**Unit I: Protista:** Toxoplasmosis in Sheep

**Introduction**

Toxoplasmosis is the disease caused by [*Toxoplasma gondii*](https://en.wikivet.net/Toxoplasma_gondii), an intracelluler protozoan parasite. Although the definitive host is the cat, *T. gondii* can infect all mammals including man and is a significant cause of abortion in sheep and goats. Toxoplasmosis does not seem to cause disease in cattle.

## Toxoplasmosis in Sheep

Toxoplasmosis infection in the sheep is caused by a parasite which is known as *Toxoplasma gondii*. The pathogen produces a great number of oocysts in the gut of a cat – as many as a few million. Oocysts are in effect the eggs or zygotes of the parasite, released in order to reproduce. The cat can then pass this disease into the surrounding external environment via defecation, thus act as a source of infection and allowing for the transfer to new hosts such as sheep and other ruminants.

  The toxoplasmosis disease can be transmitted via the ingestion of the parasite in contaminated water or feed containing these oocysts. Pregnant ewes are more at risks from the more severe effects of the parasitic disease. Economic losses from losses in lamb production are a general result of the spread of the disease. In cattle and sheep the oocysts remain dormant.

  There are generally no signs or symptoms from the infection of toxoplasmosis in sheep yet the disease can often lead to cases of abortion or foetal reabsorption. This is a zoonotic disease which means that the parasite is transferrable to humans. Vaccines are available for protection in sheep and they should not be used or kept around pregnant women.

 Transmission of toxoplasmosis

Cats and kittens are the more common sources of infection of the toxoplasmosis disease in lambs and sheep. Often kittens are more responsible for its spread. Once cats become the hosts for the parasite *Toxoplasma gondii*, the parasite resides in the gut. Here, it releases oocytes of which the cats later excrete. The environment can then become vastly contaminated with these oocysts.

  Once the oocytes are ingested by lambs and sheep, infection occurs. Contaminated food and water may spread the disease throughout the flock. This is also true for contaminated hay and pasture. Exposure from the oocysts to open wounds and skin abrasions also result in infection. Oocysts are able to survive in the environment for as long as one year, thus contributing to the increased risk of infection in these areas.

## Signs and Symptoms of ovine toxoplasmosis

In sheep and cattle, infection of toxoplasmosis is a dormant parasite. As a result sheep generally show no signs or symptoms despite being infected with the disease. They therefore are asymptomatic. Some ewes may even give birth to healthy lambs.

  The main result in ewes following infection is abortion, thus proving to be an economically unwanted disease in the sheep owning community. The disease can pass on to the foetus inside of pregnant ewes which can lead to stillbirths. During early pregnancy, ingestion of oocysts is known to cause reabsorption in ewes. Some ewes may even become barren.

  During the mid-phase of pregnancy foetal mummification can occur. Generally, if the ewe has twins, only one lamb is affected. Ewes infected during the later stages of pregnancy can have weaker lambs. These lambs may survive but can also die within two weeks after birth. In addition, they may be born with an inability to suckle.

**Treatment of Toxoplasmosis**

The parasite has been shown to be destroyed by certain antibiotic treatments. These can include sulphonamide which is often given orally. This will also be given to the rest of the flock since they will be suspected to have contracted the disease. Infected ewes may be given certain medicines advised by the veterinarian two months before lambing to prevent the pregnancy complications which arise from infection.

**Prevention of Toxoplasmosis**

Preventative measures are simple and can be generally quite effective in reducing the spread of the disease if carried out correctly and by all members of the community in the area. These include removing sources of infection and by the administration of vaccines. Infected ewes do not re-abort lambs in their second pregnancy and so do not need to be culled.

  Areas where many kittens are present should be avoided when keeping sheep. In some areas feral cats may even be mass euthanized. Farms owning many cats should considered having them vaccinated against the disease and neutered to prevent the spread of kittens, and thus sources of infection. Pastures used by infected animals should ideally not be re-grazed upon for at least a year, until the oocysts are eradicated completely.

  There is a vaccine that can be used to reduce the spread of toxoplasmosis. This vaccine can currently be used in Europe, including the United Kingdom. It must be noted that pregnant women should not be exposed to the vaccine as it can cause abortions.

**Diagnosis of Toxoplasmosis**

The clinical signs are generally the main method of diagnosis. Initially the disease may be diagnosed following cases of abortions or foetal problems throughout the flock. Following this, any history of the disease in the area, be it on cats, sheep or other animals, should be noted.

Confirmation of the disease is later diagnosed by veterinary methods. These include taking blood samples in order to detect the presence of the relevant antibodies in the animal. Lesions may be present on the placental membranes of lambs which also indicate the presence of oocysts. Tissues and fluids may be sampled from the foetus for additional confirmation.

 **Prognosis of Toxoplasmosis**

Toxoplasmosis infection rarely causes death in adult sheep. However, it is one of the primary causes of abortions in sheep. Ewes which have already been infected and had foetal loss acquire immunity for the rest of their lives. Overall, it can cause major economic losses during lambing season.



Life cycle of *Toxoplasma gondii*. Source: Wikimedia Commons; Author: LadyofHats (2010)