

The Risk to Sheep from Dog Tapeworms

Dr. Paula Menzies, Dept Population Medicine and Dr. Andrew Peregrine, Dept Pathobiology, Ontario Veterinary College, University of Guelph

Dogs and sheep naturally go together. Dogs are used to herd the sheep or guard them from predators and many flocks own at least one of these useful animals. Other canids such as coyotes, wolves and foxes commonly leave near sheep pastures. But without proper precautions, any of these canids can be a source of a parasitic disease that can rob your sheep enterprise of all its profits.

Canids can be a host to many different intestinal parasites, some of which can cause them illness. However, one of these parasites – tapeworms – do not generally make the dog sick, but the intermediate stage of these worms cycles through sheep and unfortunately, the damage that these tapeworms do the sheep carcass can cause them to be condemned at slaughter.

To understand how this happens, we need to understand the life cycle of the dog tapeworm. Adult tapeworms reside in the small intestine of the dog or other canid and use a scolex or head to grasp onto the wall of the gut. The tapeworms reproduce by shedding segments of their body each one of which contains thousands of eggs. These segments are not only found in the dog's stool but can be seen "crawling" on its coat before finally dropping off. They look like a strange white, flat worm. When dried, these segments look like a grain of rice. The eggs are spilled out of the segment and can survive in the environment for up to a year - waiting for an opportunity to infect its next host - the sheep.

If these segments contaminate the pasture or forages that sheep are eating, the eggs will hatch in the sheep's gut and the tiny larvae will burrow through the wall of the intestine to travel to its "target" tissue, where it turns into a small bladder-like structure called a cyst. Each one of these cysts contains an embryonic "baby" form of the tapeworm. If a dog or coyote gets an opportunity to eat the tissues that contain these cysts, this larval tapeworm will turn into an adult in the dog's intestine and the cycle will continue.

Here in Ontario, there are two main types of dog tapeworms to worry about and they have different target organs in the sheep.

1. *Taenia hydatigena* is the name of the most common tapeworm in the dog and *Cysticercus tenuicollis*, also called the bladder worm of sheep, is the name of the intermediate "cyst" stage in the sheep. The larval parasite prefers migrating through the liver and then developing into cysts within the liver tissue. After several weeks, the cysts may die. At slaughter, the liver may show long, wiggly migration tracts caused by a recent infection, moderately large cysts containing an embryonic tapeworm, or small round scars from an old infection. Or if re-infection is ongoing – the liver may contain all three. Regardless of which stage is found, the liver is condemned as unfit for human consumption.
2. The next tapeworm is less common but reports of the parasite are increasing in Canada – often with great economic cost. *Taenia ovis* in the dog, it is called *Cysticercus ovis* in the sheep, sometimes also called the sheep measles worm. Its

preferred tissues are the muscles of the body, including heart, diaphragm and skeletal muscle or meat of the sheep. At slaughter, small white cysts can be seen through the muscle. If found, the entire carcass will be condemned as unfit for human consumption.

So how common are these infections? In Ontario, an audit of condemnations found that 5% of lamb livers are condemned because of evidence of tapeworm cysts. In other parts of Canada, there have been cases where up to 30 lambs from one farm have been condemned because of *C. ovis* cysts in the muscle. This is an economically important disease to the sheep industry.

While these two tapeworms are not infectious to humans (unlike the cattle tapeworm), there is a dog tape in Ontario *Echinococcus granulosus*, which can harm people. It more commonly has a wolf-moose cycle in northern Ontario – but can also cycle through the dog and sheep. It is the cyst form that infects humans. Fortunately control of *T. hydatigenia* and *T. ovis*, will also control echinococcus infection in dogs.

What should be done? Once the lamb is infected, there is no treatment so it is very important that all farm dogs be routinely treated for tapeworms every 3 months, and as frequently as every month if cysts have been found in sheep. A special de-worming medicine is required to kill the adult tapes, and can only be purchased from a licensed veterinarian. The wormers sold in pet stores or feed stores will not kill tapeworms. At the same time, make sure that all dead stock is buried at least 2 ft deep or is appropriately composted so that no scavenging can occur by dogs or wild canids such as coyotes, wolves or foxes. If the tapeworms infect the wild canid population there is little chance of eliminating it. Unfortunately the cyst stage of the infection can also occur in deer. Once the wild canid - deer cycle is established in your geographic region, control in pastured sheep becomes very, very difficult. If you have any questions at all whether your dogs are infected, contact your local veterinarian right away.

In summary to prevent infection of your sheep with dog tapeworms:

1. Do not feed any of your dogs (working, guard or pet) any part of a dead sheep.
2. Do not dispose of dead sheep where dogs or coyotes or foxes might have access to it.
3. Talk to your flock veterinarian to get your dogs on a regular tapeworm treatment program.
4. Any new dogs coming to your farm must be treated and held in isolation for at least 3 days before exposing to the sheep farm.
5. Try to prevent your dog from defecating where it might contaminate sheep feed, pastures or water sources.
6. Make yourself aware of causes of condemnation of lambs that are sent for slaughter.