

Campylobacter in sheep – what's new?

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Background

Campylobacter is one of the most commonly diagnosed causes of infectious abortion in ewes in New Zealand (West 2003). In 2023, it accounted for 18% of the confirmed abortions submitted to the national veterinary laboratories. This figure has varied from 15–35% through the last 10 years (Surveillance, Sept 2010–2023). Most cases are caused by *C. fetus fetus*; however some are caused by *C. jejuni*, which has been well documented as a sporadic cause of disease, estimated to be the cause of 10–20% of diagnosed Campylobacter abortions each year (NZ wide laboratory data). Campylobacter is commonly referred to by farmers as an 'abortion' disease, however abortion losses are just the tip of the iceberg. Early embryonic loss (resulting in dry ewes or late lambers), stillbirths and weak lambs can all be attributed to Campylobacter infection.

Campylobacter abortions in sheep flocks have severe welfare implications for both the animals and the farm owners and staff. The time and zoonotic risk associated with removing aborted material and aborted ewes from the mob, due to the contagious nature of these abortions, and the emotional toll of dealing with this, means in many sheep farmers eyes vaccination is a worthy insurance policy for them.

Treatment of ewes in the face of an abortion storm with antibiotics has limited benefit. This disease is also contagious, meaning that aborting ewes can then act as a source of bacteria to other ewes amplifying the abortion storms. Losses of up to 30% of the lamb crop have been reported in unvaccinated flocks (West 2003).

Previous work

A large serological study carried out on randomly chosen mixed-age ewes throughout New Zealand (Dempster, Wilkins, Green and de Lisle 2011) demonstrated that exposure to *C. fetus fetus* (by way of antibody titres) was widespread, with 88% of flocks tested showing some level of exposure. However, the same study showed that only 48% of mixed age ewes are seropositive to Campylobacter. For this reason, a vaccine is recommended in all ages of ewes, not just maidens.

Multiple studies have attempted to quantify the effect Campylobacter may have on flock reproductive performance. A comparison of scanning and tailing percentages in Marlborough (Anderson and Sewell 2000) demonstrated a 9.3% increase in tailing percentages in Campylobacter vaccinated vs. unvaccinated flocks. Further support was given to this by a group of trials in which flocks were split and the lambing percentages of vaccinated 2-tooth and mixed age ewes was significantly higher than those unvaccinated (Anderson 2001).

It is estimated that up to 50% of the maiden ewes in New Zealand will receive a Campylobacter vaccine twice pre-mating. A much lower number of ewes receive a third shot or first annual booster, and a very small number, an on-label annual booster. Campyvax®4 (A009535) is a four-component vaccine containing inactivated *Campylobacter fetus subspecies fetus*, serotypes DL42, 6/1, 134 and *Campylobacter jejuni*. Campyvax4 prevents abortion and perinatal loss caused by *Campylobacter fetus fetus* and induces a specific immune response to aid the protection against abortion due to *C. jejuni* in sheep.

A small pilot study began in October 2024, and this paper summarises the early results of this three-year project. Campylobacter vaccination in mixed-age ewes is an important consideration for farmers and in the current economic climate, farmers want to know that vaccination has a positive return on investment.

Study outline

- Retrieve scanning and tailing data from 11 medium sized farms in a similar geographic area in Northern Southland. Most farms currently using Campyvac4 in maiden ewes only, with some doing a first annual booster in the subsequent year only.
- Blood test 10 x wet/dry ewes per farm at/around tailing time. This occurred in October/November 2024. These were ewes 4-tooths or older, scanned pregnant in July 2024, but had presented without a lamb at tailing. Farmers were encouraged not to bleed ewes with a known reason for being a wet/dry, such as dystocia.
- The ewes blood tested had not been vaccinated with Campyvac4 since 2022 or earlier. This was to ensure the titres measured were truly from natural exposure.
- Blood test results were used to identify whether study farms had recent Campylobacter exposure (both seroprevalence, and titre levels).
- A proportion of study farms have subsequently introduced an annual Campyvac4 booster to their flock (this included a repeat sensitiser and booster for those more than 12 months since last booster), and we will monitor scanning, tailing, weaning and lamb wastage data, in all study farms for a further two years.

Interim results

Eleven farms were recruited rather than the intended 12, due to the wettest spring in record in Southland and feed shortages meaning many wet/dry ewes had left the property before the study was ready to begin.

Ewe titres varied greatly across farms, but in general were substantially higher than those found by Dempster *et al.* in 2011. The Dempster samples were random farms, and not targeted to wet/dry ewes like this study targeted. Furthermore, that study excluded sera from investigations of abortions or low scanning or lambing percentage. A cut-off of 1:160 titre was used as previously by Dempster *et al.* and the results of are shown in Figure 1.

Figure 1. Percentage of ewes with titres $\geq 1:160$ to each antigen.

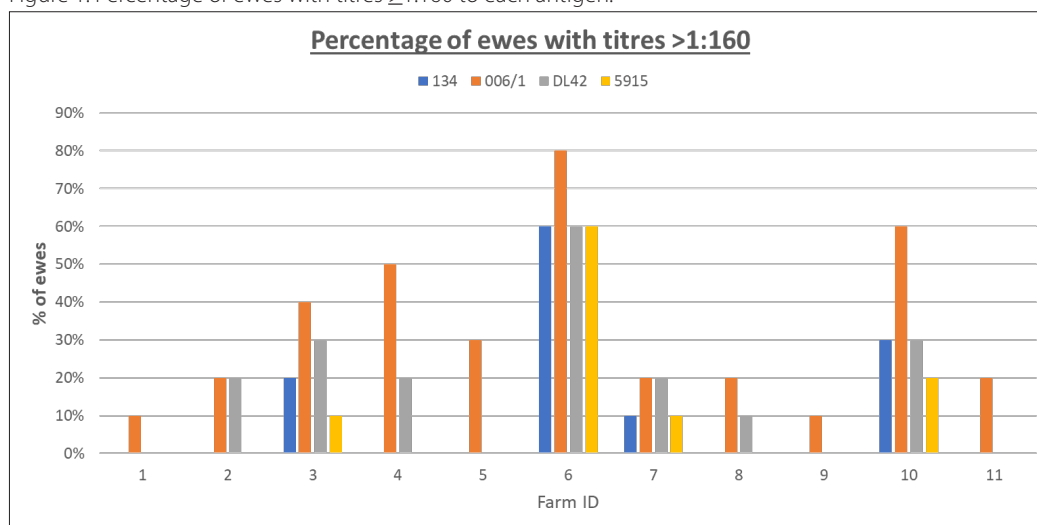
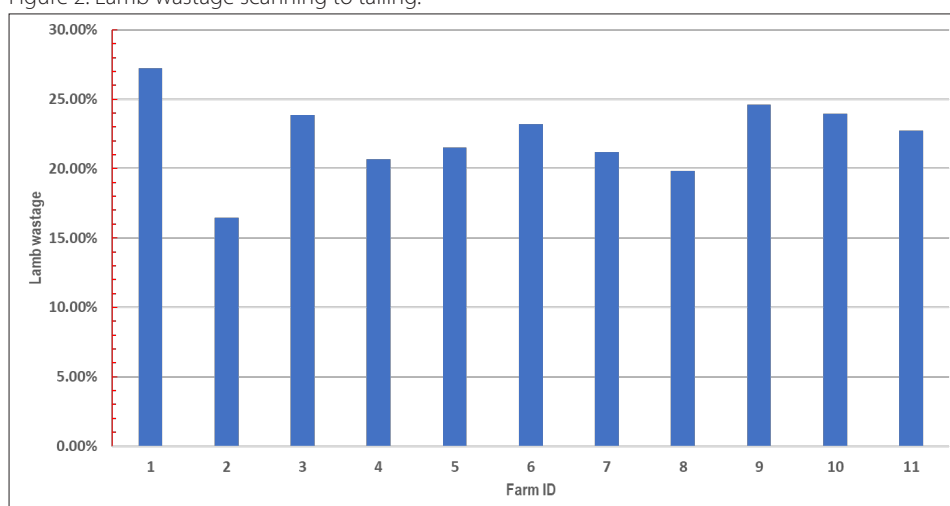


Figure 2. Lamb wastage scanning to tailing.



The farms included in this study had very typical scanning and tailing percentages for Southland farms. In 2024 the average tailing percentage in Southland was 123%, down around 2.3% from 2023 (Lamb Crop Report, Beef & Lamb NZ, 2024). There was only a slight decrease compared to previous seasons on most study farms. There was a lot of variation in lamb wastage, but this also fitted loosely with the national average of 18–20%. Previous work has shown the higher the scanning percentage, the higher the lamb wastage due to reduced survival of triplet lambs, however for the 2024 year, this was not seen in this study.

The various strains of *Campylobacter fetus fetus* isolated were examined. In the Dempster work, of all the 3,429 sera tested for *C. fetus fetus*, positive results (>1:10) to each of the four test antigens were 21% to antigen 134, 38% to antigen 6/1, 32% to antigen DL42 and 20% to antigen 5915. In this study, of the much smaller number of 110 samples, the positive results (>1:10) to each of the four test antigens were 75% to antigen 134, 88% to antigen 6/1, 78% to antigen DL42 and 50% to antigen 5915. This is a similar pattern - with 6/1 the dominant antigen, followed by DL42 and then 134, with 5915 the least commonly detected.

Further results will be available in future years. Thanks to Andrew Cochrane at NS Vets Riversdale for his support and continuing assistance with this study.

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