Evaluation of the FECPAK Deer Method

Project objectives

Knowledge gaps in the deer industry prevent the implementation of effective internal parasite control strategies. Currently farmers simply treat animals with anthelmintics on a very regular basis. Monitoring parasite burdens is rarely undertaken because the methods available are acknowledged to be unreliable or difficult to implement.

This project aimed to reduce anthelmintic use on deer farms in spring by validating a new FEC method to improve decision making around drench use by farmers and vets. If suitable diagnostic tools are available then farmers can monitor their parasite problems effectively and safely reduce their dependence on anthelmintics. This will enable the development of targeted drench programmes, reduce drench use and help delay the onset of drench resistance.

We need to be able to measure the problem accurately. An improved test is fundamental to the success of future proposals because we need to accurately measure the output of gastro-intestinal parasites before we can devise improved methods of control. Future proposals will then be able to address the key questions of when do farmers actually have to start drenching and what happens to productivity when they change from their current regimes.

Approach

Tests for monitoring gastro-intestinal (GI) and lungworm parasite burdens in deer are rarely undertaken because the current methods are acknowledged to be unreliable or difficult to interpret. The overall aim of this study was to develop a better test which can be used routinely by vets and farmers so they can monitor their parasite burdens effectively, test anthelmintic efficacy and reduce their dependence on anthelmintics.

A series of trials were designed to assess the accuracy of the new FECPAK test compared with the current Modified McMaster faecal egg count (FEC) and to assess its relationship to actual worm burdens. Improvement of the faecal larval test for monitoring lungworms was beyond the scope of this project.
The study had three components:

1. Comparability/sensitivity trial - to compare the sensitivity of the new FECPAK method with the existing FEC method using faecal samples collected from 6-10 month-old red deer of mixed sex from 5 different districts of New Zealand. A total of 124 samples were tested. There was wide variation in the FECs between the two methods. The FECPAK method appeared to be more sensitive, especially at the low counts and gave fewer false negative counts than the existing method. Unfortunately there is no "Gold Standard" that gives a true count with which to compare these two methods.

2. Repeatability trial - to determine the level of variability between counts for the FEKPAC and existing FEC methods by each testing the same faecal samples from 12 deer four times without the operators knowing the identity of each sample. There was considerable variation in FEC between the four repeated samples, with the McMaster method having significantly higher variability.

3. Longitudinal observation study - to monitor periodic FECs of 40 yearling deer over time using the two methods and assess the relationship between these FECs, liveweight gain and actual gut worm burdens of these deer at slaughter at 15 months of age. The total stomach worm counts at slaughter were only low to moderate, while small and large intestinal counts were too low for correlating with FEC. There were no significant correlations obtained between the abomasal counts vs terminal FECs, live weight gain vs abomasal counts, and live weight gain vs terminal FECs.

Main findings from this project

The new FECPAK test appears to be more sensitive and repeatable than the existing modified McMaster method, especially at low FECs. However, for this class of animal (one year old red deer) with low worm burdens, the FEC was not correlated with total worm counts and live weight gain trend.

Thus the greater accuracy of the FECPAK method may not give any advantage over the existing modified McMaster method for assessing actual worm burdens for individual deer.

However, the FECPAK method may be very useful as a tool for detecting anthelmintic resistance in FEC reduction tests and drench tests. It may also be useful for breeders wanting to rank animals based on individual FEC data, especially repeated FECs, which give much more reliable information than one-off FECs.
There is still a need to develop better diagnostic tests for assessing the negative effects of GI parasites in deer without needing to wait for the presence of eggs in the faeces, which often occurs after the damage has been done.

What difference has this project made?

The initial aims of this project were wider, i.e. to consider both intestinal and lungworm burdens. Once the project team realised how little information was available to work with the focus shifted to intestinal worm burden monitoring.

As a result of this project a strong team of researchers and industry (FECPAK) have worked together to identify the opportunities for further investigation in parasite research. The results of this SFF study have been reported widely to farmers through the Focus Farm programme and the media. Increased interest in and understanding of the issues around parasite burdens, drench resistance etc. will slowly begin to improve farm practice and may slow the impact of increasing resistance issues.

One of the major additional outcomes of the project was the opportunity to train a staff member at AgResearch to do the FEC testing to the required standard. The ongoing benefit will be the ability for researchers to have the testing completed "in house".