

Maryland Small Ruminant Page

Which Dewormer(s) Work on Your Farm?

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Worms have developed resistance to all of the dewormers and dewormer classes (n=3) used to treat worm parasites in small ruminants. Resistance varies by geographic region and individual farm and is usually the result of past deworming practices.

Worms do not develop resistance to specific drugs, but instead they develop resistance to the drugs' mode of action (i.e. method of killing worms). Dewormers in a dewormer class share a mode of action; thus, when resistance develops to one drug, there is cross-resistance to the other drugs in the same class, even if one drug is initially more potent than another in the same class, e.g. albendazole vs. fenbendazole and moxidectin vs. ivermectin.



From an industry-wide standpoint, resistance tends to be highest for the benzimidazoles or “white dewormers” [2]. This is the oldest class of dewormers. It includes fenbendazole (SafeGuard®, Panacur®), albendazole (Valbazen®) and oxfendazole (Synanthic) [1]. Efficacy may be increased with increased exposure to the drug, but there is no guarantee that fasting and/or sequential dosing will be any more effective than a single dose. Fenbendazole is one of the drugs of choice for treating the meningeal worm.

Macrocylic lactones (or macrolides) represent another dewormer class. There are two sub-classes to this group: avermectins and milbemycins [1]. From an industry-wide standpoint, resistance tends to be high among the avermectins. The avermectins include ivermectin (Ivomec®), eprinomectrin (Eprinex®), and doramectin (Dectomax®). As with the benzimidazoles, efficacy may be increased with increased exposure to the drug. Ivermectin is also useful for treating external parasites (e.g. nasal bots) and is one of the drugs of choice for the meningeal worm.

Moxidectin (Cydectin®) is the only milbemycin. In the Mid-Atlantic region, resistance tends to be less for moxidectin as compared to avermectins and benzimidazoles [2]; however, moxidectin resistance is developing rapidly due to its widespread use and chemical similarity to ivermectin.

The third class of dewormers is called cell depolarizers, due to the way in which they kill worms. Levamisole (Prohibit®) is the primary drug in this class. It is the most potent and tends to be the most effective anthelmintic on most Mid-Atlantic small ruminant farms [2]. One reason for its continuing efficacy (on some farms) is the different way in which resistance develops. Less is known about morantel (Rumatel® and Positive Goat Pellet) and strongid, the other dewormers in this class.

Monepantel (Zolvix®) is the first member of the amino-acetonitrile derivatives (AADs) or “orange” drench class [10]. It is the first new class of sheep dewormer since the 1980’s [10]. It is not yet available in the US. While Zolvix® should be effective against resistant strains of worms (in the US), the first cases of resistance (to Zolvix®) have already been confirmed in countries where the drug has been available for several years [7].

No method of parasite control will be effective unless it is backed up by at least one effective dewormer. Even “natural” or organic methods of parasite control must rely on effective drugs for treatment of clinically parasitized animals. It is essential that sheep, goat, and camelid producers know which drug (or drugs) are effective on their farms, as it may be different than the norms discussed in this article.

There are two ways to determine drug efficacy: fecal egg counts and the DrenchRite® test. Before and after (treatment) fecal egg counts can be compared to determine the efficacy of an anthelmintic treatment [5]. This is called the fecal egg count reduction test (FECRT). An effective treatment will reduce fecal egg counts by 95 percent or more [3, 9]. Only animals with pre-treatment fecal egg counts ≥ 150 epg should be used for testing [9].

A fecal egg count reduction test needs to be done for each drug and for multiple animals. It can be costly and/or time-consuming. Many producers don’t have enough animals to get reliable results. A fecal egg count test will not identify the species of resistant worm(s).

The other method to determine anthelmintic efficacy is the DrenchRite® test or larval development assay (LDA). This is an in vitro (lab) test that uses third stage larvae to test for susceptibility to the different drugs [4]. The assay also identifies the type of parasites that are present in the manure sample [4]. The only place (in the US) that does the DrenchRite® test is Dr. Ray Kaplan’s lab at the University of Georgia.

At a cost of \$450 [8], the DrenchRite® test may seem like an expensive option. However, unlike the fecal egg count reduction test, it determines resistance to all drugs simultaneously from a single pooled sample. Moreover, its cost can easily be justified when you consider the value of a few animals that may die because they were not dosed with an effective dewormer. It would only take two 70-lb. market goats to cover the cost of the test. For high-value animals, it is even easier to justify the cost of the DrenchRite® test.

For more information about the DrenchRite® test, including pricing, instructions, and submission forms, contact Dr. Kaplan’s lab at (706) 542-0742 or jscb@uga.edu or bstorey@uga.edu

It is recommended that you check for drug resistance every 2 to 3 years, using one of these methods.

References and further reading

- [1] Choosing the right drug for worm control - What Works With Worms Congress
- [2] Dewormer resistance on farms in the Mid-Atlantic Area - Delaware State University
- [3] Detecting anthelmintic resistance - SCOPS (Europe)
- [4] The DrenchRite® Assay - American Consortium for Small Ruminant Parasite Control
- [5] Fecal egg counting for sheep and goat producers - University of Arkansas
- [6] How and Why Resistance Develops to Worm Remedies: W4 What Works With Worms Congress
- [7] Monepantel-resistant goat and sheep worms and drench-resistant cattle worms - WormBoss Australia
- [8] Personal communication, Sue Howell, University of Georgia (2/18/15)
- [9] Why do sheep and goat fecal egg counts? - Improving Small Ruminant Parasite Control in New England
- [10] Zolvix® (monepantel) - Novartis