# Internal Parasite Anthelmintic Resistance in Wisconsin
Summer 2005
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In March of 2005, Dr. Bliss and I visited at my veterinary clinic about internal parasite treatment protocols for cows and sheep. At the conclusion of the visit, we decided to conduct an informal survey of sheep flocks in Wisconsin to determine the effectiveness of the anthelmintic shepherds were using in their flocks. Intervet, a major animal health company, agreed to pay for all the fecal tests.

We opted to make the program as user friendly as possible. The protocol for the survey was to collect fecal samples from five to ten animals per cohort group prior to treatment and again one week later. We designated cohorts by age; mature sheep and lambs. We did not require that the same animals be tested on the pre and post treatment sampling. Our goal was to simply look on a flock basis, to see if the anthelmintics were working as expected.

Dr. Bliss used his standard procedures for fecal examination. They were semi-quantitative. The fecal worm egg count technique used was the "Modified Wisconsin Sugar Fecal Flotation Technique". Producers were responsible for shipping the samples chilled to his lab.

A total of fourteen flocks from Wisconsin, and one from Minnesota participated in the study. They represented twelve different counties around the state; as far north as Vilas county, south to Dane county, east to Outagamie county, and west to Monroe and Jackson counties. I invited flocks that I knew used pasture as a significant part of their summer forage for feeding the lactating ewe flock. The smallest flock was fifty ewes.

All of the major anthelmintic agents were used; levamisole, fenbendazole, albendazole, ivermectin, dormectin, and moxidectin. We did not get pre-treatment samples for the dormectin treated sheep, so no conclusion could be made about its efficacy. For simplicity sake, we defined resistance as the occurrence of the post treatment fecal floatation result greater than 10% for the pretreatment fecal floatation result. If this occurred once on a given farm, it was categorized as having resistance to the anthelmintic in that flock.

| Anthelmintic | No. of Resistant flocks | No. of Effective Flocks |
|---|---|---|
| Levamisole | 0 | 5 |
| Fenbendazole | 4 | 1 |
| Albendazole | 6 | 0 |
| Moxidectin | 0 | 1 |
| Ivermectin | 2 | 0 |

The total number of flocks listed in the table is greater than fifteen because more than one anthelmintic was evaluated in some flocks.

It is important to note that this was not a peer-reviewed study. The number of treatment groups, and the techniques used do not allow us to make blanket conclusions that are based on statistical significance. It is important to note that the level of fecal count reduction varied between flocks and treatments.

One conclusion that can be drawn is that levamisole is still working on internal parasites of sheep in Wisconsin. It also seems that there is resistance of internal parasites, particularly Haemonchus contortus, to the benzimidazoles (fenbendazole, albendazole). Resistance was also documented to ivermectin, but only two flocks were evaluated for resistance. Only one flock used moxidectin, which at the time was an extra label use of a cattle product; moxidectin is now available as a drench for sheep.

The two most important things we found out had nothing to do with resistance per say, but current management of our flocks. First off, all flocks had significant fecal egg counts (worm burdens) in the ewes at the time of the first spring fecal test. This means that the ewes were not clean at the start of the grazing season and were contaminating the pastures and exposing the lambs to significant challenges. We are currently addressing this issue this winter with some follow-up fecal testing and treatment.

The second important conclusion is that we need to be doing a better job of monitoring parasites. Each and every one of the results last summer was different. That's not surprising considering how different each sheep farm is. I hope that we walk away from this experience realizing that we need to be doing more fecal egg counts as a tool to know how we are doing controlling internal parasites in Wisconsin sheep.