# 3 Alimentary System

## 3.1 Yersiniosis

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Yersiniosis, which is most likely to affect red deer in their first winter, is one of the more important infectious diseases of farmed deer.

### Cause

The disease is caused by the bacterium *Yersinia pseudotuberculosis* (synonym: *Pasteurella pseudotuberculosis*), serotypes I, II and III. A related organism *Y. enterocolitica*, usually a normal constituent of the intestinal flora, may occasionally cause disease. *Y. pseudotuberculosis* which is both carried and shed into the environment by numerous species of wildlife and domestic animals can be found in the faeces of both healthy and affected deer although it is more readily isolated from normal, young deer than from older animals.

### Clinical signs

While yersiniosis can present as "sudden death", animals are typically acutely ill with anorexia, green, watery, sometimes dysenteric, foetid diarrhoea, rapid loss of condition, dehydration, recumbency and death. Animals are usually febrile although they may not always display fever in the early, acute, clinical phase.

### Pathology

At necropsy there is usually a moderate to severe haemorrhagic gastroenteritis, with the mucosal surface sometimes covered by a fibrinonecrotic membrane affecting ileum and large bowel but on occasions also extending up into the abomasum. This is accompanied by thickening and oedema of the gut wall. Typically the mesenteric lymph nodes are oedematous, haemorrhagic and necrotic. Other organs generally appear congested.

### Epidemiology

Infected animals shed *Y. pseudotuberculosis* in their faeces and transmission can occur via contaminated food and water. Infection can be endemic in rodents, birds and feral cats and domestic livestock. In the environment *Y. pseudotuberculosis* can survive well in cold and wet conditions but poorly in the dry and sunlight. Immunity to *Y. pseudotuberculosis* is not well understood but is generally more effective in older animals, although few cases of disease occur in

calves less than three months old, presumably due to colostral immunity and minimal exposure to the organism in the summer months. As all strains of *Y. pseudotuberculosis* share many common flagellar, somatic and virulence antigens, some cross protection between serotypes may occur. Almost all young farmed deer are exposed in their first winter and most experience subclinical infection, excrete organisms and develop some immunity. However, clinical disease may be precipitated by concurrent stress such as the heavy stocking of animals in cold, wet weather, particularly if they are already in poor condition. Other forms of stress include underfeeding, sudden changes of diet, overcrowding, intercurrent disease, capture from the wild, transportation and rough handling. Sporadic cases are not uncommon and outbreaks may involve five to 20 per cent and, less commonly, up to 50 per cent of a group.

## Diagnosis

A provisional diagnosis made on the history of the management and the clinical and post mortem signs can be confirmed by histology and bacteriology. Samples of liver, lung, spleen, mesenteric lymph node and intestinal contents for bacteriology should be taken as soon as possible after death and kept chilled but not frozen, as the chance of successful isolation declines very rapidly with time after death. As *Y. pseudotuberculosis* can be found in the intestinal contents of normal as well as diseased animals isolations made from the mesenteric lymph node are of greater pathological significance than those from the intestinal contents. When newly isolated they appear as short, ovoid, Gram-negative rods (1.5 x 0.7μm) which show bipolar staining with Leishman's stain, but following subculture they can be pleomorphic. So-called cold-culture-enrichment, when samples are subcultured on to media and kept at 4°C for up to three weeks, can improve isolation rates because while other bacteria generally die under these conditions *Y. pseudotuberculosis* can survive and multiply.

The differential diagnosis should seek to exclude malignant catarrhal fever, anthrax and pasteurellosis.Salmonellosis and enterotoxaemia although less common should also be considered. Note that malignant catarrhal fever is less common in young calves and yersiniosis is uncommon in adult deer.

## Treatment

Treatment of clinical cases with either parenteral tetracyclines or trimethoprim/sulpha-drug combinations is effective. Proprietary diarrhoea medicine combined with fluid replacement therapy for three to four days may be successful if started promptly. Treatment with long-acting tetracycline or with feed nuts medicated with tetracyclines at the rate of 1g per 0.5 kg of nuts, to give 10 mg per kg bodyweight per day of drug for seven to ten days, may prevent

further cases from developing. Great care must be taken to minimize stress to the deer if gathering and handling in order to treat them.

A commercial vaccine, Yersiniavax, is available in New Zealand and has been shown to give significant protection against yersiniosis, both in experimental and clinical field trials.

## Further reading

Beatson, N.S. & Hutton, J.B. (1981). An outbreak of yersiniosis in farmed red deer. *In* Proceedings of a deer seminar for veterinarians. New Zealand Veterinary Association, 136-139.

Mackintosh, C.G. & Henderson, T.G. (1984). The epidemiology of yersiniosis in deer. *In* Proceedings of a deer course for veterinarians. Deer Branch of the New Zealand Veterinary Association, **1**, 34-42.

Mackintosh, C.G. (1992). A review of yersiniosis in farmed red deer in New Zealand. *In* The Biology of Deer. (R. D. Brown, ed.). Springer-Verlag, New York, 126-129.