IOWA BEEF CENTER

INTERNAL PARASITES IN GRAZING RUMINANTS

Grazing animals are exposed to parasites throughout the grazing season. Both external parasites, such as fleas, ticks, flies, and lice, and internal parasites can infest animals and impact health and performance of grazing livestock. Even at relatively low levels, parasites can decrease animal performance and have negative economic impacts on producer profitability. Implementing a good parasite control program is an important component of herd health. This publication will focus on understanding and controlling internal parasites in grazing ruminants.

Pasture Management

Grazing systems and pasture management play a large role in controlling parasites in grazing livestock. To optimize pasture management, it is important to understand the parasite life cycle. For internal parasites, a cycle begins when eggs are excreted from grazing livestock in manure onto the pasture.

Once excreted, parasites develop into infective larvae within the manure pat. Infective larvae then migrate away from the fecal pat and onto forage that will be ingested by livestock. The time it takes for excreted larvae to become infective is highly dependent on the environmental conditions. Under warm, humid conditions, eggs can hatch and develop into infective larvae in 7-10 days; however, this time can be prolonged in cool or dry conditions.

Once larvae have reached an infective stage, they typically can survive on the pasture for six weeks, although some have been known to survive for up to three months depending on environmental conditions. Once larvae migrate away from the fecal pats, survival is highly dependent on environmental conditions; cool, humid conditions (fall-spring) are more favorable while very hot and dry conditions (summer) are detrimental. Once ingested, larvae develop into adults within the animal and begin producing eggs, continuing the parasite life cycle. Most species begin producing eggs approximately four weeks after being ingested by livestock. Effective pasture management aims at reducing free-living parasites on pasture and reducing uptake of infective larvae by grazing livestock.

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Grazing management can be implemented to control uptake of parasites on pasture and help mitigate risk of infection to grazing livestock. Maintaining adequate pasture resources by diluting areas of contamination can reduce exposure of livestock to concentrated parasite populations. This can be done by reducing stocking rate on continuously grazed pasture or implementing rotational grazing. These strategies help maintain adequate nutritional status of livestock while also maintaining adequate sward height to protect livestock from the high parasite density found in the microclimate at the forage's base. For optimum intake, recommended residual grazing height for cattle is no less than four inches, and no less than two inches for sheep and horses. These residual sward heights are also optimal for managing parasite intake for grazing livestock because most infective larvae are found on the bottom two inches of the herbage. However, cool, moist conditions can be favorable for larval migration higher up onto the herbage and increase the risk of larval uptake by livestock. Because parasites rely on moisture for movement onto the herbage, limiting grazing when grass is wet can help control intake of parasites by grazing animals. Furthermore, occasional pasture burning can disrupt fecal pats and eliminate free-living nematodes, further reducing chances of infection.

The key to successful worm control with rotational grazing is allowing enough rest time between grazings to kill larvae that were deposited on the pasture during the previous grazing period. Resting pastures for adequate amounts of time can allow for natural removal of parasites by environmental factors without reinfection by grazing animals. Following grazing, a pasture should be rested for at least twice the length of a parasite's lifecycle. The amount of rest time will vary between climates, with more temperate climates needing shorter rest periods. For the Midwestern part of the United States, 3-6 months rest is recommended to ensure a low-worm risk. Resting pastures during unfavorable conditions for nematode growth and development such as harsh winters or hot, dry summers can help provide cleaner pastures for the subsequent grazing season.

While there is some overlap, parasites are largely specific to a particular species. Although sheep and goats share common parasites, cattle have different parasites than small ruminants. Common parasites of small ruminants include *Haemonchus contortus*, *Teladorsagia circumcincta*, and parasites from the genus *Trichostrongylus*. Common parasites of cattle include *Ostertagia ostertagi*, *Trichostrongylus axei*, and several species from the genus *Cooperia*. Therefore, rotational grazing systems with different animal species can also help control parasites. Rotating between sheep and cattle or co-grazing species can help control parasites by creating clean pastures for each species. However, when co-habiting species, disease risk, animal management, and economic implications should be given special consideration.

Deworming

In conjunction with proper pasture management, treating cows with dewormer is an important component of an effective parasite control program. Several classes of deworming agents exist. Table 1 lists some of the most common products and important information about each class, including labeled dosage, withdrawal period, and the parasite they help control. Consult a veterinarian to determine the best product and program for a herd.

Resistance

While deworming and good pasture management can help reduce parasitic infections in grazing animals, some parasites are genetically resistant to treatment with dewormer. These resistant nematodes can pass resistant traits to their offspring and build up large populations of resistant nematodes, eventually reducing the effectiveness of current deworming products. While this resistance is less apparent in large ruminants, goats, sheep, and horses have had growing incidence of parasite resistance which has limited the effectiveness of chemical treatments. While this is a growing problem, there are management strategies that can be implemented to slow resistance and preserve the effectiveness of deworming products.

Refugia

Refugia is a population of nematodes that have not been exposed to dewormer and remain susceptible to treatment. Refugia can be managed in a herd by selectively treating certain animals and leaving some animals untreated. Selective treatment can reduce worm burden on pastures and within the herd while preventing production losses and maintaining susceptible worm populations. Identifying animals to treat can be done through production responses, stages of production, or parasite burden based on fecal egg counts.

Important classes of cattle to monitor include calves, yearling replacement heifers, first- and second-calf heifers, and mature cows older than nine years of age. These production stages represent the most susceptible animals in the herd and should be carefully monitored. Another identifier that can be used in sheep and goats is the FAMACHA (FAffa MAlan CHArt) system for identifying haemonchosis. By inspecting the ocular membranes (conjunctiva) for anemia, animals suffering from haemonchosis can be identified and treated individually rather than treating the whole herd.

Drug Combination Treatments

Although not commonly practiced, combination therapy has become an option for parasite control. Because worms develop resistance separately to various classes of dewormers, combination treatments that utilize different categories of dewormers simultaneously can improve treatment effectiveness and help reduce development of resistance in parasites. However, concerns of parasite resistance to multiple classes of drugs arise with this form of parasite control. Due to concerns with overdosing, drug interactions, and resistance it is always important to consult a veterinarian before utilizing combination treatments.

Another strategy to avoid parasite resistance is to alternate between classes of drugs every year or every other year. This strategy can reduce parasite exposure to a certain class of drugs and reduce the buildup of parasite resistance to commonly used dewormers.

Biological Control

Biological control and pasture management are essential components to naturally control free-living stages of parasites. These components can be highly effective in reducing the use of dewormers in grazing livestock and thus minimizing risks of anthelmintic resistance. As previously mentioned, resting pastures for 3-6 months can help naturally remove free-living parasites and provide a clean pasture for grazing livestock. Because parasites develop and survive in fecal pats, dragging or tilling pastures to break up manure pats can also reduce parasites on a pasture. Other parasite species often found in pastures, including earthworms and dung beetles, can break up fecal pats and interfere with the environment of developing larvae.

Various grazing systems can also aid in parasite control. Rotational grazing can be helpful in managing free-living larvae on a pasture. By maintaining adequate pasture resources, livestock exposure to parasites is limited. Also, rotational grazing can help disperse manure more evenly throughout the pasture and reduce large amounts of contamination where animals typically congregate, including shaded areas and water sources. Limited time on each pasture can further limit pasture infestation. Similarly, mob grazing can reduce shedding on the pasture, limit parasite exposure to animals, and evenly distribute manure throughout the pasture.

Confined or drylot operations provide a unique method of parasite control in cow-calf production. While an initial anthelmintic treatment will need to be given to cows and calves coming off pasture to eliminate any lingering infection from grazing, there is little to no subsequent exposure to parasites and thus reduces the need for chemical control once the animals are no longer on pasture. Depending on the type of system used, either partial or total confinement, these systems provide an opportunity to greatly reduce the use of chemical products in cow-calf production.

Recognizing Resistance

The key to controlling resistance is recognizing that it exists. One way to monitor herds for resistance is by using fecal egg reduction tests (FECRT). This method compares the number of parasite eggs in the feces before and after deworming. The time between treatment and second egg counts is dependent on the class of dewormer used. For benzimidazoles a sample should be taken 8-10 days after treatment and for macrocyclic lactones a sample should be taken 14-17 days after treatment. Egg reduction less than 95 percent may be an indication of resistance within a herd.

Summary

Gastrointestinal parasites can be an issue in all ruminant grazing systems. Biological control such as proper pasture management in conjunction with a dewormer can greatly reduce the impact parasites have within a production system. Environment, parasite, and host are three components that should be taken into account when implementing an effective parasite control program. Special consideration should be given to strategies that minimize nematode resistance to commonly used classes of chemicals. As with any healthcare protocol, parasite mitigation strategies should be done in consultation with a veterinarian.

Table 1. Common deworming products

Mode of Administration	Trade Name	Drug Ingredient	Drug Class	Labeled Dosage	Withdrawal Period	Specificity
Pour-On	Ivermectin	Ivermectin	Macrocyclic Lactones	1 ml/22 lbs	48 d	Roundworms, lungworms, external parasites
	Eprinex	Eprinomectin	Macrocyclic Lactones	5 ml/110 lbs	0 d	Roundworms, lungworms, external parasites
	Dextomax	Doramectin	Macrocyclic Lactones	5 ml/110 lbs	45 d	Roundworms, lungworms, eyeworms, external parasites
	Cydectin	Moxidectin	Macrocyclic Lactones	5 ml/110 lbs	0 d	Roundworms, lungworms, external parasites
Injectible	Ivomec	Ivermectin	Macrocyclic Lactones	1 ml/110 lbs	35 d	Roundworms, lungworms, external parasites
	Ivomec Plus	Ivermectin	Macrocyclic Lactones	1 ml/110 lbs	48 d	Roundworms, lungworms, liver flukes, external parasites
	Longrange	Eprinomectin	Macrocyclic Lactones	1 ml/110 lbs	48 d	Roundworms, lungworms, external parasites
	Dectomax	Doramectin	Macrocyclic Lactones	1 ml/110 lbs	35 d	Roundworms, eyeworms, lungworms, external parasites
	Cydectin	Moxidectin	Macrocyclic Lactones	1 ml/110 lbs	21 d	Roundworms, lungworms, external parasites
	Levasole/Tramisol	Levamisol	Levamisole	2 ml/100 lbs	7 d	Roundworms, eyeworms, lungworms
Drench	Panacur	Fenbendazole	Benzimidazoles	2.3 ml/100 lbs	7 d	Roundworms, lungworms
	Safe-Guard	Fenbendazole	Benzimidazoles	2.3 ml/100 lbs	8 d	Roundworms, lungworms
	Levasole	Levamisol	Levamisole	1 ml/50 lbs	48 h	Roundworms, lungworms
	Synanthic	Oxfendazole	Benzimidazoles	2.5 ml/110 lbs	7 d	Roundworms, lungworms, tapeworms
	Valbazen	Albendazole	Benzimidazoles	4 ml/100 lbs	27 d	Roundworms, lungworms, liver flukes, tapeworms
Bolus	Levasole Boluses	Levamisol	Levamisole	1 bolus/50 lbs	48 h	Roundworms, lungworms
Block	Safe-Guard	Febendazole	Benzimidazoles	1.67 mg/2.2 lbs per day for 3 days	11 d	Roundworms, lungworms
Feed Additives	Safe-Guard	Febendazole	Benzimidazoles	1 lb/100 lbs	13 d	Roundworms, lungworms
	Tramisol	Levamisol	Levamisole	--	48 h	Roundworms, lungworm, liver fluke
	Rumatel	Morantel tartrate	Tetrahydropyrimidine	0.44 - 4.4 grams per lb of feed	14 d	Roundworms
Paste	Safe-Guard	Fenbendazole	Benzimidazoles	2.3 mg/lb	8 d	Roundworms, lungworms
	Panacur	Fenbendazole	Benzimidazoles	2.3 mg/lb	8 d	Roundworms, lungworms
Powder	Safe-Guard	Fenbendazole	Benzimidazoles	--	13 d	Roundworms, lungworms

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