



Sheep & Beef Research Review™

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Welcome to the eleventh issue of Sheep and Beef Research Review.

This issue is dominated by ovine research, including papers on the effects of pasture type on function and growth, triple-combination anthelmintic resistance in NZ, inherited diseases, and the 'residual energy intake' trait. Three papers deal with bovine research: treatment of calf fever, bovine herpesvirus type 1 diseases, and a deep dive into cattle lameness.

We hope that the selections in this issue are helpful in your continuing education. As ever, we welcome your comments and feedback.

Kind regards

Andrew Roe

andrewroe@animalhealthreview.co.nz

Research Review thanks MSD Animal Health for their sponsorship of this publication, and their support for ongoing education for animal health professionals.

The occurrence of ryegrass staggers and heat stress in sheep grazing ryegrass-endophyte associations with diverse alkaloid profiles

Authors: Fletcher LR et al.

Summary: These researchers compared different ryegrass pastures infected with endophytes producing diverse alkaloids for their ability to cause ryegrass staggers and amplify heat stress in grazing lambs. They found that ryegrass staggers was most severe on Samson pasture infected with standard endophyte (S-STD), less severe on Samson infected with AR37 endophyte (S-AR37) and least on Trojan infected with NEA2 endophytes (T-NEA2). When under heat stress, lambs grazing ergovaline-producing S-STD and T-NEA2 pastures had increased respiration rates and rectal temperatures versus lambs grazing endophyte-free Trojan pasture.

Comment: Do not be put off by the long title of this paper; at first glance, you may get the impression that the study will appeal only to agronomists and fungus enthusiasts. Nothing could be further from the truth! In my opinion, the paper is well worth reading for its introduction alone; an informative history of the selection of various ryegrass-associated endophyte strains by our plant scientists in their quest to maximise the protective benefits of endophyte to our pastures while minimising the adverse effects on our grazing livestock.

The first novel endophyte, AR1 was a widespread success, protecting ryegrass from the insect pest, Argentine stem weevil, while containing no lolitrem B, the toxin that causes ryegrass staggers, or ergovaline, which is responsible for heat stress and the associated reduction in livestock growth rates. However, AR1 does not provide any protection against other pests such as grass grub and porina, both of which commonly cause serious damage to young pasture in my patch and, no doubt, plenty of other areas of the country.

More recent research identified other classes of endophytes that do, in fact, offer protection against a wider range of insect pests than AR1, with some of them now commercially available. However, unlike AR1, these newer varieties also contain varying levels of the harmful alkaloids. This study attempts to quantify the potential consequences of the toxins produced by these more recently developed strains by comparing the degree of staggers and heat stress they induce to that caused by both endophyte-free pastures and pastures containing the standard (wild type) endophyte.

Reference: *N Z Vet J.* 2017;65(5):232–241

[Abstract](#)



Sheep & Beef Research Review

Resistance to a triple-combination anthelmintic in *Trichostrongylus* spp. on a commercial sheep farm in New Zealand

Authors: Hodgson B et al.

Summary: This study of resistance to anthelmintics containing abamectin, levamisole, and oxfendazole (AB-LEV-OX), derquantal and abamectin (DEQ-AB), moxidectin, and monepantel in naturally-acquired gastrointestinal nematodes present on a commercial sheep farm found that resistance to both AB-LEV-OX and moxidectin was present in the *Trichostrongylus* genus.

Comment: While convincing our sheep farming clients to undertake comprehensive faecal egg count reduction analysis is quite a challenge (well, it certainly is for me, anyway!), most vet practices seem to be chipping away, getting a few more done every year. The farmer upon whose property this study was carried out may have been a bit easier to convince than most, as recurring ill thrift problems in the lambs were suggestive of the presence of drench resistance. But I doubt if they would have expected the extent or severity of the problem. Not only is this the first reported case of triple anthelmintic resistance in NZ where the ML component is abamectin (previous cases have involved ivermectin) it is also the first case where *Trichostrongylus* is the offending genus. And if that was not enough of a wake-up call, the same parasites turned out to be highly resistant to moxidectin as well! In addition, while a DEQ-AB combination passed the 95% drench efficacy threshold it too failed to achieve 100% reduction against *Trichostrongylus*.

The implications of these results in terms of choice of product for the purpose of quarantine drenching are discussed. The authors made a further very interesting observation. With the farmer happy to sacrifice a couple of lambs from each treatment group it was possible to do whole gut worm counts as well as faecal egg counts. This revealed that the resistant *Trichostrongylus* worms were all found in the small intestine, with none present in the abomasum. Based on recent PCR studies this indicates that the resistant species is likely to be *T. colubriformis*. As larval cultures only differentiate nematodes down to the genus level the authors speculate that standard faecal egg count reduction analysis could fail to identify a resistant Trich species if the other Trich species are present in large enough numbers.

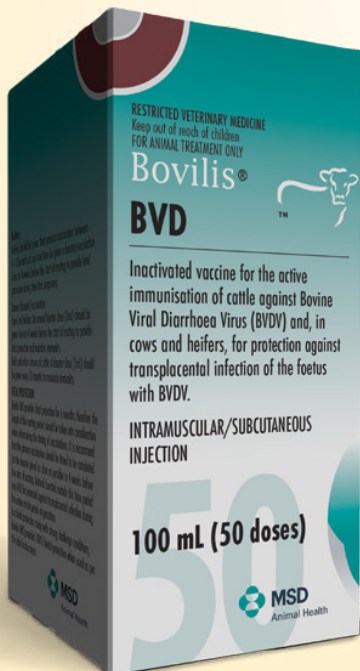
Reference *N Z Vet J.* 2017;65(5):277-281
[Abstract](#)

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Sheep & Beef Research Review

Hunting for a needle in a haystack: investigating inherited diseases of sheep

Authors: [No authors listed]

Summary: This editorial briefly describes the history of investigating inherited diseases of sheep and the steps involved in investigating outbreaks of congenital abnormalities.

Comment: Investigating potential inherited diseases can be an interesting but very challenging process. One of the limitations is that, by the time the farmer decides to get us involved, lambing is often coming to an end, making it hard to get enough samples and an accurate picture of what is going on. It can also be hard to know how much time, effort, and expense to devote to the investigation because there is no way of knowing if the problem is just an interesting one-off occurrence that may never be seen again or something that will pop again the following season, possibly at a higher frequency as more carrier animals are retained as replacements.

This article, an editorial piece from the Vet Record, is a fairly brief overview of the subject, but nonetheless contains a number of useful tips and advice. One of the more challenging components of such an investigation is determining if the disorder in question is actually an inherited disease in the first place. The article is quite helpful in this respect, firstly outlining other groups of diseases or syndromes that can present as genetic disorders and then pointing out ways to distinguish between them.

Reference: *Vet Rec.* 2017;181(7):164–166

[Abstract](#)

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to read previous issues of Sheep and Beef Research Review

Independent commentary by Andrew Roe.

Andrew has worked in a Southland mixed practice for over 25 years. With sheep, beef and deer being the predominant farming types when he moved to the region, he has considerable experience in these areas and, even though dairy cattle work now takes up a large part of this time, he is fortunate enough to still have a reasonable number of sheep clients in his practice area.



Being a founding director and former shareholder of VetSouth he has experience in practice management and governance, as well as being involved in the industry at a national level where he is currently a member of the executive of the sheep and beef cattle special interest branch of the NZ Veterinary Association, is on the panel of NZVA's Red Meat Veterinary Strategy Group as well as representing the interests of sheep, beef and deer vets on NZVA's Standards Committee.

Sustained diuretic effect of plantain when ingested by sheep

Authors: O'Connell CA et al.

Summary: This study investigated narrow-leaved plantain (*Plantago lanceolata* L.) for its potential to act as a diuretic in sheep. The results provide the first direct evidence showing that plantain causes a diuresis when it is ingested by sheep, possibly by reducing reabsorption of water in the kidneys.

Comment: Those readers who include a little herbalism in their veterinary endeavours (or maybe use natural remedies themselves!) will probably be familiar with claims around the diuretic properties of plantain. With the growing uptake of specialist pastures on our sheep farms, plantain has been gaining in popularity, usually sown in combination with other species such as red and white clover.

A couple of earlier studies had hinted at plantain's potential diuretic properties in sheep, so the authors of this paper, researchers from Lincoln University and seed company Agricom, designed a study to test the hypothesis. In case you are wondering, the study has a practical basis with concerns around ruminant urine patches being a significant contributor to the environmental problem of nitrogen leaching. It was postulated that a naturally occurring diuretic may help reduce the problem by diluting the nitrogen concentration of our live-stocks' urine.

The plant certainly lived up to its reputation, with those sheep fed a plantain diet producing significantly more urine than those on a ryegrass diet. The effect was most dramatic during the first 24 hours where the plantain-fed group produced nearly 60% more urine than the other group, whilst the difference, though still significant, declined for the remainder of the seven-day study. To ensure that total water intake was the same for both groups the only water available to the study animals was that in their feed. The authors suggested that, in an on-farm situation, where the stock have access to water ad-lib, it is likely that the large difference seen on the first day would continue. By also measuring other urine parameters, such as specific gravity and urine osmolality, it was demonstrated that consumption of plantain produced a 'water diuresis'. This is where there is a reduction in reabsorption of water from the distal convoluted tubules and collecting ducts of the kidneys, leading to a greater urine volume that is not matched by an increased osmotic load. This is exactly the effect required if the benefits of reduced urinary nitrogen concentration are to be explored.

Reference: *Proceedings of the New Zealand Society of Animal Production, Volume 76, pp 24–27, Jan 2016*

[Abstract](#)

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Growth of early weaned lambs on a plantain-clover mix compared with lambs suckling their dam on a plantain-clover mix or a grass based sward

Authors: Cranstoma LM et al.

Summary: These researchers attempted to determine if lambs weaned early, onto a plantain-clover mix, had comparable or better growth rates than those that continued suckling their dams for a further five weeks. The results suggested that early weaning improved ewe condition but did not improve lamb performance.

Comment: It is well documented that lambs grow their fastest when on their mums, with growth rates of 400 g/day being recorded. This has led to some advisors promoting weaning later than the traditional three months. However, it has been shown that growth rate in young lambs is not linear over the whole birth to weaning period; the older they get the slower their growth rate is. This is not surprising when you consider the relatively short length of a ewe's lactation. Peak lactation occurs around two weeks of age, with typically very little milk being produced after about nine weeks. So, maybe there are benefits to be gained by actually weaning earlier, especially with the option to wean the lambs onto high-quality plantain and legume pasture.

This hypothesis was tested by the team at Massey's Sheep Research Centre. The study involved three groups of twin bearing ewes and their offspring. In two of the groups the lambs remained with their mothers for the duration of the study, with one of these groups grazing on standard ryegrass/clover pasture and the other on plantain/clover. The lambs from the third group were weaned early, nine weeks from the mid-point of lambing, and put onto plantain/clover pasture.

Lambs and ewes' weights were monitored for the following five weeks, until about 14 weeks from the midpoint of lambing, the time when most farmers would normally wean their lambs. In this study, early weaning of the lambs did not prove to be beneficial, in terms of lamb growth rates. However, the discussion section of the paper is well worth a read, as possible reasons for the lack of benefit are proposed. The authors also point out that in the study all animals were offered *ad lib* feed intakes, whereas on many farms feed can be limited in the lead up to weaning; in such situations early weaning could well be advantageous.

Reference: *Proceedings of the New Zealand Society of Animal Production, Volume 76, pp 75-78, Jan 2016*

[Abstract](#)

Preliminary investigations into the trait of residual energy intake in sheep

Authors: Johnson PL et al.

Summary: These NZ researchers investigated phenotypic variability in the trait of residual energy intake (REI) for a cohort of growing ewe lambs. They demonstrated that variation in REI does exist in growing lambs, with the level of variation consistent with reports from overseas sheep studies. A potential relationship between levels of body fat and REI is inconsistent with the literature and will need to be investigated further.

Comment: Dr Neels Botha of AgResearch described the changes in mindset that those in the agriculture sector have had to adopt in recent times. According to Neels, we have gone from the "Production" phase, where all the emphasis was on producing more product, to the "Productivity" phase, which involved producing more product, more efficiently and effectively, and are now entering the "Social License" phase where farmers need to try and produce more product, more efficiently, effectively, and responsibly. It's not as if farming was easy to start with!

This paper, from the guys at AgResearch, Invermay, is the first report from a pioneering multi-year project looking into the efficiency of production in our sheep. It is a very timely and relevant project considering Neels' account of the pressures our farmers are under from those outside the farm gate.

REI is a trait that measures how efficient an animal is in converting energy into productive outcomes such as maintenance, growth, and milk production. It is an area that has been researched heavily in the pig and poultry industries, while the subject has been addressed more recently in cattle as well. But little has been done with sheep . . . until now! The long-term goal of the study is to enable the estimation of the heritability of the trait of REI and genetic relationships between REI and other production traits. However, before this could be achieved, it was important to find out that the trait of REI could, in fact, be reliably calculated in sheep. This preliminary report covers this stage of the study and, after gathering data on a cohort of 200 lambs from 24 sires, it appears that the methods used to calculate REI are valid, enabling the ambitious project to proceed. All those of us interested in the long-term sustainability of our sheep industry will eagerly await further updates.

Reference: *Proceedings of the New Zealand Society of Animal Production, Volume 76, pp 44-47, Jan 2016*
[Abstract](#)

The impact of lamb growth rate pre- and post-weaning on farm profitability in three geoclimatic regions

Authors: Thompson BR et al.

Summary: In this NZ study, a whole-farm-system model was used to assess the effect of increasing lamb weaning weight and post-weaning growth rate on farm profit and enterprise selection of three farms from three regions (Otago, Gisborne and Northland). The results demonstrated that matching animal performance with pasture performance and supply is much more important for increasing farm profitability than improving animal performance alone.

Comment: This paper continues the efficiency theme, but rather than looking at individual animal efficiency the study concerns itself with the efficiency of the farming system. As with the previously described project, this study was also undertaken by researchers from AgResearch's Invermay campus.

I am sure that we would all agree that lamb weaning weight and post-weaning lamb growth rates are key drivers of farm profitability. But, for any given farm, is there an optimum level for these parameters, above which profitability starts heading the other way?

Using data from Landcorp properties in three distinctly different geoclimatic regions of the country, the authors undertook farm-system analysis to try and answer this question. The software used was INFORM (Integrated Farm Optimisation and Resource allocation Model), a linear programming model that maximises EBITDA (earnings before interest, tax, depreciation, and amortization), by optimising resources over a one-year time-frame. By choosing seven different weaning weights for each farm (the farm's current result and six others, in 1kg increments) and seven different post weaning growth rates, similarly chosen, a total of 49 scenarios were analysed for each property and their effect on predicted EBITDA calculated.

The results make very interesting reading and provide a good demonstration of the fact that you can not change one area of farm performance without affecting other components. The overall message was that "bigger is not always better!"

Reference: *Proceedings of the New Zealand Society of Animal Production, Volume 76, pp 142-146, Jan 2016*
[Abstract](#)



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Randomised positive control trial of NSAID and antimicrobial treatment for calf fever caused by pneumonia

Authors: Mahendran SA et al.

Summary: These UK investigators found that NSAIDs alone may be a useful first-line treatment for calf fever caused by pneumonia, provided that adequate ongoing monitoring is conducted to identify those cases that require additional antimicrobial treatment.

Comment: During my initial scroll through the list of the sheep and cattle abstracts sourced by the hardworking team at Research Review I passed over this article. While pneumonia is a significant problem in calf-rearing operations in the UK, where the study was undertaken, it is not recognised as a major concern here, certainly not at a herd level. But after a second glance, I realized that this study is actually extremely relevant to NZ production animal vets. While the disease itself may not grab your attention, what should be of interest is the approach taken to, firstly, identify sick calves, and, secondly, treat them. The paper is less about pneumonia and more about finding alternatives to the traditional, empirical treatment regimens for controlling disease outbreaks in animals. In other words, moving away from prophylactic and metaphylactic antibiotic use.

A large population of calves was fitted with nifty "Fever Tags"; ear tags with an attached thermometer probe that extends 5cm into the external ear canal. If a calf's core temperature remains above a pre-determined level (39.7 degrees in this case) for longer than 6 hours a light on the tag flashes, alerting the calf rearer. In the study, half of all such cases of pyrexia were treated with NSAIDs and the other half with antimicrobials. Any calves whose temperature had not returned to normal after 72 hours, or who went on to develop clinical signs of acute pneumonia, were then treated with which ever drug they did not receive initially. While significantly more of the NSAID group went on to require antimicrobial treatment than vice versa, the most important message from the study, in my view, was that there were no deaths from pneumonia across all the calves and there was no difference in growth rates between the two groups. In other words, even though well over half of the calves initially treated with NSAIDs ended up needing antibiotics eventually, they grew at the same rate as those that were given antibiotics at the outset, thanks to earlier detection of their fever than would normally be possible by observation alone.

An enlightening study and a very timely one given our commitment to a reduction in antimicrobial usage in our farming systems.

Reference: *Vet Rec.* 2017;181(2):45

[Abstract](#)

Update on infectious bovine rhinotracheitis

Authors: Nettleton P & Russell G

Summary: This clinical practice article describes bovine herpesvirus type 1 (BoHV-1) and the diseases it causes, including infectious bovine rhinotracheitis (IBR), and then discusses options for diagnosis, vaccination, control, and eradication, as well as possible priorities for future study.

Comment: Those of us who attended the sheep and beef stream at the 2013 combined NZVA conference may recall an interesting case study presented by Barny Askin of Totally Vets, where a serious infertility problem in bulls on two different farms was attributed to BoHV-1 the virus responsible for IBR in cattle. I am not sure how IBR and the related syndromes are viewed in other parts of the country but in my area it is often something considered when we see a few ocular lesions in calves or mild, self-limiting upper respiratory tract disease in yearlings and adult cattle. However, Barny's paper reminded me of how much of an impact BoHV-1 can have in some situations.

This paper, by two British veterinary virologists, reinforces this message. Despite the title, the article does not confine itself to IBR alone, but is actually a comprehensive review of all aspects of BoHV-1 and the diseases it causes, including IBR, the genital manifestations and the severe systemic neonatal form which is suspected, but not confirmed, to occur in this country. As well as a good refresher on the subject of BoHV-1, the article is an excellent update of the latest knowledge and control recommendations of this complex virus and the syndromes it is responsible for.

Reference: *In Practice* 2017;39(6):255-272

[Abstract](#)

Veterinary Clinics of North America (VCNA): Food Animal Practice – Lameness in cattle

Editor: Shearer JK

Comment/Summary: Unlike most other veterinary journals *Veterinary Clinics of North America: Food Animal Practice* has a policy of selecting a specific topic and devoting almost the entire edition to that topic in an in-depth, almost textbook-like, approach. For the July 2017 edition the topic was lameness in cattle.

With a large proportion of cattle in North America either housed or in feedlot situations some of the major causes of lameness seen are quite different to what we encounter in this country. Having said that, however, there are also plenty of similarities making some of the articles in this volume well worth reading, especially those dealing with lameness diagnosis and treatment (both medical and surgical).

Articles that may be of most interest to NZ cattle veterinarians include:

Clinical perspectives of digital dermatitis in dairy and beef cattle

Authors: Plummer PJ & Krull A

[Abstract](#)

Pathogenesis and treatment of bovine foot rot

Author: Van Metre DC

[Abstract](#)

Diagnosis and prognosis of common disorders involving the proximal limb

Author: Desrochers A

[Abstract](#)

Surgical procedures of the distal limb for treatment of sepsis in cattle

Authors: Anderson DE et al.

[Abstract](#)

An update on the assessment and management of pain associated with lameness in cattle

Authors: Coetzee JF et al.

[Abstract](#)

Reference: *Vet Clin North Am Food Anim Pract.* 2017; 33(2):153-426

[Abstracts](#)

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