

Review of Diseases of Farmed Deer

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This review of Diseases of Farmed Deer, commissioned by DEEResearch, summarises the main diseases that currently affect farmed deer in New Zealand, together with a few diseases that have recently appeared and are starting to cause problems. It also summarises a number of diseases that occur in deer overseas and would cause problems here if they were introduced. It provides a summary of the economic impacts of deer diseases, the role of preventive medicine programmes and proposed priorities for research in the future. This research will provide information to enhance deer health, welfare and production, and protect market access into the future.

Over the last 30 years the capturing, domesticating and farming of deer has resulted in a steep learning curve to deal with health and diseases issues. There was no precedent elsewhere in the world, so much of the world's understanding of deer diseases has evolved from New Zealand. Wild deer appeared to be very healthy, but their capture and adaptation to a farming environment resulted in wastage due to misadventure, trauma and stress related diseases such as malignant catarrhal fever and yersiniosis. Initially the deer tended to be kept in large paddocks on poorer land, but increasingly farmers found that they could be successfully farmed on more productive pasture land. This led to increased numbers of animals on smaller areas and this soon led to parasite problems, especially lungworm. In the late 1970s tuberculosis (Tb) became a major problem. Trace element deficiencies, especially copper, became apparent in the early 1980s and then Johne's disease first arose in the late 1980s. Concurrently, a wide range of other herd or individual animal diseases of a more sporadic nature, similar to those seen in other domesticated livestock, have been encountered.

Research and development over the last 25 years has led to major advances in understanding of deer health, and technology for controlling and preventing most diseases. This has been achieved by the combined efforts of researchers at Invermay, Wallaceville, Massey University, Otago University, diagnostic laboratories and Ministry of Agriculture and Fisheries (MAF), as well as veterinary practitioners.

- The development of Tb tests has led to the ability to control and eradicate Tb on deer farms, in the absence of reintroduction from feral vectors. The national deer Tb control scheme was developed as a partnership between the deer industry, veterinary practitioners and MAF.
- Improvements in management, plus the development of Yersiniavax, have provided technology that can significantly reduce the risks of serious outbreaks of yersiniosis.
- Anthelmintics have been developed, trialled for efficacy and registered for deer and these, plus diagnostics tests and good management, are able to effectively control lungworm and gastro-intestinal parasites. However, continued reliance on anthelmintics may not be sustainable in the long term. Anthelmintics are not acceptable for organic farming other than for treatment of clinical illness.
- Improved management systems and the introduction of the Deer Farm Quality Assurance scheme have reduced stress and trauma of deer on farms. Improvements in pastures and provision of shelter have helped to reduce stress-related disease such as malignant catarrhal fever, yersiniosis, parasites and ryegrass staggers.

However, despite the availability of technology for the control and prevention of many diseases and subclinical losses on deer farms, there still appears to be significant preventable wastage occurring. Thus, wider application of existing technology would significantly improve deer health, welfare and profitability. Planned animal health programmes integrated with good management have the potential to maximise productivity and minimise losses.

Despite progress in many areas, there are still a number of disease and health issues that are a serious threat to the deer industry.

- Bovine tuberculosis, which is a potentially serious zoonosis, continues to be a threat in vector risk areas. The development of new diagnostic tests, vaccines and selection for resistance will provide additional tools to limit this risk.
- Johne's disease is potentially the most serious threat to the New Zealand deer industry and is the disease for which there are the fewest tools to control it. New diagnostic tests, an effective vaccine and epidemiological information on risk factors are the highest research priorities. There is also great potential for selection for increased resistance to Johne's disease, which may be related to Tb resistance.
- New developments in the field of genomics may also lead to the ability to select for resistance to a raft of other disease including yersiniosis, ryegrass staggers and parasites.
- Leptospirosis does not appear to cause major production losses in farmed deer on a national basis, but serious outbreaks have occurred on individual farms. It is a serious zoonosis and the risk for workers in the deer industry may be reduced by vaccinating deer, as it has in the dairy and pig industries.
- Research has led to improved understanding of trace element requirements of deer, and data for interpreting, diagnosing, treating and preventing trace element problems should reduce losses and result in more cost-effective production.
- This review has highlighted that trauma is a significant but largely overlooked cause of loss on deer farms, and research into predisposing factors and preventive measures is warranted.
- Malignant catarrhal fever remains an enigma, but the incidence appears to be declining.

The introduction of exotic diseases remains a major threat to deer farming in New Zealand. While foot-and-mouth disease is a threat to all livestock enterprises, chronic wasting disease (CWD) is probably the biggest threat to deer farming. It has severely damaged the deer industry in North America and all efforts must be taken to prevent its introduction to this country. The deer industry must limit the risk of introduction of exotic disease by maintaining conservative criteria for importation of live deer and genetic material.

The financial impact of a range of clinical and subclinical diseases, and mortalities on deer farms is difficult to assess because there are insufficient survey data of their prevalence, causes or production losses. However, estimates suggest that clinical disease and current disease control measures may cost the deer industry \$27 million per annum currently, and it may be speculated that at least that amount may be lost due to loss of production from subclinical diseases, resulting in costs of over \$50 million. Thus, investment to improve technology for disease diagnosis, control and eradication should yield significant dividends for the deer industry.