



Nematodirus

Nematodirus species affecting small ruminants include *Nematodirus battus*, *N. spathiger* and *N. filicollis*. *Nematodirus spathiger* and *N. filicollis* rarely cause disease by themselves in sheep and goats. They are generally low in numbers and only contribute to illness in mixed infections with other worms. However, *Nematodirus battus*, can cause severe health issues in lambs and kids.

Overall, infections do not appear to be problematic on US farms, but are of primary concern in other countries, such as those in Europe. In these countries, infections can contribute to sudden and grave illness in lambs. Even though nematododirus species are also found in goats on that continent, geographical differences and lower stocking rates used in goat production might contribute to less serious infections observed in goats. Future epidemiological studies in the US are needed to determine the prevalence of nematodirus in US small ruminant flocks as the potential for spread and severe impact on production warrants concern. This small intestinal worm causes a disruption in nutrient absorption, leading to severe diarrhea, dehydration, weight loss and even death. Because the life cycle is different from the other gastrointestinal nematodes, it can survive longer on pasture and is mostly problematic in spring or beginning of the grazing season (spring flush).

LIFE CYCLE

The life cycle of this parasite is different from the other, more problematic, roundworms we encounter in small ruminants. After nematodirus eggs are passed in the manure, the larvae develops fully in the egg from a first stage larva (L1) to the infective third larval stage (L3). These developed L3 remain inside the egg over winter. In contrast, the eggs of other nematodes, such as the barber pole worm (*Haemonchus contortus*), hatch earlier (L1) and develop to an infective L3 larvae on pasture where they are then ingested by grazing animals.



Severe diarrhea is common.

Image source: NADIS UK

The egg therefore provides more protection to the nematodirus L3 on pasture, especially against harsh environmental conditions (cold or dry weather). Due to this, nematodirus eggs have been found to survive for as long as two years on pasture. Hatching of eggs deposited on pasture from the previous season, occurs when temperature start to rise following a prolonged period of cold weather (winter). If the majority of nematodirus eggs start hatching around the time of increased grazing in lambs and kids (6 to 12 weeks old), disease risk is high and infections can appear suddenly with a high mortality rate. As with the other gastrointestinal nematodes, lambs and kids are more susceptible to infection due to their naïve immune systems. Exposure over time builds a strong immunity/natural resistance to re-infection and thus this parasite has no significant impact in grazing adults.

SIGNS OF INFECTION

Symptoms result from damage to the lining of the small intestine caused by ingested larvae and mimic those of acute coccidiosis. Resulting damage from this worm interferes with nutrient and fluid absorp-



tion, leading to the sudden onset of severe diarrhea, depressed appetite, lethargy, dehydration, thirst and possibly death. In countries where infection is a major issue, a mortality rate of five percent within a few days is possible.

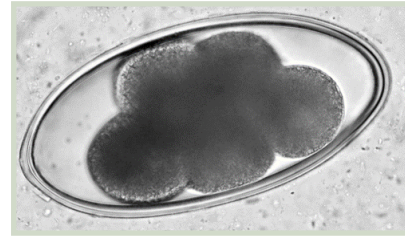
DIAGNOSIS

Diagnosis of nematodirus infection is generally based on the presence of severe diarrhea in lambs/kids. Additionally, the presence of nematodirus larvae and adults in the small intestine post-mortem can be used to confirm diagnosis. Even though nematodirus eggs are very distinctive and larger than other typical nematode eggs, fecal egg counts are not reliable for diagnosis. This is because severe illness due to infection results from immature larvae and they do not lay eggs. Therefore, it might be too late for treatment if a producer waits to see nematodirus eggs or a rise in fecal egg counts. However, fecal egg counts are helpful in the differential diagnosis of nematodirus versus coccidiosis infection since they require different treatment approaches.

TREATMENT

There are very few cases of nematodirus resistance to this class of dewormers in countries where deworming is done as a preventative. However, care should always be taken, especially when deworming.

If an outbreak of nematodirus occurs, it is advised that animals be treated with an effective dewormer and provided supportive therapy. Supportive therapy is especially important to counteract dehydration resulting from diarrhea. The white class of dewormers (benzimidazoles; Valbazen®, Safequard® etc.) is very effective in treating nematodirus infection.



Large nematodirus egg

PREVENTION

Since most infections result from the hatching of eggs deposited from the previous season, young animals could be prevented from grazing on these pastures. Additionally, careful monitoring of environmental temperature can guide dewormer treatment and grazing management. As with coccidiosis, it is important to base diagnosis on clinical signs of infection so treatment can be administered promptly to prevent permanent damage to the small intestine. Permanent damage to the small intestine will affect nutrient absorption and subsequent growth and performance in young animals.



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