

2003/V09



Producer Research Support

Organic Gastrointestinal Parasite Control

Central Victorian Organic Growers Inc.



The Central Victorian Organic Growers Inc. group wanted to develop and trial a combination of NASAA approved herbal remedies for use in sheep and goats to effectively control and eliminate gastrointestinal (GI) parasites.

Ongoing faecal egg counts were performed by the group to ensure that GI parasite levels remained low enough that they did not reduce productivity and performance, and collectively determined the required frequency for drenching.

The trial has alleviated many concerns over parasite control on organic farms, and answered critical welfare questions on this matter.

The project

Prior to this trial, members of the group were using a number of unproven and possibly dangerous drenches, which included garlic drenches, apple cider vinegar, diatomaceous earth, copper sulphate, and even kerosene soaked carrots. A great deal of effort was also placed on stock rotation, which, while a very good method for worm egg reduction, is not always practical on smaller properties, or where stocking rate is all ready high.

The Central Victorian Organic Growers Inc. group wanted to develop and trial a combination of NASAA approved herbal remedies for use in sheep and goats to effectively control and eliminate gastrointestinal (GI) parasites. The trials aimed to determine the most effective combination of herbs, and the most effective dose rates and treatment regimens.

Objectives

1. Identify the most effective herbs or combination of herbs for GI parasite elimination;
2. Identify the most effective dose rates of above herbs for GI parasite elimination;
3. Identify the most effective dosing regimens for GI parasite elimination;
4. Demonstrate significant quantifiable reductions in faecal egg counts in treated animals (>75% kill rate), compared to that achieved with current chemical vermifuges; and
5. Maintain faecal egg counts below levels that will adversely affect production (ie. below 200 epg).

What was done

Animals were selected to participate in the trial based on the likelihood of carrying significant worm burdens – pregnant and lactating females, and young weaners were used where possible.

The sheep trials were conducted using whole flock samples, where one faecal sample was collected per 10 head of sheep. The goat trials were conducted using individual samples from each animal.

The first round of drench trials used a combination drench containing three herbal extracts (Wormwood, Cloves and Black Walnut hulls). The drench was a 1:1 extract (1 part herb to 1 part alcohol). The drench was administered at a rate of 1ml per 10 kg live-weight, administered via a volumetric oral drenching gun.

Faecal samples were collected from the trial animals prior to drenching, and again two weeks after the drench was administered. Faecal samples were sent to Para-Site Diagnostic Services for faecal egg count analysis and reporting.

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Key points

- The original herbal drench combination does reduce faecal egg counts, especially when egg counts are high (>1000).
- Each trial group needs to run all three different tests (drench type and drench rate) on the same farm.
- Inconsistencies in climate and protocol need to be dealt with.
- Higher worm egg numbers are required to give significant results.
- A larger pool of animals and farms are needed.
- Control groups need to be included in each trial group.

The second round of drench trials involved used two different drenches – one was a combination of Wormwood, Cloves, Black Walnut hulls and Garlic, and the other was a combination of Wormwood, Cloves, Black Walnut hulls and *Stemona japonica*. The drenches were administered at a rate of 1ml per 10kg live-weight.

The third round trial used the combination drench (Wormwood, Cloves, Black Walnut hulls and *Stemona japonica*) at a dose rate of 1ml per 5kg live-weight.

All results were tabulated comparing pre and post drench Faecal Egg counts. Each result was given a percentage efficacy in reduction of faecal egg count (Faecal Egg Count Reduction (FECR) %).

Group data was compiled for overall efficacy in the two trial groups - sheep and goats. Further analysis was used to compare overall efficacy of the different drench types, and dose rates. Insufficient data was collected on the drench including garlic to be used in the analysis.

With a significantly reduced pool of test animals, certain sacrifices had to be made to the original planned protocols, in order to achieve any relevant data. The primary changes were the deletion of control groups, both in respect of untreated animals, and with comparison groups for traditional chemical vermifuges. The decision was made to gather as much data on the efficacy of the herbal drenches as the primary objective, and then proceed with control data in later testing rounds. Unfortunately the drought never relented until the final months of the trial period, and the planned control testing had to be abandoned.

A further effect of the drought was that the group had to extend the testing pool to animals and farmers outside the primary group, in an effort to salvage some useful data. While many of the volunteers who joined the trial were very efficient with following the protocols set out, there were also a few who failed to comply correctly, and as a result, some of the data compiled appears to be inconsistent with the core group data.

What happened?

The results of this trial have been very encouraging. Whilst the average Faecal Egg Count Reduction (FECR) for the sheep trials were not as impressive as for the goat trials, all the results have shown a definite and repeatable reduction in egg counts.

The trial has demonstrated that herbal drenches can offer effective control of GI parasites, and while there were many hurdles to overcome, the results strongly suggest that further research in this area is warranted.

Most of the trial objectives have been achieved. The group has been able to identify that the herbal combination of Wormwood, Cloves and Black Walnut does indeed possess activity against GI parasites, showing an average FECR in goats of 80.1%, and in sheep of 30.8%. The testing of additional herbal combinations (garlic and *stemona*) demonstrated no additional benefit in FECR, and testing at higher dose rates (1ml per 5kg) again showed no increase in efficacy (in fact both results showed reduced efficacy).

Unfortunately, insufficient data was collected from the second and third rounds of drenching to accurately compare the difference between the effects of the different drench type and drench rates, but overall data was sufficient to show no improvement on original results. Further testing to discover whether a second drench seven days after the initial drench would increase efficacy is being pursued.

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Producer Research Support

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Contact Gerald Martin -
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Discussion

Although the overall results of the trial have been beneficial for the group, a number of critical success factors were not achieved. The most significant problem the group faced was drought. Victoria was under severe drought conditions for the majority of the trial period, and as a result of the drought, worm egg numbers in the trial animals were drastically reduced, or totally absent (the life cycle of gastrointestinal worms require intermediate hosts and /or periods of larval development outside the host animal, which are all dependent on significant moisture content in pastures). As a result of this, the number of viable test results was dramatically reduced from original expectations, which meant that the overall significance of the trial was greatly reduced.

As a result of doing this trial, the group has identified key areas that need improvement. Although drought is an unforeseen circumstance, in future, work on drench testing would not proceed until significant rainfall had been achieved. An ideal scenario for a trial of this type would be to perform the testing on irrigated properties, where soil and pasture moisture content could be controlled. For test results to be significant, high worm burdens are desirable, and as such, stock would be chosen from high intensity properties, where stocking rates are high, paddock rotation limited, and the emphasis is on reproductive turn over (milk and meat production, rather than wool/fibre). Properties where stock handling is well organised and of high frequency is also desirable (eg. dairy). The most accurate way of repeating this trial would be to engage a PhD research group on a research farm, where many of the variable factors could be controlled.

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January 2007 / PIRD OUTCOMES

Next steps

As a result of this trial, members of the group are now confidently using the herbal drench as part of their organic control of GI parasites.

All members of the group are now highly skilled at administering oral drenches, and watching for stock that spit out the drench, and thus avoiding drench failures. Another benefit of this trial has been a much greater understanding of the benefit of performing regular faecal egg counts, instead of simply drenching on a regular basis. Many group members were very surprised to find they had nil to very low worm egg numbers, at times when they might ordinarily have drenched the whole mob. Faecal egg counts can be much cheaper and easier to perform than blindly drenching an entire flock of animals – and they provide an accurate measure for ongoing effectiveness of drenches, and allow early detection of drench resistance. Many of the traditional farmers that were involved in the trial (ie. non-organic) were simply looking for alternatives to use in between chemical drenches, in an attempt to lessen their dependence on clear, white and ivermectin based products, and to prolong the effectiveness of these drenches before resistance emerged.

Many of these farmers have been considering a change to organic or biodynamic farming, driven by the potential for increased prices for product, increasing world demand, and the potential for improved soil management and productivity. The ability to provide effective parasite control has been a critical issue for many of these farmers in making the change, and the results of this trial have encouraged several of them to proceed with their plans to make the change.

Further work in this field should include:

- Comparison to chemical drenches; and
- Total worm counts on cull animals.
 - determine if worms are killed, or if egg shedding is simply suppressed; and
 - determine which types of worms are affected by the drench.