Guest Editorial

Rats and mice and animal feed – a risk too far?

On cattle, sheep and pig farms, it is common to see house mice and not uncommon to see brown rats, while evidence of their presence in the form of numerous small dark droppings is rarely hard to find. These two species of rodents specialise in exploiting agricultural and urban environments and are particularly attracted by the easy availability of animal feed and by safe harbourage in and around farm buildings. Dairy farmers increasingly feed straights, stored in open barns where tractors can load the feed into mixer wagons, but where rodents can also gain access. Compound feeds are more often stored in sealed rodent-proof hoppers, but the parlour feeders and any spilled feed are often accessible.

In addition to the damage they cause, rodents can contaminate feeds with bacteria, such as Salmonella or Cryptosporidium species, in addition to other pathogens of veterinary and human importance such as tapeworms and Toxoplasma gondii (Anon, 2001a; b). Over 1000 incidents of Salmonella in cattle are reported each year. About 1500 incidents of Cryptosporidium in cattle were reported in 1999, and about 5500 cases in human beings. One-third of abortions in sheep in which a pathogen is identified are associated with Toxoplasma. Surveys of UK farms indicate that rodents are significant carriers of these diseases and may present a serious risk to the health of domestic animals as well as farm workers. For example, Cryptosporidium parvum has been found in 24% (Quy et al., 1999) or 63% (Webster & Macdonald, 1995) of rats and in 22% of house mice (Chalmers et al., 1997). Rats may also be capable of carrying Foot and Mouth virus (Capel-Edwards, 1971) while Webster et al. (1995) reported that 14% of rats in UK farms carry Leptospira spp, transmitted through their urine.

The main route of transmission is likely to be through ingestion of faeces in contaminated feed – each rat or mouse produces around 40 to 55 faecal pellets per day. Mice simply deposit their faeces wherever they are active (Gray, 1997; Rich, 1998), so that any feeding sites rapidly become contaminated. In contrast, rat faeces are used for communication, providing information of the depositor’s sex and identity, and most are deposited in communal latrines sited in corners, against side walls or in other sites near cover (Lande-Castillejos, 1997). In addition to faecal contamination, both species scent-mark their environment extensively with streaks of urine, particularly around well-visited feeding sites (Hurst, 1987; Landete-Castillejos, 1997).

Recent studies have shown that ruminants can avoid grazing on pasture contaminated with excreta either from their own or other species, and thus reduce their ingestion of parasites. This varies according to the animals’ feeding motivation and the quality of swards (e.g. Hutchings et al., 1998, Hutchings & Harris, 1997, Hutchings et al., 1999, Daniels et al., 2001). Whilst grazing animals can choose between contaminated and non-contaminated patches of pasture, winter-housed animals fed on concentrates have little choice in their food and may be under much stronger competitive pressure. In a paper published in this issue of the Journal, Daniels and Hutchings (2001) investigate whether cattle or sheep in winter housing avoid feed contaminated with rat or mouse faeces, or selectively avoid ingesting rodent faeces and thus reduce the risks of disease transmission.

Their findings provide important evidence that rodent contamination presents a significant risk to livestock health, not only because of the ingestion of their faeces but also because contamination could have a significant impact on nutrition. Rodent faecal contamination, especially from rats, can significantly reduce feed intake among cattle (with up to 98% feed rejected at very high contamination levels). High-producing dairy cattle need to maximise their feed intake in order to avoid excessive weight loss. Good husbandry requires that any deterrent to feeding should be removed.
Veterinary surgeons and other advisors should be aware that rodent contamination is an important factor that might reduce feed intake. It should be considered alongside other common factors such as poorly made forage, dirty water, limited space for feed and water, limited time when feed is available and mould (commonly seen in grass silage, maize silage, wet brewers’ grains, and wet sugar beet or citrus pulp).

Despite reduced feed intake by cattle and a degree of selective feeding among sheep, both cattle and sheep will ingest a large proportion of faecal contamination (Daniels & Hutchings, 2001). The levels of faecal contamination investigated in these experiments were high (equivalent to 20–80 faeces in half a one kilogram bag of sugar or up to 5000 faeces in a 25 kg sack of food). This would reflect a heavy rodent infestation or the outcome when a rat faecal latrine (which may consist of several hundred faecal pellets) becomes mixed in with feed. Results suggest however that faeces are even more likely to be ingested at lower infestation levels. Given the prevalence of important pathogens carried by rats and mice, and their rates of excretion, veterinary surgeons need to be aware of the importance of excluding rodents and other wildlife from stored food to avoid the risks of infection. Further, rodents with access to a good food supply increase in numbers rapidly, further exacerbating risks of disease and feed rejection by livestock.

Most farms use rodenticides and traps to control rodents, but it is important that baiting and trapping are frequent and well planned. It is also essential to make sites less attractive by clearing up spilt food, controlling weeds and vegetation and removing any harbourage such as old machinery or sheets or planks of wood. It is particularly necessary to ensure there is no harbourage near to food stores and that these areas are well lit. Rodents will occasionally be seen foraging during the daytime where they can seek refuge but inspection visits need to be made after dark at frequent intervals (every two weeks) to check for live rodents. Control by cats or dogs in feed stores can itself risk contamination with for example Toxoplasma gondii, or possibly Neospora, which causes abortion in cattle. Cats are the definitive host for Toxoplasma gondii, an intracellular protozoan capable of infecting all mammals but only cats shed T. gondii oocysts with their faeces. Interestingly, T. gondii appears to manipulate the behaviour of rats, an intermediate host, to increase the chances of predation by cats. Rats, which normally avoid cat odours fail to do so when infected with this parasite, though their responses to other odours are normal (Berdoy et al. 2000). Since infected cats are also a risk, the message is clear – prevent contamination by rodents in the first place by excluding them, monitoring for their activity and keeping areas in and around feed stores clean and tidy.

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REFERENCES


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**Book Review**

*Review of Meat Science: An Introductory Text*

Wariss, P. D.


This book is designed to present the reader with a simple overview of the subject of ‘meat science’ at a level of undergraduate and postgraduate students of food science and technology, animal and veterinary science, and technical staff in the meat industry. This objective is met, but it is the nature of such texts that the student is frequently left seeking more information – a desire which is met through the extensive list of references.

The author commences with a statistical survey of the world production and consumption of meat, leading on through a review of current consumer concerns to the growth and composition of meat-producing animals. Although reference is made throughout the book to farm production practices, a few words on the effects that the husbandry of farm animals exerts on the quality and safety of the meat they produce might have been pertinent given the current trends towards holistic meat hygiene control systems.

Dr Wariss brings particular clarity to matters of meat structure and biochemistry. The chapters on the post mortem changes to muscle which convert it to meat, and the effects of live animal handling on meat quality distil the essence of his comprehensive knowledge of these subjects built up over 20 years of fundamental research on the subject. His long held interest in animal welfare matters are apparent as he deals succinctly with the subjects of humane slaughter and the recognition and measurement of pain or stress in farm animals. The book concludes with two chapters reviewing methods for measuring the composition and physical characteristics of meat and eating quality.

Overall, this book is a useful and welcome addition to the volumes currently available. Veterinary surgeons engaged in the duties of an Official Veterinarian will find it a particularly useful introduction to the general principles of meat science and extremely good value for money. This thought provoking text should be sufficient to encourage any reader to endeavour to explore this speciality to a deeper extent.

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