme isolation caused by the use of solid-walled pens. There may sometimes be an advantage of this practice in reducing disease transmission but that advantage must be set against the disadvantage that all calves are seriously disturbed by such housing and are probably immunosuppressed to a degree which is of considerable importance in relation to disease. There is no doubt that calves can be reared on straw in a way which does not result in high morbidity. The rearing of calves on slats at a high stocking density can lead to a higher morbidity than crate housing.

The pig industry in the United Kingdom has moved towards a minimal disease situation on most units. As a consequence, diseases are much better controlled than they used to be. Hence a change such as the move from stalls and tethers to group-housing is unlikely to result in increased disease transmission within herds. Indeed the better welfare associated with greater freedom of movement and more opportunity to engage in social interactions probably results in higher levels of immunocompetence. Certain kinds of morbidity in sows are reduced if there is more freedom of movement, as demonstrated in a large survey many years ago by Bäckström (1973). Some of this morbidity is associated with more leg problems and more farrowing difficulties if the sows are confined. Another well studied effect is that on urinary tract disorders of sows Tillon and Madec (1984) demonstrated that prolonged lying, which is characteristically shown by inactive unresponsive confined sows, increases the likelihood of urinary tract disorders. The change to group-housing should reduce most of these problems but some animals in groups are the subjects of frequent attacks. If these, or their aggressors, are not removed they may be immunosuppressed and more prone to disease.

The housing of the laying hen is the subject of much discussion at present. Most alternatives to the battery cage include attempts to separate the hens from their droppings. For example the Dutch Tiered Wire Floor system has some droppings in the litter area but most of the droppings are removed by conveyor belts under the wire floors. Current trials do not suggest that disease incidence is any higher in this system, or in any of the three widely used Swiss systems, than in battery houses. Free range hens, however, can be particularly susceptible to disease outbreaks unless they are moved to fresh ground every six months. The dangers of infectious disease must always be considered.

A variety of other attempts to improve welfare have possible consequences for disease spread. If dairy cow housing is improved so that the animals find the conditions more comfortable and are less likely to be injured in them, the incidences of mastitis and lameness should drop. If handling procedures and conditions during transport are improved then disease incidence should drop.

The general conclusions about the inter-relationships between welfare improvement attempts and disease are: firstly that disease is an aspect of poor welfare and many actions will be of benefit in both respects. Secondly, that the possible trade off between reduced immunosuppression and increased disease transmission risk should be carefully considered in all attempts to improve welfare. Thirdly, that there are differences between production or system related diseases and dangerous infectious diseases. Whilst we have quite a lot of information about the former, the latter should also be borne in mind when developing new systems for housing and managing animals. Our overall aim should be to improve welfare in total and we should always include consideration of the effects on individuals of any disease which they might contract.

REFERENCES

Bäckström, L (1983). Environment and animal health inn piglet production. Acta.vet.Scand. Suppl 41, 1-240.

Broom, D.M. (1988a). The scientific assessment of animal welfare. Appl.Anim. Behav.Sci., 20, 5-19.

Broom, D.M. (1988b). Relationship between welfare and disease susceptibility in farm animals. In Animal Disease - a Welfare Problem, ed. T.E. Gibson, 22-29. London : British Veterinary Association Animal Welfare Foundation.

Kelley, (1985). Immunological consequences of changing environmental stimuli. In: Animal Stress. pp. 193-223. American Physiological Association.

Tillon, J.P. and Madec, F. (1984). Diseases affecting confined sows. Data from epidemiological observations. Ann.Rech.vét., 15, 195-199.