

Investigation of Apparent Vaccine Breakdown

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Abstract

AgVax receives very few complaints about apparent failure of “Yersiniavax” vaccine. All complaints received are investigated thoroughly. Data is presented from investigations over the last five years. These investigations suggest that there is much that we could do to improve on-farm use and administration of vaccines to deer. This offers both a golden opportunity and a huge challenge to vaccine manufacturers and veterinarians alike.

Introduction

AgVax thoroughly and individually investigates all complaints regarding “Yersiniavax” vaccine as soon as possible after a complaint is received. This includes close liaison with the veterinarian involved, a farm visit by AgVax staff, preferably with the veterinarian, and case discussion with Colin Mackintosh from AgResearch Invermay or other appropriate scientific expertise.

This comprehensive approach is for two reasons. Firstly, because without a farm visit and thorough investigation we can't put together a complete picture of what might have gone wrong. The vaccine itself is only part of the story. Secondly, because a complaint is a golden opportunity for AgVax, and for the veterinarian involved, to get onto the farm and inside the situation. It's almost certain that as developers of new products from research, AgVax will learn something which will help it to do the job better. It's equally probable that the veterinarian has a further chance to cement an ongoing productive relationship with his or her client.

Investigations Conducted

The following table describes the investigations undertaken

Year	Number of Investigations	Location
1996	3	Hawkes Bay
	1	Manawatu
1997	1	Gisborne
	1	Southland
1998	2	Wellington
	1	Canterbury
	1	Otago
	1	Southland
1999	2	Stn Auckland
	5	Hawkes Bay
	2	Wellington
	3	Canterbury
	2000	3
1		Gisborne
1		Hawkes Bay
2		Wellington
1		Otago
3		Southland

In total, over the last five years, AgVax has received 34 complaints. This sample is too small for statistical significance. However, the data and related on-farm investigations do reveal some interesting areas for further examination.

- No geographic pattern is evident. However, Hawkes Bay features, particularly in 1996 and 1999.
- There is no correlation between the region from which a complaint has been received and the number of doses of vaccine sold in that region, i.e., more vaccine used by farmers does not equate to more complaints.
- “Yersiniavax” vaccine contains the three field strains of yersiniosis in New Zealand. A concern for AgVax, or any other vaccine manufacturer, is that antigenic drift may occur in field strains of the disease. However, no new strain of *Yersinia pseudotuberculosis* has been identified.
- No vaccine batch failure has ever been identified. No correlation between vaccine batches and vaccine performance on a farm has been identified.
- The vaccine continues to pass its quality control and efficacy tests each year.
- Occurrences of yersiniosis on farms are not always weather- or stress-related. Some cases occur very early in the year, when it is warm and there appears to be plenty of feed. Yersiniosis is known to be stress-related, and early cases raise the question of whether weaners ‘see’ stress that humans do not.
- Post mortem and laboratory evidence shows that the cause of death is not always clear. Yersiniosis is ubiquitous in the farm environment and yersinia organisms are frequently isolated from dead animals, irrespective of the cause of death.
- In 44% of the cases studied, the first injection was given at the same time as weaning.
- In these cases the farmer had also regrouped mobs, introduced new herd mates or ear tagged animals.
- In 74% of cases, weaners were subjected to multiple treatments at the time of either the first or second vaccination, e.g. other vaccines, worm drenching.
- In 38% of cases, a pour-on drench was applied at the same time as vaccination.
- In 35% of cases, there was either a feed shortage, or an abrupt transition to some type of supplementary feed.
- Significant lungworm burdens were often a feature.

Lessons

What lessons can be learnt from the above data and the investigations that AgVax has carried out on farms?

Like all vaccines, “Yersiniavax” vaccine is not perfect. It provides whole-herd protection, saving deer farmers from the catastrophic yersiniosis losses that were experienced in the past, but does not guarantee protection for every individual animal under all circumstances.

“Yersiniavax” vaccine will not substitute for poor management, nor for inadequate nutrition. Anecdotal evidence from many veterinarians, and Invermay research data, suggests that nutritional issues lie behind a range of deer health problems on farms. Investigations by AgVax bear this out.

As an industry we don’t know enough about what causes weaners to succumb to yersiniosis, nor what stresses weaners ‘see’ that we humans do not. With so many of us familiar with sheep and cattle, animals which have been domesticated for thousands of years, it is easy to forget that we know very little about deer, a species which has been domesticated for only a few generations. Whatever processes occur in an animal species when it is domesticated, and which enable it to adapt to human intervention and management, have not yet had time to occur in deer. Any deer farmer will tell us that deer are “different.”

Some farms do very well without yersinia vaccination. Very often, these farms used “Yersiniavax” vaccine early in their development, but have now evolved management and nutritional systems which clearly suit deer and their requirements very well. These systems are typified by low stress, e.g. late weaning, weaner mobs not mixed together, no foreigners introduced into mobs, minimal human intervention, good shelter and ground cover, weaners not transported between farms, plenty of high-nutritional value feed and top management.

Animals under stress are immunologically compromised and may be unable to mount an adequate response to vaccination. It is probable that vaccination itself, allied to mustering, dogging, yarding and time away from feed and water is a significant stress on animals. In the aftermath of this, the animals are asked both to recover and to partition energy to respond to the antigens the vaccine presents to them. It makes little sense to add to the burden by inappropriate farm or animal management.

Ideal conditions maximise the chances of success, while the reverse appears to be equally true. Unfortunately, the high cost and unavailability of skilled labour on many New Zealand farms, and desire not to handle deer more than necessary, leads to the natural desire to do as many things as possible to deer when they are in the yards. Such labour and time efficiency may be very disadvantageous when it comes to maximising vaccination response.

New Research

AgVax's investigation of complaints also pointed to areas where further research could be usefully conducted. Three key areas were:

- Timing of vaccination related to weaner age and interference by maternal antibodies
- Vaccination at the time of weaning and potential interference caused by weaning stress
- Concurrent animal health treatments administered at the same time as “Yersiniavax” vaccination.

These areas were the basis of joint research by Massey University, AgResearch Invermay and the Deer Research Laboratory at Otago University in the last year. See Mackintosh *et al* and Wilson *et al* elsewhere in these proceedings.

A Golden Opportunity

Much of the above could be summarised simply by saying that complaints and their subsequent investigation let us learn how to improve the vaccine and its use on farms, and to identify where further research is required. This is a key objective to which we all, company and veterinarians, should subscribe.

However, just as important, is that a positive proactive response to complaints gives a unique chance to build an ongoing relationship with clients. A complaining client is saying to us, that we are trusted enough, and valued enough, to be worthwhile complaining to. This is a compliment and infinitely preferable to unhappy farmers voting with their closed cheque books.

Complaints are a golden opportunity both to add value above the shoulder as veterinary practitioners, and to develop a serious solution to the product and its surrounding technology, when both are tested by the realities of deer farming in New Zealand. These issues were explored in a previous paper in these proceedings (see Brenton-Rule). They are our challenge and our opportunity.