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EPIDEMIOLOGY OF GASTROINTESTINAL NEMATODES ON ORGANIC SHEEP FARMS IN CANADA

Interim Research Report E2007-24

BACKGROUND

The most serious veterinary problem in sheep production is gastrointestinal nematodes (GIN). Losses in sheep productivity due to nematode infections can be substantial if left unattended. These parasites are the greatest economic constraint of grazing livestock production. Even sub-clinical infections can have considerable impacts which may persist even after most of the parasite burden has been eliminated. The economic losses are associated with negative effects on animal health: reduced feed intake, reduced weight gain or loss of weight, lower milk production, inferior carcass quality, poor wool production, and increased mortality of young animals.

Given that conventional anthelmintics are highly regulated under the National Standard for Organic Agriculture in Canada, controlling internal parasites is a great challenge. Parasite control must rely on grazing management strategies rather than routine use of anthelmintics, and an adequate control of parasite infections is difficult to achieve. Alternative control strategies are required on organic farms to guarantee a sustainable balance between common parasites and the stock under organic mangement. Eradication of most helminth infections is, if not impossible, at least not practical. The aim of organic parasite control is to keep levels from having a negative economic impact while providing sufficient exposure to allow the development of natural immunity.

The **hypothesis** of this study is that the epidemiology of sheep gastrointestinal nematodes in Canada is substantially different than that described for warmer countries, and effective control of parasitism can be practised without or with reduced use of conventional anthelmintics.

To test this hypothesis we first need to determine the prevalence and patterns of gastrointestinal nematode parasitic disease in sheep flocks under local conditions. This will help develop management practices to reduce or eliminate conventional anthelmintics, leading to a sustainable parasite control system. Data generated at the farm level (management practices, parasite larval infectivity on pasture, parasite egg contamination, climatic conditions, control practices in use, etc.) will be used to develop models to predict the efficacy of different parasite control programs. These models will be valuable to both organic and conventional sheep production.

WHAT WAS DONE: YEAR 1

This is a three-year (May 2006-April 2009) epidemiological study to monitor the levels of gastrointestinal nematodes in organic sheep as well as studying farm management practices that can be used to minimize parasite burdens.

Collecting samples from a participating farm, June 2006.

During March and April 2006, participating farms were confirmed. The farms had to fulfill certain requirements, including the use of pasture from May to October for most animals, willingness to not mass treat the flock with any anthelmintics during the study unless clinical parasitism occurs, and good handling facilities. The first year of field work was launched in May 2006 when all farms were visited and animals and pastures were sampled. A questionnaire was given to the participating farmers; the responses will provide valuable information regarding management practices within each farm.

In the first year, 23 sheep farms in Ontario and 9 sheep farms in Quebec participated in the study. Monthly visits to these farms between May and October took place in order to collect fecal samples from ten randomly selected grazing animals from each of two age cohorts (adult and lambs), collect pasture samples, and monitor body condition scores, dag scores, and fecal consistency scores. The FAMACHA score for diagnosing the level of anaemia (blood lost) was also introduced later in the season.

All samples were taken to the lab and the following tests were performed: fecal parasite egg counts to indicate the sheep worm burden, fecal cultures for parasite larval identification; fecal samples for the presence of lungworm parasites in lambs and adult ewes, and pasture samples to determine pasture infectivity through parasite larval count and identification. Twice during the summer blood samples were taken in order to determine levels of anaemia.

Throughout May-November 2006, the following samples were analyzed in the laboratory:

- 4,248 individual fecal samples for eggs per gram faeces (GIN)
- 411 group fecal cultures (GIN)
- 231 pasture samples (GIN)
- 1,456 individual blood samples (GIN)
- 411 group Baermann test (lungworm nematodes)

At the end of the grazing season, two lambs from each of seven selected farms were transported to the Ontario Veterinary College for necropsy. These animals provided information on the overall dynamics of nematode populations and confirm parasite burden – both species and severity.

Organic sheep flock, July 2006 (S. Fernández)

CREDITS

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Executive Report of this project (PDF, 89 kb)