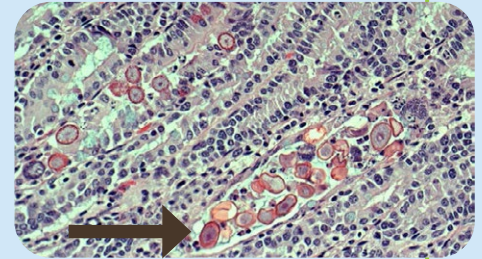


Coccidiosis In Sheep



- Coccidiosis is caused by a **protozoal parasite** called *Eimeria*.
- *E. ovinoidalis* and *E. crandallis* can cause severe disease in sheep. They are host specific, only infecting sheep. *Eimeria ovinoidalis* is more pathogenic than *E. crandallis*.
- There are many other species of *Eimeria* but few cause disease in sheep. There is no cross-protective immunity amongst different species.
- Each gram of feces may contain millions of oocysts, and 1 oocyst ingested can destroy 50 million intestinal cells, resulting in excretion of 10,000 new oocysts.



Parasite stages in the lumen of a colonic gland. Photo courtesy M. Spinato.



- *Eimeria spp.* commonly infect western Canadian lambs, and disease is common.
- Feces is the source of infection through contamination of feed and water sources.
- The disease occurs most commonly in **lambs**, about **4–8 weeks of age**, and up to 6 months of age, but may occur as early as 3 weeks of age. Coccidiosis is not a disease of adult sheep.
- Clinical disease also occurs in **lambs shortly after feedlot entry**.
- The potential for massive build-up in the environment in housed lambs leads to more severe disease.

- Factors that increase the risk of coccidiosis include **high stocking densities** and **failure to control coccidiosis in lambs**, leading to heavier loads of oocysts in the environment, with fecal contamination of feed and water.
- Other disease conditions, such as pneumonia and orf, and other stressors that may affect a lamb's immune system e.g., poor nutrition, poor air quality, wet and

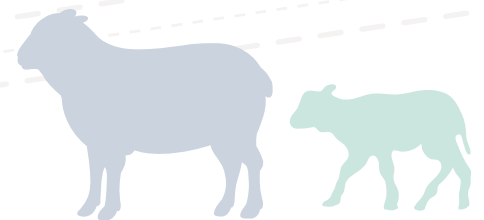
dirty environmental conditions, lack of protection from inclement weather, and poor colostrum management, will **increase the occurrence and severity of disease**.

- **Outbreaks of disease may occur in feedlot lambs** precipitated by stressful events, such as weaning, transportation, and mixing of different sources of lambs together in the same feeding pens.

- Disease may range from mild to very severe, with an acute onset, often with long lasting clinical effects, dependent on the infective load and species of *Eimeria* involved, which determines whether the large intestine is involved.
- **Early signs** include depression, dehydration, anorexia, and diarrhea, which may include mucus and blood in varying amounts, with perineal staining.

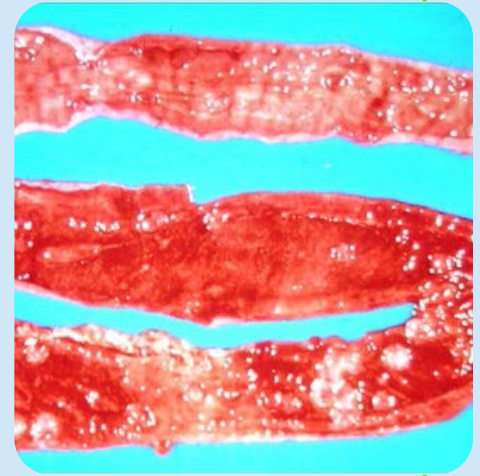


- In **severe cases**, there is profuse, fetid diarrhea with tenesmus and blood, leading to anemia (pale gums and conjunctiva), which may result in death.
- Even in milder cases, after lambs have developed immunity, they may be thin, pot-bellied, runty, with soft non-pelleted feces, and perineal staining.



How Is Coccidiosis Diagnosed in Sheep?

- Coccidiosis is diagnosed by the animal's **history**, including age of animals affected, **clinical signs**, and **post-mortem findings**.
- **Post-mortem findings** depend on the *Eimeria* species involved. The **ileum, cecum, and upper colon** are most affected and may be **thickened, edematous, and inflamed**.
- Sometimes there is **hemorrhagic colitis** and **typhlitis**.



Fecal Oocyst Counts Can Be Misleading In Diagnosing Coccidiosis In Sheep!



Source: National Animal Disease Information Service

- A **low oocyst count** does not rule out coccidiosis if feces is collected early in the stage of infection. Diarrhea can also dilute the egg count.
- A **high oocyst count** may not be meaningful, if infected with a low pathogenic strain, such as *E. babuensis*.
- A **moderate oocyst count** may occur if the lamb was recently stressed and can be present after it has developed immunity.
- Collect several **fecal samples** over several days and submit to a laboratory for **oocyst counts** and **species identification, if available**, and to rule out other parasites e.g. *Cryptosporidia spp.*
- If concerned about other pathogens, submit feces for culture to **rule in or out other pathogens**, such as rota/corona viruses, *E. coli*, *Salmonella spp.*, and *Clostridial perfringens*.

How Should Coccidiosis In Sheep Be Treated?

- **Coccidiosis is a disease that should be controlled rather than treated.**
- The **right treatment** depends on the severity of clinical signs, the number of animals affected, their age, their housing (barn, outdoor pens, pasture), their feed e.g., nursing on ewe or on solid feed, and water sources.
- If possible, **isolate** clinically affected animals.
- If sick lambs are dehydrated, treat with **fluids** e.g., oral electrolytes.
- If sick with other **concurrent diseases**, e.g. pneumonia or other nematodes, also treat and control those diseases.
- Protect lambs from **fly strike** due to perineal soiling.
- **Reduce environmental and nutritional stressors** (see below).

Therapeutic drugs include:

- **toltrazuril*** (20 mg/kg, PO, once), meat withdrawal period: 49 days
- **amprolium 9.6% solution** (20–50 mg/kg b.wt., PO, every 24 hours, for 5 consecutive days, ELDU), meat withdrawal period: CgFARAD
- **sulfamethazine PO** – not recommended in clinically ill, dehydrated lambs as it leads to kidney failure.

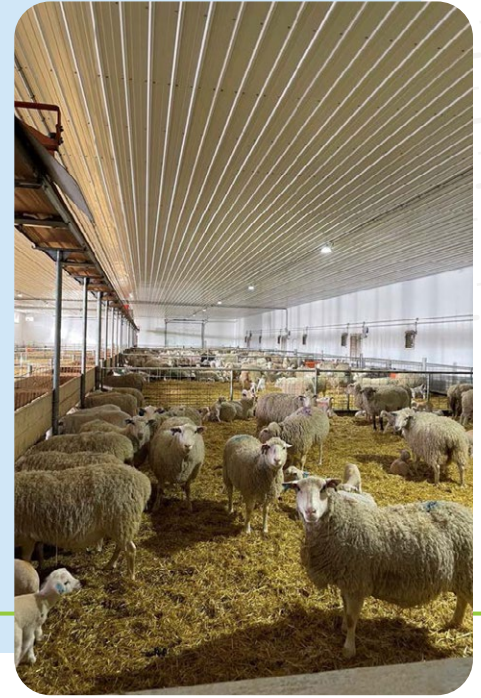
**Best therapeutic drug for coccidiosis in sheep*

- If using **amprolium**, drench clinically sick lambs individually, as they won't drink enough from medicated water troughs.
 - If amprolium is used, monitor lambs closely for secondary Polioencephalomalacia. Treat sick lambs individually with thiamine if individually treating with amprolium.
 - If treating a group through water trough medication, consider adding thiamine to their solid feed.
 - Sulfa drugs, while labelled for use orally, are not recommended for treatment, as they are unpalatable and can decrease water consumption. If lambs are dehydrated, sulfa drugs may cause kidney failure.
- **Toltrazuril** is effective at killing new infections of *Eimeria* for about 20 days after administration. By treating lambs at 3 weeks of age, it will prevent severe infections at the time most occur, but if given earlier than this e.g., 4 days of age, the drug will no longer be present when the lamb is most susceptible to infection. Thus, lambs may need to be treated twice, which is very expensive for the producer.
- **Treatment is required for the whole group of lambs** in contact with the affected lambs after the first clinical case is confirmed, because failure to treat 1 lamb can re-infect the entire group.
- Lambs should be on preventative medication by the time they are 3 weeks of age; earlier, if disease is seen earlier, before severe intestinal damage has occurred. Most coccidiostats will allow immunity to develop.

After mass medication, move treated lambs to an uncontaminated environment (new pasture or clean, dry, well bedded pen).

How Is Coccidiosis In Sheep Controlled?

- **Teach producers** how to diagnose clinical disease, promptly treat sick lambs appropriately with drugs, and how to control and prevent the disease.
- Encourage producers to **individually identify lambs** with a unique ear tag number (CSIP); keep good treatment and performance **records**; have **good handling facilities**, adequate labor; and contact you for post-mortems (in-person or digitally).
- Ensure **good ventilation** in barns to reduce moisture, ammonia, drafts, and temperature fluctuations.
- Ensure **good drainage** in indoor and outdoor pens.
- Keep indoor and outdoor **pens**, including lambing jugs, **clean, dry and well bedded**, removing contaminated bedding regularly.
- Regularly **clean** milk feeding equipment and feed and water troughs. Ensure water drinkers do not drip and increase moisture in the pens.



- If a serious issue indoors, develop a **disinfection program** to regularly clean hard surfaced pens and equipment. Oocysts are hardy and resistant to drying and many disinfectants. Sunlight will help kill oocysts.
 - 1st remove manure, bedding, feed, and animals.
 - 2nd steam-clean, which will reduce oocyst survival.
 - 3rd use ammonia-based e.g., ammonium hydroxide, or hydrogen peroxide- based premise and equipment disinfectants, as per label directions for concentration and contact time, while ensuring animal and human safety.
- Ensure **water** is fresh, clean, and provided free choice. If concerned, test water quality and if bad, either change source or add a water treatment to control other enteric pathogens which may increase the risk of coccidiosis.
- Encourage **feeding and watering off the ground**, with properly designed feeders and waterers that reduce fecal contamination from defecation or dirty feet. If using creep feeders, move them regularly to reduce fecal contamination.
- Encourage an **“all in, all out”** procedure for lamb movements in jugs, pens, and pastures, with a down time for areas to be cleaned and dry.
- Discourage mixing of lambs of different ages by **batch rearing by age**.
- **Quarantine new arrivals** for a few weeks.

Avoid overgrazing, overstocking, and pastures heavily contaminated by older animals. Use rotational grazing to reduce pasture contamination.

- Ensure **good colostrum management**, including good intakes of colostrum and milk.
- **Reduce low birth and weaning weights**, which increase the risk of disease.
- Consult with a **nutritionist** if concerned about nutritional deficiencies in ewe or lamb rations.
- **Prevent and control other diseases**, such as other causes of enteritis, orf, pneumonia, and nematodes.
- Each farm may require a specific approach that works best for their animals and facility. Anti-coccidial drugs should only be used to augment other environmental and management activities to reduce exposure to oocysts and improve the lamb's ability to develop natural immunity.
- It is no longer recommended to regularly feed coccidiostats to ewes periparturient as most environmental contamination comes from untreated

lambs. **Coccidiostats should not be fed year-round in ewe flocks, as this increases drug resistance.**

- **Toltrazuril** should be used 1 week prior to the first-time coccidiosis is usually seen in the flock e.g., treat at 3–4 weeks of age (flock specific). Once clinical signs are observed, treatment may be ineffective.



- **Feedlot lambs** from multiple sources are typically fed coccidiostats on arrival to prevent losses from clinical disease, until the lambs have developed immunity. These drugs will not work in the face of high levels of environmental contamination.
- **Control/preventive coccidiostats*** include: **decoquinate** (1 mg/kg b.wt), **monensin** (11–22 ppm), **lasalocid** (36 ppm). Feed these products daily for at least 28 consecutive days during high-risk periods of infection. Decoquinate may need to be fed for 70 days to ensure immunity has developed.
- Ionophores do not treat clinical disease.
- Ensure feed medication levels are based on actual feed intakes; else, the drug will be under or overdosed, which may not control disease, create drug resistance, or cause toxicity issues e.g., monensin heart issues.

- Nursing lambs may not consume enough medication if ewes are milking heavily and/or the lambs are sick.
- Ensure lambs have **enough trough space** to eat at once and the medicated feed is **palatable**, else it will be sorted out and not eaten.
- Remember to discuss **meat withdrawal periods** with your clients. Lasalocid has a 2 day meat withdrawal period.
- **Investigate treatment failures.**
- Pay attention to requirements in **organic and natural programs** which may restrict use of certain products or eligibility of treated sick lambs if producer is participating.

*Consult the CMIB for label directions and updates: <https://inspection.canada.ca/animal-health/livestock-feeds/medicating-ingredients/eng/1300212600464/1320602461227>

www.ontariosheep.org/uploads/userfiles/files/Handbook9.pdf

Photos from the Feedlot Lamb Pathology Atlas, <https://ablamb.ca/images/documents/resources/health/Feedlot-Lamb-Pathology-Atlas-Final-for-Print.pdf> and courtesy of Drs. Paula Menzies and Joyce Van Donkersgoed.

