

MEAT RESEARCH NEWS LETTER

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MEAT RESEARCH LABORATORY

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CYSTICERCOSIS

Cysticercosis, the greatest single cause of rejection of Australian frozen boneless mutton in the United States Market, is a severe economic problem. It is also a cause for rejection or condemnation of mutton and lamb at Australian Abattoirs and the current Department of Primary Industry procedures are set out in CV circular 68/23.

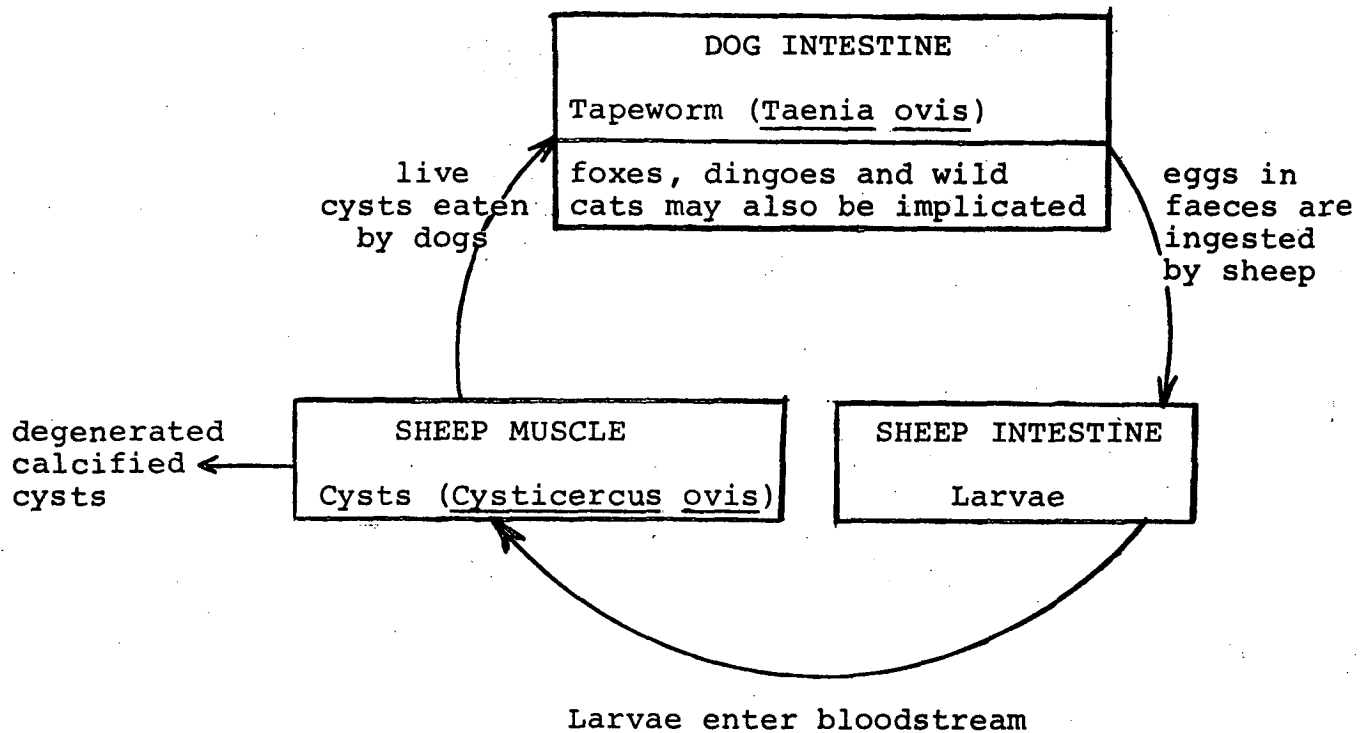
WHAT IS CYSTICERCOSIS?

The condition of cysticercosis in sheep is primarily due to the presence of the cystic stage (*Cysticercus ovis*) of *Taenia ovis*, a tapeworm of dogs and foxes and, possibly, dingoes and wild cats.

Cysticercosis of sheep also includes *Cysticercus tenuicollis*, the intermediate stage of the bladder worm of dogs. In cattle, beef measles occur due to *Cysticercus bovis* which is the intermediate stage of the tapeworm of man. *Cysticercus cellulosae* is the cause of cysticercosis in the pig. Because of its importance, this News Letter will only be concerned with *Cysticercus ovis*.

Cysticercus ovis cysts can be found in the meat and offal of infected sheep and lambs. The fertile mature cyst is an egg shaped, thin walled fluid filled sac about 0.1" - 0.25" in diameter, containing a single tapeworm head. These live cysts are surrounded only by a thin fibrous wall and are therefore difficult to see in the tissues.

The degenerated calcified cysts are small, solid, white masses about 0.2" - 0.4" in diameter. These lumps, when scattered through the meat, give the condition the name "measles".

LIFE CYCLE

The tapeworm, *Taenia ovis*, is found in the small intestine of dogs. Eggs from the tapeworm are passed out to the pasture in faeces. When swallowed by a sheep, the eggs hatch in the sheep's intestine into larvae which penetrate the wall of the gut and enter a blood vessel.

The tiny worms are then carried in the blood stream until they lodge in a muscle where they grow into small cysts. Yellowish white lesions up to 0.1" long may be seen as early as 2 weeks after infection. It takes about 8 weeks for a cyst to develop to the stage of being infective to dogs. However, many of the cysts are destroyed by the host before fully developing, the degenerated centre becoming calcified and surrounded by a thick fibrous tissue capsule. With time the number of live cysts become less and most of the cysts have died and become calcified after 3 to 4 months.

The dog becomes infected with the tapeworm when it eats raw sheep meat or offal containing the live cysts. The single tapeworm head inside the cyst will develop into a large tapeworm in the dog's intestine in about 2 months (if a human ate a sheep measles cyst, nothing would happen!).

A tapeworm will live in a dog for up to about 9 months. Each worm is 3 to 4 feet long and divided into 200 - 300 segments. Each segment, when mature, contains about 20,000 eggs. A segment will break off and pass out of the dog in its droppings every 1 or 2 days. A dog carrying one tapeworm can, therefore, infect a lot of sheep but will usually show no outward symptoms.

REDUCING THE PROBLEM

The limited surveys of dog infestation in Victoria and Tasmania indicate an overall incidence of about 2%. The way to reduce the incidence of cysticercosis, in the long term, is to break the cycle by eliminating tapeworms in dogs. This can be achieved by ensuring that dogs do not eat raw sheep meat or offal and by obtaining veterinary advice on treatments to remove tapeworms from the dog. However, because of the possible involvement of the fox and dingo as hosts, it is not known by how much infection in sheep and lamb would be reduced if tapeworm infestations in domestic dogs were completely eliminated.

Individual sheep flocks show an infected carcass incidence as high as 20% - although the average figure is much lower, particularly with lambs. In the *short term* the problem of reducing or eliminating the incidence of cysts in the export packs can only be solved by improved methods of quality control in abattoirs. Better surveillance before or during packing of meat and offal may be necessary in some plants. X-ray examination enables calcified cysts to be detected and hence infected meat could be excluded from export using this technique.

Industrial X-ray equipment for displaying images of the cysts and other X-ray dense material is now being installed for testing at the Meat Research Laboratory. If results of these tests are satisfactory, the equipment will be used for production line testing in a meatworks preparing boneless mutton for export.

Next Issue will be Ultra-Violet (U.V.) Storage of Meat.