Sheep & Beef Research Review™

Making Education Easy

Issue 13 – 2018

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Welcome to the latest issue of Sheep & Beef Research Review.

This issue features a balanced mix of research into sheep and beef production. Topics covered include Infection and disease control, health and performance, and farm management. In particular, the looming threat to all livestock posed by Johne's disease and the findings of an Italian study that have important implications for intensive beef finishing systems.

We hope that you enjoy this issue of **Sheep & Beef Research Review**. We value your input so please keep sending us your comments and feedback.

Kind regards

Andrew Roe

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Control of clinical paratuberculosis in New Zealand pastoral livestock

Authors: Gautam M et al.

Summary/comment: This article reviews current control measures for Johne's disease (clinical paratuberculosis) in NZ pastoral livestock, noting that the primary objective for all livestock is reduction of the incidence rate of clinical disease rather than bacterial eradication.

Johne's disease has a very high profile internationally, with the International Association for Paratuberculosis holding its 14th international conference in Mexico a couple of weeks ago. The link with Crohn's disease in humans is still only tenuous at best, but, as we live in an age where "perception is reality", not everyone requires scientific evidence before drawing conclusions. This, along with the excellent progress of our national TB eradication programme in bringing the annual infected herd period prevalence down to 0.1%, has some experts warning that Johne's disease could soon become the "new TB". Such comments refer to the potential for Johne's disease (or, more specifically, our country's approach to Johne's disease) becoming a trade barrier, given the head start that a number of our trade competitors have got with their own paratuberculosis management programmes.

This paper, by some of the heavy weights from Massey's EpiCentre and veterinary school, is an excellent review of the Johne's control strategies in the deer, dairy, and sheep industries in NZ. After briefly sharing some background on the history of Johne's disease as well as its significance, both globally and locally, the authors then give an account of the status of the disease for each of the three sectors. The information for each species is presented under the subheadings of epidemiology, diagnosis, and control with, as expected given the title of the paper, most attention being given to the "control" sections. The review provides a comprehensive update on how the different sectors of our agricultural industry are tackling the looming economic threat posed by paratuberculosis, and the success they have achieved so far.

Reference: N Z Vet J. 2018;66(1):1–8

Abstract

Diagnosing and managing footrot in sheep: an update

Authors: Green L & Clifton R

Summary/comment: Current recommended approaches to the diagnosis, treatment, and control of footrot in sheep in the UK are discussed in this review article.

While containing a wealth of information on ovine footrot and its treatment and control (some of which I believe would be at odds with current accepted practice in NZ), this article is a great demonstration of the progress that can be made through a combination of farmer education and an industry-wide willingness to tackle a problem.

I was surprised to learn that, back in 2004, the average prevalence of lameness amongst UK sheep flocks was around 10%. In 2011, the Farm Animal Welfare Council proposed the ambitious goal of reducing this to below 2% by 2021 (ten years later). Through considerable research, the development of educational resources, and farmer training, rapid progress was made, with the prevalence down to 3.5% as early as 2013. On many farms, where the recommended management techniques have been adopted, the 2% target has already been achieved. The article goes into a reasonable amount of depth when discussing the diagnosis and treatment and control strategies for footrot. Included are several sets of clear industry-agreed guidelines developed to help farmers get on top of the problem. These cover a range of aspects of footrot control including clinical presentations of footrot, appropriate use of antimicrobials, and external biosecurity measures. With a little modification these could be quite handy for educating our sheep farmer clients here.

The biggest surprise for me was the finding that hoof trimming in animals affected by footrot, in combination with either topical or parenteral antibiotics, proved to be significantly less effective than antibiotics alone. Both the research and the proposed reasons for the finding seem to be sound to me, but I would be interested in the thoughts of those practitioners that have had a fair bit of experience in the footrot control programmes in this country.

Reference: In Practice 2018;40:17–26
Abstract

Fatal cases of *Citrobacter freundii* septicaemia and encephalitis in sheep

Authors: Liu H et al.

Summary/comment: These authors report an outbreak of *Citrobacter freundii* septicaemia and encephalitis on a sheep farm in central China.

Before reading this article, I don't think that I had ever come across the *Citrobacter* genus. While memories of my veterinary microbiology lectures at Massey are now a little hazy (given they took place more than 30 years ago!) I am fairly confident that *Citrobacter* did not rate a mention. But then again, neither did *Salmonella* Brandenburg! Considering that the case described in this article occurred in China and, to the best of my knowledge, *C. freundii* has never been implicated in livestock disease in this country, there is every chance that it will not appear on your radar ever again. But it turns out the organism is present in NZ, so the possibility exists that it could strike one day.

A member of the *Enterobacteriaceae* group, *C. freundii* is a facultative anaerobe present in soil and water, as well as being part of the bacterial flora of healthy animals and humans. While considered of less importance than some of the other *Enterobacteriaceae* in the human health field, it has nevertheless been implicated as the cause of a wide range of ailments, especially urinary tract infections, but also meningitis, as was seen in sheep in the case described. We are occasionally called out to investigate outbreaks of disease in sheep involving neurological signs and death. The list of differential diagnosis is quite long and includes toxicities as well as infectious agents. Perhaps *C. freundii* will, one day, be added to the list. After all, *Salmonella* Brandenburg was first isolated from animal samples in this country more than ten years before causing its first abortion outbreak.

Reference: J Vet Diagn Invest. 2018;30(2):245–248
Abstract

The use of farm-management tools by New Zealand sheep farmers: changes with time

Authors: Corner-Thomas RA et al.

Comment/summary: This brief communication describes a study that assessed the use of farm-management tools among NZ sheep farmers over a 2-year period.

The New Zealand Veterinary Association and Massey University have partnered to provide a unique continuing professional development pathway of courses and papers for those veterinarians looking to incorporate a greater degree of advisory work into their career. The first module, animal health planning, has just been launched. This paper, authored by members of Massey's Sheep Research Centre and Lincoln's agriculture faculty, will be of interest to those of us looking to go down this route.

Based around a survey sent to 12,000 sheep farmers in 2012, and repeated in 2014, the study takes a look at the uptake of a wide range of farm management tools by the responding farmers, who numbered nearly 1,000 in the first year and over 1,300 in the next. Thirty tools were included, categorised into the following groups:

- Animal measures
- Animal health
- Pasture measures
- Environmental measures
- Software

Analysis of the returned questionnaires showed that, while a small number of the tools were used by 80% or more of the respondents, the majority had pretty low uptakes. For most tools the level of usage did rise a little, however, between the two years. The table that details all of the tools in the survey, and the level of uptake of each one, makes interesting reading and the results overall show that there is definitely the potential for increased uptake of management tools, which, if relevant, may lead to improvements in on-farm productivity.

Reference: Proceedings of the New Zealand Society of Animal Production, Volume 76, Adelaide, 78–80, 2016
Abstract

Preliminary estimates of genetic parameters for adult dag scores in NZ sheep and their relationship with juvenile measurements

Authors: Mcrae KM et al.

Summary/comment: This brief communication reports the findings of an investigation that addresses the lack of formally published data on of the genetic relationship between dag score as a lamb and dag score as an adult in the NZ sheep population.

Dags! The bane of all sheep farmers' lives. The despondency caused by having daggy ewes (and conversely, the satisfaction gained by having a relatively dag-free flock) seem to be disproportionate to the actual economic impact that dags has on a sheep farming operation. I guess it's got something to do with the fact that they are so visible . . . not just to the farmer him/herself, but to anyone driving past! In the early years of anthelmintic capsule usage, it always struck me, when I would follow up with clients to find out if they believed they were getting any benefits from the treatment, that the commonest reported benefit was a reduction in dags in their ewes. Never mind the extra weaning weight of their lambs, the improved condition of their ewes, or maybe the reduced worm burdens later in the season. Farmers were perfectly happy forking out $3 a ewe for the pleasure of having fewer ewes to dag! And this was in a region where flystrike was usually only a minor problem.

Dagginess is something that can be factored in when selecting your rams, with dag score being one of the traits measured and analysed by SIL (Sheep Improvement Ltd). The estimated breeding value (EBV) is based on dag scores taken at 3 and 8 months of age. But the authors of this paper, animal scientists from NZ (AgResearch and Focus Genetics) and Canada, were interested to learn if the dag score as a lamb had any correlation with how daggy the animal may become as an adult. A reasonable question given how many times a ewe may require dagging throughout her life. Those sheep farmers utilising SIL's breeding values when making their ram purchasing decisions will be pleased to know that the investigation revealed that, not only is adult dag score highly heritable, but there is a strong correlation between adult and juvenile scores.

Reference: Proceedings of the New Zealand Society of Animal Production, Volume 76, Adelaide, 144–145, 2016
Abstract

Which traits best predict ewe performance and survival the following year on a UK hill farm?

Authors: Wishart HM et al.

Summary/comment: These UK researchers investigated the traits that best predict ewes that will survive and be productive in the following year.

As we all know the higher percentage of young ewes you have in your flock, the faster your genetic gain should be. The counter to this argument is that the longer you retain breeding ewes for, the fewer replacements are required, reducing the proportion of unproductive animals in the flock (especially if you don't breed your hoggets) and increasing the number of lambs you will have to sell. As well as this improvement in whole-flock efficiency, increasing ewe longevity also leads to a reduction in environmental impact.

This study was conducted by researchers at Scotland's SRUC Hill and Mountain Research Centre. They recognised that many of the mixed-age ewes that were being routinely culled from hill country farms were likely to still be highly productive, and so designed the study to determine the best indicators of a ewe's survival and future performance. Their approach was to record a range of information and measurements from nearly 800 ewes on a commercially-run farm over a two-year period and then work out which characteristics were the most reliable predictors of (a) the survival of the ewe the following season and (b) her performance in terms of number and weight of lambs she reared to weaning the next season. There were three categories of information/measurements recorded for each ewe: estimated breeding values (EBVs), visual appearance pre-mating (e.g., presence and severity of udder damage, dental soundness, and lameness), and recorded parameters (e.g., body condition score at weaning, lamb weaning weight, and body condition score at mating).

The most enlightening finding was the fact that, overall, the previous season's performance parameters proved to be more reliable predicators of ewes' survival and future performance than EBVs and those visual characteristics typically relied on by farmers when deciding which ewes to cull. While the study was carried out in the Scottish hill country, the findings could well have relevance to NZ flocks, especially those run on our more extensive properties.

Reference: Proceedings of the New Zealand Society of Animal Production, Volume 76, Adelaide, 159–162, 2016
Abstract

Use of rumination and activity data as health status and performance indicators in beef cattle during the early fattening period

Authors: Marchesini G et al.

Summary/comment: The objective of this Italian study was to measure the level of activity and rumination in beef cattle and to determine whether these data can be used to predict health status and average daily weight gain.

The development of technological aids in agriculture is moving at a rapid pace. Techniques and devices that were found only in the hands of researchers a few years ago are now available more widely and more cheaply, making them feasible to be taken up by our farming clients. Calf rearers using automated feeding systems can receive alerts on their cell phone when individual calves have not consumed their milk allowance for the day, motion sensors are available to help with oestrus detection, and indwelling thermometers can be used as an early indication of illness in the calf shed.

In this study, by a group of Italian researchers, beef cattle were fitted with sensors to determine if their rate of rumination and activity had any correlation with their health and productivity. Not only did the results show a positive correlation between rumination rate and average daily weight gain, but that a reduction in rumination and activity was a useful predictor of health issues. The sensors enabled the detection of both respiratory disease and lameness three to six days before the onset of clinical signs. The implications of these findings for both early diagnosis and treatment of disease, as well as improvement of herd management in general, are huge especially in intensive beef finishing systems

Reference: Vet J. 2018;231:41–47
Abstract

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http://www.vetcouncil.org.nz/contProfDevel.php

Risk of iatrogenic damage to the sciatic nerve in dairy cattle

Authors: Kirkwood RM et al.

Summary/comment: This cross-sectional UK study investigated the anatomical size and position of the sciatic nerve in four dairy cattle cadavers to determine its risk for iatrogenic damage.

We've all been taught that the anterior portion of the neck is the recommended site for administering intramuscular injections in cattle. But I suspect that the majority of us (myself included) head towards the other end of the cow more often than not, especially when working with cows at milking time. Convenience and operator safety are big drivers as well as the knowledge that, when it comes to adult cattle, most animals we see are not likely to be heading to the works any time soon, so carcass damage is possibly less of a consideration than with young stock.

This paper, by a team of vets predominantly from the University of Nottingham veterinary school, might encourage a behavioural change, or at least a refinement of technique. In a neatly designed study, a group of over 50 practitioners were asked to insert needles into cattle cadavers to demonstrate where they would typically administer intramuscular injections. It turned out that in almost 70% of the cases the needle tip ended up within 5cm of the sciatic nerve, with a few piercing the nerve.

Consequences of sciatic nerve damage and inflammation are discussed as well as the risk factors and recommendations. Young cattle and those in poorer condition are at greatest risk of such iatrogenic damage. The study was conducted on dairy cattle, which, it could be argued, are at greater risk than beef cattle as the former, on average, are leaner and so have less tissue cover protecting the nerve. However, this advantage may be negated, at least partly, by the fact that beef cattle are usually heavier than dairy cows and so the volumes injected are often larger.

Reference: Vet Rec. 2018;182(5):140
Abstract

Natural lymphatic ("atypical") actinobacillosis in cattle caused by Actinobacillus lignieresii

Authors: Caffarena RD et al.

Summary/comment: These authors report two outbreaks of bovine actinobacillosis in South America that primarily affected the lymph nodes of the head and neck.

I remember listening to a great presentation on actinobacillosis by renowned South Taranaki vet Cathy Thompson at the 2012 Sheep and Beef Cattle branch's conference (see http://www.sciquest.org.nz/node/138600). I was already aware that the condition could present in a number of ways beyond the classic "woody tongue", but Cathy's paper really hammered home the wide range of syndromes that could be attributed to infection with *A. lignieresii.* Thanks to Cathy, it now pops up in my list of differentials fairly frequently when examining sick cows.

This article describes two dramatic reports of atypical actinobacillosis in South America, one in a dairy herd, the other in beef cattle. Unlike the usual NZ presentation, normally involving individual animals, both of these cases involved multiple cattle, especially the dairy one where 40 cows were affected. I was interested to read that sodium iodide treatment yielded good results, as it is something that I have had success with myself, when used in combination with antibiotics on some of the more advanced cases of woody tongue.

Reference: J Vet Diagn Invest. 2018;30(2):218–225
Abstract

Better beef sire use in the dairy industry

Authors: Burggraff V et al.

Summary/comment: This NZ study investigated the use of beef sires in dairy cows and then monitored the performance of the offspring.

NZ is becoming increasingly reliant on dairy-beef cross calves from dairy farms as a source of finishing cattle for beef production. These calves are mostly derived from natural mating and are often sired by bulls of unknown genetic merit, leading to unpredictable performance, with the risk of calving problems or poor growth. Another issue is the increasing reluctance of dairy farmers to use bulls of traditional beef breeds to follow up after AI, due to concerns about dystocia and subsequent cow and heifer wastage. Consequently, there is a growing preference for using unrecorded dairy bulls, especially Jerseys, for this purpose. While maybe reducing the incidence of calving problems, this practice reduces the number of dairy-beef calves available for rearing.

To demonstrate the benefits to dairy farmers of using proven beef sires over those cows that they do not want to select replacements from, Beef + Lamb NZ (through its Dairy Beef Integration Programme) along with two commercial partners, set up the study described in this paper. The study, presented by Vicki Burggraaf of AgResearch Ruakura, involved inseminating low Breeding Worth dairy cows with semen from one of three recorded Hereford "Ezicalve" bulls (selected for calving ease, low birth weight, and good growth rate). Following six weeks of AI the cows were run with either Ezicalve bulls or unrecorded Hereford bulls.

The various groups of offspring were then monitored, with birth weight, live weight gain, and finishing performance all recorded. The results make interesting reading with the lower birth weights of the Ezicalve sired calves leading to fewer calving problems. Growth rates did not differ markedly between the groups but with those calves sired to AI being born earlier they reached target slaughter weights sooner. This demonstrates the benefit of using beef semen over the lower BW portion of the herd, rather than just confining the use of beef bulls/semen to the latter stages of the mating period.

Reference: 2017 Proceedings of the Society of Sheep and Beef Cattle of the NZVA, pp 1–2, Jan 2017
Abstract

Independent commentary by Andrew Roe.

Andrew worked as a mixed practice vet in Central Southland for almost 30 years. With sheep, beef, and deer being the predominant farming types when he moved to the region, he developed a special interest in these areas of veterinary practice.

Being a founding director and former shareholder of VetSouth he also has experience in practice management and governance. He is involved in the wider agricultural industry through his facilitation roles with Beef + Lamb NZ and Deer Industry NZ. Andrew is the current editor of the Grazing Gazette, the newsletter of the sheep and beef cattle special interest branch of the NZVA, and represents the interests of sheep, beef, and deer vets on the NZVA's Standards Committee.

Along with wife Sam, Andrew recently moved up the road to South Otago, joining Clutha Vets, where he is looking forward to furthering his experience in sheep and beef practice.