

## Determination of the Prevalence of Anthelmintic Resistance in Ontario Sheep Flocks with Indicators of Gastrointestinal Parasitism

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**Background:** Gastrointestinal nematode (GIN) parasitism is a severe and increasingly important production-limiting disease on sheep farms around the world. For many years, GINs have been controlled around the world using anthelmintics that belong to three major drug classes: benzimidazoles (e.g. fenbendazole), tetrahydropyrimidines (e.g. levamisole) and macrocyclic lactones (e.g. ivermectin). Within Canada, ivermectin is licensed for use in sheep. However, fenbendazole is commonly used off label; levamisole is not readily available. Anthelmintic resistance (AR) to all three major drug classes has been reported in many parts of the world, and was first reported in Ontario in 2007. However, the prevalence of AR in Ontario is, as yet, unclear. Such information is urgently required to generate management guidelines for sheep producers to control the impact of AR and to minimize the risk of the resistant parasites spreading further.

**Objectives:**

1. Determine the prevalence of drench failure to ivermectin;
2. Determine the prevalence of anthelmintic resistance in flocks with drench failure by using a fecal egg count reduction test (FECRT);
3. Identify risk factors associated with drench failure and anthelmintic resistance through a herd/flock management questionnaire; and
4. Establish and validate the Larval Development Test (LDT) for anthelmintic susceptibility in Ontario – a tool for use by veterinarians to provide results more quickly, at less cost and with less labor, than the FECRT.

**Methods:** Fifty flocks will be enrolled over two summers. On a monthly basis for the grazing season, the producers shall send in 15 fecal samples from lambs or ewe lambs in their first grazing season and the fecal egg counts determined. Once the mean fecal egg count reaches a 200epg threshold, ivermectin will be sent out to the producers. Two weeks after treatment, fecal samples shall be re-submitted to assess the egg count reduction. If drench failure results (i.e. egg count reduction is <90%), a Fecal Egg Count Reduction Test (FECRT) will be performed using ivermectin, fenbendazole and levamisole at the licensed doses. This will allow us to determine whether drench failure was due to AR or other mismanagement practices.

**Results:** During Summer 2010, we received monthly fecal samples from 25/25 farms. Of these, 23 farms had mean parasite egg counts that hit the threshold for treatment with ivermectin by producers:

- Drench efficacy (i.e. reduction >95%) occurred on 5 farms;
- Drench failure (i.e. reduction ≤ 95%) occurred on 16 farms;  
(1 farm did not treat with ivermectin and 1 farm never sent post-treatment fecal samples)

The Fecal Egg Count Reduction Test was conducted on 11/16 farms with drench failure.

Results have been completed for 10/11 farms.

- 10/10 farms tested were resistant to Ivermectin
- 6/6 farms tested were resistant to Fenbendazole
- 0/5 farms tested were resistant to Levamisole

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