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

Theileria orientalis dominates this issue with four articles devoted to this important pathogen, including key learnings from the 2012-2014 *T. orientalis* epidemic in the North Island. Also featured are articles on liver fluke control in livestock, post-partum emergencies in cows, and an outbreak of *Helicobacter* abortion in Southland ewes.

Research Review is ten!! The first ever issues of Research Review were delivered to inboxes in February 2006. Fast forward ten years and we now publish 48 regular reviews to which there are over 160,000 subscriptions. We're grateful to each and every one of you for your support and are looking forward to even bigger and better things over the coming years.

We hope that these selections are informative, educational, and of benefit in your practice. As ever, we look forward to receiving your comments and feedback.

Kind regards

Andrew Roe

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Chlamydia pecorum infections in sheep and cattle: A common and under-recognised infectious disease with significant impact on animal health

Authors: Walker E et al.

Summary: This review by Australian authors summarises current knowledge of the prevalence and impact of *Chlamydia pecorum* infections in sheep and cattle. The review provides an update on efforts to improve detection and treatment of infections caused by this obligate intracellular bacterium. A range of diseases have been associated with *C. pecorum*, including infectious arthritis, infertility, enteritis, reduced growth rates, mastitis, and pneumonia. Diagnosis of *C. pecorum* infection is based on clinical findings, serology, and histopathology. However, these interrogations are not necessarily implemented in subclinical or early stages of infection potentially contributing to under-diagnosis and under-reporting of infections associated with this bacterium and hence underestimation of its true economic impact.

Comment: *Chlamydia pecorum* (or *Chlamydophila pecorum* as he seems to be known in this part of the world) was first isolated in New Zealand in 2000. On this occasion it was not associated with any clinical disease but, nonetheless, still caused quite a headache when one animal in a group of goats destined for export reacted positively to a routine test for the notifiable disease, enzootic abortion. It was only after a lot of investigation, including the use of overseas labs, that the offending organism was determined not to be *Chlamydia psittaci* (the cause of enzootic abortion) but its cousin, *C. pecorum*. More recently, *C. pecorum* has popped up from time to time, most notably as the cause of about five outbreaks of sporadic bovine encephalomyelitis in calves since 2011 (refer to the proceedings of last year's [DCV conference](#)).

This article published in the UK Vet Journal discusses the possibility that the bacteria is more widespread in Britain than first thought and could be responsible for production-limiting subclinical conditions as well as a range of clinical syndromes. Knowing that the organism is also present in New Zealand, this article is well worth a read as many of the findings could be applicable here as well.

Reference: *Vet J.* 2015;206(3):252–60

[Abstract](#)

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Sheep & Beef Research Review

Control of liver fluke: An emerging issue in terms of veterinary residues

Author: Statham JM

Summary: This editorial discusses the current status of liver fluke prevalence and control in the UK as well as important emerging issues. It notes how the incidence of fasciolosis in cattle and sheep has been increasing rapidly over the past decade and highlights concerns about the emergence of flukicide resistance and residues from those medicines entering the food chain.

Comment: As in New Zealand, liver fluke is endemic in many parts of the UK, particularly the wetter areas. This article begins as a commentary of the current challenges of fluke control in Britain, not the least of which could well be climate change. The prevalence of fasciolosis in cattle and sheep has increased quite rapidly, going from an estimated 48% in England in 2003 to 72% just three years later. This increased prevalence, along with concerns about the development of resistance to flukicides and the fact that the EU is looking to tighten up MRLs for these products in milk, has been the motivation for this timely article, the remainder of which is largely directed at liver fluke control strategies. Such programmes are potentially more complicated than their nematode equivalents due to the indirect life cycle of the parasite, the fact that it is the immature stages that do most of the damage, the fact that different flucidal drugs are effective against different stages of the life cycle, and the lack of a sensitive diagnostic test.

Reading the article gives the impression that fluke is a bigger problem in the UK than here, resulting in greater losses to their sheep and beef industry. Heeding the warnings and advice offered, however, could be helpful in ensuring we don't go down the same road.

Reference: *Vet Rec* 2015;177:519–21

[Abstract](#)

Diagnosing limb paresis and paralysis in sheep

Authors: Crilly JP et al.

Summary: These authors provide a detailed review of paresis and paralysis in sheep. Both are uncommon neurological problems in sheep but they are likely to prompt farmers to seek veterinary advice. A planned approach can aid in determining the cause of the problem and highlighting the benefit of veterinary involvement. This article describes an approach to performing a neurological examination of the ovine trunk and limbs, the ancillary tests available, and the common and important causes of paresis and paralysis in sheep. Distinguishing between central and peripheral lesions is important (they have different prognoses) and can often be achieved with minimal equipment.

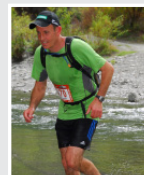
Comment: I am always impressed when I overhear one of my companion animal workmates discussing a neurological case. Neurology has never been one of my strong fields, with what little knowledge I did have becoming even further diluted since going down the path of only dealing with production animals. So, I listen in awe when one of my colleagues rattles off the full array of techniques and reflexes used to localise the site of a CNS or peripheral nerve disorder. But, despite popular belief, sheep do have brains too and, although we are not called upon very often to investigate cases of paresis or paralysis in this species, they do occasionally occur, either in individual animals or as a flock problem.

This review article from *In Practice* is an excellent comprehensive guide to the subject, dealing with aetiology, diagnoses, and treatments of the full range of potential causes (including the odd one such as Scrapie, which you hopefully will not get to see here). For those wanting to impress their clients, there is even a step-by-step guide to CSF collection . . . making it look easy! The review will be particularly useful for those vets with a large lifestyle block-owner clientele, who are perhaps more likely to be tending to individual sick or injured sheep. Next time I am called to such a case I will make sure I have a quick re-read of this article before heading out.

Reference: *In Pract.* 2015;37(10):490–507

[Abstract](#)

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. **FOR FULL BIO** [CLICK HERE](#)



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***Theileria orientalis*: A review**

Authors: Watts JG et al.

Summary: These New Zealand and Australian authors present an introduction to *Theileria orientalis*. This economically important parasite, which is responsible for benign or non-transforming theileriosis, exerts its major effect through erythrocyte destruction. The article describes the life cycle of *T. orientalis*, the pathogenesis of anaemia that results from infection, and the early clinical signs indicating infection. The article emphasises the importance of raising awareness of the risks posed by this parasite so that management practices are implemented to minimise its impact.

Comment: As all New Zealand production animal vets will be very aware, the *Theileria* epidemic of 2012–14 was a major animal health event for this country. Working in the lower South Island, I had no first-hand experience of the disease but, like all NZVA members, I was kept very well up to date on the important aspects of the outbreak. The significance of the epidemic is evidenced by the fact that the whole of the first issue of the NZVJ for 2016 is dedicated to *Theileria* and its impact here. For those of us not at the coalface, these articles offer a detailed insight into the parasite, the damage it can do, and the various characteristics of the outbreak. But I also believe that even those readers heavily involved with the disease at the time will find value in what the NZVJ has achieved in gathering together so much information on the subject into one resource.

I have selected four articles to give specific mention to here.

The first article, a review of *Theileria orientalis*, sets the scene. After introductory paragraphs about the parasite in general, the paper outlines the history, clinical picture, and control strategies seen in three countries in which the organism has had a significant impact: Japan, Australia, and New Zealand. It was first identified here in the early eighties with numerous cases identified in the Northland region over the following four or so years. However, things quietened down fairly quickly again and, while it was acknowledged that the parasite was probably spreading more widely, actual reports of clinical cases had been fairly sporadic since. Until late 2012 that is, when the epidemic in question got underway. The culprit was a different strain, not previously reported in this country. The *T. orientalis* Ikeda strain is believed to be more pathogenic than its other endemic counterparts and, since that initial isolation, outbreaks of anaemia in both dairy and beef cattle have been reported from most regions of the North Island.

Reference: *N Z Vet J.* 2016;64(1):3–9.

[Abstract](#)

Epidemiology of the epidemic of bovine anaemia associated with *Theileria orientalis* (Ikeda) between August 2012 and March 2014

Authors: Lawrence K et al.

Summary: The aim of this surveillance study was to describe the epidemiology of the epidemic of bovine anaemia associated with *T. orientalis* infection in New Zealand during 2012–2014. In the first 18 months, there were 496 case herds. Of these, 392 (79%) were dairy and 104 (21%) were beef herds. Of 882 individual cases, 820 (93.0%) were positive for *T. orientalis* (Ikeda). Case herds were initially clustered in the Northland, then the Waikato regions. The odds ratio for a case farm compared to a non-case farm having at inward cattle movement was 2.03 (95% CI: 1.52–2.71) and the distance moved was 26km (95% CI: 20.8–31.3) greater for case farms. Spatial-temporal analysis showed significant clustering of infected herds within 20–30 days and ≤15km distant from a case farm.

Comment: This paper, by researchers from both IVABS and MPI, provides an interesting account of the progression of the *Theileria* outbreak from those first few cases in August and September 2012 to the peak of it about twelve months later. As the authors describe, there were three distinct phases, which are dramatically portrayed both diagrammatically and graphically. By March 2014, just over 18 months since the epidemic began, almost 500 herds had been infected. Interestingly, it took around seven years for the Australian epidemic to reach this level.

Reference: *N Z Vet J.* 2016;64(1):38–47

[Abstract](#)

An assessment of the herd-level impact of the *Theileria orientalis* (Ikeda) epidemic of cattle in New Zealand, 2012–2013: A mixed methods approach

Author: Vink WD et al.

Summary: This study estimated the incidence risk, cumulative mortality, and case fatality rate within herds affected by bovine anaemia associated with *Theileria orientalis* infection, in New Zealand during the early phase of the epidemic (August 2012–September 2013). Data from 196/263 (74%) case farms were analysed. These farms contained 99,505 cattle of which 2,847 animals were reported with clinical disease and 590 animals were recorded as having died from *T. orientalis* infection. The within-herd incidence risk, cumulative mortality, and case fatality rate were estimated to be 0.97% (inter-quartile range [IQR] 0.36–2.07), 0.23% (IQR 0.00–0.66), and 16.67% (IQR 0.00–33.33), respectively, and were consistent between data sources and did not differ between beef and dairy herd. There was substantial variability in the level of impact; 22 farms were severely affected (incidence risk >5% and cumulative mortality >5%).

Comment: While the Ikeda type of *T. orientalis* is assumed to be more pathogenic than earlier reported NZ strains, there are still plenty of properties, and certainly plenty of animals, that have tested positive to the parasite but without showing clinical disease. Like the vast majority of infectious agents, the exhibition of clinical signs depends not only on the presence of the organism but also on a variety of pathogen/host/environment factors and the interaction between them. This paper, also written by MPI and IVABS researchers, describes a mixed methods study (involving a questionnaire to dairy farmers, data collected during disease investigations of beef herds, and a large telephone survey) that was designed to help define what the main risk factors may be as well as to gain a level of understanding of within-herd disease frequency

Reference: *N Z Vet J.* 2016;64(1):48–54

[Abstract](#)



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Prevalence and spatial distribution of cattle herds infected with *Theileria orientalis* in New Zealand between 2012 and 2013

Authors: McFadden A et al.

Summary: The aim of this study was to describe the prevalence and spatial distribution of cattle herds infected with Ikeda and non-Ikeda types of *T. orientalis* in New Zealand between November 2012 and June 2013. Pooled serum samples collected retrospectively during this period were obtained from cattle herds throughout New Zealand and were subjected to DNA testing. The Northland (33/35; 94%) and Auckland/Waikato (63/191; 33%) regions had the highest prevalence of herds infected with Ikeda type. Only 2/204 (1%) herds were positive for the Ikeda type in the South Island. The Gisborne/Hawkes Bay (23%; 95%CI: 13–37), Auckland/Waikato (22%; 95%CI: 16–29), and Bay of Plenty (24%; 95%CI: 10–44) regions had a high prevalence of infection with non-Ikeda types.

Comment: This study is based around the retrospective testing of cattle blood samples that had been submitted to the various animal health labs around the country between November 2012 and June 2013. By testing pooled samples for both Ikeda type and non-Ikeda type *T. orientalis* from a large number (>700) herds, the distribution of both categories could be accurately predicted. The findings are nicely portrayed in a table, which shows that, while 21% of all *Theileria* cases in the North Island were of the Ikeda type, the proportion varies markedly throughout the different regions. Way out in front was Northland with 93%, compared with the Auckland/Waikato area recording 33% and all other regions being 12% or less.

The same data are strikingly displayed in a choropleth map, which is overlaid with blue dots representing the individual farms where clinical disease occurred. Those mainlanders amongst us will be interested to see that two regions in the South Island had Ikeda positive samples and that there was one case of clinical disease in Mid Canterbury

Reference: *N Z Vet J.* 2016;64(1):55–9

[Abstract](#)

Taking action to reduce the risk of copper toxicity in cattle

Authors: Grace N & Knowles S

Summary: This article reports data collected by New Zealand animal health laboratories during 2000–2014 showing that the median value of copper concentrations in liver samples from cattle (primarily dairy) has increased from 380 to 1204 $\mu\text{mol/kg}$ wet tissue (WT). This is approximately equivalent to 1500 to 4800 $\mu\text{mol/kg}$ dry matter (DM). In addition, the number of cases of copper overload rose substantially; samples with copper concentrations >3000 $\mu\text{mol/kg}$ WT (12,000 $\mu\text{mol/kg}$ DM) comprised 0.2% of the total in 2000 versus 3% in 2014.

Comment: A [paper](#) published in the *Vet Record* last year (Kendall et al.) described a large survey designed to get a feel for the copper status of the national dairy and beef cattle herd in the UK. After taking liver samples from over 500 cull cows at an abattoir, it was found that over 40% of female dairy cattle had liver copper levels above the upper end of the Animal Health and Veterinary Laboratories Agency (AHVLA) reference range. The implication was that a significant proportion of the UK herd is at risk of chronic copper toxicity.

This article, by well-respected AgResearch scientists Neville Grace and Scott Knowles, also published in the *Vet Record*, reports that a similar situation exists in New Zealand. Data collected from our animal health labs reveal that the median liver copper level in cattle has risen from 380 to over 1200 $\mu\text{mol/kg}$ in the last 15 years. The authors believe that part of the problem may be due to the terminology used when reporting mineral test results. Reference ranges accompanying the results will refer to an “adequate” level. While the intention is that adequate means sufficient, the authors are of the opinion that, to the farmer (and his/her advisor!), “adequate” is not a desirable trait and implies “could be better”. With a large proportion of cattle tested being dairy cows, another contributing factor is likely to be the increasing level of PKE being fed in recent years. Like Kendall et al. in the UK, the authors sound a warning about the potential for copper toxicity amongst our cattle and call for advisors to base their recommendations on scientific evidence.

Reference: *Vet Rec.* 2015;177(19):490–1

[Abstract](#)

Post-partum emergencies in cows

Authors: Rees G

Summary: This author describes how postpartum emergencies in cattle are an important aspect of mixed or farm animal practice in the UK. The article considers three of the more challenging postpartum emergencies that veterinarians encounter and presents the latest research on the prevalence, risk factors, first aid, treatment, and prognosis for each of the conditions.

Comment: This article by Bristol University lecturer in farm animal medicine, Gwen Rees (who may be known to some readers as she spent time working in New Zealand), covers three post calving scenarios: uterine prolapse, laceration/haemorrhage, and post calving paralysis.

While most production animal vets experienced in cattle practice are unlikely to find anything here that will radically change what they are already doing, the article, like many from *In Practice*, is worthy of a read because it is full of sound practical tips and advice; there is every chance that you will pick up something new that may make the job a little easier or increase the chance of a favourable outcome. For me, it was the idea of attaching the cow's hind limbs to a tractor hoist (as opposed to using hip clamps) to raise the rear end of the cow, making replacement of a difficult prolapse easier. I was intrigued by the picture: check it out!

Reference: *In Pract.* 2016;38(1):23–31

[Abstract](#)

Clinical communication: A helicobacter abortion outbreak in two-tooth ewes in Southland

Author: Catley M

Summary: This article describes an investigation into an abortion epidemic among two-tooth ewes on a Southland sheep and beef farm. It considers the factors involved and implicates *Helicobacter rappini* as the likely causative agent. After reviewing the literature on this bacterium, the author concludes that *H. rappini* appears to be an emerging and significant cause of abortion in New Zealand.

Comment: In [Issue 3](#) of *Research Review Sheep and Beef*, the topic of helicobacter abortion in ewes was covered in an article by Rawdon et al. This paper, by Michael Catley, gives a practitioner's perspective of this emerging disease, presenting a case study of an outbreak in Southland.

The case was a devastating one with 25% of a mob of two tooth ewes aborting in an outbreak that started in mid-July and, frustratingly, continued for well over a month despite the farmer following his vet's advice and taking the ewes off the swede crop and moving them onto good quality pasture. Standard sheep abortion lab tests were performed, which ruled out the more common causes of abortion including toxoplasma, campylobacter, salmonella and listeria as well as fungal species. *Helicobacter* remained as the most likely differential diagnosis and samples were submitted to MPI for PCR testing. At the time this report was written, the results had not been received but the author goes on to give a valuable review of this vexing disease. Now that a commercially available test is finally available hopefully the disease will be a little less vexing, with a reduction in the number of those annoying ewe abortion cases to which we are unable to attribute a cause.

Reference: *Proceedings of the Society of Sheep and Beef Veterinarians of the NZVA and Cervetec Conference 309, pp 115–118, Jan 2015*

[Abstract](#)

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