

Turning the worm

Number 29, November 2011



The main purpose of this informal newsletter is to share information with those interested in the management of endoparasites of farmed animals, including sheep, goats and cattle.

Unsigned articles are by the editor.

The aim was to have an issue of TTW published each quarter, with the time between being filled by the ad hoc, more or less weekly e-newsletter, WormMail. Alas, this is only the second issue of TTW this year (2011), and much of the content is pasted from previous WormMails, back issues of which can be found on-line at

<http://wormmailinthecloud.wordpress.com/> or <http://wormmailinthecloud.posterous.com/> .

Worms – what’s new?

See:

<http://wormmailinthecloud.wordpress.com/2011/11/03/worms-whats-new-conferencejournal-paper-dec-2010-s-love/>

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From the editor

Welcome to this issue of TTW.

Resistance to cattle drenches- Australia

This is being discussed more of late. Rendell (Aust Vet J) and Lyndal-Murphy (Vet Para) for example have reported cases of resistance to macrocyclic lactones and other drenches. Also, a survey has been done in Western Australia (results yet to be published).

Meanwhile, following New Zealand’s lead, we are starting to see work on and /or registrations of combination cattle drenches by drench companies in Australia.

If we can learn anything from the experience of drench resistance in sheep worms, the earlier cattle producers start using combination drenches (as they do in NZ), the better.

Meanwhile cattle producers should start thinking about regular DrenchChecks: a worm egg count 14 days after drenching (preferably with a WEC just before drenching as well) to monitor drench efficacy.

See this link (page ix ff of paper) for some discussion on cattle drench resistance:

<http://wormmailinthecloud.wordpress.com/2011/11/03/worms-whats-new-conferencejournal-paper-dec-2010-s-love/>

Macrocyclic lactone (ML) resistant ovine isolate of *Trichostrongylus colubriformis* (black scour worm) from Mackay area, Queensland

In August this year (2011), the 23rd International Conference of the World Association for the Advancement of Veterinary Parasitology (WAAVP) was held in Buenos Aires.

At this conference, Malcolm Knox (CSIRO, Armidale, NSW) and others presented a paper on macrocyclic lactone (ML) resistance in an isolate of ovine *Trichostrongylus colubriformis* (black scour worm) from the Mackay area, North Queensland.

Resistance of *T colubriformis* in sheep to MLs has been considered rare in Australia, although there are field reports (based on worm egg count reduction tests (WECRTs)) from around Australia, especially in uniform and winter rainfall areas, suggesting that ML-resistance in *Trichostrongylus* sp is be emerging (Love S, 2011).

ML resistance is now common in *Haemonchus* (barber's pole worm) and *Teladorsagia* (small brown stomach worm) spp. Confirmed ML resistant *T. colubriformis* has previously been reported in Australia, in an isolate from goats on the Gold Coast of Qld. (Le Jambre and others, 2005). Incidentally, **resistance of this isolate to naphthalophos (NAP)** was also inferred (low efficacy of NAP+BZ)).

Knox and co-workers performed a WECRT, using worm free sheep artificially infected with the Mackay isolate, with WECs performed at 42, 44 and 50 days after treatment with moxidectin at the standard dose rate (200ug/kg).

They also tested the Mackay isolate (MKY) in larval development assays (remember the old DrenchRite(R) assay?), alongside a susceptible isolate of *T.colubriformis* (McMaster (McM)) and a resistant isolate of *T.c* of goat origin (LeJambre and others, 2005.(Mox-R)). Drugs tested in the assay: thiabendazole (TBZ), levamisole (LEV), and ivermectin (IVM).

There was no significant reduction in WEC after treatment with moxidectin.

Using McM as the benchmark in the larval development assays, MKY appeared to be more resistant to LEV and TBZ than Mox-R (Gold Coast isolate). For IVM, MKY and Mox-R appeared similarly resistant.

In short, these tests indicated this Mackay isolate is highly resistant to (all) MLs, BZs and LEV.

The authors conclude that this is the first confirmed case of this level of resistance in *T colubriformis* in sheep from Australia, which sounds a warning for other areas where *T. colubriformis* is a major pathogen and current control is reliant on MLs.

References

Knox M, Lyndal-Murphy M, Kotze A and Le Jambre L (2011). Macrocyclic lactone resistance in an isolate of ovine *Trichostrongylus colubriformis* from North Queensland. Proc 23rd Int ernat. Conference, WAAVP, Buenos Aires, Argentina.

Le Jambre LF, Geoghegan J and Lyndal-Murphy M (2005). Characterization of moxidectin resistant *Trichostrongylus colubriformis* and *Haemonchus contortus*. *Veterinary Parasitology* 128: 83–90.

Love S (2011). Prevalence of Anthelmintic Resistance in Sheep Worms in Australia – a Thumbnail Sketch. Proc. Conference, Australian Sheep Veterinarians, South Australia, 16-18 Sept. 2011.

Originally published in WormMail: "WRML.201109: Multi-drug (BZ, LEV and ML (incl MOX)) resistant *Trichostrongylus colubriformis* from sheep in north Queensland, Australia"

Mehlisia - REDUX

'Remember the fluke/trematode found in the quoll?'

See WormMail.201103251500 - Tapes and Trematodes

<http://wormmailinthecloud.posterous.com/wormmail-tapes-and-trematodes>

Fluke guru Dr Joe Boray comments:

Dear Steve,

Yes, I was delighted to see the lovely *Mehlisia*. Obviously the researchers found it either in the duodenum or in the small intestine, (not mentioned). They probably were looking for adult hydatid worms. In the Armidale area there are plenty of *Lymnaea tomentosa* and some bulinid snails possibly serving as intermediate hosts. I found several species of Echinostomes in those snails, which are trematodes of the duodenum of ducks. With patience and time,

somebody could find the intermediate host of Mehlisia. I don't believe that anybody would provide a grant, but it would be a delightful hobby. A fenced in area for a few Quolls will be necessary. I would be happy to help in the protocols of the work.

Hoping to find a few applicants,

With kindest regards,

Joe"

Tapeworm in lambs - REDUX

There was quite a bit of comment on the WormMail featuring Bruce Watt's newspaper article on intestinal tapeworm (*Moniezia* sp) of sheep.

'Ironic that we talk so much about a parasite we regard as being inconsequential, or nearly so. :-)

You can see the WormMail at <http://wormmailinthecloud.posterous.com/wormmail-tapes-and-trematodes> but I will reproduce it here, and append the various comment that followed.

Bruce Watt's article

Dr Bruce Watt has just written a very nice article on this subject for his local (Bathurst) rag. This was discussed in a recent WormMail.

Here is Bruce's article (reproduced with permission):

"SHOULD YOU DRENCH LAMBS FOR TAPEWORMS

Sheep producers are divided into two camps on the great debate on whether to drench lambs for tapeworms or not.

Those in favour, argue that tapeworms must be doing something. After all, the segments are obvious in the manure of lambs. If you follow up with a post mortem, you sometimes find that their intestines seem almost choked by long white tapeworms.

As an aside, you will no doubt be fascinated to learn that a New Zealand lamb holds the record with 41 tapes. Apparently, students of sheep parasites refer to the volume of tapes that a lamb might carry. This rarely exceeds 200 ml but can be as large as 280 ml, which is a middy. Imagining that may help if you need to reduce your alcohol consumption.

Those who don't drench lambs for tapeworms however argue that research has shown that tapeworms don't cause any harm and are not worth treating.

Having done some homework on this subject and communicating with colleagues, Drs Brown Besier and Stephen Love, both eminent parasitologists, I can now give you an opinion.

The first study I found on this subject was conducted on prime lambs in the Armidale district in the early 1970s. The veterinarians who ran the trial took 100 spring and later 100 autumn drop lambs and drenched half with 'Mansonil,' a product that kills tapeworms. They repeated this treatment every three weeks. They also drenched both groups regularly with levamisole to take care of the other worms.

At the end of the trial they found that the spring lambs treated for tapeworms gained 33.0 lbs (back in the pre-metric days) while the untreated lambs gained 31.9 lbs. The autumn lambs treated for tapes gained 39.75 lbs while the untreated lambs gained 40.0 lbs. The veterinarians concluded that this difference was not significant.

In New Zealand, numerous studies have looked at possible benefits to treating lambs for tapeworms. None showed any advantage. This led DC Elliot from the Wallaceville Animal Research Centre to conclude that there was 'no justification for treating sheep for *Moniezia expansa* (the scientific name for these tapeworms) on the basis of any likely benefit to the health or production of the animal.'

So the case seemed settled. However, a Kiwi team led by J Southworth decided to take another look at this issue. In October 1993, they divided 300 Romney lambs into three groups. Group one received no worm treatments of any kind. Group 2 were drenched with levamisole to take care of round worms but not tapes. Group 3 were treated with both levamisole and praziquantel, taking care of both round worms and tapeworms. Praziquantel is a highly effective, relatively new treatment for tapeworms including hydatids in dogs.

Southworth and team found that the untreated lambs gained 7.56 kg from October to December, while the lambs treated with levamisole for roundworms only, gained 8.53 kg. However, the lambs treated with both levamisole and praziquantel gained even more. They gained 10.53 kg over the duration of the trial. These differences were all statistically different.

With only one New Zealand trial showing a benefit and many showing no benefit, it seems unlikely that treating lambs for tapeworms is worthwhile. However, that may not be correct under all circumstances. If sheep producers on the tablelands would like us to study this in our area please let me know.

In the meantime, we can be sure that the other worms, including barber's pole worms, which are rife now, must be controlled. If farmers concerned

about tapeworms use products that are less effective or inappropriately timed for the control of the other worms, then tapeworms really can cost money."

Some notes (SL):

'Mansonil' (Bayer; active = niclosamide) was a common tapewormer for sheep but was supplanted by praziquantel (the active ingredient in 'Droncit' (and similar) for dogs).

There are a number of 'wormers' on the market now for sheep that combine a broad-spectrum with praziquantel. In deciding which product to use by far the most important consideration is whether the broad-spectrum works on your property...(against the really important worms, ie the not-so-easy to see nematodes, like barber's pole worm (*Haemonchus*), black scour worm (*Trichostrongylus* spp) and small brown stomach worm (*Teladorsagia/Ostertagia circumcincta*).

And, as always, its important to read the label. Did you know for example that 'Cydectin+Tape' (moxidectin+praziquantel) has no claim for persistent activity against barber's pole worm, unlike its sibling, 'Cydectin Oral' (which is sans praziquantel)??

One of the first combination broad-spectrum + tapewormer products on the market for sheep in Australia (in the last 15 years at least) was 'FirstDrench', which contained levamisole + praziquantel. As implied, this was targeted as the first drench for lambs. The praziquantel doubtless worked fine on tapeworms, but on most properties would have been less than highly effective against the scour worms (*Trichostrongylus* and *Teladorsagia*) as resistance of these genera to levamisole was already widespread. Thankfully FirstDrench was soon followed by 'FirstMectinDrench'. The broad-spectrum in this is abamectin, which is somewhat more likely to be effective against the scour worms than levamisole.

In short, concentrate most on what is most important. (There is probably a time-management principle in this as well).

Why did Southworth et al find a significant response to treatment for *Moniezia*, when virtually all other trials have found no significant/detectable benefit in treating for tapeworms? Who knows? Perhaps tapeworms generally produce little in the way of negative effects on lambs because they are so well adapted to the host??? and/or they have an immuno-modulatory effect (like *Trichuris*/whipworm infection in humans with ulcerative colitis).

Much of the negative effect of worms on their host can be due to the host response, as well as direct

effects from the worms themselves. Perhaps in the Southworth trial the hosts -for some reason - were not in a state of relative 'immuno-tolerance'? I really don't know.

Another of life's mysteries.

Tapeworm - comments:

Prof Bill Pomroy, NZ

"Hi Steve, I am not sure what is happening in Australia but there is evidence of BZ resistance in *Moniezia* in NZ although this has never been formally surveyed.

Interestingly, no-one thinks of BZs when considering treating for *Moniezia* anymore.

Bill Pomroy' 25 March 2011."

(Comment: Dr Paul Mason, NZ also has made mention of drug resistance in Moniezia, but with respect to praziquantel. See earlier issues of Turning the Worm. - SL).

Dr Johann Schröder, MLA

www.mla.com.au

"Nice article, Bruce, and interesting comments, Steve.

Some more musings:

In South Africa, sheep can be infested by a variety of tapeworm spp of which the most important 4 are:

- *Moniezia expansa* (which they call "milk tapeworm")
- *Thysaniezia giardi* ("serrated tapeworm")
- *Avitellina centripunctata* ("narrow tapeworm")
- *Stilesia hepatica* ("liver tapeworm")

Moniezia mainly occurs in suckling lambs (infestations are usually shed spontaneously at weaning – very frustrating if you buy infested lambs for an efficacy trial and transport them to the lab for treatment, slaughter and worm recovery!!)

Thysaniezia ("serrated" because the genital opening occurs only on one side of each proglottid/segment and this alternates) was "discovered" by Flip van Schalkwyk while working for SmithKline-Beecham and investigating a Valbazen "*Moniezia*" efficacy complaint; mostly occurs post-weaning.

Stilesia can cause liver condemnations (parenchymal damage during the migratory phase

and fibrosis once the adults take up residence in the bile ducts) in up to 90% of sheep in some parts of the country and this was accepted as inevitable until praziquantel was registered against it (Cestocur®) by yours truly.

Before cambendazole ("Bonlam" in South Africa – I think there was a Camben Paste on the market in NZ for a while) came along as the first BZ with a tapeworm claim, farmers were dependent on niclosamide (Mansonil elsewhere, but "Lintex" in South Africa – tapeworms = lintwurms in Afrikaans) or resorantel (Terenol®, Hoechst; very valuable, because it was also effective against *Paramphistomum microbothrium*, or "conical fluke") for tapeworm control.

Sheep tapeworms are considered serious enough that drug companies will do their darndest to get at least one tapeworm claim on the label of a new drench, so as not to be shown up by the opposition; there were many anecdotal reports of a "bloom" on the lambs after a successful tapeworm drench, but until Southworth's paper, never any scientific support for this view.

OK, I'll retire to my rocking chair in the sunny spot on the verandah now and enjoy a cup of coffee."

J S 25 March 2011.

Mary Pratt, eastern NY, USA

"Thanks for sending info about studies on tapeworms. Info below about a study in Germany.

On our farm we stopped de-worming for tapeworms many years ago, probably 15 years ago.

I used to see tapeworm segments in lamb manure into our autumn, as late as November. So we stopped de-worming. Occasionally I might see a lamb which acted as though it had some sort of gut distress, and would give it mineral oil.

As the years went on, the lambs seemed to become immune to the tapes earlier and earlier in their lives. Today I rarely see tapeworm segments in manure, ever.

I don't know why they've disappeared, but they seem to have.

Mary in eastern NY - US.

<http://www.sheepandgoat.com/articles/tapeworms.html>

TAPEWORMS - A GERMAN STUDY

In a recent study reported in the Wool & Wattles newsletter of the American Association of Small Ruminant Practitioners, German researchers used two flocks of sheep and several breeds of sheep to determine the effect of treatment (with praziquantel) on tapeworms. The results showed no evidence of the pathogenicity of tapeworms in lambs. Nor did they demonstrate a beneficial effect of treatment.

Lambs were randomly assigned to a treatment (n=117) or control (n=117) group. Individual fecal flotations were performed (with zinc chloride and sodium chloride). The treated animals received a commercial 2.5% solution of praziquantel (at 3.75 mg/kg) orally, repeated every six weeks for up to four treatments. All lambs received moxidectin on the same schedule (at the labeled dosage) to remove the possible effects of nematodes on lamb health.

At the beginning of the trial in June-July, 28 to 45 percent of the lambs tested positive for tapeworms eggs. The percentage dropped off markedly in both the treated and untreated (control) lambs, such that only 0 to 7% of treated animals and 0 to 9% of untreated animals had detectable eggs at the last sampling before slaughter (up to 140 days after the beginning of the trial).

There were no significant differences in body weight between the two groups. In fact, the animals that remained infected with tapeworms were often heavier than the average of the uninfected lambs. Five of 45 of the treated lambs that were necropsied (up to 29 days after the final treatment) had juvenile tapeworms in their intestines, while 29 of the 67 control lambs contained juvenile tapeworms."

Dr Graham Lean, Victoria

"Hi Steve,

Thanks for your WormMail. I've got a comment to make on the Southworth's paper, about which you speculate in your comments.

.... I attended an Australian Sheep Vets Association conference in Melbourne in 2001, and David Rendell presented the findings of a small trial he had undertaken on a large grazing property near Hamilton to see if there was a response from tapeworm treatment in prime lambs. He found none, which is consistent with nearly all other trials published.

However, in the audience, low and behold, was Southworth. He commented that he didn't think there would be many responses from tapeworm treatment, as the trial he ran in NZ was characterised by huge tapeworm burdens, which he indicated would be rare. He ascribed the

treatment response he recorded in his trial to this extremely high burden.

Regards,

Graham R. Lean

Graham Lean and Associates, Farm Business Advisers, Hamilton VIC 3300, Australia"

WormBoss

WormBoss is a national repository of information and guidance on sheep worm management.

A while ago it moved from www.wormboss.com.au to the Australian Wool Innovation (AWI) site, www.wool.com/wormboss.

There have been some issues since the move, but please be patient: with the assistance of AWI information technology staff, we are working on ironing them out.

In the meantime, a lot of behind the scenes work is happening on redeveloping the WormBoss website content and appearance, as well as developing WormBoss regional worm control programs for all of Australia. We'll keep you informed.

Have you subscribed to the monthly WormBoss News/Outlooks? If not, subscribe at the website.

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Turning the worm is a newsletter for those interested in the management of endoparasites of farmed animals.

Editor: Stephen Love
Veterinarian/State Worm Coordinator
Building C2, Ring Rd North
University of New England
Armidale NSW 2351

Phone 02 6738 8519
Fax 02 6772 8664
stephen.love@industry.nsw.gov.au
<http://www.dpi.nsw.gov.au/newsletters/ttw>

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