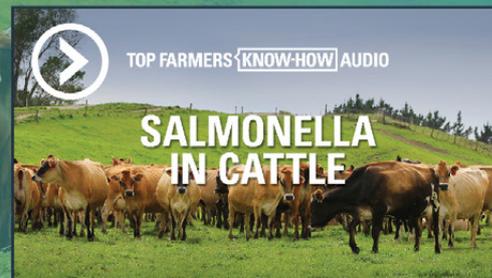


TOP FARMERS KNOW-HOW AUDIO SALMONELLA IN CATTLE



TRANSCRIPT

Intro: This is Top Farmers' Know-How, brought to you by MSD Animal Health.

AMANDA: For sharemilkers Matt and Jennifer Davison, the lead up to the Canterbury calving season of 2016 was just like any other year. The calf sheds were prepared, pasture covers were on target, staff were all up to speed. They were looking forward to the season ahead. Then one morning Matt went out to shift breaks and what he saw made his stomach drop.

MATT: There was about a dozen cows that wouldn't get up, they wouldn't move. So to me that was an alert straight away, because in my whole dairying career I've never ever had that amount of cows stay down in one spot.

AMANDA: It wasn't clear what they were dealing with straight away because at first the down dry cows seemed to respond to metabolic bags, but when 6 had died by the afternoon and several more began passing a bloody scour, Jennifer suspected the worse. One of their graziers had recently told them some cattle on his place had been diagnosed with Salmonella Brandenburg, which had prompted Jennifer and Matt to bring that mob of 300 cows they had grazing at the run off home early. Now these were the cows getting sick. So, on a hunch Jennifer took some faecal samples from the sick cows into the vets for testing.

JENNIFER: Like your heart kind of broke for them and to just you knew what they have been exposed with its really hard to deal with something that you don't know. So, for me, I'm not prepared to take this as a calcium deficiency because this wouldn't last this long. It wouldn't, a calcium deficiency to me, would not be affecting the cows in this kind of way.

AMANDA: While they waited for the lab results to come back, Matt and Jennifer decided to take on sole responsibility for looking after the sick mob so they wouldn't put their staff at risk. They knew that people can get Salmonella from cows. They monitored and nursed those 300 cows around the clock, treated every sick cow with antibiotics and anti-inflammatories and put strict biosecurity precautions into place.

MATT: We made our own set of cattle yards around there so that every day we could just pull the animals in that needed to be treated. There were days that we would be going up to the vets and we would be spending five and half thousand dollars on drugs just to keep our cows alive.

JENNIFER: We had a new-born baby at that stage as well so I guess at the forefront of our minds was making sure we don't bring anything home so it was just as simple as having our own overalls and gumboots that we went over there and dealt with them and then everything was cleaned and disinfected before we came home. And at the time we had a nanny as well to help look after our sons, so I just made sure she cleaned and mopped the floors every single day and just was really "anal" I guess around the hygiene of it all—from dealing with it to making sure we didn't bring it home.

AMANDA: Sure enough when the lab results came back they confirmed that Matt and Jennifer were facing a Salmonella Brandenburg outbreak. About 5 days in, the clinical picture became to change and sick cows began slipping their calves. Rotten calvings became a daily chore and the sick mob took up nearly all of their time.

JENNIFER: So we were out there and we were monitoring them every 2-3 hours.

MATT: And that includes during the night as well.

JENNIFER: So, I mean for us they took more priority over the calving cows...yeah...rotten calves are pretty tough to deal with, eh?

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AMANDA: Once all was said and done, they would be out of pocket an estimated \$90,000 dollars in lost production, cow value, missing replacements and treatment costs. When the dust settled, 15 of the cows of that mob of 300 were dead and another 45 were dry.

How common are outbreaks of Salmonella like this? What options do you have for damage control? And could anything have been done to prevent it?

Hi and welcome to Top Farmers Know How audio edition, bringing know how worth having straight to your ears. I'm Amanda Kilby one of MSD Animal Health's Technical Vets. Today I'm sitting down with two of my co-workers to find out the answers to these questions. Can you each introduce yourselves?

DAVID: Tēnā koe Amanda. I'm David one of the technical vets for MSD, based in the North Island.

SEAN: Yeah gidday Amanda. I'm Sean Daly, I'm the MSD technical vet for the northern half of the South Island.

AMANDA: Sean, can we begin by having you explain what salmonella is?

SEAN: Salmonella is a bacteria and there is thousands of different types of it, about two and half thousand, all around the world, affecting all sort of animals from turtles, to sheep, cattle and even people.

AMANDA: Where does it come from?

SEAN: So salmonella is a bacteria as I said and its spread by healthy carrier animals so they are animals that don't show signs of the disease but are shedding, usually low levels of bacteria, but enough to infect other animals. They will be showing no signs of disease and they can go on shedding disease for months or even years. Within a farm, it's spread by infected materials, so infected faeces, aborted materials such as fetuses or placenta, and that can even be spread by scavenging animals such as seagulls or hawks as well.

AMANDA: Oh so they would physically carry it from one farm to another?

SEAN: Absolutely. The bacteria live for quite a long time in wet areas on pasture so if its wet such as in the spring it can last for quite a long time there until it gets picked up again. And then in calf sheds, any areas where there is faecal material or moisture, it can live in there and survive for quite a long time.

AMANDA: Great ok. So Salmonella Brandenburg which we heard about when we were hearing from Matt and Jennifer earlier...what is so special about that type of Salmonella? What does it do here in New Zealand?

SEAN: Yeah so Salmonella Brandenburg is one of these types of salmonella, it was first diagnosed in New Zealand in 1996, so its relatively new on the scene and what's specials about Salmonella Brandenburg is it causes late term abortions and sickness in cattle in that it shows up in particularly first calving heifers.

AMANDA: Ok so that's different from other kinds of salmonella then?

SEAN: That's correct there's other ones around such as Salmonella Typhimurium and Bovismorbificans which cause more enteric (or affect the gut) diseases.

AMANDA: OK so Salmonella Brandenburg is special in that it causes abortions late in the dry period usually?

SEAN: Yeah that's right. That's what we're seeing mainly. Brandenburg's quite interesting because of the severeness or how quickly an outbreak it occurs in naïve herds, you see a lot of cows affected, up to 35% in some herds, of first calving heifers affected, and it happens and you get a lot of abortions. And that peaks through calving, and then most people are going in and vaccinating at that time and that usually gets on top of it. But initially in a naïve herd a massive outbreak, a lot of animals are affected. Other types of salmonella, a lot of farmers say "yeah we saw one or two cases last year but didn't think too much about it..." But when Brandenburg turns up, it kicks off.

AMANDA: David when you were working as a clinical vet, I understand you were based in the Waikato, so can you tell us about your experience?

DAVID: Yeah we don't really see Brandenburg in the North Island, it hasn't been recorded yet, surprisingly since there is quite a few animal movements back and forth between the islands. So we mainly see the enteric type, so Typhimurium and Bovismorbificans are the two main subspecies that we'd see. So we did see probably primarily the odd one or two cases where on a farm we'll have sick animals, scouring, off feed, we cultured their faeces and we detect salmonella. But you get the odd case where you get a huge outbreak where whole herds can actually be affected, animals dying and lots of animals getting sick and certainly a big financial cost to the farmer.

AMANDA: And are those cases able to be treated?

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DAVID: Yeah so in the majority of cases if you catch those cows early before they get really dehydrated and really succumb to the infection they generally they respond really well to things like fluids and antibiotics and sort of just nursing care. But we usually do get a few cases in any outbreak or even just the odd case where you usually see one or two animals die because of the disease.

AMANDA: And what time of year do those outbreaks tend to happen? So, we said Brandenburg outbreaks tend to happen in the late dry period. When would you be seeing enteric salmonella outbreaks?

DAVID: In times of stress, the typical times we can think of is thing like around calving. So that seems to be when we usually see them.

AMANDA: So probably that bacteria is there before that but then the cattle that haven't had it yet are stressed and then they are more likely to get sick.

DAVID: Yeah so as like in Brandenburg we have these healthy carrier animals that are carrying the bacteria in their gut and when they get stressed sometimes they start shedding significant numbers of bacteria and any of those naïve animals that are around pick that infection up and then certainly can succumb to the disease. So that's primarily where we are seeing it. Now, people talk about contaminated feed stuffs and birds being a big issue. People often blame, for example, PK, but they typically are not the source of infection. Usually it's these healthy carrier animals that you just can't detect in the herd.

AMANDA: I see. Are there any sort of management stressors or diet changes that would make individual animals more likely to get salmonella?

DAVID: Yeah so just on diet itself so we know that a healthy cow and a healthy rumen produces volatile fatty acids, or VFAs, and they tend to be pretty protective against Salmonella infection. And when animals are undergoing diet change, that can sort of depress those volatile fatty acids and again succumb them to being more likely to be infected. The other big thing that we've seen in the North Island particularly around magnesium supplementation. So we've had quite a few cases series of big salmonella outbreaks in whole herds associated with a granulated form of magnesium. And we're not really sure why that is the case but we're pretty sure that there is an association there.

AMANDA: But what you are saying is its less likely to be contamination of the feed supplement and its more likely to be some sort of change in the gut environment caused by feeding that supplement.

DAVID: Correct

AMANDA: I see, so it sounds like if stress and animals going off feed are important risk factors for Salmonella, but all cattle pretty much have times where they are stressed and off feed its sounds like reducing those risk factors is likely to be difficult for a lot farms.

DAVID: Yeah correct because you can't stop a cow from calving because that's the way you are going to get your milk. So yeah the only way to really control or prevent Salmonella is through vaccination.

AMANDA: Right ok, and our company MSD is the company that makes the salmonella vaccine that is available for cattle and sheep in New Zealand and its called Salvexin+B. Sean could you tell the listeners a little bit about this vaccine. What's in it, how does it gets used?

SEAN: Yeah sure Amanda. So Salvexin+ B has 4 strains of salmonella in it, 3 common enteric forms and also it's had added to it Brandenburg as well.

AMANDA: Ok so it's going to provide some protection against three of the most common enteric salmonella and Brandenburg.

SEAN: That's correct. And the vaccination course with that vaccine you give an initial dose, a sensitiser, and then a booster 4 weeks later but the key thing there is that the 2nd shot should be at least 2-3 weeks before the key period of challenge that you have with Salmonella. After that point you then look at an annual booster to continue that protection.

AMANDA: Ok and they need two shots initially is what you're saying?

SEAN: Exactly, two shots initially.

AMANDA: Ok and David are there any potential risks associated with vaccinating?

SEAN: Occasionally animals' temperature can be up for 1 or 2 days and they do sometimes get a drop in milk production. But it doesn't seem to have any particular long-term effects.

AMANDA: So, in the face of an outbreak is vaccination indicated? Would that help?

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SEAN: Absolutely, so with cattle it is indicated, vaccinating in the face of an outbreak once you've seen a few cases, determined that Salmonella is there, discussed it with your veterinarian, going in and vaccinating and that will usually get cases down within 10-12 days, but still go on and give the second shot to give longer term protection.

AMANDA: And I know you have been organising and overseeing some MSD research particularly in Brandenburg in cattle and also on Salvexin+B. Can you tell us a bit about that?

Discussion about Sean's research:

SEAN: Yeah when I first started in the role in 2017 there had been a lot of Salmonella abortions coming down to Brandenburg had been noticed and we had reports over the last few years indicated it was spreading and becoming more common so we decided we wanted to go out and find out what was really going on in a bit more of a formal setting. So we did a scientific survey of local vet clinics that had had cases put us in contact with 12 farmers. We asked them a survey with 63 questions on it just looking at the impact of the disease, how it presented, those sort of things, how long it went for, then any associations with vaccination that they had used, just to get an idea on what was really happening in Canterbury.

AMANDA: So on those 12 farms, how did the outbreaks typically progress?

SEAN: It was interesting, in that initially, we thought it was just first calving heifers affected so we went and looked and talked to these farmers and it became apparent that adult cows (mixed age cows) were affected as well; some farms had only mixed-age cows affected. So that was an interesting finding that we took out of it. And it pretty much presented as a very sick, depressed cow in the springer mob and we noticed that they were having trouble calving, they were doing a lot of assisted calvings, the calf was late term so right on when they were due and having aborted fetuses, and high temperatures and sick and depressed cows. Quite often there was some extensive intervention needed to get that calf out and then afterwards the cow's becoming very sick and some of them dying anyway, despite the use of antibiotics, and, more often than not, not coming into milk at all (so being pretty much a waste of time) and then struggling to get into calf again.

AMANDA: So had any of those farms preventatively vaccinated?

SEAN: No well that was a relief for me, none of those farms had vaccinated previously but all of the vets in those cases were recommending vaccination in the face of the outbreak and did vaccinate most of them going into the vaccine 2-3 days after the first cases had been seen.

AMANDA: And that point would they know exactly which Salmonella they were dealing with?

SEAN: That was, it's a tricky one, we can get a culture back saying its Salmonella very quickly, within 2-3 days. To find out exactly what type it is takes a bit longer because there is some further testing required. But because we were in Canterbury and we'd seen so many cases and the presentation was so specific, we were ticking the Brandenburg box pretty quickly.

AMANDA: Yeah there's not much else that looks like that.

SEAN: That's right and on the other side of things too is the vaccine does contain the two other common strains in dairy cattle so the farmers and vets involved were quite happy going in and vaccinating in the face of an outbreak because of what they were seeing.

AMANDA: Yeah, ok. And so the farmers that opted to vaccinate, what did they observe? How did that change the course of their outbreak?

SEAN: Yeah so in the survey work we asked that exact question and the average time was around about the 11 day mark that farmers were actually seeing things calm down and that fits in with what we would expect from the immune response. Vaccination is not immediate, we are relying upon the immune system of that animal to react to the vaccine and produce antibodies to protect and that takes about 11 days, is what we were seeing. That's some powerful information for vets and farmers so we can manage expectations in the future with that.

AMANDA: Yeah, and what did the farmers that you surveyed say they are going to do about Salmonella going forward?

SEAN: There was a lot of talk about changing graziers over the winter and looking at back-fencing and things like that, but the main thing that stood out were that they were going to be vaccinating next year.

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AMANDA: And would those other sorts of management changes be effective? Based on what you guys were saying, it now sounds like once salmonella is established that they now have carrier animals.

SEAN: Yeah that's exactly right. Once it's there, carrier animals are there, it's on the farm so changing the management practices are going to really struggle to have a major impact there.

AMANDA: Right, except for things like reducing stress.

SEAN: Reducing stress, yeah those sort of things, but there is no way that you will ever eliminate salmonella now.

AMANDA: And it sounds like your survey results reflect Matt and Jennifer Davison's experience. They vaccinated their entire herd during the outbreak and now they continue to vaccinate each year beginning with their in-calf heifers.

JENNIFER: You can't prevent an outbreak from happening, if its going to happen it will happen. And the best thing you can do is vaccinate so that you don't have to experience it.

AMANDA: Amazingly their strict biosecurity measures contained the outbreak to just the original sick mob of 300 cows and none of their staff or family members got sick.

JENNIFER/MATT: We even went as far as wearing face masks and bits and pieces and yeah it worked because none of us got sick and we didn't bring it home, we didn't pass it on to the new-born calves.

JENNIFER/MATT: We did everything we could and we felt pretty good because we contained it to the 300, because if we had got it through all eleven hundred cows, we might have been in a bit of trouble.

AMANDA: So Sean, in addition to your farmer survey you are just finishing up overseeing a trial looking at whether vaccinating cows with Salvexin+B around dry off provides protection to their calves through colostrum. Can you tell us a little about that trial? And when you are expecting to have the final results to share?

Discussion on Sean's passive transfer trial

SEAN: Yeah this is quite a cool wee study that we are putting together here. Overseas, when you look at it, there has been a lot of trial work done where we've vaccinated cows with a variety of vaccines against a variety of different strains of Salmonella. And that has shown through production of colostrum by those cows being transferred onto those calves that there is protection against Salmonella challenge in those calves in the early part of their life, which is really good. That's overseas data with overseas strains, overseas vaccines. We wanted to do it in New Zealand under the New Zealand system against strains that we see here and using our vaccine to show that the same thing happened.

AMANDA: And so do you have any results or are we still waiting?

SEAN: Still waiting on results at this stage. We've finished the in-life phase-that's all gone well-so we're going to test blood samples from the calves immediately after, just seeing where the antibodies were in there and whether they are passed onto the calves. The goal is to demonstrate protection of the calves through that colostrum just like what we get with Rotavec Corona when we want to protect calves against Rotavirus scours, we vaccinate the cows pre-calving and they produce the antibodies which are transferred in the colostrum to protect the calves.

AMANDA: But I guess the calf would have to drink enough colostrum for it to work.

SEAN: Absolutely! That's so vital. There are a hundred different reasons why it's important to get calves to drink plenty of colostrum...and this is just another.

AMANDA: Another one to add to the list.

SEAN: Absolutely

AMANDA: So since your 2017 farmer survey how have you seen the dynamics of Brandenburg shift and change so it was kind of confined to Canterbury but I'm understanding that its actually moving beyond Canterbury now. What have you seen in the field?

SEAN: Absolutely. So what we've seen in Canterbury is when we look at the outbreak over time, it started out it spread across the Canterbury Plains pretty much from the Rakaia river down to Timaru and it's filling in the gaps now basically. So we've got the vast majority of dairy farmers on the Canterbury Plain are now vaccinating for Salmonella. We've also seen it spreading outside of the region. We've seen it pop up in Central Otago. We've seen it pop up on the West Coast. The West Coast experience is interesting

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and quite heartening. The veterinarians over there, as soon as they started seeing cases on the West Coast, they recommended their farmers to go and vaccinate and they've had good results over there. Those farmers that have vaccinated haven't had it. There have been more cases but in farmers that haven't vaccinated, so they know they did the right thing there to stop the massive explosion they had in Canterbury. So that's heartening, and the vets really did their farmers a favour over there giving that recommendation. And acting proactively so the Canterbury disaster didn't happen again. There are other areas around the South Island where it has popped up as well up the Murchison, Nelson Lakes area as well, Springs Junction. And so our recommendation is those farmers should also be vaccinating. And farmers right across the country should really be aware of this for any sick cows around calving, late-term abortions, diarrhoea, these sort of thing they should be checking for salmonella.

AMANDA: Thanks Sean. So David, what do we know about vaccinating against enteric salmonella? Sean has been talking to us about Brandenburg and its spread but for enteric do farms on the North Island especially, but all over New Zealand, do many vaccinate preventatively?

DAVID: As a technical vet we get tonnes of phone calls particularly through September-October period, end of calving, early mating where vets have called up and say "look I've got an outbreak... what do I do? They're unvaccinated..." And, as a general rule, vaccination is recommended in those situations. And like Sean said, usually within sort of 10 days, we start seeing less cases occurring, and it seems to tail off much faster than if we let the disease run its course. And typically, those farmers that have had an outbreak definitely do not want an outbreak again. So, most of those guys are going onto preventative programmes where they get two shots for their calves and then an annual shot for their heifers and mature cows. And that typically tends to be at dry off because that's the most convenient time and it sort of fits in with the fact that, you know, in a few months' time they will be calving, and that tends to be the stress period of the year for those cases you see.

AMANDA: I see. So if a farm has never had a Salmonella outbreak, why might they consider vaccinating?

DAVID: Well vaccinating is actually relatively inexpensive, and if you look at a Salmonella outbreak, you know, and you compare the cost of the cow, for most herds, losing one or two cows, you've already paid for the cost of the vaccination. And that's just the small cost. I mean, some of these farms that have had major outbreaks, they'll see a massive drop in production, so you've got that loss of milk. And I know of a few cases where they've actually had to stop supplying for several weeks until the outbreak is over because there is so much Salmonella actually detected in the milk that they've been trying to send to the supplier and the supplier has said "look, we can't take that anymore." There have been numerous cases and it's well known that it's a zoonotic disease. Farm workers, farm staff and veterinarians have all succumbed to Salmonella infection when dealing with sick animals. So it's a human health factor as well; we need to consider that.

AMANDA: Jennifer Davison really emphasised the human aspect to salmonella vaccination.

JENNIFER: Its up there with the Lepto vaccination and it's the best thing you can do by cows but also by your people because it's the people that have to deal with the outbreak and seeing it mentally and for it to go on, and on, and on. And during calving who wants to be dealing with something like that.

AMANDA: Yeah exactly, so David, for both of these types of Salmonella, it sounds like its most practical for people to preventatively vaccinate around dry off and then you don't have to deal with the outbreaks over calving, over mating. You're not going to lose replacements because you've had late term abortions... So it sounds like, just practically speaking, that preventatively vaccinating would be the way to go.

DAVID: Yeah correct I mean it's a bit of a no brainer really. I mean, again, the cost of the vaccination is pretty inexpensive and it's a really good insurance policy you know.

AMANDA: Yeah that's exactly what Matt and Jennifer say

JENNIFER/MATT: It's the cheapest form of insurance you can get, if you go and spend what is it, 80 cents or something a shot a cow that's your insurance premium, it's not a lot of money for your herd. So I guess we'll always continue to do it.

AMANDA: So David, what would be a typical ongoing presentation of Salmonella on farms that vaccinate?

DAVID: Yeah that's really farm-dependent. Probably the majority of the time we don't see many, if any, cases of salmonella each year, which is, you know, great for the farmer and its certainly showing the vaccine is working well. But you do get the odd case or the odd farm that just seems to have a higher load of

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Salmonella on the farm, so they will often get just one or two cases, and they tend to be a little bit milder. And we tend to find that compared to what they might have had previously when they might have had 10, 20, 30 animals affected, you know, 1 or 2 is acceptable. So it's not perfect, but we get a pretty good result.

AMANDA: So using the vaccination, we're boosting the animal's immune system to fight the Salmonella that is around, but we're not actually eliminating Salmonella from the farm, like Sean was saying.

DAVID: Yeah correct. So no matter what, the vaccination doesn't kill the salmonella per se. All it's doing is creating antibodies for the animal so that they can sort of fight off the infection if they get exposed to it.

AMANDA: What are some extra things that farms could do in addition to vaccinating?

DAVID: So making sure they fence off those feed bins so that animals can't get in and defecate on the feed. Other parts is if they have had a big salmonella outbreak previously, there is probably a lot of contamination around. So they've got to be a little bit careful about how they spread effluent over the pasture because again, that could be a potential hotspot for Salmonella. The other main thing that, again, we see, is that some of these herds have been feeding that granulated form of magnesium which we talked about before. So, if they had a problem with that with Salmonella then it's definitely recommended not to feed that just because of the high associated risk with that type of magnesium supplement. So, they may choose to go back to dusting on pasture or other sources through feed.

AMANDA: Well thanks so much David and Sean for sharing your expertise here with us today and thanks also to Matt and Jennifer for sharing your story. Do you have any final bits of advice for people listening who might be experiencing a Salmonella outbreak.

JENNIFER/MATT: I guess just the biggest thing is if you do experience it, you have to be in the paddock with your cows all the time. The more time you spend with them the better success rate you will have.

AMANDA: So if you're unsure about the risk of Salmonella on your farm or you have any questions about Salmonella vaccination, talk with your vet. Salvexin + B and Rotavec Corona are vaccines available only under veterinary authorisation. You can also visit our website: topfarmers.co.nz for fact sheets, a transcript of this podcast and a full list of our references. Thanks so much for listening. Bye for now.

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