8. Cattle diseases and their control and management on farm

Introduction

8.1 There is some doubt about the extent to which BSE cases, particularly in the early days, might not have been reported to the vet or to the local Veterinary Investigation Centre, since BSE symptoms resembled those of other diseases familiar to cattle farmers. When the first BSE cases occurred, the symptoms led many vets to consider a diagnosis of hypomagnesaemia, a metabolic disorder. This chapter describes the main cattle diseases encountered by UK farmers, some of which affect the nervous system and have similar symptoms to BSE. It also discusses the avoidance of disease from fallen animals, and the spreading of waste onto pastures. Chapter 9 discusses infectious diseases which have been made notifiable, and whose control and eradication is coordinated at national level through the Agriculture Departments.

Some common cattle diseases

Metabolic disorders

8.2 Metabolic disorders arise as a result of deficiency of a particular nutrient in the diet and can usually be treated by supplying the animal with the nutrient. Typical examples observed in the UK are:

- Anaemia – iron, folic acid, or vitamin B deficiency. Treatment depends on the cause of the affliction, but can include the provision of vitamin B12, liver extract, cobalt, copper or iron.
- Acetonaemia – can affect dairy cows in early lactation if demand for carbohydrates exceeds that available from feed, and is characterised by low blood glucose. Treatment consists of oral dosing with glycerine or propyleneglycol or sodium propionate as readily available energy sources.
- Hypocalcaemia or ‘milk fever’ – can affect dairy cows and is caused by a shortage of calcium in the blood. It is treated with an injection of calcium borogluconate solution, which may or may not contain magnesium. In the past, mortality rates were up to 90 per cent, but have been reduced to about 5 per cent with proper treatment.
- Hypomagnesaemia or ‘grass staggers’ – can occur in all types of cattle and is caused by too little magnesium in the blood system. A prompt injection of
magnesium sulphate is the usual treatment, and can save the cattle in most cases.

8.3 Animals affected with hypomagnesaemia are often unable to rise, and if lying down will paddle their legs when stimulated. If the animal is not recumbent, then shivering, a staggering gait, excitement, convulsions or paralysis may be present. Hypocalcaemia presents similar signs at first, though the cow will usually remain quiet after initial struggles to regain its feet. Partial or complete loss of consciousness and paralysis of the hindquarters follow. The signs of anaemia and acetonaemia are general appetite loss and various indications of general lethargy in the cow.165

**Infectious diseases**

8.4 Infectious diseases are caused by the presence in the body of micro-organisms or other infectious agents, and transmitted to other animals. Typical infectious cattle diseases that may affect UK cattle are:

- Mastitis – can occur in the udders of lactating cows and is treated with antibiotics introduced into the udder.

- Brucellosis – an infection leading to abortion in cattle, it can be passed to humans as undulant fever, in which the symptoms are similar to influenza, but incapacity lasts a long time.

- Bovine tuberculosis – can be transmitted in many ways, primarily through the respiratory system or digestive tract. The liver, lymph nodes and lungs are typically affected by lesions, which cause the characteristic coughing. The disease is usually chronic, and treatment is not attempted.

- Foot and mouth disease – is extremely virulent and characterised by the formation of sores in the mouth and feet; almost 100 per cent of animals exposed to infection will fall sick.

- Virus pneumonia in calves – is characterised by coughing, loss of appetite; scouring (diarrhoea) is also common.

- Johne’s disease – is usually fatal, chronic infection of the small and large intestines, characterised by persistent diarrhoea, gradual emaciation and weakness.166

8.5 Some infectious diseases, such as tetanus and listeriosis, cause damage to the nervous system. Tetanus is a rare disease in cattle, and when outbreaks do occur, they may be due to abrasive feed that allows entry of the infection through the gut. Early signs include a raising of the tail head and maybe bloat. The gait becomes stiff and there may be difficulty in feeding because of stiffness in the neck.167

8.6 Listeriosis causes cows to exhibit nervous symptoms. A sick animal may keep its distance from the rest of the herd, and later on be unable to stand without support. If walked it will usually move in a circle, maybe with the head held back and to one side. Cows may also become violent near the terminal stage.168

165 Black’s Veterinary Dictionary, 19th Edition
166 Black’s Veterinary Dictionary, 19th Edition
**Parasitic diseases**

8.7 Commonly occurring parasitic diseases in UK cattle include ‘husk’, or parasitic bronchitis, caused by lungworm; and general lack of strength and vigour and scouring caused by roundworm, tapeworm and liver fluke.

8.8 Warble fly is an example of a readily recognised parasitic disease in cattle, leading to loss in milk yield, reduced growth rates and damage to the cattle hides. It has been suggested to the Inquiry that organophosphates used for treating warble fly infestations under national eradication schemes contributed to the emergence of BSE (see vol. 2: *Science* for an assessment of this theory). Policies on eradicating warble fly in the UK are discussed in Annex 1.

**Livestock disease control and management on farm**

8.9 Appropriate control and management of animal diseases on farm promotes animal welfare and livestock productivity. UK farmers had accumulated much experience in looking out for, and dealing with, diseases in their livestock when BSE emerged. This section describes farmers’ routine handling of livestock diseases and, in particular, hygiene measures on farm, prevention and treatment of disease, use of vets and disposal of fallen animals.

**Routine hygiene measures**

8.10 Most UK cattle are housed in farm buildings from late autumn to early spring, largely because of poor weather conditions and limited grass growth. Disease can spread rapidly during the housing period if hygiene practices are inadequate.169

8.11 Routine hygiene measures include provision of clean bedding, frequent removal of slurry, appropriate stocking densities in buildings, good drainage, adequate ventilation, appropriate building design (cubicle sizes, position of drinking bowls or troughs, etc) and regular treatment for parasitic diseases, such as lice.170

**Prevention and treatment of disease**

8.12 In addition to routine hygiene management and the supply of appropriate nutrients for the treatment of metabolic diseases, methods for the prevention and treatment of disease on farm comprise:171

- eradication – complete elimination of the causative organism from the country (eg, brucellosis) or, where that is not possible, from the farms where the disease appears (eg, tuberculosis);
- vaccination – specific protection against organisms that cannot be eliminated from the farm (for example, dairy heifers are vaccinated to prevent BSE).
blackleg/rotavirus, pasteurella and pneumonia, leptospirosis and bovine viral diarrhoea); and

- preventive medication – the use of medicines or other preparations to destroy or inhibit bacteria or parasites before they cause clinical disease (for example, ‘dry-cow therapy’, use of organophosphates in warble fly control and treatment by anthelmintics (wormers) for parasitic gastroenteritis).

8.13 When an animal contracts an infectious disease, appropriate drugs such as antibiotics are administered to destroy or inhibit the disease-causing organisms. A variety of antibiotics are used to treat cattle, including penicillins and antimicrobial drugs such as sulphonamides and nitrofurans. Supportive therapy and nursing can also be important: for example, providing the animal with painkillers, nutrients and salts to accelerate healing; and ensuring the animal is comfortable.

8.14 Cattle are exposed to, and may be infected by, many diseases throughout their life. Farmers manage the threat and/or occurrence of disease in their cattle by a combination of vaccination and treatment. Table 8.1 below provides an indication of the range of vaccinations which may be given to cattle during their lifetime. The vaccines are given as necessary to protect against diseases which are known to exist on any particular farm. Some vaccinations need to be boosted annually, eg, against leptospirosis. Cattle may therefore receive many vaccinations to protect against particular diseases, and, in addition, injections of medication (such as antibiotics) to treat other diseases throughout their lives.

8.15 MAFF’s 1990 BSE Advisory Note gave the following advice on farm hygiene and medical treatment – whether dealing with a BSE suspect or not:

i. when treating an animal on the farm, new needles should be used each time an injection is given;

ii. if treating several animals without using up all medicine in the bottle, one needle should be placed in the bottle, and another used for injecting stock – this helps prevent contamination of medicines kept in store;

iii. used needles should be disposed of safely in a strong container.174

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172 S131 Boot para. 4
173 This involves the administering of antibiotics or similar to the udder during the cow’s dry period to eliminate and prevent infection, particularly mastitis
174 YB90/06.004/1.3: This advice was reiterated in the 1995 Advisory Note
### Table 8.1: Common cattle vaccination programmes

<table>
<thead>
<tr>
<th>Disease</th>
<th>Vaccine</th>
<th>Use</th>
<th>Route</th>
<th>Approx. age given</th>
<th>Suckler beef herds</th>
<th>Dairy</th>
<th>Beef rearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf pneumonia</td>
<td>P13</td>
<td>Given to calves reared during winter months when pneumonia is a problem</td>
<td>Intra-nasal</td>
<td>From 6 weeks</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Calf pneumonia</td>
<td>IBR</td>
<td>As above, but where IBR virus is known to exist</td>
<td>Intra-nasal</td>
<td>From 6 weeks</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Calf pneumonia</td>
<td>RSV</td>
<td>As above, but where RSV virus is known to exist. If necessary all three vaccines – P13, IBR, RSV – may be used in the same calf</td>
<td>Intra-muscular</td>
<td>From 6 weeks</td>
<td>Rarely</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Lungworm (or husk)</td>
<td>Husvac</td>
<td>Oral vaccine given in two doses to calves during the winter before they are turned out to grass</td>
<td>Oral</td>
<td>From 8 weeks</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Blackleg</td>
<td>Blackleg vaccine</td>
<td>Only given to calves in the spring at or before turnout on farms where blackleg is known to exist. There are marked regional differences in use</td>
<td>Subcutaneous</td>
<td>From 8 weeks</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Leptospirosis caused by <em>Leptospira hardjo</em></td>
<td>Leptavoid</td>
<td>Used in adult cattle on farms where leptospirosis is a problem. Needs to be boosted annually</td>
<td>Subcutaneous</td>
<td>From about 15 months old</td>
<td>Sometimes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>IBR</td>
<td>IBR</td>
<td>Used in adult cattle when new infection enters the herd or in replacement cattle in herds where the virus is endemic</td>
<td>Intra-nasal</td>
<td>Any age</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Rotavirus diarrhoea in calves</td>
<td>Rotavec</td>
<td>Used in adult cattle by vaccination in late pregnancy to boost the antibody levels in colostrum and milk to protect the calf against rotavirus infection</td>
<td>Intra-muscular</td>
<td>Pregnant cows only</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

*Source: Royal College of Veterinary Surgeons*
Use of vets by farmers

8.16 According to the British Veterinary Association (BVA), ‘the veterinary surgeon in practice is concerned with the diagnosis and treatment of the disease on the farm and with advising farmers on breeding and feeding regimes’. In the area of beef production, veterinary involvement on the farm extends to prevention of contamination of animal feed produced off and on the farm, and containment or eradication of disease on the farm.\(^{175}\)

8.17 Farmers usually treat routine conditions, such as foot ailments and parasitic infections, by using medicines purchased from veterinary medicine retailers. However, they maintain close working relationships with their local vet and usually seek his or her advice for conditions requiring medicines that can only be supplied under prescription – such as antibiotics to treat viral pneumonia in calves – and for conditions requiring specialist skills – such as intravenous injections of calcium salts to treat milk fever (hypocalcaemia: see paragraph 8.2) in dairy cows.\(^{176}\) After initial treatment of the afflicted animal by the vet, the farmer usually continues to administer the required course of treatment, such as intramuscular injection of antibiotics.\(^{177}\)

8.18 When the attending vet is unable to make a diagnosis, referral to the local Veterinary Investigation Centre (VIC) is an option. Not all vets refer cases or submit samples to the VIC, as referral is voluntary and based on the relationship between the private practice and the local VIC.\(^{178}\)

8.19 If an animal dies suddenly for no apparent reason or without showing any symptoms, the vet will not always be called in. Instead the knacker or hunt kennel may be called in to dispose of the carcass.\(^{179}\)

Avoidance of disease from fallen animals

Disposal of fallen animals

8.20 Animal deaths occur regularly on farm for a variety of reasons, including old age, disease and accident. It has been estimated that between 1 and 2 per cent of the national herd is lost each year from random events such as heart attack or foreign bodies in the stomach. In such cases it is unlikely that a pathological examination will be performed, and the death is accepted as part of everyday farming life.\(^{180}\) This means that at the time BSE emerged, up to 250,000 cattle deaths (around one animal per holding) occurred each year in the UK from random events.

8.21 Regulations require farmers to dispose of animals that die on farm in a suitable manner (see paragraph 8.23). The traditional system of disposal in the UK has been through the collection of carcasses from the farm by the hunt, the knackers or, in some instances, by bait breeders.\(^{181}\) If necessary, knackermen destroy animals humanely on the farm. In 1986 collection of the carcasses by the hunt or

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\(^{175}\) Veterinary Record, vol. 126, 23 June 1990, pp. 626–7

\(^{176}\) Intravenous injections are used to dispense the antibiotic rapidly through the body

\(^{177}\) Intramuscular injections are used for a more gradual build-up of the antibiotic, but longer systemic effect

\(^{178}\) S421 Sibley para. 3

\(^{179}\) T57 p. 86

\(^{180}\) T57 p. 38

\(^{181}\) M12 lab 22 p. 31; M43A tab 15 p. vii
knackermen was farmers’ preferred method because they received a small but important financial return, as opposed to on-farm disposal, which involved a cost.\textsuperscript{182}

8.22 If an animal is afflicted with a notifiable disease that is accompanied by a slaughter and compensation policy – such as BSE or foot and mouth disease – and diagnosis and appropriate notification is made, responsibility for disposal of the animal then rests with the veterinary service of the relevant Agricultural Department (the SVS in Great Britain (MAFF) and the DANI Veterinary Service in Northern Ireland). Disposal options include:

- incineration off farm by VICs or the CVL, or on waste ground or at a local authority site;
- incineration on farm by a contractor or local authority;
- burial off farm, for example, on a local authority tip; or
- burial on farm by a contractor.\textsuperscript{183}

**Regulation of on-farm disposal**

8.23 Burial of fallen animals on the farm between 1986 and 1996 was controlled by the following regulations:

i. under the Dogs Act 1906 it was an offence to leave carcasses accessible to dogs;

ii. successive legislation on water resources including the Water Resources Act 1963, the Water Act 1989 and the Water Resources Act 1991 had provisions dealing with pollution. Section 85 of the 1991 Act made it an offence ‘to cause or unknowingly permit a discharge of poisonous, noxious or polluting matter or solid waste matter into any controlled waters without the proper authority’.

8.24 MAFF’s non-statutory Code of Good Agricultural Practice for the Protection of Water (1991) advises that the best way of disposal is to send fallen stock to a licensed knackerman, licensed landfill site, or licensed incinerator.\textsuperscript{184} However, the Code also includes guidance on burial of carasses on farm, when other means of disposal are not practical, to comply with Regulations. The site:

i. must be at least 250 metres away from any well, borehole or spring that supplies water for human consumption or for use in farm dairies;

ii. must be at least 30 metres from any other spring or watercourse, and at least 10 metres from any field drain;

iii. must have at least one metre of subsoil below the burial pit, while allowing a hole deep enough for at least one metre of soil to cover the carcass; and

iv. when first dug, the bottom of the hole must be free of standing water.\textsuperscript{185}

8.25 The MAFF Water Code also proposes purpose-built lined disposal pits as another option for disposal, and provides advice on construction and use. Anaerobic
digester are another possible means of disposal, but experience in this method was limited at the time and their practicality and economic value were untested.\textsuperscript{186}

\section*{Emergence of carcass disposal problems following BSE}

8.26 Farmers’ established pathways for disposal of fallen animals were disrupted as a result of the BSE epidemic. Owing to a variety of factors – the introduction of the SBO ban being one – it became uneconomical for farmers to have knackers collect their fallen animals, and thus alternative methods of disposal were increasingly used, including on-farm burial and incineration. Changes in disposal practices and associated issues are covered in further detail in vol. 6: \textit{Human Health, 1989–96}.

\section*{Waste spreading}

\subsection*{Pre-BSE practices}

8.27 UK farmers have always recycled livestock faeces onto agricultural land, in the form of either slurry or manure, to provide nutrients for crop or grass growth. Farmers have also recycled other types of waste, usually supplied free of charge from various sources, onto farmland with the aim of improving the nutrient status of the soil. These others wastes have been used on farm in smaller quantities than livestock faecal waste and in 1986 included blood and gut contents from abattoirs, sewage sludge, poultry manure, paper waste, and yeast and brewer’s waste.\textsuperscript{187}

8.28 Spreading of waste on pastureland was never risk-free, and was regulated. The Sludge (Use in Agriculture) Regulations 1989, which implemented EC Directive 86/278/EEC,\textsuperscript{188} regulated the use of sewage sludge on agricultural land. There was also a regulatory framework for spreading unprocessed blood and slaughterhouse waste onto farmland as a fertiliser:

i. the local authority responsible for the abattoir concerned had to agree to use of this waste by farmers;

ii. the recipient farm had to be licensed under the Control of Pollution Act 1974; and

iii. farmers had to comply with Waste Food Order 1973, which prohibited livestock’s access to unprocessed waste food, including blood. If farmers waited long enough, until the waste had been ‘washed into’ the ground, this Order would be satisfied.\textsuperscript{189}

8.29 MAFF advice on the spreading of unprocessed blood was based on guidelines formulated in 1978. Fields dressed with ruminant blood were not to be grazed for four months, while those dressed with pig blood had to be left for six months.\textsuperscript{190}

8.30 The recommended period of four to six months between spreading and grazing was not practical for all farmers, particularly if they used high volumes of
slaughterhouse waste. In practice, the period allowed by farmers could be significantly less, in some cases as little as four to six weeks.¹⁹¹

**Impact of the Specified Bovine Offal ban**

8.31 Following the imposition of the ruminant feed and Specified Bovine Offal (SBO) bans, renderers raised their charges to slaughterhouses for the removal of blood, making spreading it on land the cheaper option.¹⁹²

8.32 By February 1991 over 500 tonnes of blood a week was being spread on land. It was expected that spreading would continue at these high levels, given that slaughterhouses faced collection charges of about £40 per tonne, while the cost of spreading on land was about £15–£20 per tonne.¹⁹³

8.33 At its meeting on 7 March 1991, the Spongiform Encephalopathy Advisory Committee (SEAC – see vol. 11: *The Tyrrell Committee and SEAC*) concluded that spreading of blood posed little risk, and could continue as long as existing controls were properly applied in the slaughterhouse to ensure that other tissues did not contaminate the blood.¹⁹⁴