

Takes you to the main page for this section

## **Livestock Research**

### **Alternative methods of Internal Parasite Control in Sheep**

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#### **Introduction**

Internal parasites of sheep are one of the most challenging aspects of organic livestock production. Control methods rely on management without the routine use of anthelmintics .

The development of anthelmintics in the past has allowed great increases in disease control. However, in more recent years, their overuse has led to the development of parasite resistance ( *Jackson and Coop, 1994* ). It is estimated that within the UK resistance is found in 15 - 44% of farms ( *Vipond, 1998* ).

Wormy sheep showing poor development

For organic farmers, success in controlling internal parasites depends on understanding the lifecycle of the parasites, and using different management approaches to achieve their reduction .

**Homoeopathy** is a method which does not kill worms but renders the gut an inappropriate environment for the establishment of worms ( *Sheaffer, 1996* ). The key principle behind the homeopathic method is that a substance can cure the symptoms in an ill animal that it can cause in a healthy animal ( *Wynn 1998* ). Paradoxically, the therapeutic effect of a toxic substance can increase as it becomes more dilute.

**Homeopathy is permitted and encouraged in organic farming** ( (External) Soil Association, 1999, Auckland, 1997 ). In well managed organic systems they can then be used as a good preventative measure. Regular practical diagnostic tests also assist in the monitoring and control of parasites.

#### **CASE STUDY**

##### **Aims of the Project**

- To examine the worm problem on a study farm in North East Scotland, UK, through examination of management procedures and to make recommendations for a whole farm strategy
- To carry out an experimental trial by testing the efficacy of a homoeopathy remedy as a dewormer.

## Methods

### 1. Management Procedures

Data was collected and analysed. These included:

soil analysis, field plans, history and management of the farm, nutritional information, veterinary records, blood serum analysis, post mortem results of a ram, and meteorological data.

### 2. Trial to test the efficacy of a homoeopathy treatment.

#### Experimental Details

- A total of 28 pregnant ewes were studied, all between 10-12 years old. Lambs were born in late April grazing with their mothers until weaning in late September. Ewes also received home-grown oats at 1/2lb per ewe daily.

Typical Strongyle eggs average size ~ 100 um

- These sheep were exposed to natural, mixed, predominantly *Ostertagia circumcincta* infection while grazing. This is one of the most common nematodes involved in parasitic infections in Scottish sheep.
- Faecal samples were initially taken in order to establish the severity of the worm burden. Average egg counts were 620 epg, justifying treatment.
- The ewes were randomly divided into two groups of fourteen.

**GROUP 1** was treated with a standard anthelmintic as a positive control.

Individual faecal samples were taken on the day of treatment and 3 weeks after treatment.

**GROUP 2** were transferred to penned stalls and treated with a homoeopathy drench on 2 different occasions. Individual faecal samples were taken on the day of treatment and 3 weeks after treatment - before a second treatment was administered. Final faecal samples were collected 7 days after the second treatment.

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**The FECPAK egg counting system allows a quantitative estimate of worm egg output**

Fresh faecal samples were obtained from the field and stored at <5°C. The concentration of nematode eggs in the faeces was estimated in a 10g sample with the (External) FECPAK® counting system.

- 10g of faeces were suspended in 30ml of water and left to soak.
- The sample was then crushed thoroughly to ensure it is totally broken down. This is done to release all the eggs from the fibres and other faecal debris.
- 30ml of the sample/water mix was measured out and topped up to 230ml in a measuring cylinder with saline/water solution (30% salt).
- The cylinder was inverted to ensure the contents are mixed thoroughly.
- The mixture is then filtered into a jug. It is important to ensure that the filter is wet before use. The jug was swirled to mix the filtered liquid.
- A sample was pipetted from under the surface of the liquid. The pipette was held horizontally to avoid eggs floating to the top of the pipette.

- The counting chambers are filled with the liquid, the liquid was stirred in between filling chambers 1 and 2. The slide was left to sit for 30 seconds. Both chambers were examined under the microscope at 10x for nematode eggs. The count sheet was filled out. Finally, eggs per gram were calculated by multiplying the number of eggs counted by 30. This procedure was repeated for every sample taken.

#### Anthelmintic

Levamisole 3% drench was used as the anthelmintic in the positive control. The dosage was at a rate of 14ml per ewe and it was administered orally.

#### Homoeopathic Remedy

BM62 (External) (Blue Merle) (External) was used as the homoeopathic remedy in group 2. The dosage was 10ml per ewe and it was administered orally.

#### Statistical Analysis

Mean values and standard deviations of the data were calculated. The faecal egg counts of the ewes were analysed by a paired 't' test using the Windows Minitab statistical package to determine significant effects of treatments. Level  $p < 0.05$  was considered significant.

## Results

### Management

- Soil data confirmed phosphorus and potassium well below normal. These imbalances indicate there may be further mineral imbalances, consistent with deficiencies in the sheep.
- Blood serum results indicated **low** Vitamin E, Copper and Vitamin B 12 and Selenium. Selenium and Vitamin E are interrelated: both have metabolic functions as well as antioxidant effects. Low Selenium levels are consistent with the occurrence of many selenium deficient pastures in the North-East of Scotland. 50% of ewes tested for selenium and copper were below normal and the rest were low (Figure 1)

#### Figure 1

**Trace Element Deficiencies in Ewes and Lambs 21/03/02:  
Serum Copper**

### Experimental

- The average pre-treatment faecal egg counts were **618 eggs per gram** indicating that the minimal parasite load required for anthelmintic evaluation was present. None of the animals showed clinical signs of infection although soft faeces from some animals were observed.

- The effect of treatment was readily apparent:

#### **Control Levamisole) Group**

**(a)** A paired t test demonstrated that the post treatment faecal egg counts (nil egg) were significantly different from the pre-treatment counts in the Levamisole group.

The **p value** was **0.001** (Figure 2).

#### Figure 2

**The Faecal Egg Counts of Individual Ewes in the  
Control (Levamisole) Group**

### **Experimental (homeopathic) Group**

(b) A paired t test demonstrated that overall, there was a statistically significant difference in the post treatment faecal egg counts using the homeopathy remedy.

The p value was 0.002 (Figures 3a and 3b).

#### **Figure 3a**

**The Faecal Egg Counts of Individual Ewes in the Homeopathy Group**

#### **Figure 3b**

**Mean Egg counts in the Homeopathy Group Showing Effect of Repeated Treatment**

### **Evaluation of Results**

- The high reduction in faecal counts observed with the levamisole drench is not totally beneficial to the animals, at least not in organic farming. Complete eradication of parasites is very effective as a short-term solution but leaves the host naïve to infection and such an animal put into a contaminated pasture may be seriously affected.
- The imbalances observed in the soil analysis indicate that there might be further mineral imbalances, all of which may be consistent with mineral deficiencies in the sheep.
- The ram, ewes and lambs had copper deficiency which may to some extent be due to the low copper content in the soil and therefore the herbage. Another possibility could be that absorption may be related to the age of the ewes or high levels of molybdenum or sulphur in the diet - which interfere with the absorption of copper.
- Low copper levels in the lambs are consistent with recent findings that treating ewes with copper, cobalt and selenium supplements has a greater impact on lamb worm burdens compared to only supplementing the lambs ( *Gray, 2002* ) Copper is well documented for having anthelmintic properties ( *Waller, 1999, Bang et al, 1990* ) therefore it is logical to presume that copper deficiency leaves the host more susceptible to worm infestations. In turn, high worm burdens in the host's gut can interfere with mineral absorption and in the case of copper leaves the host even more susceptible to the establishment of worms.
- The faecal egg counts of the ewes indicate that a **double treatment** with **Blue Merle 62** is highly effective in controlling egg output.
- The Means (n=14) (Figure 3b above) of the homeopathy treated group -

**373 epg pre-treatment,**

**72 epg post treatment**

**p=0.002**

- are even more interesting in that they occurred in parallel with the periparturient rise which is associated with survival of nematodes in pregnant ewes.

### **Recommendations for Worm Control Programme**

**After detailed discussions with the farmer, it was recognised that a worm control strategy needed to be implemented on the farm focussing on managerial and nutritional factors.**

1. A well planned and conscientiously implemented clean grazing system offers by far the best method of reducing the risk of parasitic gastro-enteritis on organic farms. Parasite control through clean grazing requires diligent husbandry and attention to detail (*Niezen et al, 1996; Thamsborg et al, 1998*). The lower stocking rates and more mixed farming systems found on organic farms suggest that implementing clean grazing will be easier than on some conventional farms (*Keatinge, 1996*).

2. It is also beneficial to introduce a disease monitoring strategy, in this case regular faecal egg counts, as a means of predicting when worm populations are becoming dangerously high. Faecal egg counting can be used in the long term by basing the selection of ewe lamb replacements on their ability to resist worm infection.

### **Preventive Medicine**

3. Homoeopathy compounds, *Blue Merle 62* or *Teucrium marum* (cat thyme) (*Lowman, 1990*) could be administered monthly over the summer grazing period to control infestations of stomach worms.

Homoeopathy does not eliminate all the worms, allowing the host to continue developing resistance. Homeopathy may therefore be useful for maintaining satisfactory welfare and health status of the animals in terms of preventive medicine, rather than being used as a treatment for clinically ill animals.

#### **Note:**

*There is no information available on the homoeopathy treatment used due to legal reasons and therefore further discussion is limited.*

*After consultation with Blue Merle, it was advised to give a second dose of the treatment after 2 weeks, however, this was not printed on the product label. The UK has laws on what can and cannot be claimed on labelling and advertising of treatments that have not been tested to the satisfaction of the Veterinary Medicines Directorate. Totally prohibited are claims implying that a treatment is capable of preventing, treating or curing any specific injury, ailment or any conditions of the mind or body unless licensed as a medicine. Homoeopathy labelling can only state recommendations and the information given is often limited.*

*Until changes occur in the legislation surrounding labelling of non-conventional medicine, it will be difficult for farmers to observe significant changes in their animals if the correct usage of the treatment is not marked on the label.*

Homoeopathy is reputed to having spectacular and rapid effects, but also some subtle and long term. Remedies may hold the situation stable, while not curing it, but this may be far more than could be hoped for with allopathic medicine, where agents to treat disease are totally unrelated to the target disease organism. Homoeopathy has its limits, but a major impediment to use is the current lack of scientific knowledge.

### **Summary of Recommendations for Study Farm**

- Emphasis should be on the whole system rather than dependence on external inputs.
- Diagnosis before treatment is of high importance.
- The administration of organic mineral supplements will help to increase host health and immunity in the short term.

- To achieve long term control, underlying problems such as soil imbalance need to be rectified in order to eliminate trace element deficiencies.
- Implementation of a practical clean grazing system.
- Inclusion of plants with natural vermifuge qualities, e.g. garlic into grazing pastures.

## **Conclusion**

Controlling internal parasites in sheep needs integrated animal health care, combining prevention and disease diagnosis with treatment. In order to achieve long term control the inter-dependence between soil, plant and animal should be considered. An animal's health and it's ability to resist parasites depends on the quality of what it eats, and the quality of what is eaten results from how the soil is managed.

Homeopathy can play an important role in achieving parasite control through stimulating nature to work more effectively both at farm and animal level. Parasite burdens in the sheep treated with a homeopathy compound were reduced by 81 per cent.

However, the amount of material available on the subject of homeopathy is extremely limited. More research is required before any definite conclusions can be reached. Further investigations could elucidate the effect homeopathy has on parasites. To date, few of the many researchers in veterinary homeopathy have addressed the issue of such treatment on parasites.

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