

Turning the worm

Number 28, January 2011



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From the editor

Welcome to this issue of TTW.

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.

New kids on the block – where do new drenches fit?

Stephen Love

The first of September 2010 marked the arrival of spring as well as Australia's first new drench in 22 years. Ivermectin, the first of the macrocyclic lactone (ML) drenches, was released as a sheep drench in 1988; now we have monepantel ('Zolvix', Novartis), representing the new drench group known as the AADs (amino-acetonitrile derivatives).

Pfizer has a new drench in the pipeline too. This one, called 'Startect', was released in July in New Zealand, which means we might see it in Australia in 12-18 months. Startect is a combination of new and old. The new part is derquantel, representing the new action group, the spiroindoles. Derquantel is combined with the ML, abamectin.

So, where does a new drench fit? Do we use it or keep it on the shelf? And if we do use it, bearing in mind that we tend to break (drench resistance) new drenches after about five years, *how* do we use it?

We should use not shelve Zolvix, but use it well. Being new and highly effective, Zolvix will do a good job on worms in its own right, but it can also keep the older drench actives alive for longer.

Zolvix should be used in rotation with older actives, and the evidence suggests rotation within a season has the edge on annual or longer rotations.

But this is where many producers will come unstuck. You cannot have a sensible system of drench rotations if you do not know precisely what drenches or drench combinations work on your property. Test the efficacy of drenches on your farm; otherwise you are flying in the dark.

Also consider combinations. The consensus is that using a combination of unrelated broad-spectrum actives will raise efficacy and delay resistance a whole lot better than using drench actives one at a time, unless of course severe resistance affects all the actives.

Here is an example of how you can use combinations but also practice drench rotation. On your farm you might find that an ML-based triple combination and an organophosphate (OP)-based combination are options that still work well. In this case you could use the ML-based combination, followed by the OP-based combination at the next drench, with Zolvix being the next drench in line.

Of course, you may not wish to use combinations; that is your choice. At least consider Zolvix as part of a rotation of drenches known to be effective.

Below are some ways to keep drenches, young or old, alive for longer:

Managing resistance

Use effective drenches. Consider using combinations of unrelated drenches.

Use the correct dose using equipment known to be accurate. Calculate dose based on the heaviest animals in the mob.

Follow the label.

Avoid unnecessary drenching,

- especially of adults,
- during droughts or prolonged dry spells, and
- when grazing or about to graze very clean paddocks, for example cereal stubbles.

WormTest before drenching.

Rotate between effective drenches or drench combinations from different drench families.

If you drench ewes pre-lambing, especially if a long-acting product is used, have a management plan to deal with resistant worms that accumulate on the lambing paddock.

Don't import resistance. Treat newly arrived sheep with four different actives (concurrently or in combination), and hold sheep for at least 4 days

on a quarantine area before releasing onto the property.

It's great to finally have new drenches: let's use them well.

Retrieved September 2010 from 'WormBoss': http://images.wool.com/pub/Wormboss_StephenLove_DrenchUpdate_Sept2010.pdf

How will we use our first new sheep drench in 20 years

Bruce Watt, Senior District Veterinarian, Tablelands LHPA NSW

The long awaited launch of our first new class of drench in over twenty years took place in Sydney last week. The new chemical, monepantel (brand name ZOLVIX) is currently (Spring 2010) being promoted at a series of meetings across the sheep producing areas of Australia.

An advantage of monepantel is that it is both highly effective and highly selective. Across a range of trials, monepantel killed 99.9% of worms including our most dangerous types, such as black scour worm, small brown stomach worm and barbers pole worm. It only kills nematode parasites so is safe against all other organisms including aquatic animals, dung beetles and people.

At over \$1.00 per adult dose, sheep producers in the tablelands with several effective drench options may not rush ZOLVIX. While the withholding period is 14 days, the export slaughter interval is currently 115 days, which may limit its use. However, the new chemical will definitely have a place in our drenching programs.

Novartis, the company behind monepantel, employs or contracts some highly regarded veterinary parasitologists who have considered how we might use this new chemical.

One suggestion, applicable on the tablelands, will be to use monepantel for lambs at weaning. I think this will make sense for many sheep producers. We require a highly effective drench here because our young sheep have poor immunity to worms and cannot handle a setback.

In addition, if you have used moxidectin as a pre-lambing drench the worms surviving on the pastures as this drench reaches the end of its protective period may be those with some resistance.

Lambs at foot are therefore likely to pick up these resistant worms and help multiply them. A highly effective drench of a new class will kill off these emerging resistant worms, helping to prolong the lifespan of moxidectin and our other drenches.

The other reason that you might use ZOLVIX at weaning is because the smaller lamb dose will be more affordable.

Some producers will find ZOLVIX to be useful as the first summer drench. Those who aim to rotate away from the mectins at the first summer drench can choose either the three way combinations or the organo-phosphate combinations. Monepantel now gives farmers a third choice.

Finally, monepantel will be valuable as a quarantine drench when you bring new sheep onto your property. Remember that you can rapidly acquire drench resistance if you import it from elsewhere. Quarantine drenches aim to kill all the worms in purchased sheep. Previously our options have included three or four way combinations. Monepantel will be a convenient alternative.

If you purchase sheep we recommend that you hold them in the yards for 24 hours to enable them to pass the eggs of the introduced worms. Then run your new sheep in a paddock with a good selection of your own worms. If by chance any highly resistant worms survive, they will face plenty of competition from your own worms.

Finally, Novartis has taken a fresh look at how we drench sheep. The company has designed a completely new drench gun and a new backpack. Instead of struggling with an ill-fitting plastic container with thin black straps, you can try the new backpack designed to fit comfortably like a skier's daypack. I am not sure that you will ever enjoy drenching sheep but these innovations may make it more comfortable.

Resistance in liver fluke

See [Turning the Worm Issue 19 - December 2005](#) for a short discussion (and references) by Joe Boray on this subject.

Trichostrongylosis in humans - Australia

You might recall the WormMail several days ago about the people, one a woman from the UK, who got diarrhoea, abdominal pain and eosinophilia subsequent to a week's stay on a New Zealand sheep farm. (Wall and others, 2010). (Article reproduced at the bottom of this email; also in the new edition of *Turning the Worm* (#28, January 2011).

The long and short of that story was that the people picked up *Trichostrongylus* sp infective larvae from the salads they were eating. The salads were home-grown (and perhaps not

washed overly well?) in a garden that used fresh sheep manure.

The subjects were treated with albendazole and recovered. I commented/wondered at the time if the drug resistance status of the *Trichostrongylus* isolate was considered.

Following that article, Nick Sangster (CSU Wagga Wagga) drew my attention to an article, authored by him and others, that reported on similar cases in Australia. (Ralph and others, 2006).

These authors note that isolated cases of trichostrongylosis in humans have long been recognised in Australia. Sixty cases were reported from Queensland by the Hookworm Campaign between 1923 and 1928, and five cases were detected out of 46 000 stool examinations at a Queensland laboratory between 1992 and 1995.

However, *Trichostrongylus* eggs are commonly mistaken for hookworm eggs, the adult worms may also be misclassified (as *Enterobius*, for example), symptoms may be mild or absent, and the pre-patent period may be long, with reported delays of 4 months to 2 years between onset of symptoms and detection of eggs in faeces. (Still quaintly referred to as 'stools' in human medical literature).

The two cases described by Ralph and others (2006) were suburban goat keepers, who had eaten vegetables from gardens fertilised with goat faeces. Both had abdominal pain, diarrhoea and eosinophilia. It took a little while for the correct diagnosis of trichostrongylosis to be made, not helped by the fact that no eggs were seen in patient 2's faeces, presumably due to a long pre-patent period (c.f. the PPP of around 3 weeks in small ruminants such as goats and sheep).

The authors note that the tendency to use stool immunoassays for *Giardia* and *Cryptosporidium* in many cases in medical labs rather than the more laborious traditional microscopic examinations for parasites, may miss a number of locally acquired parasite infections such as hookworm, *Trichuris trichiura*, *Strongyloides stercoralis*, *Isospora belli*, *Fasciola hepatica* and *Brachylaima cribbi* as well as *Trichostrongylus* sp.

Once a diagnosis of trichostrongylosis was made, these two patients were treated with benzimidazoles (BZs), mebendazole in one case and albendazole in the other, with zero or partial effect. As there was collaboration between medical and veterinary parasitologists in this case, it was understood that the parasites were very likely BZ-resistant, and treatment with the macrocyclic lactone (ML), ivermectin (200 ug/kg), was undertaken with good results, although, as the authors note, ML-resistant *T. colubriformis* isolates in Australia have been reported (Le Jambre and

others, 2005). (I think I might be asking for treatment with the novel anthelmintic, monepantel).

Ralph and others (2006) suggest the following lessons can be learnt from these two cases:

- Trichostrongylosis may be an under-recognised cause of eosinophilia and/or gastrointestinal symptoms in Australia.
- Stool microscopy for parasite eggs is the only means of diagnosing trichostrongylosis, but is no longer routinely performed by many laboratories.
- The eggs of *Trichostrongylus* sp. and hookworm are very similar and can easily be confused, even by experienced laboratory staff.
- People fertilising their vegetable gardens with manure from herbivores, especially goats, should be advised to thoroughly wash or cook their garden produce before consumption; efficient composting is also effective in killing larvae.
- The drug of choice is ivermectin, because of high rates of resistance to benzimidazoles.

Personally, I think this last point regarding the drug of choice now needs re-visiting.

Additionally I suggest that the risk of using fresh sheep manure could be just as high as for goat manure (and perhaps alpaca manure as well, given that alpaca can carry sheep and cattle worms).

Sangster also notes that laboratory-acquired infections are possible through mouth-pipetting techniques. (One or two readers of WormMail may be acquainted with some cases).

I would re-iterate that good hygiene and food safety can markedly reduce the risk of many if not most zoonoses. [See Primefact 814](#). (The revised edition will have *Trichostrongylus* reinserted).

SL

References

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

Ralph, A, O'Sullivan, MVN, Sangster, NC, Walker JC (2006) Abdominal pain and eosinophilia in suburban goat keepers. *Medical Journal of Australia* 184, 467-469

Wall CW and others (2010). An unusual case of hypereosinophilia and abdominal pain: an outbreak

of *Trichostrongylus* imported from New Zealand. *J Travel Med* 2011; 18: 59-60.

Footnotes

'Eosinophilia' means that there are more eosinophils than normal (usually referring to a blood smear/blood count). Eosinophils are a type of white blood cell that may be elevated in parasitic infections. They are called eosinophils ('lovers of eosin') because they contain granules that stain red (from eosin) in H&E (haematoxylin and eosin) stained histology sections. (They look very pretty)

Trichuris sp - 'whipworms'; *Trichostrongylus* sp (intestinal species (e.g. *T. colubriformis*, *T. vitrinus*): 'black scour worm'; abomasal: 'stomach hair worm' (*T. axei*); *Strongyloide* - 'threadworm'; *Isospora* sp - coccidia, less common than *Toxoplasma* or *Cryptosporidium*; *Fasciola hepatica* - liver fluke; *Brachylaima* - a recently discovered trematode ('fluke'); human cases from South Australia (via ingestion of white-shelled snails); first documented case in 1996.

(From WormMail.20110201)

Trichostrongylus infection in travellers visiting a New Zealand sheep farm

Reference: Wall CW and others (2010). An unusual case of hypereosinophilia and abdominal pain: an outbreak of *Trichostrongylus* imported from New Zealand. *J Travel Med* 2011; 18: 59-60.

A 62 year old British woman spent a week on a sheep farm in NZ. Shortly afterwards she felt dizzy and nauseated, followed by abdominal pain, bloating, diarrhoea and weight loss.

Haematology ordered by her GP (Cornwall, UK) showed eosinophilia. Clinical and other investigations (at Royal Cornwall Hospital) revealed nothing of note, apart from increasing eosinophilia.

Later the woman got an email from two friends who had been on the same trip, developed similar symptoms, and had them investigated (in New Zealand).

They were found to have eosinophilia, and *Trichostrongylus* sp eggs in faecal samples.

The email exchange resulted in further investigations, at the Hospital for Tropical Diseases, on the woman back in the UK. *Trichostrongylus* sp eggs were found in her faeces also. Albendazole 400 mg twice daily for 3 days led to full recovery in 6 weeks and almost complete resolution of her peripheral eosinophilia.

(I wonder if our medical colleagues considered the resistance status of the isolate. But, I guess this sort of treatment regimen with albendazole could be efficacious even against benzimidazole-resistant *Trichostrongylus*).

The source of the infection was traced by veterinarian Dr Chris Morley (Ministry of Agriculture, NZ) to the use of sheep manure as an organic fertiliser on a salad garden.

[Sidenote – fasciolosis in humans

Which prompts a side note: there have been humans cases in Australia of fasciolosis - e.g. one case I know of just east of Walcha, in NSW, associated with eating water cress (in salad presumably), the source presumed to be wild water cress growing alongside a waterway on a liver fluke-infected property. It pays to be circumspect in such cases, unless you habitually use salad dressing based on triclabendazole. My recollection is that Dr Joe Boray was involved in this and/or similar (human) cases and prevailed upon the health authorities to treat the patients with triclabendazole, instead of a somewhat less suitable anthelmintic. It helps that Joe was involved in the development of this drug in his Ciba-Geigy days).]

Trichostrongylus spp of course are common in herbivores including sheep in Australia, New Zealand and elsewhere. Humans usually are infected through exposure to animal faeces, via contaminated food or water, and most commonly in Asia and the Middle East. As well as this NZ case, several cases of human infection have been reported in Australia. One report from Sydney involved manure from a pet goat being used to fertilise an organic garden. Wall and colleagues also state that five human cases have been reported from rural Australia with a similar transmission method proposed.

(This article was first published in the Wormmail e-newsletter. WormMail.20110121).

Abamectin toxicity in lambs - South Australia

Another colleague (GD Gray) drew my attention to this. (It's nice to have such helpful colleagues). See Animal Health Surveillance Vol 15: 3 p12.

On a property in the mid north of South Australia, 19 out of 32 marked lambs were found dead. Necropsies were unremarkable. The report implies the lambs were less than 6 weeks old and had been drenched with a combination drench containing abamectin.

Clinical signs in a live affected lamb were considered to be consistent with abamectin toxicity. The drench gun had been set to a dose for 40 kg animals.

(WormMail.20110121).

How long do liver fluke remain after effective treatment?

The following is from a recent (20100812) note from Dr JC Boray:

Treatment with triclabendazole (TCBZ) causes irreversible, drastic changes in the integument of TCBZ-susceptible *Fasciola hepatica*. The flukes are paralysed but it takes more than 2 weeks for them to be eliminated from the bile ducts (Fairweather and Boray, 1999; Walker, S.M. and others (2004).

Flukes killed by closantel will be eliminated within 2 weeks.

References:

Fairweather and Boray (1999). Fasciolicides: Efficacy, Actions, Resistance and its Management, *The Veterinary Journal*, 158:81-112.

Walker, S.M., McKinstry, B., Boray, J.C., Brennan, G.P., Trudgett, A., Hoey, E.M., Fletcher, H. and Fairweather, I. (2004). Response of two isolates of *Fasciola hepatica* to treatment with triclabendazole in vivo and in vitro, *Parasitology Research*, 94: 427-438.

(WormMail.20110121)

Alpaca worm or what??

The following is just for interest.

I & I NSW District Agronomist Tac Campbell (Grafton NSW) sent me this image (pasted/attached) from an alpaca producer.

The owner wanted to know what was "the worm-type thing I found swimming in my alpaca-manure-tea bucket".



(Photo by Penny Mahoney)

What is this thing?

Here are two expert answers, which both agree:

" Looks like a rat-tail maggot to me

http://en.wikipedia.org/wiki/Rat-tailed_maggot "

Jill Lyon

Senior Laboratory Officer, Parasitology, Animal Health Laboratories, Dept Agriculture and Food, Albany. WA 6330

"The photo is of a so-called rat tailed maggot. They are the larval stage of a nectar eating hover fly. The larvae live in rotting material (commonly found around the yards at meat works). The "tail" is a breathing tube that allows the larva to drawn in air while buried in the anoxic gunge below. The larvae are not parasitic; they are one of the good guys in the break down of waste material.

When I worked in the veterinary diagnostic lab we often got enquiries about these beasts. Apparently mummified versions of these larvae were regarded as a food delicacy by Maori in NZ."

Cheers

Paul Mason

Consultant Parasitologist, Christchurch, New Zealand.

WormMail vs Turning the Worm

Turning the Worm is a newsletter for sharing worm management related information, especially information that otherwise would have a limited circulation or not otherwise be readily accessible. It is published on the Industry and Investment-NSW (Primary Industries) website and, is a registered serial (ISSN 1442-8466). See <http://www.nla.gov.au/services/issn.html> and <http://trove.nla.gov.au/>.

Normally we aim to publish TTW 3-4 times a year, but for various reasons this is the only issue for 2009.

WormMail is the name of a mailing list, and serves as a conduit:

- WormFax, which is mailed (through the WormMail list) as well as posted on our website
- Issues of Turning the Worm

- Occasional, usually weekly, updates, which are referred to as 'WormMails', and of late have also been posted to <http://wormmailau.wordpress.com/> .

Much of the content that normally would have been published in TTW has this year been published in WormMails. This issue of TTW contains some information already sent out as WormMails.

To subscribe to WormMail, go to: <http://www.dpi.nsw.gov.au/agriculture/livestock/sheep/health/internal/worm-mail>

WormBoss

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

In recent times its home has 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.

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.

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