

American Consortium for Small Ruminant Parasite Control

Best Management Practices for Internal Parasite Control in Small Ruminants

PROPER USE OF DEWORMERS

March 2019

INTRODUCTION

Treating goats, sheep, and camelids that are showing signs of internal parasitism effectively with dewormers is not a simple task anymore. New dewormer medications are not coming to market fast enough to outpace the development of high levels of resistance to the dewormers. Worm control strategies cannot rely totally on administration of dewormers, if they are to be sustainable. Other fact sheets have addressed the importance of pasture management and the importance of only treating animals with sub-optimal body condition scores, high FAMACHA© scores, and/or high risk circumstances, such as time of year, life stage, and condition of the rest of the herd or flock.

This fact sheet provides useful tips on how to maximize the effectiveness of dewormer treatments. Since many dewormers are used in an extra-label fashion, it is important to work with your veterinarian when planning treatment strategies.

USE ORAL DEWORMERS

Orally-administered dewormers put the drug where the worms are: in the stomach and intestines. As a result, more worms are killed when dewormers are given orally than when they are injected or administered topically. Some dewormers, such as ivermectin and moxidectin, are available in an oral, injectable, and pour-on formulations, but only oral forms are specifically formulated for small ruminants. Formulation matters, so with small ruminants, always use dewormers formulated specifically for oral use, rather than for other routes, to treat worms in the gut. Dewormers that you feed are not recommended unless the animal is eating well and can be individually dosed (fed).

Goats metabolize dewormer medications more



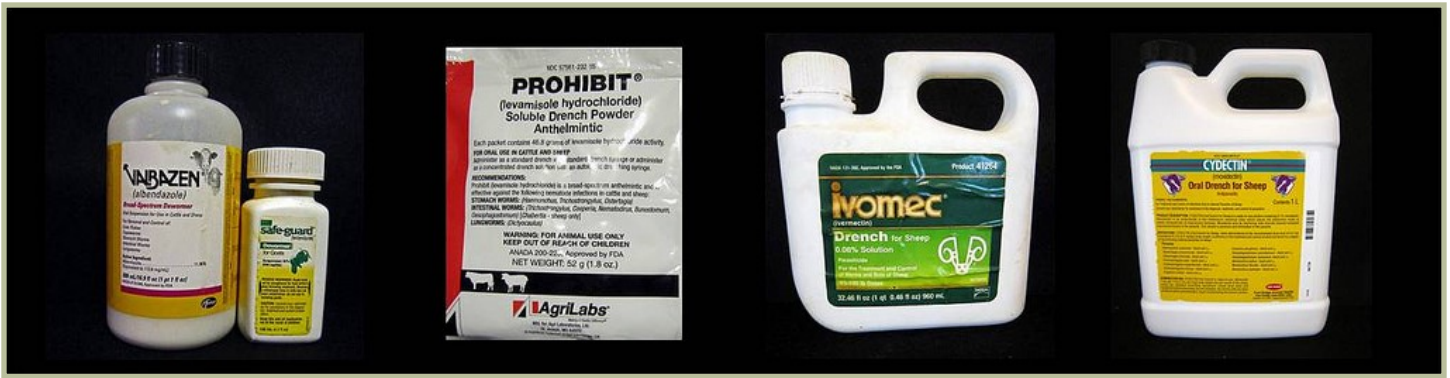
Formulation matters

Image by S. Schoenian

USE THE RIGHT DOSE

rapidly than sheep, so they require higher doses of dewormers. In most cases, the dewormer dose is doubled for goats compared to sheep. Levamisole is the exception to this rule: use a 1.5 times increase over the sheep dose in goats. Studies in alpacas and llamas indicate that, like goats, higher doses of most dewormers are needed in them, compared to sheep.

Convenient dewormer dosing charts for goats, sheep, and camelids are available at wormx.info. Scroll down under the “Topics” tab to find the “Dewormers” tab. The charts are available as free PDF files. Withdrawal information for meat and milk for treated goats and sheep is available at the bottom of the charts for those species. Note that there are multiple versions of these charts circulating on the internet, and some of these contain outdated information. Always use the most up-to-date versions from the wormx.info website.



Dewormers are divided into classes based on how they kill worms.

Image by S. Schoenian

MAXIMIZE TREATMENT

When administering dewormers, use a clear-barreled, graduated-dose syringe with a rounded nozzle tip (see image). Deliver the medication into the back of the throat. During administration, slightly elevate the animal's head above horizontal to minimize spillage. When large volumes are being administered, deliver the medication gradually to allow the animal time to swallow it without choking. If administering more than one dewormer at a time, administer them using separate dosing syringes. Make sure the dosing syringes are functioning properly to avoid erratic dosing. Store dewormers according to label directions (usually room temperature). Do not store in the barn or shed. Do not use dewormers past their expiration dates.

Weigh animals instead of approximating weights to ensure correct dosing. Underdosing can result in treatment failure. It can also promote the development of resistant worms. A sizable overdose of levamisole can result in toxicity and death, thus proper dosing is essential. However, the other dewormers are quite safe and moderate overdosing will not pose a safety issue and will increase the

likelihood that underdosing is avoided. A pet digital scale for large dogs works well to weigh most goats and sheep. These large dog scales are affordable and portable. Weigh tapes may be accurate for goats. If working with a large herd or flock, invest in an alleyway and weigh scale that rests in a chute system. This investment saves time and labor.



Do not mix dewormers.

Image by L. Williamson

Weigh animals instead of approximating weight to ensure correct dosing. Underdosing can result in treatment failure. It can also promote the development of resistant worms.



Weigh animals.

Image by L. Williamson

USE A COMBINATION

Use of a combination of dewormers from different classes at the same time is now highly recommended when treating worms in sheep, goats, and camelids. Recent studies have shown that most farms have worms that are resistant to at least two of the three dewormer classes. However, since not all the worms on the farm are resistant, the dewormer can still provide some benefit when used in combination with other dewormers. This strategy provides an additive killing benefit when treating resistant worms. Another benefit of using a combination of dewormers is that it also improves the spectrum of activity. For example, using a benzimidazole (white dewormer) in combination with moxidectin and/or levamisole might add only a small advantage for barber pole worm treatment, but it would help manage tapeworms, whipworms, and *Nematodirus* (thread-neck worm).

When using a combination of dewormers, be sure to give a full dose of each medication, sequentially, one right after the other. Use a separate dosing syringe for each drug. Do not mix the dewormers in the same syringe. Meat and milk withdrawal times are based on the medication used in the combination with the longest withdrawal time. An excellent review of the use of combination treatment is in the January 2017 Timely Topic, “Combination Dewormers: The Time is Now”, by Dr. Ray Kaplan (wormx.info website under Resources and Timely Topics tabs).

DEWORMER CLASSES

To use the combination dewormer strategy effectively, producers need a working understanding of which dewormers are in which of the three chemical classes. Dewormers are divided into classes based on the way they kill worms. Three chemical classes are available in the United States: (1) the benzimidazole class, (2) the membrane depolarizing class, and (3) the macrocyclic lactone class.

Producers are advised to test the products they use on their farms for resistance. This is the subject of another fact sheet, “Managing Dewormer Resistance” by Dr. Dahlia O’Brien (July 2018).

1. Benzimidazole Class

The benzimidazoles are called the “white dewormers” based on their appearance. This class of dewormers generally has a wide margin of safety. The two benzimidazoles most commonly used in small ruminants and camelids are (1) fenbendazole (Panacur®, Safe-Guard®), and (2) albendazole (Valbazen®). Albendazole is the most potent member of the benzimidazole class. It should not be used in the first 30 days of pregnancy because it can damage the fetus(es). Multiple day dosing of the white dewormers can improve efficacy, if the worms have only low level resistance. However, the resistance level to the benzimidazoles is so high in barber pole and black scour worms in the Southeastern US (and other areas) that multiple-day dosing is now of limited benefit. If albendazole is used for multiple days, it should be used at the recommended dosage.



Invest in a handling system.

Image by L. Williamson



2. Membrane Depolarizing Class

Members of this class include levamisole (Prohibit[®], Levamed[®]), morantel tartrate (Rumatel[®]), and pyrantel pamoate (Strongid[®]). Levamisole is the most potent member of this class, and it is also the most potentially toxic. To avoid toxicity, animals should be dosed according to an accurate weight. Further, the levamisole powder needs to be dosed according to the dilution method used. The package label lists several different dilutions, which can lead to dosing error. If using the dosing chart on the wormx.info website, follow the mixing instructions on the dosing chart. Otherwise, underdosing or overdosing can occur. Signs of toxicity can occur within an hour after receiving a 2X (or greater) dose of levamisole. Symptoms include excitability, salivation, trembling, staggering gait, urination, defecation, and collapse. An extreme overdose can result in death.

Morantel tartrate and pyrantel pamoate are less potent than levamisole, but they have a wider margin of safety. Morantel tartrate is more effective in ruminants than pyrantel pamoate. Note that pyrantel is not approved for use in food animals. Morantel is available as a feed premix or feed pellet, and it is approved for use in goats.

3. Macrocytic Lactone Class

Members of the macrocytic lactone class include ivermectin (Ivomec[®]), eprinomectin (Eprinex[®],

LongRange[®]), doramectin (Dectomax[®]), and moxidectin (Cydectin[®] Oral Drench For Sheep, Cydectin[®] Pour-On for Cattle, and Cydectin[®] Injectable for Cattle). Moxidectin is the most potent member of this class. It will even kill ivermectin-resistant worms for a while. However, when used on ivermectin-resistant worms, the levels of resistance continually increase in the worms over several grazing seasons, eventually leading to moxidectin losing its effectiveness. Most barber pole worm populations from sheep, goats, and camelids living in temperate parts of the United States are already resistant to ivermectin, and resistance to moxidectin is becoming more and more common. Studies have shown that the orally-administered members of this class kill worms more effectively than the ones given by injection or topical administration. Use oral ivermectin and moxidectin preparations formulated for oral use when treating worms in the gut.

SUGGESTED RESOURCES

Sheep and Goat Resources at ATTRA
attra.ncat.org/livestock/#sheep_goat

Wormx.info. See information under Topics and Resources tabs. Available at <https://www.wormx.info>.



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Fact sheets in the *Best Management Practices for Internal Parasite Control in Small Ruminant* series were written and reviewed by members of the American Consortium for Small Ruminant Parasite Control. They are for educational and informational purposes only. No practice described in the fact sheets stands alone as a method to control internal parasites. Each producer needs to implement the appropriate combination of practices that will achieve satisfactory control of internal parasites in their flock or herd. The fact sheets are not meant as a substitute for professional advice from a veterinarian or other animal science professionals. Some treatments described in the fact sheets may require extra label drug use, which requires a valid veterinarian-client-patient relationship.

For a complete list of fact sheets, go to <https://www.wormx.info/bmps>.