Warrnambool Veterinary Clinic Dairy Heifer Internal Parasite monitoring project 2012-2013 – *Part 1*

Dr Jon Kelly
Warrnambool Veterinary Clinic

[Editor's note: This is part 1 of a 2 part series. A discussion of weight gains and drenching decision making will appear in a future edition]

Introduction

Traditionally, replacement dairy heifers in western Victoria have been treated for gastrointestinal parasites, or worms, either by the "calendar", usually every 6-8 weeks, or whenever they were yarded. This habitual approach to drenching replacement dairy heifers has generally involved the application of pour-on drenches using Ivermectin as the active chemical.

Recent studies in Australia and New Zealand have shown that the pour-on method of application may not deliver a consistent effective dose to each individual calf. Factors implicated in the variable dose received include animals licking their herd mates, prevailing weather conditions, long/dusty hair or animals not receiving the correct dose due to application error.

The development of resistance within worm species to commonly applied anthelmintics has also emerged as an increasing problem in cattle throughout the world. Consistent exposure of worm populations to poorly applied anthelmintic treatments has the capacity to accelerate the development of resistant populations of worms.

Farms enrolled in the JDCAP Johnes accreditation scheme, and the 3-step calf raising system, are required to raise calves with no contact with adult faeces for the first 12 months of life. In practice, this requires the majority of weaned heifers to be grazed on the same dedicated calf paddocks year after year, without the ability to spell paddocks and allow the natural decay of worm larval burdens on pasture to occur. The tendency for high levels of continued worm larval ingestion has encouraged the practice of frequent drenching with a range of pour-on anthelmintics. It is likely that this unique set of circumstances increases the probability of worm species developing significant levels of drench resistance over a period of time.

In season 2012-2013, the Warrnambool Vet Clinic (WVC), with support from Zoetis and Westvic Dairy, undertook a dairy heifer worm monitoring project. The project aimed to utilise worm egg count monitoring and culture to identify worm species that commonly affect dairy heifers in our district. The results were used to assist with drenching decisions on a farm by farm basis. Heifers were weighed throughout the course of the project and these weights were used to construct a growth curve that was compared to a target weight curve for Holstein heifers. Other aspects such as seasonal changes, available feed on offer for grazing and supplementary feed were also investigated during the course of the project. Liveweights recorded from individual heifer groups were used to determine the correct dosage of anthelmintic applied to each heifer group. An injectable anthelmintic containing Doramectin 10mg/mL (Dectomax Injectable, Zoetis) was applied to heifers at the dose rate of 1 mL/50 Kg bodyweight subcutaneously in the neck region.

Dectomax injectable (Zoetis) was chosen as the "base" anthelminitic treatment due to the broad spectrum of activity and persistence against strongyle species, with the benefit that it was an injectable formulation.

By using targeted drenching and monitoring the effectiveness of the drench, the project aimed to show that the frequency of drenching could be reduced compared to the traditional method of "drenching by the calendar" so minimising costs for the farmer, and reducing the risk of drench resistance whilst still achieving target growth rates.

This article describes the nature of the parasites identified. A future article will discuss the effectiveness of drenching decisions based on WEC results.

Materials and Methods

Six farms, with 987 heifers were selected on the basis of having a history of using WVC to monitor calf weights and being interested in understanding more around parasite management in their calves. Farmers were asked to provide heifer ration details, accurately identify all calves using NLIS tags and visual ear tags and maintain details of age and breed.

All farms had seasonal calving herds, with cows calving over a 10-12 week period. All calves were initially reared in housing with no access to grass. Due to the spread of ages of calves, all farms "batch" weaned calves in at least 2 batches. Those calves born in the first 4 weeks (approx) were weaned onto grass when the youngest of these calves were 8 weeks old (i.e., calves were approximately 8-12 wks old). The first "batch" of calves received a drench, with the product typically used on farm, 3-4 weeks after access to grass. When the second, and final batch of calves was weaned, and had access to grass for 2-3 weeks, all calves (first and second weaning batches) received the Day 0 Doramectin injectable (10mg/mL) drench. Day 0 of the project therefore was defined as the time when all calves born in 2012 received a Doramectin injectable (10mg/mL) treatment concurrently. After the day 0 treatment, smaller calves were segregated so that preferential feeding could be provided to them.

All herds calved from May-July, so in general, the first batch of calves were weaned on grass by mid August, received a farmer specified drench mid September, with all calves weaned on grass by early October. Thus, the start of the monitoring project (Day 0), with all calves treated with Doramectin injectable (10mg/mL) on a single day, was in late October/early November 2012. The heifers were also weighed, received a booster vaccination of 7 in 1 (Clostridial and Leptospirosis protection) and vaccinated with a Pink-eye vaccine as required by individual farms.

Heifers were treated with Doramectin injectable (10mg/mL) at a dose rate of 1ml/50kg BW. Heifers were weighed at each drench event, an accurate estimation of the weight of the largest animals in the group was made and this weight was used as the standard dose for all heifers in the group. Doramectin injectable (10mg/mL) provides sustained protection against re-infestation for a period of 21 days for *Ostertagia ostertagi, Haemonchus placei, Trichostrongylus axei, Bunostomum phlebotomum, Oesophagostomum radiatum* (nodule worm) and *Cooperia spp*. Based on the pre-patent period of strongyles being approx 21 days, the first monitoring sample to determine worm levels and species took place 6-8 weeks after Day 0. The following protocol was used:

Figure: Faecal Egg Count Sampling Protocol – Active Herd

Worm egg counts and larval cultures were performed at Veterinary Health Research, Armidale, New South Wales, Australia (VHR). The WEC was conducted to a sensitivity of 1:20 using a modified McMaster chamber on 10 individual samples from each management group on the farm. Faecal samples were then pooled, with larval culture and identification carried out using standard procedures.

Results

In 18% of total samples, no worm eggs were detected.

Cooperia sp were detected in 77% of cultured farm submissions. *Ostertagia ostertagi* larvae were identified in 70% of the farm samples submitted to VHR. No other nematode larvae were identified in the samples submitted for this project. *Cooperia* sp was generally isolated in larger number on larval culture than *Ostertagia ostertagi*.

Figure: All farms, Mean Worm Egg Counts and worm species proportion, sorted by mean WEC

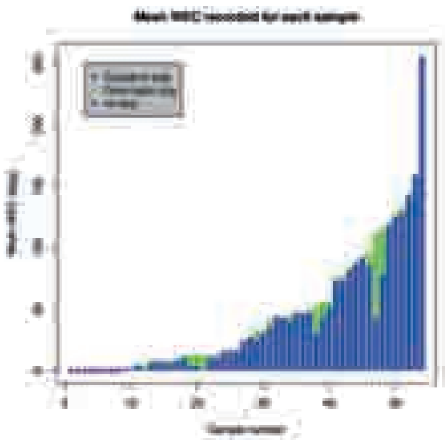

Figure: All Farms, Mean WEC and Range, sorted by mean WEC.

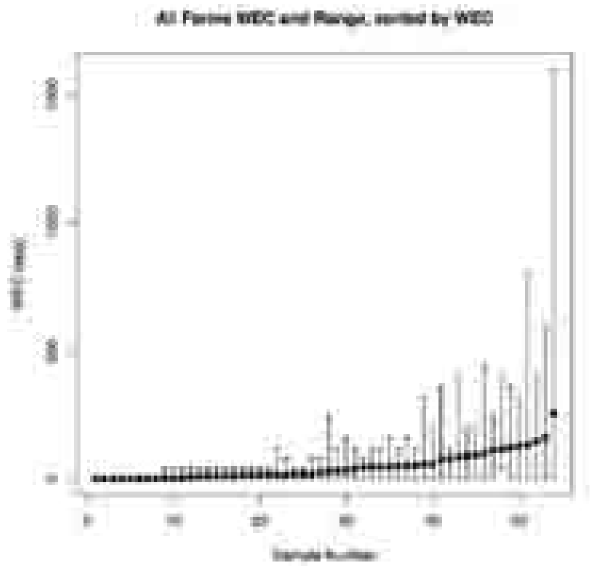

Figure XX shows that the variation of individual samples within a group can be large, even with a similar mean WEC.

Discussion

O. ostertagi is a highly pathogenic worm with low fecundity. An egg count of 20 eggs/gram of *O. ostertagi* has been considered by some authors as an indication of significant parasite burden.

The most common species of *Cooperia* in cattle of Southern Australia is *C. oncophora*, which is free living in the small intestine, does not cause damage to the intestinal wall, is generally considered to be of low pathogenicity and rarely causes production losses. It is a worm with high fecundity. Its ability to produce high numbers of eggs can result in high WEC counts and domination of larval cultures.

Cooperia sp. was the dominant worm species, and was present on all farms examined. *O. ostertagi* was present on 9 out of 12 of the monitor farms, but was only found in low to moderate levels and was never found in isolation.

Conclusions

The predominant worm species, both in number of farms effected and population proportion in positive samples was *Cooperia* sp. *Ostertagia* was found on the majority of farms in the monitoring project, but only at low to moderate levels. Dairy heifers mobs with similar bulk egg counts could have widely different species and individual variations.

The raw worm egg count result was not useful by itself in dairy heifers – but required larval culture as a necessary adjunct in order to make informed drenching recommendations. Further, individual egg counts and cultures are helpful in identification of mobs where individuals have very high burdens.