World association for the advancement in veterinary parasitology conference 2015

CLIVE BINGHAM
Zoetis NZ Ltd, PO Box 2094, Shortland Street, Auckland

Introduction

The World Association for the Advancement in Veterinary Parasitology (WAAVP) conference for 2015 was held at the Echo Arena and Convention Centre in Liverpool, England on 17–20 August. The conference hosted 766 delegates from around the world. Showcased over 500 research posters and 250 scientific presentations. Six topic streams were run concurrently on the following areas of research:

1. Drugs and drug resistance
2. Climate change, epidemiology and modelling.
3. Novel approaches to chemical and non-chemical control (endo. and ecto-parasites)
4. Vaccines and immunology
5. One health
6. Genes and genomics

In this paper summarises only four of the research papers that were presented.

Parasites in a changing world

Lord Robert May, Department of Zoology, Oxford University

The speaker talked about how global warming could affect parasitic and infectious disease in the future. The human population is expanding more rapidly than ever before.

<table>
<thead>
<tr>
<th>Years</th>
<th>World population doubling time</th>
</tr>
</thead>
<tbody>
<tr>
<td>8000–3000BC</td>
<td>1200 years</td>
</tr>
<tr>
<td>1830–1930</td>
<td>100 years</td>
</tr>
<tr>
<td>1970–today</td>
<td>52 years</td>
</tr>
</tbody>
</table>

Table 1. Change in the time taken for the world population to double its size

One of the reasons for this rapid expansion is that human life expectancy has increased. In 1860 only about 50% of children lived past five years of age. Now the average life expectancy is about 70 years. This is not true for all countries. In the third world countries (e.g. many African countries) the survival statistics are not much better than those recorded in 1860.

There are other disparities between the developed and developing worlds.

- In developed countries parasites and minor infectious diseases account for only 2% of the decreased disability adjusted life years. In low income, developing countries 20% can be attributed to parasites and minor infectious disease.
• Most research and drug development in humans is targeted at the diseases of developed countries (e.g. high cholesterol, heart conditions, cancer). Only 13 of the 1300 recently developed new drugs were focused on tropical disease.

With the increase in global warming, parasitic and tropical infectious diseases are likely to spread further and affect a greater proportion of the world’s ever expanding population. These parasites and their diseases therefore warrant more focus.

One health approach: Prevention and control of rocky mountain spotted fever in the south-western United States

Casey Barton Behravesh, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention, USA

Rocky Mountain Spotted Fever (RMSF) is a human disease caused by the bacterium Rickettsia rickettsia. It is a tick borne disease transmitted by the Brown Dog Tick. The symptoms it causes are:

• Headaches
• Muscle pain
• Nausea
• Fever
• Vomiting/diarrhoea
• Abdominal pain
• Joint pain
• Rash

These symptoms are due to the widespread vasculitis that the organism causes. Although this disease is treatable, it can be fatal with deaths being recorded in more than 20% of untreated cases. One of the biggest challenges with this disease is its speed of progression. The average time from showing first symptoms to death is only eight days.

During 2003–2013, an epidemic was recorded in Arizona. ~300 RMSF cases and 20 deaths were documented among Arizona’s American Indian population. On the worst reservations the annual incidence in 2009–2012 was 136 cases per 100,000 people, over 150 times the national average. This area had a high level of dogs that roamed free, had access to multiple houses and the children would even sleep with the dogs and were therefore more at risk from tick bites.

The solution that was implemented was called the RMSF Rodeo. This was a two year pilot program started in 2012 and conducted on a 600 home tribal community in Arizona.

Year 1: Long-acting tick collars (Seresto® tick collars, Bayer) were placed on all dogs in the community. These gave eight months protection from ticks. Environmental acaricide was applied to yards monthly and animal care practices such as spaying, neutering and proper tethering procedures were encouraged.
Year 2: Long acting tick collars were again used on all dogs in the community.

By the end of year 1, approximately 1000 dogs had been collared and managed. Less than 1% of dogs had visible ticks compared to 64% in non-treated areas and the environmental tick populations were below detectable levels. At the end of Year 2, less than 3% of dogs had visible ticks and the incidence of human disease had decreased by 43%.

This successful program was a good example of the ‘One health’ approach in action, benefiting both the animal and human populations within a community.

Effect of anthelmintic treatment strategies on nematode species prevalence in grazing lambs in Scotland

Lynsey Melville, Moredun Research Institute, Edinburgh, UK

This study investigates the change in GIT parasite species diversity within the animal and on pasture for lambs exposed to four different ivermectin refugia based drenching regimes over a six year period.

Method

Four groups of lambs were weaned onto the same replicate paddocks each year. The refugia based drenching programs used on each block were determined on year one and were kept the same between years.

Drenching regimes:

- Monthly treatment (NST),
- Targeted selective treatment based on weight gain (TST),
- Strategic prophylactic treatment (SPT) (drench at weaning and at six weeks) and
- Treatment upon observation of clinical signs of ill thrift (MT)

Faecal egg counts (FEC) were taken every two weeks during the grazing season and larval identification performed using PCR.

Worm naive tracer lambs were grazed on the pastures at the beginning and end of each season. These were slaughtered and adult worms recovered and identified. This gave an indication of the parasite diversity present on each block and how it changed over time.

Results

For the monthly treated lamb block, there was a reduction in the species diversity in egg output, within the first season. Species diversity was protected within the other three groups for the six year period. The expected shift in species prevalence throughout the season from Teladorsagia to Trichostrongylus was observed in all but the monthly treatment group where only Teladorsagia were recovered from trial lambs by the end of the experiment.
No difference in weight gains were observed in all of the groups except the treatment on observed signs of ill thrift group (MT) which tended to gained less weight.

Conclusions
Three of the refugia based drenching regimens maintain parasite biodiversity on pasture while monthly treatments fail to do so.

Managing resistance to long-acting injectable moxidectin in sheep nematodes through identifying relationships with the efficacy of oral moxidectin and co-administration of unrelated anthelmintic

Gareth Kelly, Lewis Kahn, School of Environmental and Rural Science, University of New England, Armidale, NSW, Australia

The value of concurrent administration of a short-acting but chemically-unrelated anthelmintic with long-acting moxidectin injectable (Cydectin LA) is being promulgated as a means to slow development of macrocyclic lactone resistance. While effects of concurrent administration on initial efficacy are readily estimated, it is not known if this practice will enhance the residual efficacy (i.e. persistency) through putative effects on larval establishment or parasite fecundity.

An experiment was conducted using Merino weaners on a property on the Northern Tablelands of NSW, Australia. The efficacy of a range of anthelmintics and anthelmintic combinations was determined over a 112 day period. Sample collection and measurements were designed to allow calculation of treatment efficacy, treatment persistency and growth rate. Initial worm egg counts (WEC) were high with mean WEC of the untreated control group being 3500 epg with approximately 70% identified as *H. contortus* and 30% as *Trichostrongylus* spp. There was severe moxidectin resistance detected in the *H. contortus* population. Initial mean treatment efficacy at Day 14 post treatment against *H. contortus* was 52% for moxidectin oral, 66% for Cydectin LA, and 100% for both Zolvix (monepantel) and Cydectin LA/Zolvix. Treatment with Cydectin LA resulted in mean WEC over the 112 day period being 7.2 fold higher than for animals treated with Zolvix at day 0, despite WEC following Cydectin LA treatment continuing to decline by 67% between Days 14 and 70. Treatment with Cydectin LA/Zolvix significantly reduced WEC, and in association with low pasture challenge, remained low. In contrast to effects on WEC, persistent anthelmintics supported higher growth for the first 49 days of the experiment with significant differences among treatments recorded (0.5kg, P<0.05).
This study highlights both risks of ineffective treatments and benefits of long-acting moxidectin on production. Due to seasonal conditions during the experiment, questions remain about managing development of resistance to moxidectin with co-administration of an unrelated anthelmintic.

WAAVP conference 2017

The next WAAVP conference is being held in Kuala Lumpur, Malaysia, 4–8 Sept 2017