Introduction

Last spring/summer lack of efficacy issues emerged with certain batches of Scabine®. This follows similar efficacy issues with Scabine® in the spring of 2006. The objective of this paper is not to cast aspersions etc. however there are lessons to be learnt for all parties concerned so should any similar problems arise in the future with any scabby mouth vaccine the same mistakes are not made again. This paper will summarise the events of 2006, provide some background to the problems that arose last spring and detail issues raised and lessons learnt. One of the issues that emerged this past season is that there are some farmers and some vets who are uncertain what a primary response to vaccination (or take) in a naïve lamb looks like compared to the ‘take’ (secondary response) you get when the vaccine is ineffective or the lamb already has some immunity. It is hoped the inclusion of colour photographs of examples of the various takes in this proceedings will act as a permanent record for future reference.

Background

Scabby mouth (Orf, Contagious pustular dermatitis, Contagious ecthyma) is a highly infectious disease of sheep, goats and deer caused by a parapox virus that, following some minor scarification or abrasion invades cells on the skin surface (primarily non woolly areas) and the mucosa of the mouth. The disease is common in lambs in late spring and summer although occasionally older stock (ewes and rams) can also be affected with the udder and teats, feet (strawberry footrot) and the poll and ears being sites of infection. Morbidity can be high – up to 90 even 100% but the mortality is usually very low – occasionally very young lambs may succumb due to an inability to suckle or secondary flystrike (West et al. 2002).

Commonly accepted dogma is that the scabs shed from diseased or vaccinated sheep remain infective on pasture for several years however United Kingdom work from the 90s suggests the virus does not survive long on pasture and carrier animals are probably more important in the continuation of the disease from year to year (Lewis 1996). Work at Moredun clearly demonstrated that scab material retained its potency far longer when kept dry than when subjected to normal environmental wetting and drying cycles. Hence in the New Zealand situation covered sheep yards and contaminated equipment will be important in maintaining infective virus. In the United Kingdom young lambs frequently get a secondary bacterial infection with Staphylococci (Lewis 1996). In New Zealand Dermatophilus has been found associated with scabby mouth virus in lesions in lambs on pasture (Cooper et al. 1970). Based on local farmer anecdotal reports of responses to treatment with lotions containing disinfectant and iodine, usually in glycerine, I suspect secondary infection is probably not uncommon. In older grazing lambs various agents can act as scarifiers with thistles by far and away the most important but dry coarse grass and in some instances gorse can also be responsible in New Zealand.

The 2006 experience

In early October 2006 I received phone calls from several farmers who were concerned about an apparent lack of takes following
their routine scabby mouth vaccination. A visit to some of these farms and other farms confirmed that the situation was quite clear cut – there was a definite lack of scabs apparent at the site of vaccination. Furthermore all farms appeared to have used the same batch of Scabine® (batch #896–MN3).

Following discussions with Schering Plough a challenge trial was set up to determine the level of protection afforded by vaccination with batch #896 and therefore determine whether revaccination was necessary. The result of this trial was that 53% of the vaccination lesions were considered to be primary responses (Smart 2009). The conclusion was therefore made that there was insufficient protection, hence revaccination was recommended where practical.

Subsequent investigations by Schering Plough – Coopers (as MSD Animal Health was then known) revealed that the lack of efficacy was due to a minor change in the manufacturing process particular to batch #896 (Marchant and Moffat 2007).

The 2014 experience

Now fast forward to 2014. A similar situation – I received a call from a farmer concerned about a lack of takes in a few early lambs he had vaccinated. At this point I should explain why it is that this practice seems to get the early notifications of any problems. We have a small group of farmers in one area of the practice who ‘make’ their own vaccine. They buy one vial of commercial vaccine quite early on in the season, scratch some early lambs then harvest the scabs to manufacture their own ‘brew’ which is administered using empty Scabine® vials. A bit cheeky really but what can you do! On enquiring where they had got the vaccine from this time, they revealed they had got it from another farmer, which immediately set alarm bells off over handling issues etc. The farmer who had originally bought the vaccine was on holiday in Australia and couldn’t be contacted for 2–3 weeks. In the meantime I went through our sales records, identified purchasers immediately before and after the one in question and rang them asking if they could check their lambs for takes. The results of this were equivocal – some farmers who had used the batch in question said they had takes and one farmer who had used a different batch had no takes. Further investigation of this latter case revealed just how accidents can happen. This farmer had bought four vials of Scabine® and put them in the fridge. However he had forgotten he had four vials (now expired) left over from last year also in the fridge and he had inadvertently grabbed a vial from the wrong lot. Inefficacy explained!

The farmer at the centre of the original purchase was eventually contacted and revealed that his wife had bought one vial in the morning and had then gone to Dunedin (an hour north of Balclutha) for the day. When all the above facts were put together and combined with an assurance from MSD that the retention samples had been checked and were up to specification I concluded (wrongly as it turned out) that various handling issues were likely behind the inefficacy issues and there the matter rested for a while.

Over the next few weeks however ‘rumblings on the grapevine’, mainly from farms/practices in Southland got louder and we received more complaints from farmers in our practice area who had checked some lambs and found minimal scabs. When I investigated these it became apparent that there was an issue – several farmers with plenty of prior vaccinating experience had very poor, in some cases no takes at all, following vaccination. Because the situation was far from clear cut in that some farmers
were reporting takes with the batches in question, while others were having efficacy issues, it took a while to establish for certain that there was a problem other than the more usual handling or application issues. Hence public notification of the problem was quite a lot later than in 2006. The immediate ramification of this was that for those farmers who hadn’t checked any lambs for takes, despite being told in our practice newsletter for >10 years to check takes 8–10 days post vaccination, it was now:

- Often too late for many to check with any degree of certainty whether they had had takes or not.
- And as quite often later lambs had been scratched with a different batch the results of checking these lambs was not necessarily reflective of the earlier main mob(s).

For those farmers who didn’t have any idea of the vaccine’s efficacy on their place this presented a huge dilemma. Revaccination can present massive logistical challenges and wouldn’t be undertaken lightly. Conversely if lambs were indeed susceptible, an outbreak of scabby mouth can have major production limiting consequences. I sent out a mailer to all Scabine® purchasers outlining the situation as it was known then and explaining that if they were in this situation to obtain one replacement vial (of a different batch!) and scratch some lambs and check for takes a week later. The mailer had colour photos of a primary and secondary take and an explanation of what these meant. A number of farmers did this and some pretty much exclusively found primary takes (unfortunately). However a number of other farmers adopted what I call the ostrich approach (put their head in the sand and hoped for the best) and even into the New Year we were still fielding reports of scabby mouth outbreaks in vaccinated lambs by which time there was invariably no practical course of action that could be taken.

Initially it was thought (well I did anyway) that as some of the affected batches had also gone to the North Island where there had been no reports of inefficacy received plus the fact MSD’s retention samples were up to spec that some break in the cold chain supply, probably earlier on in the chain, between manufacturing plant and the tailing pen(s) must have been behind the inefficacy issue however we now know that the lack of reports from up in the North Island was likely due to the fact that farmers there do not routinely check for takes, hence only discovered there had been a problem much later on when cases of scabby mouth in supposedly vaccinated lambs started to appear.

Issues highlighted/lessons learnt from the 2014 experience

1. Probably the most important issue highlighted and I also emphasized this in an earlier paper on the 2006 scabby mouth field challenge trial (Smart 2009) is that it is really important that all farmers check some lambs for takes 8–10 days post vaccination otherwise if there is a possible problem discovered later it can be too late to check with any degree of certainty. It could be an automatic procedure that, come early spring, vet practice newsletters carry a reminder for farmers to do this. There would be very few farms that don’t have some lambs that get through a fence somewhere and at the very least they can easily be checked when they are caught to put them back where they belong.
2. It became apparent that there were some farmers (and unfortunately some vets as well) that didn’t know for certain what a correct vaccine take, a primary response, actually looked like. One aspect that emerged as investigations went on was that some initial reports of vaccine efficacy, because of subsequent outbreaks of scabby mouth occurring on these properties, had to have been incorrect. When doing follow-up investigations on farms this year I found some farmers were interpreting what was actually very much a secondary response as a take or a primary response. I think this contributed to the initial confusion over the situation with Scabine® this past season in that in certain instances some efficacy was attributed to the batches of concern, 132–SL2, 132–SL3 and 135–SL2 that was probably never there in the first place.

Following are two examples of typical primary takes (Figure 1a–h) and typical secondary takes, (Figure 2a–h) each photographed on Days 0, 4, 6 and 8 following vaccination.

![Figure 1a](image1a.png) Primary take Case 1 Day 0
![Figure 1b](image1b.png) Primary take Case 1 Day 4
![Figure 1c](image1c.png) Primary take Case 1 Day 6
![Figure 1d](image1d.png) Primary take Case 1 Day 8
![Figure 1e](image1e.png) Primary take Case 2 Day 0
![Figure 1f](image1f.png) Primary take Case 2 Day 4
![Figure 1g](image1g.png) Primary take Case 2 Day 6
![Figure 1h](image1h.png) Primary take Case 2 Day 8
As can be seen with the primary takes in Figure 1, occasionally by Day 4 and certainly by Day 6 a definite zone of inflammation surrounding the developing lesions is evident along with thick raised pustules and scab formation. With the secondary takes (Figure 2) on Day 4 there was usually an area of inflammation and some minor scab formation but by Day 6 this had not progressed and in fact had often regressed somewhat. By Day 8 there was usually just a reddened line where the scratch had been and minimal scab formation.

In our original challenge trial in 2006 10% of lambs had a response that could not categorically be classified as primary or secondary (Smart 2009). There is always going to be a range of responses obtained and in any examination of takes there is likely to be a small percentage of these. The flock situation can invariably be ascertained by checking enough lambs. Twenty should be enough to resolve the situation for any given flock. The following (Figure 3a–h) are two examples of these ‘in-between’ takes.
There are a variety of possible explanations that can explain why on any one property you may get a mixture of primary and secondary takes and careful questioning is needed to elicit the reason(s) for this. Possible explanations include:

- The usual variation that can occur due to operator and application issues etc. On any given farm where an effective vaccine has been correctly applied you are unlikely to find 100% of primary takes. Anything above ≥90% primary takes is acceptable and indicates the procedure has been diligently carried out.
- Different batches of vaccine used and carried over between mobs.
• Late lambs in particular will quite often have a different batch used on them as farmers purchase 90% of their requirements early on in the season and top up if necessary for their later lambs once they are more sure of their numbers so they don’t buy excess vaccine as we, and I presume most/all vet practices, will not take back unused scabby mouth vaccine.

• Despite what Wellington bureaucrats may think about the ‘sanctity’ of the PAR (sorry RVM) prescribing process it is not uncommon for farmers to beg, buy or borrow vials of vaccine off each other – for example running out of vaccine while tailing in the weekend necessitating a quick trip to the neighbours for a top up vial or two that could well be of a different batch or even a different commercial product altogether.

1. The third issue that was again highlighted this past season pertains to the recording of batch numbers on vet clinic sales invoices. In fact it doesn’t matter what animal health product we are talking about, these days many farmers, with all the various freezing company audit type schemes, would prefer batch numbers and expiry dates recorded on their purchase invoices. Unfortunately this presents all sorts of logistical challenges at the point of sale as with the current veterinary software programmes there is no reliable automated means of ensuring accuracy with this information. For example automated entry of batch and expiry information according to the last receipted inwards goods does not necessarily correlate to that for the outwards sales. This means the only ‘semi-reliable’ way would be manual entry at the point of sale. Because this is a manual process occurring at times when staff are often under pressure with other clients waiting to be served plus the entry process involves random numbers and /or letters that are sometimes almost illegible on the labels, it is also going to be subject to entry errors. Getting back to the current scabby mouth vaccine issue though, there is no doubt that with this latest episode of Scabine® inefficacy, having accurate batch information for all sales would have helped enormously in the retrospective analysis of what the hell was actually going on! In case I am giving a ‘holier than thou’ impression, here at Clutha Vets, while we know what batches of scabby mouth vaccine we have received and when we received them, which is a partial help we, until now anyway, because of the logistical reasons outlined above, have not recorded that information on sales invoices.

2. One of the questions that arose this time around, because it was later in the season before the inefficacy problem really came to prominence, was how late can you check for takes post vaccination and be certain that if there are no scabs then that is indeed due to the fact there were no scabs and not that the lesions may have resolved and the scabs have dropped off? Based on multiple observations since 2006 I can categorically state that the best time to check for takes is 8–10 days post vaccination. Up to 14 days post vaccination you can be certain that if there was a scab there you would see it. I checked one mob of lambs 24 days post vaccination last year and of the 20 lambs checked 12 had a primary take and eight had no scab but you could see a scar in six out of these eight – whether this scar was from a primary or secondary response couldn’t be determined. The interesting fact however is that of the 12 lambs with scabs there were two where you could just about have blown on the scab and it would have fallen off. So 21 days would be the absolute maximum length of time that you could check with a reasonable degree of certainty and even then it is my opinion that to be absolutely certain the checking needs to be done within 14 days of vaccination.

3. In the earlier stages of the investigation into what had gone wrong there was a check done by MSD of the cold chain transportation logistics of the batches involved. As an indication of what can happen with the cold chain supply, we ordered some Scabine®
one Thursday for overnight delivery and it should have arrived at our clinic the next morning. It eventually turned up the following Tuesday and no one, not even the courier company concerned, had any idea where it had been for the past four days. It could have been sitting in a hot courier van for the entire time – who knows! As a result we refused to take delivery and it was returned. For this type of incident to be spotted veterinary practices need reasonably robust ordering and inwards goods systems. Also of concern is the fact that, as found when checking back, this episode had not registered with the manufacturer as a transportation ‘glitch’. In my opinion the lesson to be learnt here is there needs to be better monitoring of transportation right from the manufacturer through wholesalers etc. to the veterinary clinic. Some form of track and trace perhaps or temperature loggers in with the outers of vaccine. The comment has been made to me by company personnel that the vaccine is ‘fairly hardy’ and can withstand ‘some higher temperatures’ however I think this misses the point. If we allow some latitude in the cold chain of supply it could make investigation of any future ineffectivity problematic to say the least.

4. For future reference in case a similar situation should arise again, when it comes to revaccinating heavy lambs, to save operators backs the most practical method of doing this is to run the lambs, with their mothers if not weaned, up a drenching race. If the operator is right handed then they grab the right ear of the lambs with their left hand, tense it and scratch up the inside of the ear. At times the operator may be doing this slightly blind but after a small amount of trial and error the average person will have a pretty good success rate. It is not the end of the world if the odd lamb is not vaccinated successfully. The bulk of future scabby mouth cases will be prevented while making the revaccination job as practical as possible. Note – this method is only recommended in these particular circumstances when heavy lambs are being vaccinated. It is not recommended for routine vaccination at tailing.

5. When there are large numbers of lambs with clinical scabby mouth there are really two possible courses of action:

a. Do nothing and the disease will run its course.

b. Treat affected lambs with a ‘scabby mouth lotion’. Here at Clutha Vets we make up a mixture of equal parts of disinfectant (in this case Vetacide™), 2.5% Stock Iodine and Glycerine and this is brushed on or applied with a cloth to the affected area. As alluded to earlier, anecdotal reports from many farmers are that this treatment does seem to help which leads me to surmise that secondary infection with either bacteria and/or Dermatophilus is probably quite common as you would not expect that any of the ingredients of the lotion would have any real affect against the virus itself. Either that or the softening of the scabs from the glycerine helps. There are many lotion recipes, mostly a variation on the above theme, used by different veterinary practices – some famers even just use waste oil or diesel.

1. A number of farmers who had many clinical cases of scabby mouth in some mobs of lambs and very few in other mobs despite all having received the same affected batch of Scabine® now have a better appreciation of the important role thistles play in the development of the disease. The observation was made by several farmers that lambs in paddocks where there was good thistle control had a minimal incidence of scabby mouth lesions whereas those in paddocks with quite a thistle infestation had a much higher incidence of clinical scabby mouth. Over the years we have had a few farmers who have ceased vaccinating for scabby mouth, put extra effort and the money saved by not vaccinating into good thistle control, who seem to have no or absolutely minimal scabby mouth issues. This further confirms the important role thistles play in the pathogenesis of the disease, in New Zealand at least.
Pissed orf – more scabby mouth issues!

2. Not so much a lesson learnt but useful information for practitioners none the less is the response that occurs in lambs in the face of a heavy challenge by the virus when they have been correctly vaccinated with an effective vaccine. Lambs get what is essentially a mild case of scabby mouth with some hyperaemia and small granulomatous proliferations round the mouth and nose. Sometimes these small proliferative lesions extend almost halfway up the dorsum of the nose. These scabs have a superficial appearance more akin to that due to Dermatophilus and are not severe enough to cause any noticeable growth rate retardation. The large scabs typical of a normal scabby mouth case never develop. Following in Figure 4a–b are photographs of two such affected lambs.

![Figure 4a. Small raised circular lesions](image1)

![Figure 4b. More apparent raised circular lesions](image2)

Conclusion

The most important lesson to arise out of both the 2006 and the 2014 Scabine® vaccine efficacy episodes is for farmers to always check a number of lambs, perhaps around 10–20 for takes 8–10 days post vaccination.

Appendix

Finally I wish to bring a little culture to these proceedings and will finish with a poem by the William Shakespeare of South Otago, Ross Agnew, a local farmer client who penned the following poem after his experiences vaccinating with Scabine® #896 in 2006 (Agnew 2013). He is perhaps best known for his protest song ‘The Fart Tax Blues’ written in 2003 in response to a frankly ridiculous Labour Government proposal back then to tax the methane emissions of livestock!
The True Cost of a Vaccine Failure

Dear Mr. Vaccine Maker-Man, I’m sending you this mail
I’ve had a problem with your product which I’ll outline in detail.
The one we use for scabby mouth, we treat the lambs at docking.
The costs that have occurred from that for me have become shocking.

It started back at tailing when we brought in our first mob
We got the lambs all drafted up and started on the job.
When we opened up the bottle, the product looked like water
Instead of being coloured blue, the colour that it oughta.

I rang the local vets, who sold the stuff to me
And told them that the vaccine wasn’t blue like it should be.
They checked with the supplier, who said the stuff would be OK
But come and change it if you like, to be sure anyway.

When driving from the paddock, a gate swung on my truck
And crunched in on the mudguard, of all the rotten luck.
Although I cursed out long and hard, decided what the heck
The tailing pen was full of lambs, so proceeded to the vet.

Some time after tailing and treating all the lambs
I noticed a small problem, things hadn’t gone to plan.
The vaccine that we used that year didn’t have a take
So I contacted your company to put right their mistake.

You said that you’d consider it, after talking with the vets
And to determine what the problem was, have to do some tests.
Then after lengthy consultations came up with a plot
There was no other option but to re-treat the bloody lot.

To complete this operation I had to rehire my casual man
By then some weeks had past and we had fifteen kilo lambs.
And kid up to my wife, our vaccine applicator
With promises of big holidays on which I’d take her later.

By the second day my back was crook from all that big lamb lifting
The applicator up and left… got sick of all my bitching.
So now we’re one man down, or in this case it was wife
Who told me she was leaving for a better way of life.

Then told me some days later she now wants half the farm
And half the treated lambs as well for all the emotional harm.
So we battled on without her, my hired hand and me
But the job took an extra day, four instead of three.

By now the job’s a struggle; my back was so darn crook
I had to see the doctor, and let him have a look.
He recommended treatment, chiropractic manipulation
At one hundred bucks a visit, to try and ease the situation.
I’d have to travel up to town, one hundred k’s away
And no work for you he told me, you need to rest it several days.
So I had to keep my casual man, to help me with my work
Told me he’s struggling too, his back as well now hurt.

My banks put me in overdraft, by a very large amount
That’s why I’m writing you this letter, and enclosing an account.
I sit here all alone, my wife lives somewhere else
My back is still not right, you’ve buggered up my health.

I’m still taking medication, my life is now a wreck
All because your vaccine wasn’t up to spec.
So I’ve billed you for the total of all the money that I spent.
It comes to one million, five hundred and ninety one thousand,

Three hundred and sixty three dollars… and ninety seven cents.

References


COOPER BS et al. An outbreak of contagious pustular dermatitis associated with Dermatophilus congolensis infection. New Zealand Veterinary Journal 18, 199–201, 1970

LEWIS CJ. Update on Orf. In Practice, pp376–381, 1996


Pissed orf – more scabby mouth issues!