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Director
Chemical Review
Australian Pesticides and Veterinary Medicines Authority
PO Box 6182
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(email: chemicalreview@apvma.gov.au)

Dear Sir/Madam

Livestock SA was formed in 2013 to represent South Australian sheep, beef cattle and goat producers.

Recently we circulated members about both Diazinon and Levamisole.

I am forwarding a copy of the responses received.

Yours faithfully

Geoff Power
President Livestock SA

Diazinon

- “Diazinon is still the key. At 5c a dose to kill lice versus the next chemicals from 60-120c it is still the clear winner.”
- “I would like to see Diazinon reconsidered with restrictions as it is a cheap effective chemical for lice control. Eureka Gold still has a portion of Diazinon but it is” watered down” somewhat to what it used to be and there is the opportunity for contract cage dippers to use the product under license. However, even with a ChemCert certificate it is unavailable for sheep producers.”

Levamisole

In relation to Levamisole, there was a much stronger response –

- “We still use it. It is one we come back to every few years, as it is cost effective, and is a "break" from other drenches. It is a useful addition to the many others, but, as usual, is often over-used, giving rise to resistance issues.”
- “I would be absolutely filthy if they cut lev. It is the main drench we use to control nematodirus in merino weaners that are trail fed with grain. Nem’s are shed live from the butt and are beginning to cause major problems in our herd and others I have spoken to. Vets and animal health consultants in the past have brushed nems off as more of a secondary worm but young susceptible stock get absolutely smashed in my experience with worm burdens as little as 30 eggs per gram. When I have zero trich’s/ostertagia I always use levamisole as it costs me 3 cents a dose as opposed to 33+ for a abamectin/bz/lev mix combo (mix it myself as it saves additional 20-50c a dose). Levamisole is the only drench that is 100% effective with no known resistance to nematodirus worms that I’m aware of. LEV is used in combination with many drenches and as it is cheap it provides farmers with effective but still cheap alternatives before being forced to adopt the expensive new age drenches which cost 100c+ a dose. “
- “Levamisole is one of the key drenches I use on our farm and a major reason when used in combination with rametin that we sit in the top 1% in high rainfall zones for least chemical intervention and 5% for parasite resistance. Given that 10 years ago our farm was a major offender for chemical resistance (a direct result from previous expert advice) this is a very strong reason to maintain lev on the APVMA register.”
- “We should not forget that Levamisole is now a key product being used in cattle drenches (Elclipse) to help prolong macro lactic (ML) based drenches.”
- “I believe that Levamisole as a single active component is still very useful for the control of the Nematodirus species of worms, as well as being a useful component in combination drenches. I would like to make the following observations.
 1. Levamisole is a very effective anthelmintic against Nematodirus species worms.
 2. It is a very cheap product compared to other available drenches.
 3. Nematodirus worms cause significant production loss in young animals, despite previous opinions that they were not a significant problem in Australian conditions. They have long been recognised as a problem in Europe.
 4. They may very well become a much more recognised problem in future if “confinement feeding” and “trail feeding” are more widely adopted in the sheep grazing industry, as many advisors are recommending.

5. They are often a problem in summer and autumn when the other species that are mostly a winter problem are not normally requiring treatment.
6. It is very well documented that exposing worms to un-necessary drenches is one of the main causes of emerging drench resistance.
7. Most worm control programs advocate regular monitoring of worm egg counts before drenching to see if the burden is high enough to indicate that a drench is necessary
8. Worm egg counts will identify which species are present, which can assist in the choice of a suitable treatment product.

Based on these points, and especially points 6 & 8 it makes no sense to use a class of drench that may lead to resistance and extra running costs in future at a time when a very cheap alternative will solve the problem.

I believe that for those producers who have a problem with Nematodirus worms, the loss of Levamisole as a drench would be contradictory to a lot of the advice that parasite advisors have been advocating as best practice worm control. Levamisole must be retained as a parasite control chemical.”

- “The most important reason for using Levamisole in our sheep farming system is that it enables us to effectively and cheaply control the Nematodirus species of internal parasites in our young sheep (weaners) during summer without building up resistance to the broad-spectrum drenches which are crucial for the management of other production-limiting worms which challenge all classes of sheep during the ‘green feed’ period of the year, especially black scour worm (*Trichostrongylus* spp.).

In our relatively high rainfall/long growing season environment, we normally drench all sheep two or three times per year with abamectin mixed with ‘combi’ (a combination of white drench (Bendimazole family) with Levamisole) to combat the ‘normal’ class of internal parasites which are ingested as larvae on the green pasture feed being consumed. The final drench is in early summer (commonly referred to as a ‘Summer drench’) to clean out most (or all) of these worms in the sheep before the dry summer period during which there is minimal further pick up of larvae. The worm egg population in faecal pellets on the ground is greatly reduced during the hot summer, with minimal shedding of new eggs from grazing sheep.

Nematodirus is a completely different challenge, as re-infection of sheep occurs readily during the hot summer period by ingestion of worm eggs contained in faeces and hatching of these eggs in the stomach of the sheep. Nematodirus eggs also have a thick shell which resists desiccation by the sun and reducing the effectiveness of the traditional ‘summer drench’. Weaners pick up pellets of faecal material as they eat trail-fed grain and are quickly re-infected after drenching.

With an increased uptake of ‘confinement’ feeding in the sheep industry the Nematodirus species may well be an emerging parasite of considerable significance.

Fortunately, Nematodirus does not appear to significantly affect the health of grown sheep which have developed an immune system resistance to internal parasites. If not treated, Nematodirus-infected weaners soon begin scouring, cease weight gain and many will lose weight and die if the treatment is not carried out in a timely manner. My understanding is that there are no recorded cases of Nematodirus species showing resistance to Levamisole.

Our highly effective Nematodirus control strategy is to drench grain fed weaners with Levamisole every four to six weeks through the summer period (on worm-egg count, or immediately following onset of scouring), following the December broad-spectrum drench.

The total cost-saving of say four summer drenches with Levamisole at 4.4 cents per head per drench (8.5 mls each time at \$5.20 per litre) by comparison with 3.5 mls of Low Volume Abamax (\$19.50 per litre) and 3.5 mls of Low Volume Combi (\$23.50 per litre) amounts to 15 cents per head per drench, or around \$1290 over four drenches for 3000 weaners.

By far the biggest concern, however, is the prospective loss of effectiveness of our current broad-spectrum drench mix to control the other significant worm species, and consequently the forced switch to new generation drenches at much higher cost. The prospect of having to summer drench numerous times with broad-spectrum for Nematodirus control is a very bad scenario for build-up of drench resistance in these other species because of removal of all drench-susceptible worms during a period (summer) of nil re-infection with drench-susceptible larvae, coupled with thorough removal of all drench susceptible worms in the sheep. It is well documented by parasite scientists that un-necessary exposure to a class of drench rapidly accelerates the development of drench resistance.

The uniqueness of the reproduction cycle of Nematodirus is matched by its apparent total susceptibility to Levamisole, an 'ancient history' drench of generally low effectiveness against 'winter worms'. The very nature of the reproductive cycle of Nematodirus (with continual ingestion of susceptible worm eggs), suggests very slow if any resistance build-up to Levamisole, despite frequent challenge by drenching.

Consequently Levamisole has the double advantage of cheaply controlling Nematodirus species and also avoiding extra exposure of the other classes of drench to the worm species that do not need control at this time of the year.

Finally, I believe that despite the widespread resistance to Levamisole in other species such as Trichostrongylus, Ostertagia and Haemonchus when applied as a single drench, it still contributes significantly to effective winter worm control and to the deferral of build-up of drench resistance when included as part of a multi-drench mixture."