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IN PROGRESS

What are the economic impacts of parasitic roundworms?

Project Code:	ANH.04.17
Completed:	*In Progress. Results expected in March 2022.*

Project Title:

Assessing economic impacts and developing models for evidence-based decision support systems for sustainable parasitic roundworm control in Canadian beef cattle

Researchers:

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Background:

Internal parasites steal nutrients away from the animal and can cause production losses but Canadian data on this topic is old and based on feedlot cattle. Ivermectin-based pour-on products are inexpensive so they are sometimes used without first determining whether they are needed. This can lead to resistance, lost efficacy, and wasted money. Most pour-on products are very closely related, meaning that resistance to one encourages resistance to others. Parasite control options are limited if these products lose efficacy.

Cows consume L3 larva and shed parasite eggs. The eggs hatch and develop into L3 larva in the environment, so this stage is very climate dependent. An ability to accurately predict pasture contamination rates based on climactic conditions would help develop more appropriate parasite treatment protocols.

Objectives:

To investigate the production impact of roundworms, and the seasonal patterns of pasture contamination in commercial stocker beef cattle herds in Western Canada. Researchers will parameterize, test, and refine the GLOWORM-FL predictive model.

What They Will Do:

Production impacts of internal parasites will be determined in 20 herds of at least 100 head in both Eastern and Western Canada over two years of grazing the same pasture. In each herd, 25 head will be treated twice with Safeguard and Longrange 90-100 days apart to eliminate parasites. The remaining cattle will not be treated. Average daily gain and fecal egg counts (FEC) will be compared between treated and untreated stocker cattle. L3 larvae will also be collected and DNA sequenced to determine what worm species are present.

Soil level temperature, relative humidity, precipitation, and dewpoint will be continuously measured in six of these herds (three in Western and three in Eastern Canada). Fecal egg counts and DNA sequencing will be conducted using fresh fecal samples collected from each herd every six weeks during the grazing season to identify which species are present. Larvae on pasture will be monitored in spring, mid-summer and fall to assess pasture contamination.

A European computer model (GLOWORM-FL) will be used to predict L3 levels on pasture over time based on egg shedding rates, climate conditions for larval development, survival and migration to grass. Samples from the field studies will be used to infect cattle. Feces will be collected and incubated to produce known numbers of L3 larvae (*Cooperia* and *Ostertagia*). Artificial fecal pats will be made and kept in rainfall and temperature conditions typical of Canada. These will be used to study the migration of L3 from fecal pats under varying rainfall conditions, as well as mortality rates in dry fecal pats at temperatures ranging from -15 to 30oC. The results from these controlled experiments will be used to modify the European model for Canadian conditions, and the modified model will be validated against field data collected in the previous experiments.

Implications:

This project will provide up-to-date information on the prevalence and production impacts of parasitic roundworms, and a tool to reliably identify environmental conditions that warrant treatment. This will help slow the development of resistance and maintain the efficacy of treatments.

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