DYNAMIC AG CONSULTANCY
Livestock Nutrition, Health & Management

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12th December 2015

Mr John Example
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1212 Example Rd
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Dear John,

WORM EGG COUNT REDUCTION TRIAL

Summary of Drench Trial

Date trial set-up: 30th November 2015 **Date sample collected:** 4th December 2015
Lamb LW at drenching (kg): 35kg **Breed & age of lambs:** Composite/Coopworth – 4MO

Drench used	Batch number	Expiry date	Dose rate
Rametin	V11207/1	01/2017	9ml/lamb
BZ/Lev	53179V1	04/2017	7ml/lamb
ABA/BZ/Lev	9245	06/2017	7ml/lamb
IVO	808137	04/2018	9ml/lamb
Aba	51250V1	05/2016	9ml/lamb

Trial Results

THIS YEARS RESULTS			PREVIOUS RESULTS	
DRENCH TYPE	**2015**	**Comments**	**2012**	**2009**
CONTROL	672 epg		**821 epg**	**854 epg**
BZ/Lev	92%	Resistance	92%	84%
Ram/Bz/Lev	98%	Borderline	96%	97%
Aba/BZ/Lev	100%	Excellent	-	-
IVO	84%	Resistance	95%	96%
ABA	99%	Very Good	99%	-

The minimum recommended drench efficacy levels are 98% and above. Drenches with efficacy < 95% are considered not suitable for use.

Larval Culture Results

	2015		
Worm Type	Control	Bz/Lev	Ivo
Ostertagia spp. (Small Brown Stomach worm)	**18%**	**19%**	**-**
Trichostrongylus spp. (Black Scour worm)	**78%**	**81%**	**100% N=51**
OTHER (*Chabertia*/*Oesophagostomum*)	**4%**	**-**	**-**
Haemonchus spp. (Barbers Pole)	**-**	**-**	**-**

Understanding the worms on your farm

Worm Species:

The most important worms in southern Australia are *Ostertagia spp.* (Small Brown Stomach Worm) and *Trichostrongylus spp.* (Black Scour Worm). Occasionally, during summer and summer rainfall events, *Haemonchus spp.* (Barbers Pole Worm) may be prevalent. Infections usually occur as mixed infections (one or more species present) and rarely as single species infestations.

Strongylid infection

Black Scour worm is an economically important worm in our winter rainfall environment. Infection with this worm, as its name suggests causes scouring and rapid loss of condition, usually affecting weaners under 9 months of age on a low plane of nutrition. Accumulation of dag on the breech or hind legs combined with low body condition and lethargic looking animals may be indicative of a scour worm infestation. This worm inhabits the first third of the small intestine and inhibits absorption of nutrients, particularly protein. The two major species infecting sheep are *T.colubriformis* and *T.vitrinus*, the latter being less prevalent but more pathogenic, where lamb and weaner deaths can occur with WECs as low as 2-300epg. Occasionally, infection with scour worm can be missed diagnosed by farmers as symptoms can be sometimes confused with nutritional scours, where lack of fibre and low dry matter pasture produces a scour. Similarly, protozoan infection (Yersiniosis) can cause similar symptoms.

Small Brown Stomach Worm or *Ostertagia (*now known as *Teladorsagia*) is also an important worm species in our environment. The disease caused by this worm mainly affects young autumn and spring drop lambs in the post weaning period of winter and summer/autumn respectively. Upon larval ingestion by the sheep, the larvae can burrow into the glands of the abomasum within 6 hrs, causing inflammation and disrupting the cells responsible for secreting the acids required to digest plant material, before developing into adult egg laying worms. Clinical symptoms are similar to infection with Black Scour worm and include diarrhoea, reduced feed intake due to loss of appetite and loss of body condition.

Tapeworms (Moniezia)

Tapeworms are common in lambs and are easily visible with heavy infections. There is little evidence that infection with Tapeworm causes any production losses in lambs. Several studies have shown no production responses (weight gains) in lambs following a drench with Praziquantel. Tapeworms inhabit the small intestine and feed on faecal debris that has not been absorbed, rather than feeding on the animal itself.

Nematodirus

Nematodirus spp. or the Thin Necked Intestinal Worm inhabits the small intestine. They are different to the three major worm species in that the L3 larval stage are contained within the egg shell unlike other worms where the L3s develop outside the egg. This allows the worm to be very resilient on the ground, resisting environmental extremes (temperature and moisture). Cold weather seems to trigger development, particularly above 10^{o}C, and usually hatching occurs in the spring to infect young lambs. Nematodirus can cause problems in young sheep after dry periods when sheep are grazing short green

feed. Usually it is not necessary to drench specifically for Nematodirus as drenching for Scour worm and Stomach worm cleans up the infection.

Other species

There are other species of worms that infect sheep. Usually they are of lesser economic significance and rarely cause production losses. These include *Cooperia* spp. (Small Intestinal Worm), *Trichuris* spp. (Whipworm), *Chabertia* spp. (Bowel worm) and *Oesophagostomum* spp. (Nodule worm).

Conducting routine larval cultures as part of your worm control strategy is an important tool as it allows identification of the worms present. Understanding what worms are infecting your animals, combined with your worm egg count (WEC) allows a more targeted drench strategy and allows us to monitor the resistance status of worm genera over time. Similarly, it can be useful in determining the requirement to drench, as different worms lay eggs at different rates, potentially overestimating the WEC results and the requirement to drench.

Drench Resistance

How does drench resistance develop?

A very small population of worms are naturally resistant to a drench. In fact, there are worms that are already resistant to chemical groups that have not yet been developed! Every time you drench sheep, a small population of worms survive the drench (this will depend on many factors such as frequency of drenching, dose rates, when you drench (summer more selective). The surviving worms reproduce and pass on the ability to survive the drench to their offspring and this happens relatively quickly (in evolutionary terms) because worms have a short generation time (~21 days). Over time and with continued drenching, susceptible worms are slowly eliminated leaving a largely resistant population of worms. These resistant worms are what we are identifying during a drench resistance test.

Delaying the onset of drench resistance

There are a number of measures that can be employed to delay the onset of resistance:

- Drench the mob to the heaviest animal. Don't assume live-weight. Get the scales out and weigh some sheep. Under-dosing leads to drench resistance
- Monitor WECs and try and reduce the drench frequency on your property
- Limit drenching in dry conditions (summer). Only drench on WEC for summer treatments as there are usually few (if any) susceptible worms on pasture in summer to dilute the resistant worms surviving the summer drench.
- Use combination drenches were possible to ensure an effective kill
- Conduct regular WECRT (every 3 years) to assess drench efficacy and monitor worm population changes

Managing drench resistance

Managing drench resistance involves a combination of grazing management combined with strategic drenching decisions based on WEC results. Normally, 90% of the worm population is contained on pasture and only 10% are expressed by the livestock. The aim of grazing management is to provide the most vulnerable animals (young stock) with the lowest worm contamination pastures and the "best feed". Animals maintained in good condition score (3+) are more resilient and can tolerate heavier infections of worms. It is important that we allow weaners to develop natural immunity to worms by keeping the challenge reasonably high and drenching before production losses occur. To discuss grazing management, please call our office for more information.

Your drench history

	2013	2014	2015
Ewes			
Winter:	Triguard	Triguard	Abamectin
Pre-lamb:	Bionic capsule	Triguard	Triguard
1st Summer:	Trigaurd	Rametin combo	Zolvix
2nd Summer:	Rametin combo	Rametin combo	Zolvix
Lambs			
Marking:	n/a	n/a	n/a
Weaning:	triton	abamectin	triguard

Summary of your trial results

These results indicate there is substantial resistance to Ivomec and to BZ/Lev combination, and emerging resistance to Ram/BZ/Lev and Ivomec/Ram, while very good results were obtained with the Aba/BZ/Lev combination and Aba alone, giving you good chemical control options in the future. With the exception of Ivomec, there has been no significant shift in resistance status of the chemicals tested since the last trial conducted in 2012. There has been a reduction in the efficacy of Ivomec since the 2009 trial but is not surprising given Ivomec is the least potent of all the ML drenches and widespread resistance to this drug across Australia is now quite common.

DRENCH RECOMMENDATIONS

Winter/Spring in 2015

i. **Aba/BZ/Lev** - Abamectin based triple combination (E.g. Triguard, Hatrick or Pyrimide) 28 day ESI (Pyrimide is 42 day ESI).

Summer treatments 2015-16

i. 1st summer drench – (Nov - Dec 2015) - **Startect** – 1ml/5kg, 14 day meat and 28 day ESI

ii. 2nd summer drench (If required Jan-Mar 2016) – **Zolvix** but not terminal lambs or cull ewes to be sold soon as it has 115 day ESI.

Continue to monitor livestock with WECs. Decision to drench should be based on WEC results.

Repeat drench resistance test in 2018.

Regards
Dr Steve Cotton, PhD (parasitology)