Other Internal Parasites

Lungworms

Sheep are infected with a number of lungworm species, the most important being D*ictyocaulus filaria*. Several species of metastrongylid lungworms also occur in sheep and include *Protostrongylus rufescens*, found in the small bronchi, *Muellerius capillaris*, *Cystocaulus ocreatus* and *Neostrongylus linearis* all of which are present in the lung parenchyma forming small nodules.

The life cycle of *D. filaria* is similar to GI nematodes except that L1 pass out in the faeces and develop to infective L3. After ingestion, the L3 penetrate the intestinal mucosa and pass to the mesenteric lymph nodes where they moult. The L4 then travel via the lymph and blood to the lungs, and break out of the capillaries into the alveoli about one week after infection. The final moult occurs in the bronchioles, a few days later, and the young adults then move up the bronchi and mature.

The life cycles of the various other lungworm species are similar and indirect, requiring a molluscan intermediate host. Sheep are infected by ingesting a slug or snail containing an infective L3. Following ingestion of an infected mollusc with herbage, the larvae are freed and travel to the lungs via the lymph and blood vessels and enter the mesenteric lymph nodes and lungs.

Disease due to lungworm in sheep is usually less severe than those seen with cattle. Infections with *D. filaria* may cause dyspnoea and coughing in grazing animals usually in the autumn. Mild infections usually of other lungworm species are not normally a problem, though heavy infections may cause bronchopneumonia and emphysema.

Tapeworms

Tapeworms are mainly of importance as the intermediate larval (or metacestode) stages in sheep; the final hosts being carnivores. Adult tapeworms (*Moniezia* spp.) are common parasites of the intestines of sheep and are frequently diagnosed because of the presence of segments in the faeces. Infections are generally symptomless, though occasionally clinical signs including unthriftiness or diarrhoea, have been attributed to *Moniezia. Moniezia* eggs are passed in the faeces and on pasture where the onchospheres are ingested by pasture mites and develop into cysticercoids in 1-4 months. Sheep are infected by ingestion of infected mites during grazing.

Intermediate stages of *Taenia* spp. may harm the host e.g. *Taenia multiceps,* found in the brain (metacestode stage called *Coenurus cerebralis*), causing 'sturdy' or 'gid' in sheep. Clinical signs depend on the location and size of the cyst or cysts and include circling behaviour, visual defects, and peculiarities in gait, stumbling, non-coordinated movements or paraplegia. As the infection progresses animals may become anorexic and lose weight and death may result. With the syndrome ‘gid’ the animal holds its head to one side and turns in a circle to the affected side.
Others such as *Echinococcus granulosus* (hydatid) found in the lungs and liver may be important in public health. Hydatid infections (*E. granulosus*) in sheep are generally not associated with clinical signs but can lead to local condemnation of affected organs.

The metacestodes of *Taenia hydatigena* (*Cysticercus tenuicollis*) can result in liver or carcass condemnation and in heavy infections may lead to hepatitis and death in young lambs. *Cysticercus ovis* (“sheep measles”), the intermediate stage of *Taenis ovis* found in the muscles and heart, can be a significant cause of economic loss through carcase condemnation at slaughter. Such infections have become a significant problem in some areas in recent years.

The larval tapeworms found in sheep (e.g. metacestodes stages of Taenia spp, and Echinococcus granulosus) are acquired by ingestion of eggs passed out in the faeces of the final canid hosts (dogs and foxes). The life cycle is completed when a dog of fox feeds on infected sheep viscera.