



19. Intestinal Diseases

Intestinal diseases generally present in three ways:

1. Diarrhea
2. Bloat
3. Weight loss

Diarrhea

There are many possible causes of diarrhea. Which is the most likely cause depends on the animal's age:

Neonatal scours – refer to *Chapter 5, Acquired Health Disorders in Newborns*.

Coccidiosis – refer to *Chapter 11, Coccidiosis*.

Intestinal worms – refer to *Chapter 20, Parasite Control*.

Diarrhea in flocks of small ruminants may present in outbreak form if caused by *Salmonella* or *Campylobacter*. Contact your veterinarian for assistance in dealing with these situations.

Bloat

Cause

Bloat can occur in two distinct circumstances:

1. If the rumen fails to contract normally, the gases produced during fermentation of forage accumulate and the rumen distends. This form can also occur if an animal becomes cast.
2. Under certain circumstances, the feed in the rumen can form foam which traps the gas, so the animal is unable to belch off

the gas. This is most commonly seen when animals are moved to a pasture which has a high content of alfalfa or clover.

Bloat is dangerous because as the rumen expands, it puts pressure on the chest, seriously inhibiting breathing. The rumen also puts pressure on major blood vessels, blocking blood circulation.

Clinical Signs

The abdomen of affected animals appears massively distended. Careful examination may reveal that the most obvious distension is on the left side behind the last rib. The animal may appear to have difficulty breathing. If the area of the bloat is flicked with a finger, it often appears very resonant - "like a bass drum."

Treatment

In all cases of bloat the first approach is to pass a stomach tube into the rumen. Ideally, you should have a stomach tube on hand, but in an emergency, a length of hose will suffice. A mouth gag is needed to prevent the animal chewing the tube/hose; a six inch length of plastic pipe is very effective. Place the gag (pipe) in the mouth between the dental pad and the front teeth. Gently push the tube/hose into the back of the mouth and allow the animal to swallow it. Then advance the tube/hose into the rumen. This is often easier if you blow down the tube/hose to distend the esophagus.

If it is a free-gas bloat, once the tube is in the rumen the gas will be released and the problem resolved. If it is a foamy bloat, there will be little or no gas released. In these cases, animals should be treated by pouring a bloat treatment such as **Tympanex** down the tube. The treatment causes the froth to collapse, releasing the gas.

Remove the stomach tube and wait 10 minutes. If the bloat has still not resolved, the stomach tube should be passed again to relieve the gas.

Prevention

Avoid sudden changes in diet, especially sudden moves to rich alfalfa pastures. Products such as **Alfasure** may also be used to control problems.

Weight Loss

Many intestinal problems present as weight loss. Refer to *Chapter 13, Poor Body Condition*.

Miscellaneous Intestinal Diseases

Rumen Acidosis

Cause

Rumen acidosis occurs when animals are fed a diet that contains too little forage and/or too much concentrated carbohydrates (grain). The carbohydrates (sugars) are rapidly fermented to produce large amounts of acids. The acids in large quantities are very damaging to the rumen, killing the normal bacteria and damaging the rumen wall. In addition, the large amount of acid in the rumen draws water from the circulation and animals may go into shock. The damage to the rumen wall allows toxic compounds and bacteria to enter the bloodstream and that can result in problems such as laminitis (refer to *Chapter 9, Laminitis*) or liver abscesses.

Clinical Signs

The signs will be dependent on the amount and type of feed ingested. They will also depend on the normal diet of the animal, since over time animals can adapt to high concentrate diets, such as those used in feedlots. Signs typically occur from 12 to 36 hours after eating a high concentrate ration. Animals are typically depressed and off feed. They tend to lie down and may have a staggering gait and look drunk. They often appear bloated and have diarrhea.

Diagnosis

The best way to make a diagnosis is to collect a sample of fluid from the rumen using a stomach tube and measure the pH (acid content). This level should be five (pH 5).

Treatment

Traditionally, very extreme treatments such as surgical rumenotomies to empty the rumen were recommended. This is a surgical procedure requiring the help of a veterinarian.

Supportive treatments include:

- **Oral antacids to neutralize the rumen** – magnesium hydroxide or magnesium oxide at 1 g/kg body weight.

pH is a measure of the acidity or basicity of a solution. Pure water is said to be neutral. The pH for pure water at 25°C is close to 7.0. Solutions with a pH less than 7 are said to be acidic and solutions with a pH greater than 7 are said to be basic or alkaline.

ELDU

Extra-label drug use, also referred to as "off-label use" refers to the actual use or intended use of any drug, whether it is a prescription drug or over-the-counter (OTC) drug, in an animal in a manner that is not in accordance with the approved label or the package insert of the drug licensed by Health Canada.

- **Systemic anti-inflammatory drugs** – these are extra label use (ELDU); consult your veterinarian.
- **Thiamine supplementation** – rumen acidosis can predispose to polio. Thiamine given three times daily at 5 mg/kg body weight until the animal recovers will help prevent the disease.
- **Transfaunation** – due to the disruption of the normal flora in the rumen, it may be necessary to collect a sample of rumen fluid from a healthy animal and administer it to the affected animal in an attempt to repopulate the rumen with healthy bacteria.

If you suspect that animals have consumed too much grain, the first thing to do is remove them from water, since access to water will accelerate the fermentation process and make the disease more severe.

Note: Due to the wide variation in the severity of the disease you should contact your veterinarian for advice.

Prevention

Ensure that animals are kept away from feed storage areas. If you have any concerns about your animals' diet, contact a nutritionist or your veterinarian.



20. Parasite Control

Parasites can be broadly split into three categories:

1. Worms
2. Insects
3. Protozoa

These categories can be further subdivided. Different parasite categories require different control strategies.

Worms can be divided into three main types:

1. Roundworms
2. Tapeworms
3. Flukes

Roundworms

Most roundworms that affect sheep and goats have a direct life cycle. This means that the adult worms live in the intestines of the sheep/goats. The adult female lays eggs that are passed onto pasture through the feces. The eggs typically hatch on pasture and the larval form of the worm migrates from the feces onto the grass where it is eaten by another sheep/goat. The larva undergoes further development to the adult worm within the intestines.

Important Roundworms of Sheep and Goats

The larval form of this worm develops in the wall of the abomasum (or true stomach). The development causes inflammation that prevents normal digestion, resulting in severe diarrhea. *Ostertagia sp.* can also undergo a form of hibernation (called hypobiosis) in which the larvae

stop their development and simply “wait” in the wall of the stomach before emerging many months later. This is typically done to survive the winter months.

Haemonchus

The adult form of this worm also inhabits the true stomach of sheep and goats. The adult actually bites into the wall of the stomach and sucks blood. Although an individual worm sucks only a very small amount of blood, a large infestation will result in significant blood loss which can be seen as very severe anemia .

In addition to these worms there are others such as ***Nematodirus*** and ***Trichostrongylus*** that inhabit the abomasum and small intestine causing inflammation and interfering with digestion. This results in diarrhea and poor body condition despite adequate nutrition being supplied.

Anemia

– reduction in the normal level of red blood cells in circulation.

Diagnosing Roundworms

All roundworms shed eggs into the feces. In the laboratory it is possible to analyze feces and count the number of eggs per gram of feces (a fecal egg count) in order to determine the magnitude of an infection.

Note: For some worms such as ***Ostertagia***, the developing immature larvae cause significant disease. The larvae do not produce eggs, so a fecal egg count would be negative even though the worms are causing clinical disease.

Controlling Roundworms

Roundworm infections have been a scourge for small ruminant production around the world and the focus of much research. This research has led to some major advances in how roundworms are controlled using effective management strategies and new highly effective drugs.

However, the situation on the Canadian prairies differs from most other sheep/goat producing areas of the world. The summers here are generally very dry. Roundworms need moisture for survival and do not do well on dry pastures. Our long cold winters typically kill off residual eggs left on the pasture from the previous summer.

Practical strategies for controlling roundworms in western Canada:

- Work with your veterinarian to develop a control strategy tailored to your farm location and management style.
- Consider deworming ewes/does at lambing/kidding time. Ewes/does are typically immuno-suppressed at this time and excrete

many more eggs (Periparturient Rise) which contaminate the environment and infect the lambs/kids.

- Quarantine all brought in animals, deworm them, and wait before mixing them with your flock/herd.
- Consider deworming in the fall when the animals come off pasture. Sheep/goats tend not to become infected during the winter months.
- **Most important**—rather than deworming on a fixed schedule, consider moving to a system in which you randomly collect some sheep/goat feces and submit them to the lab for analysis. Deworm only when animals have a high worm burden. While the analysis has some cost, this will result in significant savings as you will spend much less on deworming product. You will also avoid over treating, which can lead to worms developing resistance to dewormers.
- When you use dewormers, ensure all animals get a full dose. If necessary weigh animals and dose on a body weight basis. Fasting animals for 12 hours before administering a deworming product will increase its effectiveness.

Note: Roundworms only cause problems through animal disease and reduced productivity. They do not spread to man or other domestic species.

Tapeworms

The Sheep or Goat as a Primary Host

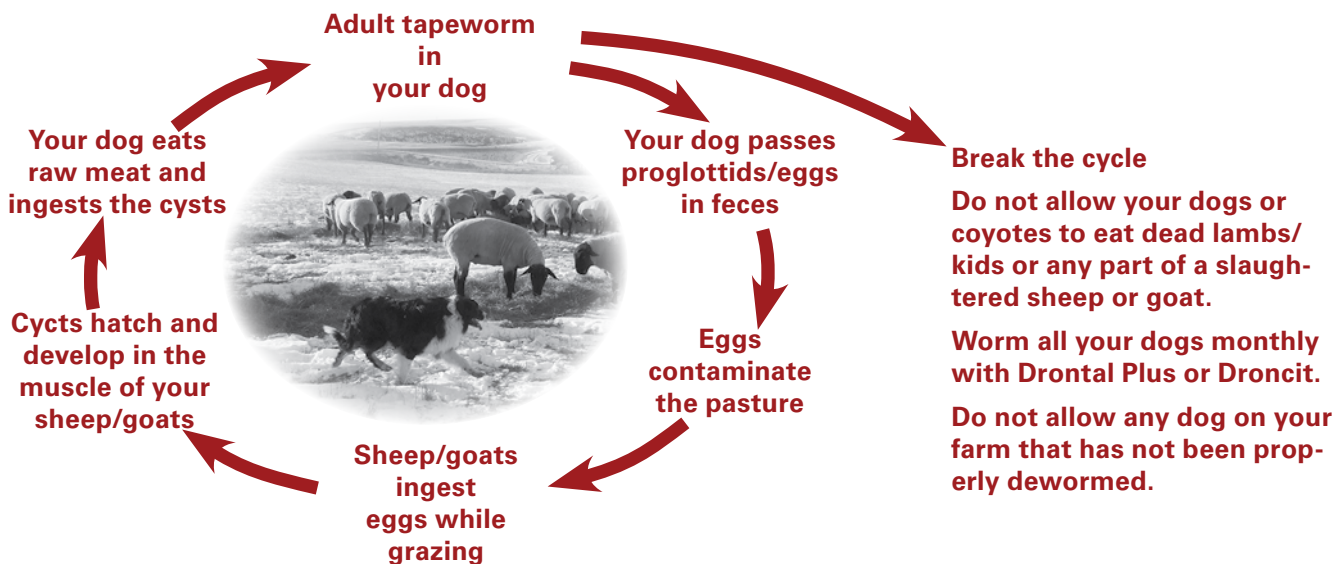
There are actually very few tapeworm species which use the sheep or goat as a primary host. *Monezia*, the main species, uses forage mites as an intermediate host, and while the parasite rarely causes death, it can be responsible for poor rates of gain and in extreme situations contribute to “thin ewe/doe syndrome.” Occasionally the tapeworm segments may be seen in feces. Infection can be easily treated with Valbazen administered as an oral drench.

The Sheep or Goat as an Intermediate Host

Sheep/goats can act as an intermediate host to a wide variety of tapeworms. The most important are:

Worm in Sheep/Goats	Primary Host	Cyst Site
<i>Taenia ovis</i>	Dog	Muscle
<i>Taenia hydatigena</i>	Dog	Liver
<i>Taenia mulliceps</i>	Dog	Brain
<i>Echinococcus</i>	Dog	Liver, lungs

Taenia sp. are not a human health risk but *Echinococcus* is. If the cysts are found in the carcass at slaughter, the carcass—all or part of it—may be condemned. *Taenia ovis* has been the cause of very significant economic loss to the Canadian sheep industry in the last few years.



Tapeworms have a more complex life cycle than roundworms. A tapeworm life cycle involves a primary host in which the adult tapeworms lie in the intestines and produce eggs. The eggs are shed in the feces and are eaten by the intermediate host (a different species). The eggs hatch in the intestines, penetrate the gut wall and migrate through the bloodstream before establishing themselves in specific tissues to form a cyst. When the animal dies the cysts are eaten with the carcass by the primary host. The cysts reactivate in the primary host's intestines and grow into adult tapeworms, and the cycle continues.

Controlling Tapeworm Cysts (C.Ovis)

There is no wormer that will effectively control the dog tapeworm in your sheep. **The key to controlling tapeworm cysts is prevention.** The goal is to break the cycle of infection between the dog and the sheep or goats.

C. ovis (also referred to as sheep measles) is the intermediate stage of a tapeworm that infects any member of the dog family, wild or domestic. It is important to understand that this is **not** a sheep/goat tapeworm; it is a **dog** tapeworm that **must** infect sheep or goats to complete its life cycle.

The dog is the final host where the adult tapeworm lives—all two metres of it. While inhabiting the intestine, the adult sheds eggs in the dog's stool, up to 250,000 per day. Eggs have the ability to survive on pastures for up to **six** months, depending on the conditions. The sheep and goats then become infected by eating the eggs. The eggs contaminate anything that the dog can defecate in or on: the pasture, feed bunk, chop house, silage pit, or round bale feeder.

The tapeworm eggs then hatch—inside the sheep or goats, not on the ground—and develop either into cysts in the muscle or into cysts that hang off the liver, lungs, or diaphragm.

Dogs become reinfected by eating infected sheep/goat carcasses.

Four to five weeks after consuming the eggs, the sheep/goats develop the infective cysts. Each cyst contains a tapeworm head which, if eaten by a dog, grows into an adult dog tapeworm, *Taenia ovis*. Assuming that lambs/kids really start to eat forage at about 21 days of age, they can have cystic lesions as early as 56 days of age.

At about three to six months after ingestion (116 to 176 days of age) most of the cysts die and they become hard and gritty; the typical

white spot is known as sheep measles and is detected at meat inspection. This stage is known as *Cysticercus ovis* or *C. ovis* and this is the lesion that causes condemnations. **This is not a human health hazard, but it is unacceptable and carcass condemnations are common.**

Therefore:

- **Do not** feed dead lambs or kids **of any age** to your dogs or allow coyotes to eat them.
- **Do not** feed **any part** of a slaughtered goat or sheep to your dogs. Bury it or burn it. If you compost, make sure that no animals dig up what you buried. Make the compost pile dog proof.
- Worm your dogs, **all** dogs (including pets), at least every two months with a **praziquantal** based wormer. Either use **Drontal Plus** or **Droncit** tablets. Guardian dogs can be very difficult to get pills into; you can grind the pills up and mix them into canned dog food. Make sure that you see the dog swallow the wormer and that he does not spit the pill out. Guardian dogs in particular can be very suspicious and difficult to worm.
- It takes seven weeks for this tapeworm to develop in the dog, so worming the guard dog **monthly** is necessary.
- **Do not** let any dog onto your farm that has not been properly dewormed. Make sure that you know what product was used and when it was last given.

The Role of Coyotes

Many producers continue to blame *C. ovis* losses on coyotes. However, there is no evidence to support that coyotes, while they can be the primary host for the tapeworm, are in close enough proximity to the flock for a long enough time to be significantly responsible for *Taenia* infestation in small ruminants. Evidence from Australia, where the disease has been nearly eradicated by the diligent deworming of dogs and feed control, supports this conclusion despite the presence of wild canines that also prey on flocks.

Controlling *Echinococcus*

The *Echinococcus granulosus* cysts are found in the liver and lungs of affected sheep. This parasite is important because the eggs can be ingested by humans, leading to serious disease when the cysts form. The cycle of infection can be controlled as described above for *Taenia* tapeworms.

Flukes

Flukes are flat, leaf shaped worms which are typically found in the liver. Flukes have a very complex life cycle that involves intermediate hosts. There are three main flukes found in western Canada.

Fasciola hepatica

Although this form of liver fluke has been occasionally reported in southern Manitoba and the Waterton Lakes area, it is uncommon elsewhere in Canada. It does have a tendency to be over-diagnosed because the eggs of *Nematodirus* look very similar. In sheep and goats fluke infestations are very serious and commonly result in death or severe disease without eggs ever being produced. The diagnosis is commonly made on post-mortem examination.

Should a problem with this fluke arise, there are effective drugs available in other parts of the world that can be imported into Canada on a case by case basis.

Fascioloides magna

This is a natural fluke of deer and moose. It is occasionally found in small ruminants, where infection with even one fluke can prove fatal. It is usually diagnosed at post-mortem and is considered sporadic.

Dicrocoelium dendriticum

This is the natural fluke of small ruminants. The fluke is very small and does not usually cause any serious problems.

Protozoan Parasites

There are three main protozoan parasites of sheep/goats. Two coccidia species and cryptosporidium cause diarrhea in young lambs/kids. These are covered in detail under lamb/kid diseases. Refer to:

Chapter 11, Coccidiosis.

Chapter 5, Acquired Health Disorders of Newborns respectively.

The other, *Toxoplasma*, can cause abortion in sheep/goats and is covered in detail in *Chapter 6, Diseases of Pregnancy, Toxoplasmosis.*

Insects

Flies

Flies can cause problems to sheep and goats in a number of ways. Probably the most important is fly strike (refer to *Chapter 8, Fly Strike*). Biting flies can be a nuisance but they rarely cause serious problems. Other potential fly problems include keds, which are really wingless flies, (refer to *Chapter 8, Sheep Keds*) and nasal bots (refer to *Chapter 12, Nasal Miasis*).

Lice

Refer to *Chapter 8, Lice*.

Mites

Refer to *Chapter 8, Psoroptic Mange (Scab) and Foot Scab*.

Ticks

Ticks are occasionally found on sheep and goats. Many times keds are mistakenly called ticks, but they are different insects. Ticks have eight legs and a round body shape, and in most cases when found on an animal they will be attached and feeding. In contrast, keds have six legs and a segmented body, and are normally walking around in the fleece.

The occasional tick is not a serious problem, but a heavy infestation of ticks can cause serious blood loss. Ticks can also carry disease.

There are several insecticidal sprays available that can be used to treat the flock/herd if it becomes necessary.