

## Sheep measles - another profit killer

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### The problem

Consider this scenario: prime lamb producer 'Fred' has sent a consignment of 400 lambs to the abattoir. At slaughter, small white cysts in various muscles, oval shaped and about 3–10 mm long, are found in one hundred of the lambs. These cysts are identified as 'sheep measles'. Some of the carcasses are partially condemned, and some fully condemned. Fred lost a lot of money.

This really happened, and it's not an isolated case. 'Sheep measles' is the intermediate or 'larval cystic' stage of a particular tapeworm<sup>1</sup>, *Taenia ovis*. It occurs in Australia wherever there are sheep or goats – and dogs.

The life cycle of *Taenia ovis* is similar to that of the hydatid tapeworm, *Echinococcus granulosus*. The dog is the final or definitive host and harbours the adults of both tapeworm species in its intestines. The adult *Taenia ovis* tapeworm is about 2 m long; the adult hydatid tapeworm is tiny, about 4–6 mm. For a comparison of various larval cestodes (tapeworms), see the table overleaf.

Eggs are shed in the dog's droppings, then sheep ingest the eggs when eating pasture. These eggs hatch and the tiny larvae develop into cysts in muscles – in the case of sheep measles – or organs such as the liver and lungs – in the case of hydatids. Dogs get infected by eating viable tapeworm cysts in sheep or goat tissues.

### Foxes and dingoes

The fox is not an important definitive host for *Taenia ovis* in Australia. While foxes can become infected with this tapeworm, field experience indicates that this happens rarely. In contrast, foxes quite commonly are infected with the tapeworms

*Taenia pisiformis* and *Taenia serialis*, from eating rabbits. Less commonly, foxes can also be infected with the tapeworm *Spirometra erinacei*, from eating reptiles and amphibians. As to dingoes and wild dogs, field evidence indicates that they are only very occasionally infected with *Taenia ovis* in certain areas (David Jenkins, personal communication, 2007).

In short, domestic dogs are the most important definitive host for *Taenia ovis* (and *Taenia hydatigena*) in Australia.

Unlike hydatids, sheep measles is not a human health hazard. The parasite does not develop in humans. But it is nonetheless considered unacceptable – and carcass condemnations at slaughter can and do occur.

Like hydatids, the key to control is breaking the sheep–dog lifecycle:

- control dog movements;
- prevent dogs from eating sheep or goat meat or offal;
- treat dogs regularly with an efficient tape-wormer.

Sheep measles can cost producers a lot of money, but control of sheep measles – and hydatids – is relatively easy.

See the table overleaf for details of various larval cestodes.

### References

- Cole VG (1986). *Helminth Parasites of Sheep and Cattle. Animal Health in Australia*, Volume 8. Australian Agricultural Health and Quarantine Service, Department of Primary Industry, Canberra, p.255.
- Love, SCJ & Hutchinson, GW (2003). 'Pathology and diagnosis of internal parasites of ruminants' in *Gross Pathology of Ruminants*, Proceedings 350, Post Graduate Foundation in Veterinary Science, University of Sydney, Ch. 16, pp. 309–38.

### Further reading

- King S and Hutchinson GW (2007). *Hydatids – you, too, can be affected*. Primefact 475 (February 2007), NSW Department of Primary Industries.

<sup>1</sup> Tapeworms (cestodes) are parasitic flatworms that live in the digestive tract of vertebrates as adults and often in the bodies of various animals as juveniles.



**Table 1. Cysts of larval cestodes (tapeworms) of sheep and cattle**

Cyst/larval stage	Intermediate hosts	Location	Size	Appearance	Adult tapeworm, length, location	Definitive host
Hydatid cyst ( <i>Echinococcus granulosus</i> )	Sheep, cattle, goat, pig, wallaby, kangaroo, human, deer, camel, wombat.	Liver, lung, kidneys, spleen, heart, brain, bone.	4–5 mm at 3 months, 20 mm at 6 months.	Viable cysts enclosed within laminated fibrous capsule and embedded in substance of affected organ. If fertile, contain many scolices ('hydatid sand'). Degenerated cysts contain caseous material that 'shells out'.	<i>Echinococcus granulosus</i> , 4–6 mm (4–6 segments), small intestine.	Dog, dingo, fox.
Sheep measles ( <i>Cysticercus ovis</i> )	Sheep, goat.	Heart, diaphragm, masseter (chewing) muscles, oesophagus, all striated (skeletal) muscle.	3–6 mm at 7 weeks. Oval shape, up to 10 mm long.	Viable cysts contain fluid and a single protoscolex. Dead cysts become calcified.	<i>Taenia ovis</i> , 2m, small intestine.	Dog (dingo very occasionally, fox rarely).
Beef measles ( <i>Cysticercus bovis</i> )	Cattle, buffalo, deer, giraffe.	Heart, tongue, masseter muscles, diaphragm, all striated muscle.	Variable in size: 2–20 mm, average 5 mm. Fully developed in 16 weeks.	Viable cysts contain fluid and a single protoscolex. Degenerated cysts become caseous and calcified.	<i>Taenia saginata</i> , 4–10 m, small intestine.	Human.
Bladder worms ( <i>Cysticercus tenuicollis</i> )	Sheep, cattle, goat, pig.	Liver and abdominal cavity.	Average 50 mm; range 1–60 mm.	Cysts loosely attached to surface of viscera. Contain clear, jelly-like fluid and a single large scolex.	<i>Taenia hydatigena</i> , 3 m, small intestine.	Dog, dingo.

Note: In addition to the tapeworms listed above, there are a number of tapeworms commonly found in dogs, foxes and dingoes that do not involve livestock or humans as intermediate hosts. These include *Taenia pisiformis* and *Taenia serialis* (intermediate hosts: rabbit, hare) and *Dipylidium caninum* (intermediate hosts: flea, and possibly the biting louse). Table modified from Love and Hutchinson (2003), adapted from Cole (1986).

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