

MANAGING INTERNAL PARASITES IN SHEEP

By Janet Wallace

The goal in organic sheep production is to manage, not eliminate, internal parasites.

A healthy animal can tolerate low numbers of parasites. However, a heavy parasite load, particularly in a stressed animal, can lead to poor weight gain, a loss of condition, anemia and even death. The key is having healthy animals and minimal exposure to parasites.

To avoid a build-up of parasites on pastures and in animals, organic farmers focus on pasture rotation, nutrition and breed/individual selection. At times, synthetic dewormers may be needed and are allowed under certain conditions (see box).

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To manage internal parasites, OSC researchers led by Dr. Andrew Peregrine are learning more about the life cycle of parasites on Canadian sheep farms. The most common and problematic internal parasites on Canadian sheep farms are *Trichostrongylus* species, *Haemonchus contortus* (barber-pole or wireworm), and *Teladorsagia circumcincta* (brown stomach worm).¹ Their lives are divided—on the pasture and in the bodies of the sheep—as described below.

On pasture

Parasite eggs are excreted by infected sheep. Within the fecal pellets, the larvae grow and develop. At 15–20°C, it takes about three weeks for eggs to hatch and develop into the infective stage. In moist, warm conditions, larvae can travel up to 30 cm away from the pellets and 5 cm up stalks of grass.

The optimal temperature for the black scour and

The Canadian organic standard (sections 6.7.4 and 6.7.9) requires that farmers “have a comprehensive plan to minimize parasite problems in livestock.” Farmers can use parasiticides (chemical dewormers) under the following circumstances:

- Fecal samples or animal examination indicate the animal is infected with parasites.
- A veterinarian has prescribed the drug and specified the dosage.
- Withdrawal times are twice the label requirement or 14 days, whichever is longer.
- Slaughter animals under one year of age are treated only once, and older slaughter animals can receive a maximum of two treatments (if they receive more, they lose their organic status).
- Ewes may be treated during gestation.

brown stomach worms is 16–30°C, while the barber-pole worm prefers humid and warm conditions (25–37°C).

Under freezing or very dry conditions, larvae can become dormant. Many species can survive Canadian winters while dormant. However, Drs. Peregrine and Menzies found that *H. contortus* does not overwinter well on pastures. According to University of Guelph researcher Laura Falzon, “Very few barber-pole worms (which are considered the most pathogenic since they feed on blood) survive well on pasture. Those that do survive are not very infective in the spring time; therefore, the pastures are to be considered essentially clean of barber-pole worms after the winter.”



Lambs raised alongside ewes while inside barns or when the ground is snow-covered avoid infection from parasites.

In the gut

After being ingested, the worms moult and feed on the sheep's protein and blood. At this point, the parasites may do one of two things:

- 1) During the grazing season, the larvae develop into adults and lay eggs, which are excreted two to three weeks after the larvae were ingested.
- 2) If larvae are ingested by ewes in late summer, the larvae often remain inactive all winter. During this time, they will not cause symptoms or be detected in fecal tests (which count worm eggs).

In ewes, these larvae mature just before lambing, when the ewe's immune system is stressed; this is called peri-parturient egg rise. The ewe may shed large numbers of parasite eggs that can contaminate the pastures for the young lambs grazing with them. Lambs raised alongside ewes while inside

barns or when the ground is snow covered would avoid infection. This peak in parasites around lambing may also cause parasitic disease in ewes.

Avoiding infection

Stress, including nutritional stress, weakens a sheep's immunity. Ewes carrying multiple lambs tend to have more stressed immune systems and heavier worm loads than ewes with single lambs.

A good diet helps animals tolerate and resist parasite loads. Keeping ewes on a good plane of nutrition before and after lambing may reduce their parasitic load and minimize the effects of the worms. In particular, the diet should contain adequate levels of 'bypass protein' (e.g., roasted soybeans).

Certain forages, such as birdsfoot trefoil, chicory and sainfoin, contain condensed tannins which may reduce parasitic infections in sheep.^{2,3,4} Con-

densed tannins inhibit parasites and increase the sheep's resistance by improving their digestion of protein. Livestock should not be fed such plants exclusively, but rather as part of a forage mix. Using pastures with trees, particularly willows and conifers, may also reduce parasitic infections.⁵

Reducing exposure to parasites

Rotational grazing can help prevent a build-up of parasites on pastures. Researchers found that sheep under intense rotational grazing (i.e., five days per pasture) tend to have lower worm egg counts than those on longer rotations.⁶ A less intensive rotation that moves the sheep every two to three weeks (once the forage is grazed to 1.5 cm in height) will maintain forage quality and reduce parasite populations to a certain degree. However, larvae can remain in their infective stage for up to three months in the summer. Overstocking exacerbates parasite problems.

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Heavily contaminated pastures should rest for a year, or be plowed and re-seeded with forage or field crops. Rotating the pastures with cattle helps to control parasites while maintaining forage quality. Goats, however, host the same parasites as sheep.

Thick thatch protects worms from freeze-thaw cycles and sunlight (which dries them out, thereby affecting their survival and development). To reduce

Certain dewormers (e.g., benzimidazoles) are most effective when the sheep have not been fed for 12–24 hours before the treatment. Veterinarians can provide advice on using these drugs.

thatch, farmers can clip or groom pastures, or graze cattle or horses.

Protecting the most vulnerable sheep from exposure

If possible, farmers should avoid putting sheep, particularly lambs and pregnant or lactating ewes, on wet pastures. Heavy morning dews and showery weather allow larvae to travel to the top of the grass where they are most likely to be ingested by sheep.

Lambs are born without immunity to parasites. Lambs born on pasture are exposed to high levels of parasites from the start because ewes release a high number of eggs around lambing time.

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The time of peak infection in lambs varies. In hot, wet weather, the peak may occur in early summer. If the summer is cool, the peak might not occur until the fall. After four to five months of exposure to worms, the lambs develop immunity that helps them resist parasitic infection.

The timing of lambing and weaning affects parasite loads. One option is to lamb in late winter and wean early (5–6 weeks of age) before the ewes go onto pas-



Participants of the OSC study on pasture.

ture. This way, the lambs will not be exposed to the heavy parasite load shed by the ewes.

The stress of weaning makes lambs more vulnerable to parasitic infection. One option is to send lambs to market before weaning. Weaned lambs should graze the cleanest pastures, such as those used the previous summer to graze ewes, not lambs. (Yearlings and non-lactating ewes shed fewer parasite eggs than lambs.)

Which sheep to deworm

The OSC research team studying sheep parasites does not recommend that producers treat all their flocks at specific times. Instead, they recommend:

- Monitoring the animals using fecal egg counts, weight gains, evidence of bottle jaw, diarrhea and FAMACHA scores.*
- Treat only when there is the need to treat.
- Treat only the animals that need treatment.

* Veterinarians (or farmers who have received FAMACHA training) compare the colour of the inside lower eyelid to score cards to identify individuals infected by *H. contortus*. Note that on-line score cards can be inaccurate.

When it comes to treating pregnant ewes, Dr. Menzies suggests treating ewes that are lambing for the first time, ewes that are carrying multiples, and ewes that are in poor body condition.

Lambs can be monitored during the summer by checking their condition and weight gain, and through fecal egg counts. To avoid disease and possibly death, lambs should be treated when they show signs of parasitism or when fecal egg counts are high.

Avoiding dewormer resistance

Ideally, farmers should rotate families of drugs every year or two. This reduces the risk of resistance more than alternating drugs between treatments within a year.

To avoid contributing to parasite resistance, researchers recommend that after deworming, sheep go onto lightly contaminated (not parasite-free) pastures for three to five days.⁷ Here, the sheep will ingest some non-resistant parasites, but their parasite load will remain low. After 3–5 days, the animals can go onto clean pasture. The sheep will now be infected with both resistant and susceptible parasites. The new pasture will

soon be populated by parasites, but numbers will be low and not dominated by resistant parasites.

Alternatives to chemical dewormers

There is anecdotal evidence to support the use of various herbs to treat or prevent parasitic infections in sheep and goats. In most cases, the efficacy of the herbs has not been evaluated scientifically. There is some evidence of anti-parasitic action produced by:^{8, 9, 10, 11}

- garlic,
- various types of wormwood (*Artemisia* spp.),
- eucalyptus,
- tansy,
- fumitory (*Fumaria parviflora*),
- pumpkin seeds, and
- neem oil.

For most of these plants, however, only one or two studies have been conducted, or multiple studies have been conducted but had conflicting results. Diatomaceous earth (DE) in feed has also been suggested as a dewormer, however there is no scientific evidence of its effectiveness.

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Photo credits: Laura Falzon

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To learn more about managing parasites in sheep, see the following:

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