Factsheet

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Pasture Management for Reducing Gastrointestinal Parasite Infection in Sheep

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INTRODUCTION

One of the challenges of using pasture in a sheep operation is parasitism. To manage parasitism, a parasite control plan should be developed with the flock veterinarian. A parasite control plan will be specific to each farming operation and address monitoring and treatment of animals, the use of dewormers and overall control of parasites in the flock management system. *The Handbook for the Control of Internal Parasites of Sheep & Goats* is a good resource that explains all aspects of the control of internal parasites for sheep. Pasture management techniques are an important part of a flock management system to control parasites.

Implementing pasture management techniques without also implementing best practices for dewormer use may speed up parasite resistance to deworming drugs on your farm.

This factsheet is limited to the discussion of pasture management strategies to reduce infective parasites. Pasture management strategies are divided into three sections:

- reducing the number of parasites picked up by the sheep or sheep infection
- reducing the number of parasites on the pasture field
- prioritizing grazing based on animal risk

REDUCING SHEEP INFECTION THROUGH ROTATIONAL GRAZING

Parasite eggs are deposited on pasture in the feces of infected sheep. Egg development and hatching into infective larvae varies with weather conditions. Larvae can survive for weeks and in some cases months on pasture. When temperatures are 25˚C or hotter and conditions are moist, *Haemonchus contortus* eggs passed in the feces can reach the infective stage in as little as five days.

Sheep grazing for more than three or four consecutive days on *Haemonchus* infected pasture in hot and humid weather conditions can rapidly reach high levels of parasite infection.

Rotational grazing systems are pastures that are subdivided into smaller paddocks. The paddocks may be created with either permanent or temporary fencing. Sheep only have access to one paddock at a time. Moving the flock to a new paddock and away from their fresh feces before larvae reach the infective life stage plays a big role in reducing parasite loads in the sheep. Electric netting is a common type of temporary fence used to create a rotational grazing system (Figure 1).

In Ontario, most paddocks in rotational grazing systems are grazed three to five times per year to take advantage of high-quality grass regrowth. Unfortunately, **multiple**

Figure 1. Electric netting used in rotational grazing system.

grazing events in a year also build up pasture contamination and the timing when the grass is ready to be grazed again will align with when parasite larvae are in an infective life stage. Farmers need to use additional strategies within their rotational grazing system to keep sheep infection levels low.

Lengthening the Rest Period for the Pasture

Sheep are most likely to become infected when pasture plants have recovered from previous grazing and regrown to provide palatable, high-quality forage. Depending on the time of year, this regrowth may take 21 to 60 days. Prolonged exposure to hot, dry conditions can reduce larval survival and thus lower pasture contamination. Sheep farmers use a few methods of lengthening the rest period, including alternating haying and grazing, alternating grazing with different livestock species and stockpiling pasture.

Formulas for calculating the number of paddocks required based on the grazing and rest periods, as well as the acreage requirements based on forage supply and flock size, can be found in *Publication 19: Pasture Production*, starting on page 68.

Alternating Grazing and Haying

In fields where the terrain allows equipment access, alternating haying and grazing can be an easy way to extend the time between grazing events without sacrificing forage quality. Grass growth is very rapid in the spring and most flocks cannot keep up to the amount of high-quality forage available. Taking a first cut of forage off some paddocks preserves high-quality feed that can be used over winter. The flock will graze the regrowth that would be second cut in a hay-only system. Meanwhile, the paddocks that were grazed in the spring are cut for forage (around second cut timing) instead of being grazed when they regrow.

Publication 30: Guide to Forage Production has more information on harvesting and storing forage.

Alternating Grazing with Sheep and Other Livestock (Mixed Stocking)

When a paddock has recovered from being grazed by sheep, it can be grazed by a herd of cattle. The cattle ingest the larvae as they graze, but since they are not a host for most sheep parasites, the parasites are unable to complete their lifecycle. This lowers the parasite population on the pasture. The plants need another rest period to recover and regrow before being grazed by sheep again.

Alternating livestock species for each grazing event in a paddock is more effective than either co-grazing (grazing sheep and cattle together) or using a leader-follower system where the cattle enter a paddock immediately after the sheep have left. Neither of these scenarios allow time for parasites to develop into their infective stages before introducing cattle to the pasture. If the parasites cannot infect livestock, the ability for cattle to disrupt their lifecycle is limited.

Do not co-graze sheep and goats or use them in a mixed stocking or leader-follower system. Goats are very susceptible to the same gastrointestinal parasites that cause issues in sheep. Grazing sheep and goats on the same pastures will make parasite issues in both species

worse. Llamas and alpacas also share parasites with sheep and will not reduce the population of parasites on pasture.

Horses are not hosts for major sheep parasites, but they are difficult to manage as grazing livestock. For this reason, horses are likely less effective than cattle for mixed stocking with sheep.

Stockpile Pasture

Pasture managers may choose not to bring livestock back to a paddock when it is ready to be grazed again. Instead, they "stockpile" that growth — let it keep growing and save it for later grazing. Usually, pasture is stockpiled either in the spring to graze during the summer slump, or in the late summer and early fall to extend the grazing season into late fall or for an early spring start.

Forage quality is usually lower on summer stockpiled pasture because the plants have matured. Dry ewes can often meet their nutritional needs on summer stockpiled pasture, but young stock or lactating ewes usually need supplemental feed for energy and protein. The life and production stage of the flock at the intended grazing time should be considered before stockpiling.

Tall fescue, smooth bromegrass, birdsfoot trefoil and Kentucky bluegrass are all pasture species that stockpile well. These tend to retain forage quality better than other species.

Maintaining a Targeted Grazing Residual Above 5 cm

Pasture managers with rotational grazing systems plan to leave some grass behind. This "leftover" grass is the grazing residual. Residual helps keep the grass plants healthy and protect the soil. Unlike how mowers cut, livestock do not graze evenly, so the residual will vary across a paddock. Increasing stocking density makes animals less selective about what they eat and results in more even residual across the paddock.

Stocking density is the relationship between the number of animals and the specific unit of land being grazed at any one time: an instantaneous measurement of the animal-to-land area relationship. It is a measure of animal impact, since increasing stocking density results in more uniform manure distribution across the pasture and less selective grazing by the livestock. Increasing the stocking density means that livestock need to be moved more frequently, because they will eat all the forage in the smaller paddock in less time. However, this can also enable longer rest periods for the smaller paddocks. Stocking density is often confused with stocking rate, however they are not the same thing.

Stocking rate is the relationship between the number of animals and the total area of the land over time — usually over the entire grazing season.

For example: a continuously grazed pasture has a stocking density equal to the stocking rate. Every time that pasture is subdivided into smaller paddocks, the stocking density increases but the stocking rate stays the same, since the number of animals and the total grazeable area do not change.

Since most parasite larvae are in the bottom 5 cm of the pasture canopy, pasture managers should set their target grazing residual above 5 cm to reduce the number of parasites sheep pick up. When the grass is nearly grazed down to the target residual, it is time to move the flock to a different paddock.

Figure 2 shows how much grass sheep farmers should aim to leave behind after each grazing event — to reduce parasite ingestion.

Figure 2. Example of a pasture grazed to 5 cm residual.

MANAGING THE PASTURE FIELD TO DECREASE PARASITE CONTAMINATION

The level of parasite contamination on the pasture also influences how likely severe infections are. Pasture management practices that decrease the parasite population outside the sheep contribute to lower sheep infection.

Manure Management Matters

Composting Manure Before Spreading

Fresh manure contains parasite eggs and larvae. Spreading manure on pastures will spread parasites, which grazing sheep may pick up. Plan to spread manure on grain fields that are not grazed, or hay fields and pastures that are about to be terminated and seeded into a different crop.

Composting is an aerobic form of decomposition that involves carefully managing the moisture, temperature and carbon-to-nitrogen ratio of the manure to kill parasite eggs and larvae. Old manure piled up somewhere and left to rot on its own is not compost. Properly composted manure may be spread on pastures to provide nutrients for plant growth.

High Stocking Densities Can Break Up Fecal Pellets

Fresh feces are deposited directly on the pasture by grazing sheep. High stocking densities increase the odds that fecal pellets are broken apart by hoof action. This exposes the parasite eggs and young larvae within the pellet to sunlight, extreme heat and freezing temperatures, which can kill them. The drawback of this approach is that infective larvae will not be killed and may be spread further around the pasture.

Mechanical harrowing with a chain drag is sometimes suggested to break up fecal pellets and expose eggs and young larvae to sunlight and extreme weather. However, for the drag harrow to contact most pellets, the grass would have to be shorter than the target residual of 5 cm. This means that likely the sheep have already ingested many parasites from grazing too close to the ground. For this reason, mechanical harrowing is not normally recommended for breaking up sheep fecal pellets.

Using Crop Rotation to Create Safe Pasture

In the context of parasite management, “safe pasture” refers to pastures that have low or very low levels of parasite contamination. The time it takes for parasite eggs and larvae to die off on pasture varies with weather conditions and production systems. Discuss with your veterinarian to determine which paddocks may provide safe grazing on your farm.

Fields that have not had small ruminants grazing on them, or manure applied to them, for at least 12 months can generally be considered safe pasture. Hay fields or pastures in their establishment year are commonly safe pastures. Cover crops or annual forage crops grown in rotation with grain crops are also usually safe pasture. *Publication 30: Guide to Forage Production* has more information on establishing both perennial and annual age crops. Oats are inexpensive and easy to grow. They are a good option for farmers who are new to managing annual crop grazing (Figure 3).

Figure 3. Oat crop for annual grazing.

Consult your agronomist (or your seed and crop inputs provider) and your nutritionist (or feed provider) to assist with the development of a crop plan. Determine how many acres of safe pasture you need each year and build a crop rotation around that. The rest of the crop plan will make sure you have enough forage and pasture at an appropriate quality for the entire flock each year. Crop planning should always be anticipating 18 months to two years ahead, but initial planning should project even further to assess “what if” scenarios and

the consequences of different actions. The hardest part is sticking to the plan. Resist the temptation to put less susceptible animals on safe pastures, as having enough safe pasture is usually the most limiting factor.

Reducing Thatch in Old Pastures

Parasite larvae move up the stems and leaves of pasture plants by swimming through the moisture present on the outside of the plants. This water may be from dew or rain. On warm, sunny days, larvae typically can only move up 5 cm above the soil surface before water evaporation forces them back down.

Pastures with a thick thatch layer trap more moisture in the lower canopy and may enable larvae to move higher up the plant. Pastures that feel "spongy" underfoot have too much thatch.

Increasing the stocking density will encourage sheep to trample dead plant material into the soil surface, where it will decompose quickly. The higher stocking density also reduces how selective the sheep are when grazing. This minimizes the number of plants that mature and become unpalatable, which is a major source of thatch build-up.

Mechanical dethatching is not common on Ontario pastures. It is usually easier and more cost-effective to manage excessive thatch with higher stocking densities. Tine harrows may pull some thatch out of the bottom of a stand, but they also tend to pull up the grass. Purpose-built turf dethatchers may not be able to handle heavy thatch in tall grass. After mechanical dethatching, the thatch must be removed from the field.

PRIORITIZING WHERE TO GRAZE BASED ON ANIMAL RISK

Adult sheep develop some tolerance to parasites and some sheep are more genetically tolerant or able to mount a better immune response than others. This means that adult sheep may be able to graze pastures with low to moderate contamination without ill effects.

Grazing Lambs on Safe Pastures

Lambs are the most susceptible to parasite problems. They have a small body size and have not yet acquired immunity to gastrointestinal nematode parasites, which means it does not take very high parasite loads to affect weight gain and overall health.

By late July and throughout August, lambs are shedding eggs from parasites they picked up in the spring, before weaning. Once-over grazing systems, where weaned lambs do not re-graze a paddock that has already been grazed that year, are ideal for keeping their parasite load low. Adult sheep may be used to graze the regrowth, but the paddock can no longer be considered safe. Be sure to plan so that a safe pasture is available each year for lamb grazing, or plan to house and feed weaned lambs instead.

Parasite Shedding During Late Gestation and Lactation

There is an increase in the number of parasite eggs in ewes' feces from late gestation through their lactation as their immune system temporarily weakens. The simplest way to reduce reinfection and minimize the number of parasites new lambs ingest is to house the flock during this time, though the ewes may still exhibit parasitism in the barn.

However, housing is not a viable option for flocks that lamb out on pasture. Pasture lambing should be done on safe pasture. Low stocking densities are necessary during pasture lambing to reduce mismothering. This also provides ewes with more opportunity to graze away from fecal pellets, since the grazing period in a paddock may be longer than three days to accommodate bonding between newborn lambs and their dams.

Supplement the flock with a quality source of by-pass protein and a balanced mineral to help support an immune response to parasites in the ewes. Work with a nutritionist to identify what your flock needs.

Paddocks that have been used for lambing will be highly contaminated afterwards if no other control measures have been used, due to high egg shedding from the ewes. Talk to your veterinarian about selective treatment to prevent parasite resistance to dewormers. Since lambing happens every year and the safe pasture may become highly contaminated after one grazing event, consider lambing on annual forage crops in a grain rotation to provide safe pasture each year. Where this is not practical, integrate as many other strategies to reduce sheep infection and parasite contamination as possible on these paddocks.

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