

CONTROL OF THE INTERMEDIATE STAGE OF DOG TAPEWORMS

There are many types of dog tapeworms and some of these have an intermediate stage which can infect sheep. The damage they do to the sheep or goat is usually limited to the internal organs and / or carcass and the effect is usually economic. However these economic losses can be devastating with regards to losses associated with carcass condemnation. One of the types is also dangerously zoonotic. All can be controlled using similar measures.

IMPORTANT DOG TAPEWORMS - INTERMEDIATE STAGE

ECHINOCOCCUS GRANULOSUS

Description: “**Hydatid disease**”. This tapeworm of dogs and wild canids (coyotes and wolves) is highly zoonotic. The tapeworm in canids is short (~ 0.6cm in length) making it difficult to see in the intestine. The intermediate stage is a hydatid cyst rather than a cysticercus. These cysts form in the liver or lungs of the sheep (or human) and can grow very large - up to 20 cm. Inside these cysts are tens to hundreds of tapeworm larvae (hydatid sand), each one capable of growing to a tapeworm. If the cyst forms in the abdomen, it may grow very large, containing several litres of fluid.

Epidemiology: Many ruminants can be the intermediate host (along with humans) but sheep have been historically implicated in maintaining dog infections. The dog can be infected with thousands of adult tapeworms without signs and infected sheep rarely show signs. But humans with cysts develop signs of respiratory disease (lung) or liver disease. If one ruptures, the person may die of anaphylaxis. Children that play with infected dogs are particularly at risk. Dogs become infected because they are allowed to scavenge infected sheep. Evidence of cysticercosis in sheep indicates that the management of sheep and dogs is conducive to *Echinococcus* infection. At present this parasite occurs in northern Quebec and Ontario, but not in the southern parts of these provinces.

CYSTICERCUS TENUICOLLIS

Description: This is the intermediate stage of the dog tapeworm *Taenia hydatigena*.

Epidemiology: Dogs, wild canids (wolves, fox, coyotes), weasels and stoats are the final host (i.e. adult tapeworm occurs in these species). Sheep, goats, deer and cattle are the intermediate hosts. The dogs consume the infected intermediate host (e.g. sheep/goat offal) and become infected. The adult tapeworm sheds segments which contain thousands of eggs, in the faeces. The eggs contaminate pasture or feed which the sheep/goat eats. If the sheep/goat eats an entire segment, then death may occur from severe liver damage. The eggs hatch and the larvae migrate for about 4 weeks, eventually to the liver and abdominal cavity where each larva forms a cysticercus. This is a bladder-like structure that contains one embryonic tapeworm or protoscolex (head only). These cystic structures are fairly large (1 to 3 cm) but do not harm the sheep. Eventually the cysticercus will die and scar if not consumed.

Clinical Signs: There are no clinical signs in the sheep/goats (with the exception of a massive infection which may cause liver failure) or the dog.

Post Mortem: Larval tracts, bladder-like cysts and scars can be seen in the liver, causing condemnation of that organ. While not economically devastating, the presence of this infection indicates a farm-level problem with management of dead-stock (scavenging) or offal from slaughtered animals. This sets up the possibility of infection with *Cysticercus ovis*(see below) which can be economically devastating.

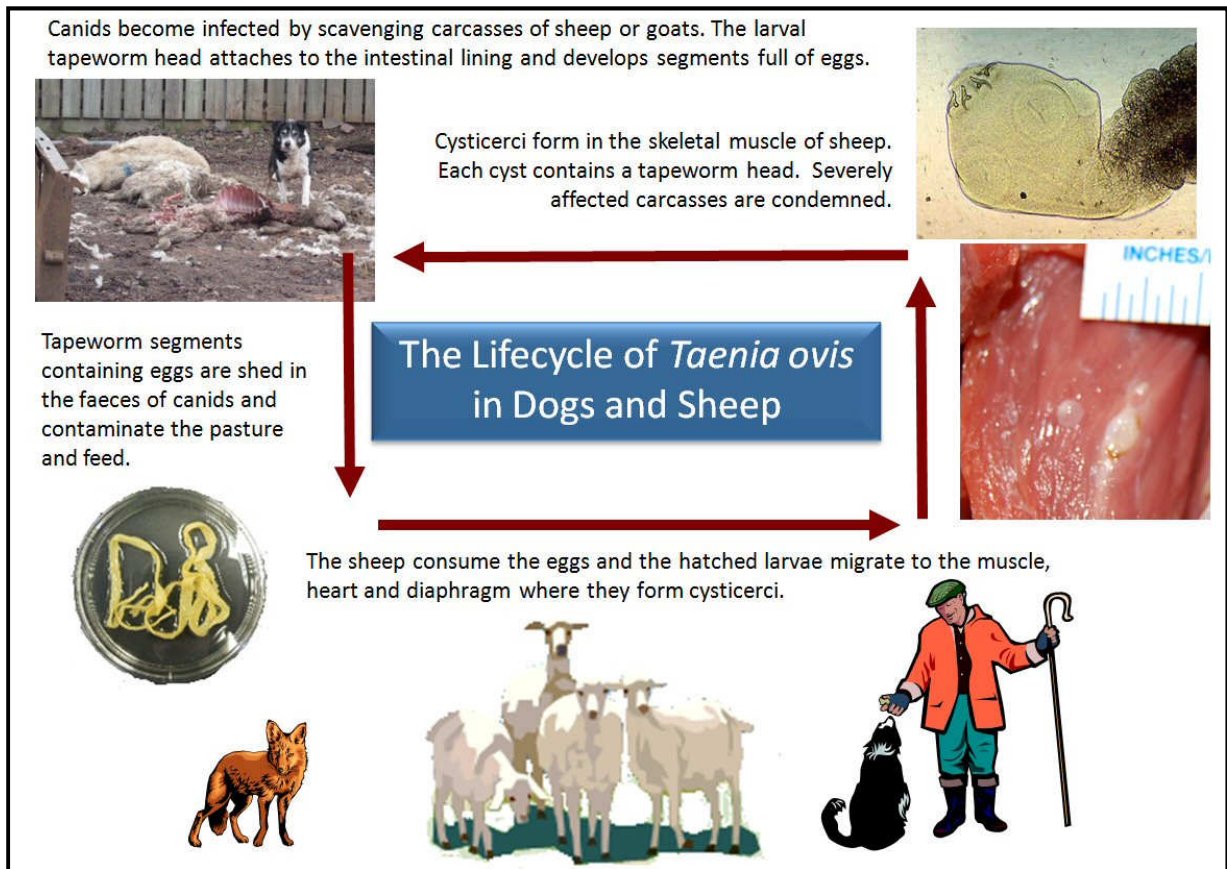
Description: “Sheep Measles”. This is the intermediate stage of the dog tapeworm *Taenia ovis*.

Epidemiology: The dog and wild canids (wolves, coyotes, foxes) are the final host. Sheep and goats are the intermediate hosts (not deer). This is an emerging disease in Canada. The adult tapeworm is long and sheds segments that each contain over 70,000 eggs. The segments are found in the faeces but also on the coats of dogs. Eggs have been known to disperse up to 80 metres across pasture. The eggs contaminate pasture and feed. Sheep consume the eggs which hatch in the digestive tract. The larvae migrate to the muscles (skeletal, heart, diaphragm, masseter muscles) where they form small cysts ~ 1 cm in size. After 2-3 months, the cysts are infective to dogs. This life cycle is portrayed in Figure 5. The cysts may die but some can remain viable in the sheep for over 1 year. While sheep eventually develop resistance to the tapeworms, a new crop of naive lambs continues the cycle - as long as dogs and wild canids are allowed to scavenge or eat sheep. If a dog is allowed to eat an infective cyst, the prepatent period is 6 to 9 weeks. The biggest risk factor for this disease is improper disposal of deadstock allowing dogs to scavenge carcasses.

Clinical Signs: There are no clinical signs in the sheep or the dog.

Post Mortem: The cysts are apparent at slaughter and depending on the number and distribution, can cause the carcass to be condemned. The disease is not zoonotic, but affects meat quality so an outbreak - causing condemnation of a large percentage of carcasses - can be economically devastating to the industry.

Figure 5



Control and Prevention of *Cysticercus ovis*

Control of the infection in sheep is done by controlling the infection in your farm dogs and preventing infection of coyotes, wolves and foxes. Once a sheep is exposed to the tapeworm eggs, there is no available method of preventing development of the cysts – either through medication or vaccination.

Control is done by:

- proper deadstock management to prevent scavenging of carcasses by all canids including guard dogs, neighbour's dogs and coyotes
- reduce predator losses through a variety of means.
- routine deworming of all farm-dogs with medications effective against tapeworms (see below)
- ensuring that farm dogs are only fed safe forms of dog food (see below)

Routine Deworming of the Dog

Talk to your vet about what option is best for your operation, generally all dogs with access to sheep or goats should be de-wormed monthly

- Droncit injectable; (Praziquantel)
- Droncit tablets; (Praziquantel)
- Lopatol tablets; (Nitroscanate)
- Drontal Plus tablets; (Praziquantel + Pyrantelpamoate + Febantel)
- Cestex tablets; (Epsiprantel)

If Sheep Carcasses are to be Fed to Dogs

- Freezing: freeze carcass to -10 degrees Celsius for 7 days OR
- Cooking: cook meat to an internal temperature of 72 degrees Celsius



GLOSSARY OF ABBREVIATIONS

AAD	Amino-Acetonitrile Derivatives	LV	Levamisole
ADG	Average daily gain	GIN	Gastrointestinal nematodes
AR	Anthelmintic resistance	ML	Macrocyclic lactones
BZ	Benzimidazoles	PPER	Periparturient egg rise
CT	Condensed tannins	SL	Sericaelespedizia
epg	eggs per gram		
FEC	Faecal egg count		
FECRT	Faecal egg count reduction test		