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

**Haemonchus and weight gain**

Dr Leo Le Jambre

(Well-known parasitologist Dr Leo Lejambre is a Post-retirement Fellow, formerly Senior Principal Research Scientist, with CSIRO, Armidale NSW. –Ed)

The effect of *H. contortus* infection on productivity of weaner lambs at pasture can best be predicted by haematocrits; for each further 0.01 proportional decrease in haematocrit there is a 0.03 reduction in live-weight gain (Albers et al 1990). Haematocrit decreases can be determined from the daily blood loss of sheep (Albers and Le Jambre, 1983) and blood loss determined from faecal egg counts as demonstrated by Le Jambre, 1995. When this is calculated, the relationship is that shown in the figure below. It is possible therefore to determine the effect that a given faecal egg count will have on liveweight gain. The graph emphasizes the value of diagnosis of parasitism based on faecal blood loss in order to identify and remove the infection before production loss occurs.

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Weaner lambs with the egg counts shown on the x-axis. The blood loss in mls per day for a given egg count is also shown. Uninfected weaners are assumed to gain 100g/day.

References


**Riverina Reflections**

Dr Dan Salmon

_Dan Salmon is the District veterinarian for the Riverina Rural Lands Protection Board (RLPB). Following are some observations on worm patterns in his district. In the last issue of TTW, we re-printed an article by Dan (from the Riverina RLPB Animal Health Newsletter Vol XIV Number 4 Spring 2005) which mentioned the results of a recent anthelmintic resistance survey by Harry Suddes and Dan in the Murray and Riverina RLPBs. – Ed._

‘Steve,

You may recall some time ago (months if not years) an electronic discussion about the relative importance of _Ostertagia_ and _Trichostrongylus_ in this area.

Last spring was wet all the way through, producing the conditions that I consider to be conducive to the development of ‘Trichs’. We had above median rainfall for Aug, Sep, Oct and Nov.

Subsequently our egg counts have been more the levels that I would associate with ‘Trich’ than with ‘Ost’ (individual counts >1000 epg).

The larval cultures/differentiations that we have seen have also had a lot more ‘Trichs’ than usual, meaning quite a few rather than none.

It is interesting that we should see this when similar moisture levels produced by irrigation do not give the same results.

_Cheers,

Dan 30/05/2006’

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**Parasites at slaughter – abattoir surveillance by NSW DPI**

Stephen Love
NSW Dept Primary Industries, ARMIDALE

In addition to OJD surveillance NSW DPI, in cooperation with abattoir operators at Dubbo, Deniliquin and Wallangarra, is also collecting information on other conditions observed at these works.

Below (see table, next page) is initial information which may be of interest. If you do not have (internet) access to the publications mentioned in the notes which I have prepared below, you should be able to get hard copies through the Rural Lands Protection Board or your nearest NSW DPI office.

Notes regarding table (next page):


2 ‘Pimply gut’ (aka ‘Knotty gut’) is caused by the host reaction to migrating larval ‘nodule worm’ (_Oesophagostomum columbianum_). _O. columbianum_ should not be confused with its somewhat more common but somewhat less pathogenic cousin, ‘large bowel worm’ (_O. venulosum_). Nodule worm was once second only in importance to _Haemonchus contortus_ in the northern tablelands of NSW. Being somewhat less cold and desiccation tolerant than even _H contortus_, nodule worm has entirely or almost entirely disappeared from the Northern Tablelands with the advent of pasture improvement and ‘modern’ drenches (Thibenzole® and following) around 4 decades ago. Nodule worm is now confined it seems to the northwest...
Inspection under the NSW Sheep Health Abattoir Monitoring Program

"Other Conditions" detected in 1229 Lines of Sheep in three major NSW Abattoirs - January to March 2006

<table>
<thead>
<tr>
<th>OJD Vaccination Lesions</th>
<th>'Pimply Gut' / O. columbianum</th>
<th>Liver Fluke</th>
<th>Hydatids</th>
<th>Sheep Measles (C. ovis)</th>
<th>Sarcocyst</th>
<th>CLA</th>
<th>Pleurisy/ Pneumonia</th>
<th>'Cancer'</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Lines</td>
<td>6</td>
<td>54</td>
<td>447</td>
<td>17</td>
<td>59</td>
<td>33</td>
<td>31</td>
<td>46</td>
</tr>
<tr>
<td>Total</td>
<td>1229</td>
<td>1229</td>
<td>1229</td>
<td>1229</td>
<td>1229</td>
<td>1229</td>
<td>1229</td>
<td>1229</td>
</tr>
<tr>
<td>% of lines with evidence of condition</td>
<td>0.49%</td>
<td>4.39%</td>
<td>36.37%</td>
<td>1.38%</td>
<td>4.80%</td>
<td>2.69%</td>
<td>2.52%</td>
<td>3.74%</td>
</tr>
</tbody>
</table>

Source: Adapted from data from document prepared by Dr. Ian Links, NSW Dept Primary Industries 30 March 2006

Sheep worm control and drench resistance – an update

Stephen Love

What’s the latest on the resistance front?

For an overview of the current resistance situation in NSW and elsewhere, see the NSW DPI publication, ‘Sheep worm control and drench resistance’.

Even more recent – and alarming – data has come from Armidale-based veterinarians Justin Bailey and Rad Nielsen, who presented their findings at the World Association for the Advancement of Veterinary Parasitology conference in Christchurch last year. (Their poster is reprinted at the end of this newsletter). They examined the database (approx. 40,000 samples) at Veterinary Health Research (VHR), Armidale for the year 2004. (Strict protocols were followed; client information was not disclosed).

Because relatively few drench resistance tests are done, they looked for cases where there was a positive worm egg count (positive WEC) during a defined period after treatment when you would expect zero egg counts if the drench was 100% effective. This ‘defined period’ will vary depending on the type of drench (short- vs long-acting) and, to some extent, on the species of roundworm. (Haemonchus (barber’s pole worm) eggs might appear in faeces ('Positive WEC') after a 100% effective drench

| Table 1. Days before Haemonchus eggs appear in faeces ('Positive WEC') after a 100% effective drench |
|------------------|--------------------------|
| Short-acting drench (eg benzimidazole (BZ), levamisole (LEV), ivermectin, abamectin, naphthalophos) | 18-21 (Usually 21) |
| Moxidectin-oral  | 32                       |
| Capsule (ivermectin or BZ) | 121                  |

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Table 2. Farms with Positive WEC after various drenches (Based on Bailey and Nielsen (2005))

<table>
<thead>
<tr>
<th>Drench Type</th>
<th>Farms with Positive WEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-acting drench within 21 days; n=87</td>
<td>&gt; 65%</td>
</tr>
<tr>
<td>Moxidectin oral within 32 days, <em>Haemonchus</em> only, n=49</td>
<td>41% (zero in 2000)</td>
</tr>
<tr>
<td>Ivermectin capsule within 121 days, n=6</td>
<td>67%</td>
</tr>
</tbody>
</table>

Notes: Analysis: Reasonably good correlation between DrenchTest results and ‘Positive WEC’ results (but interpret with care. There can be other reasons for an unexpectedly early ‘Positive WEC’). ‘Positive WEC’ a rough guide to resistance prevalence. Database: 40,000 samples (VHR). Region: Australia. Year: 2004. n=number of farms.

appear a little earlier than eggs of other important sheep worms).

This is not an exact measurement of how much resistance is ‘out there’, but it is a useful guide.

Table 2 (above) is a summary of some of the findings of Bailey and Nielsen.

Bailey and Nielsen also compared ‘positive WECs’ results for oral moxidectin with those of previous years. The following is a graphical representation of the data:

Notes: Adapted from Bailey and Nielsen (2005).

As moxidectin is the most potent of the macrocyclic lactone (ML)-based sheep drenches, one would expect the figures to be even higher for the avermectin members of the ML family.

The bottom line

- Resistance to the MLs appears to be developing rapidly
- All MLs –indeed all drenches - are affected to some degree.
- Don’t assume any drench will work on your farm, unless you have tested it.
- WormTest regularly to:
  - monitor worm control.
  - monitor drench effectiveness.

More information

- Your vet or other professional adviser
- WormBoss <http://www.wormboss.com.au>

References

Bailey J and Nielsen R (2005). Anthelmintic resistance in Australia – a commercial laboratory’s experience. WAAVP, Christchurch, NZ. (See last page of this newsletter)


(Reprinted from e-newsletter WormMail 20060629).
‘Bad Haemonchus year’ in Northern Tablelands and elsewhere

Stephen Love

(The following first appeared in the March and April issues of WormFax http://www.agric.nsw.gov.au/reader/wormfax-nsw and is an attempt to make sense of the ‘bad barber’s pole worm’ season in 2006 (summer/autumn)).

Many have observed that Haemonchus was ‘bad’ this year in the Northern Tablelands (where Haemonchus is commonly a problem), but also in other parts of NSW (eg Goulburn, central tablelands, parts of the southern tablelands etc). Below is a graph of average worm egg counts (WECs) for the Armidale district (part of the ‘WormKill’ area) for this and some previous summers. The table shows some recent weather data for Armidale.

Some comments:
- This is ‘average’ data. Some individual WormTests had much, much higher WECs (eg from Armidale/March 2006: one WormTest with average 7828 eggs per gram of faeces (epg) - average of 10 counts; highest individual count in that test was 16920 eggs per gram).
- Rainfall and other conditions varied quite a lot over the tablelands: Guyra for example got a lot more rain than other localities. Likewise, there were more cases of haemonchosis in some areas than others.
- In some cases, sheep were dying of acute haemonchosis i.e clinical signs and even deaths were occurring before WECs rapidly escalated. This indicates a rapid intake of larvae, and significant blood loss from these before reaching breeding/egg-laying stage.
- Management factors were doubtless another factor. Were effective drenches used? Were sheep set-stocked (greater risk of parasitism) or was there some system of grazing management?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
<td>Rain – observed [average] (mm)</td>
<td>Evaporation (mm)</td>
</tr>
<tr>
<td>Nov05</td>
<td>161 [80]</td>
<td>120</td>
</tr>
<tr>
<td>Dec05</td>
<td>88 [89]</td>
<td>172</td>
</tr>
<tr>
<td>Jan06</td>
<td>73 [105]</td>
<td>138</td>
</tr>
<tr>
<td>Feb06</td>
<td>67 [87]</td>
<td>126</td>
</tr>
<tr>
<td>Mar06</td>
<td>94 [65]</td>
<td>98</td>
</tr>
</tbody>
</table>

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Rainfall for Armidale city was around average or even below average, after a flying start with double the average in November 2005. Once there is a certain minimum amount of monthly rainfall (say, 50mm) to keep *Haemonchus* ‘ticking over’, other factors such as number of rain days/frequency of rain may well become as or more important than total rain received in a month. Bear in mind that *Haemonchus* eggs freshly deposited on pasture in faeces need adequate moisture within about a week in order for the eggs to develop and hatch. Otherwise the eggs die.

Some take home points:

- Regular WormTesting (WEC monitoring) is one of the best things you can do, even if – very occasionally – you get caught with worm problems when egg counts are still low. (Notably, barber’s pole worm in very bad seasons; thin-necked intestinal worm in young sheep in certain situations).
- WormTesting:
  - Gives you information on how worm control is going on your farm
  - Provides DEW: distant early warning
  - Can you save you the cost of unnecessary drenching
  - Can tell you what drenches work on your property

More take home messages: grazing management:

- Set-stocking is bad for worm control. Barber’s pole worm in particular loves it.
- Do this for starters: don’t move young sheep onto pasture which has had other young sheep on it within the last few months.
- Preparing low worm-risk lambing paddocks for Spring: this should be well underway now.

That other blood sucker – liver fluke

The April/May fluke drench (triclabendazole-based product) to small ruminants and large is the single-most important one on ‘flukey’ properties.

Recently published NSW DPI Primefacts


NSW DPI newsletters


A – Z index for entire NSW DPI website

http://www.dpi.nsw.gov.au/aboutus/a-z#n

Next page …

Bailey and Nielsen (2005) – the poster
Anthelmintic resistance in Australia - A commercial laboratory's experience

J.N. Bailey and R. Nielsen

Introduction

That anthelmintic (drench) resistance is the major animal health issue facing the Australian sheep industry is widely accepted. However, the precise level of resistance to each anthelmintic group is difficult to determine on a regional, state or national scale. This is largely a result of limited uptake by producers of parasite monitoring services, including drench resistance testing. However, analysis of available data presents a clear and disturbing picture.

Methods

Veterinary Health Research Pty Ltd runs a diagnostic laboratory specializing in 'large animal' parasitology. Approximately 40,000 faecal samples were processed in 2004, with samples submitted from most sheep producing regions of Australia. Data from these samples were collated to give an indication of the reduction in anthelmintic efficacy as seen in the field in 2004. Data from samples were included for analysis if the samples were submitted within 21 days of treatment with a short-acting anthelmintic (n=87), within 32 days of treatment with moxidectin (n=49, Haemonchus spp. only) and within 121 days of treatment with an ivermectin capsule (n=8). These submission dates correspond to the periods following treatment when we would not expect to see strongyloids eggs in the faecal samples if the treatment had been 100% effective. A positive worm egg count (WEC) was interpreted as an indication of reduction in anthelmintic efficacy (efficacy <100%, actual efficacy unknown). The results were expressed as the percentage of farms with a positive faecal egg count following treatment.

Results

Table 1. Reduction in anthelmintic efficacy. Percentage of samples collected within 21 days of treatment with a short-acting anthelmintic showing positive WEC as an indication of a reduction in efficacy in the field - 2004 data.

<table>
<thead>
<tr>
<th>Anthelmintic</th>
<th>No. farms analysed</th>
<th>% farms with positive WEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BZ</td>
<td>15</td>
<td>91.3%</td>
</tr>
<tr>
<td>LEV</td>
<td>20</td>
<td>85.8%</td>
</tr>
<tr>
<td>BZ + NAP</td>
<td>17</td>
<td>70.5%</td>
</tr>
<tr>
<td>IVM</td>
<td>15</td>
<td>89.6%</td>
</tr>
<tr>
<td>BZ + LEV</td>
<td>10</td>
<td>80.0%</td>
</tr>
</tbody>
</table>

1 Mixed nematode genera present
2 Predominantly Haemonchus spp. present

Table 2. Anthelmintic resistance (efficacy <95%). Summary of FECRT data collated from 24 tests undertaken between January and June 2004 using the VHR Drench test Kit®: broad spectrum treatments (Wooster et al., 2004).

<table>
<thead>
<tr>
<th>Anthelmintic</th>
<th>No. farms analysed</th>
<th>% farms with efficacy &lt;95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>BZ</td>
<td>23</td>
<td>81%</td>
</tr>
<tr>
<td>LEV</td>
<td>24</td>
<td>73%</td>
</tr>
<tr>
<td>BZ + NAP</td>
<td>24</td>
<td>68%</td>
</tr>
<tr>
<td>IVM</td>
<td>23</td>
<td>61.0%</td>
</tr>
</tbody>
</table>

Table 3. Reduction in anthelmintic efficacy. Percentage of samples collected within 32 days of treatment with moxidectin showing positive Haemonchus spp. WEC as an indication of a reduction in efficacy in the field: 2000-2004 data by year.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. farms analysed</th>
<th>% farms with positive WEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>2001</td>
<td>44</td>
<td>18.2%</td>
</tr>
<tr>
<td>2002</td>
<td>30</td>
<td>23.3%</td>
</tr>
<tr>
<td>2003</td>
<td>30</td>
<td>36.7%</td>
</tr>
<tr>
<td>2004</td>
<td>49</td>
<td>40.8%</td>
</tr>
</tbody>
</table>

1 Predominantly Haemonchus spp. present

Discussion

The reductions in efficacy seen in Tables 1, 3 and 4 do not necessarily signify the presence of resistance according to the WAAVP definition (efficacy <95%). However, it can be seen that the results for reduction in short-acting anthelmintic efficacy (Table 1) correlate well with data from 24 faecal egg count reduction tests (Table 2), conducted on-farm by Veterinary Health Research Pty Ltd (over four states) from January to June 2004 (Wooster et al., 2004). This highlights the potential for industry and extension services to use this type of data to aid in the assessment of anthelmintic efficacy on a regional level.