HUME DRENCH RESISTANCE TRAILS

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INTRODUCTION

During 2012 and 2013, Drench Resistant Trials (DRTs) were conducted on sheep properties across the Hume region of southern New South Wales. They were carried out by Livestock Health and Pest Authority (LHPA)1 veterinarians and rangers in conjunction with Zoetis Animal Health2 staff.

Most farms in the study had drench resistance. Poor results were seen with ivermectin (Ivomec), benzimidazole/levamisole (white/clear) and naphthalophos (Rametin) combinations on a number of properties.

DRTs, also known as Faecal or Worm Egg Count Reduction Tests, should be performed every two to three years (Love, n.d.). They demonstrate which drenches are effective on a given property and which are no longer successful at killing one or more worm species.

The procedure involves assigning sheep with adequate worm burdens into treatment and control groups. Each treatment group is given a different drench and the control group is left untreated. Individual faecal egg counts and larval culture (to identify worm species) are performed on animals in all groups post-drenching.

Results of treatment groups are compared with those of the control group. The effectiveness of a drench in reducing egg counts of a worm species is expressed as a percentage, which reflects the likely ‘kill rate’. Resistance is defined as < 95% drench efficacy ie > 5% survived the treatment.

On completion of each trial, farm managers received a report describing their resistance profile and were given tailored recommendations about drench choice and rotation. Results varied enormously from farm to farm emphasising the need for individual farmers to do their own DRT on their own sheep. More broadly, the results were collated for our region and are discussed below.

METHODOLOGY

DRTs were performed on 25 farms widely distributed across the Hume region. The participants self-selected following promotion of the trials. The study began in February 2012 and was completed in January 2013. Sheep used in the trials were undrenched weaners with average worm counts > 200 epg based on initial screening of 10 animals. Zoetis Animal Health provided the drench and equipment kits used.

Sheep were randomly allocated into groups of 12 to 15 head and identified with ear tags using a different colour for each group. Each treatment group was assigned a specific drench and animals were weighed and dosed accordingly. One group was left undrenched and designated the control. Drenches were not standardised between farms due to individual preferences.

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1 www.lhpa.org.au
2 Formerly Pfizer Animal Health www.zoetis.com.au
The following drenches were used:

<table>
<thead>
<tr>
<th>Drench</th>
<th>Number of Farms</th>
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<tbody>
<tr>
<td>Ivermectin (Ivomec®)</td>
<td>25</td>
</tr>
<tr>
<td>Derquantel/Abamectin (Startect®)</td>
<td>25</td>
</tr>
<tr>
<td>Moxidectin (Cydectin®)</td>
<td>24</td>
</tr>
<tr>
<td>Naphthalophos/benzimidazole/levamisole (Rametin® Combination)</td>
<td>22</td>
</tr>
<tr>
<td>Abamectin/benzimidazole/levamisole (Triguard®)</td>
<td>14</td>
</tr>
<tr>
<td>Benzimidazole/levamisole (Scanda®)</td>
<td>12</td>
</tr>
<tr>
<td>Closantel</td>
<td>2</td>
</tr>
<tr>
<td>Levamisole (Nilverm®, clear drench)</td>
<td>1</td>
</tr>
<tr>
<td>Ivermectin/benzimidazole/levamisole (ivermectin ‘triple’)</td>
<td>1</td>
</tr>
<tr>
<td>Monepantel (Zolvix®)</td>
<td>1</td>
</tr>
</tbody>
</table>

Faeces were collected directly from the rectum of 10 animals in each group 10 to 14 days after drenching. The samples were sent to the Veterinary Health Research Laboratory in Armidale where faecal egg count reduction tests were performed.

RESULTS AND DISCUSSION

The three worms of greatest pathologic and economic significance in sheep are Teladorsagia (Small Brown Stomach Worm), Trichostrongylus (Black Scour Worm) and Haemonchus (Barber’s Pole Worm). All three species were represented in this study with Teladorsagia present on 25 of 25 farms, Trichostrongylus on 24 of 25 farms and Haemonchus on 15 of 25 farms. Where multiple worm types were present on a single farm, the resistance profile differed for each and consequently the data in this study is presented with reference to worm species.

Teladorsagia has shown widespread resistance to benzimidazole (white) and levamisole (clear) drenches since the 1980s (Love, 2011). It was, therefore, unsurprising that most properties in the study had Teladorsagia resistance to a benzimidazole/levamisole combination drench (Scanda). There is some debate over the presence of naphthalophos (Rametin) resistance. This drench can have variable results in the absence of resistance and is most effective against adult parasites (Woodgate, 2013, pers comms, 29 April). There are no published cases of naphthalophos resistant Teladorsagia in Australia. In this study suboptimal efficacy of a naphthalophos combination drench against Teladorsagia was found on 48 percent of properties.

Teladorsagia resistance to macrocyclic lactones (‘mectins’) was first documented in southern New South Wales in 2000 and a prevalence of 30 percent was reported in south-eastern Australia in 2007 (Love, 2011). The levels of resistance to ivermectin (Ivomec) in this study were much higher at 65 percent; however the relatively small sample size may have affected the results. Nonetheless, ivermectin resistance is well established in the Hume region. While moxidectin (Cydectin) performed better, resistance in Teladorsagia was found on 9 percent of properties.
*Trichostrongylus* resistance to benzimidazole/levamisole is well known and occurred on 27 percent of farms. The result was better than expected and may be due to its limited use in recent years. Nevertheless, resistance has been established since the 1980s and would likely return with vigour on reintroduction of the drench. Naphthalophos resistance in *Trichostrongylus* has been reported in one published case in Australia (Le Jambre et al., 2005). In the Hume study, a naphthalophos combination had less than 95 percent efficacy against *Trichostrongylus* on 32 percent of farms. In fact, the benzimidazole/levamisole drench outperformed the naphthalophos combination, which seems contradictory and most likely reflects the different sample size between the two treatments. An emerging issue is *ivermectin resistant Trichostrongylus* which was found on 44 percent of farms in Hume. This appears to be a trend affecting the Riverina and further investigation is warranted and is currently underway.
*Haemonchus* is known to be resistant to levamisole, although less commonly than to benzimidazole (Love, 2013, pers comms, 17 May); however both a benzimidazole/levamisole and a naphthalophos combination containing levamisole were effective on the 15 properties with *Haemonchus* burdens in the study. Unfortunately, this was not the case for the macrocyclic lactones with 73 and 27 percent of properties harbouring ivermectin and moxidectin resistant *Haemonchus* respectively. All farms with moxidectin resistance also had significant ivermectin resistance, as was expected. Conversely, some properties with marked ivermectin resistance had no moxidectin resistance, probably reflecting the higher potency of moxidectin.

No resistance was found in any worm species to the abamectin triple combination or new compounds including derquantel (Startect) or monepantel (Zolvix). While the latter was only
used on one property, there are no reported cases of resistance to this compound in sheep in Australia. Moxidectin performed relatively well in populations of *Teladorsagia* and *Trichostrongylus*. The compound is 2 to 5 times more potent than ivermectin and may also have a slightly different chemical action (Kieran, 1994). Yet it is in the same family and resistance was clearly demonstrated on a number of farms. Consequently, it should be used with caution and its efficacy monitored, for example with a faecal egg count 10 to 14 days post-drenching, often referred to as a ‘DrenchCheck’. Indeed, regular DrenchChecks are recommended as part of good sheep worm management. The naphthalophos combination is a valuable rotation option as it represents a different chemical family. Its use should also be monitored due to its inherent variability. The Hume study clearly highlights the value of performing individual farm DRTs. Each property had different resistance present in their worm populations and only once this is established can an effective drench plan be implemented.

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REFERENCES


FURTHER INFORMATION
