

Lungworm Infection in Organic Cattle

Norman Beggs

Disease Surveillance and Investigation Branch, Veterinary Sciences Division, Department of Agriculture and Rural Development, 43 Beltany Road, Coneywarren, Omagh, Co. Tyrone BT78 5NF, Northern Ireland

Introduction

Bovine parasitic bronchitis, or lungworm disease (“hoose” or “husk”), is caused by the roundworm, *Dictyocaulus viviparus*. Although infections with this parasite may occur in all ages of cattle, the disease is mainly seen in calves during their first season at grass. However, lungworm disease has recently emerged as a disease of second grazing season and older animals.

On most organic farms, a gradual infection occurs in young animals resulting in development of a natural immunity. However, on some farms this gradual infection does not take place and large numbers of infective larvae may build up on pasture. The challenge may be sufficient to cause clinical disease in cattle which have not developed adequate immunity. Although lungworm disease most commonly occurs from July to November, outbreaks have been recorded in every month of the year.

Life Cycle of Lungworms

The life cycle of bovine lungworms is relatively simple. The adults are white thread-like worms that live in the air passages (trachea and bronchi) leading to the lungs. Hundreds of worms may be

present in heavily infected animals. Adult female worms can produce many thousands of eggs that contain a first stage larva (L1). The eggs are coughed up with mucus and swallowed. The L1 larva emerges from the egg in the gastrointestinal tract and leaves the body in the faeces where development to the infective third stage larva (L3) takes place. Manure pats may contain thousands of larvae that contaminate the pasture, feed, or water of cattle. The L3 may leave the faecal pat with the help of sporangia of the fungus *Pilobolus* or, under wet conditions, just by active or passive migration onto the pasture. Infection of cattle results from eating herbage contaminated with L3 larvae. In the bovine host, L3 larvae penetrate the intestinal wall and migrate via the lymph or blood systems to the mesenteric lymph nodes and eventually to the lungs which they can reach as early as one week after ingestion. In the lungs they grow and migrate to the larger bronchioli and bronchi, where they mature to adult worms that start to produce eggs around 24 days after ingestion of the L-3.

What are the Signs of Lungworm Infection?

Signs of this disease most frequently become apparent

during the late summer and autumn. Infected calves start to cough, and usually have a rough hair coat and lower weaning weights. The major economic loss resulting from lungworm infection is due to poor weight gain. About 1-2% of infected calves may develop a hypersensitivity reaction to the lungworm that may cause an acute respiratory problem or sudden death.

All pasture deaths should routinely be submitted for post-mortem examination.

What Should I Do if I Notice These Signs?

The limitations placed on organic livestock farmers prohibit routine administration of anthelmintics. An accurate diagnosis is required before treatment may be carried out. Have your veterinary surgeon examine the cattle as soon as a herd coughing problem is noticed. Remember that other causes of pneumonia can produce similar signs, or complicate lungworm disease. Careful diagnosis, made by clinical examination of the animal, is therefore essential. If the examination suggests lungworm infection, your vet may take samples for laboratory confirmation of the diagnosis.

- **Examination of faeces for lungworm larvae** (minimum 15g or one tablespoonful required). Note that false negative results can occur if the animals are sampled before or after the adult lungworms become patent (egg-producing). Furthermore, adult cattle, which are often partially immune, may show disease without the infection ever

becoming patent. Thus laboratory confirmation by demonstration of lungworm larvae in faeces is successful in only about 50% of outbreaks in dairy cows.

- **Serology by ELISA** (clotted blood) for antibodies to adult lungworm gives a higher diagnostic rate in adult cattle but occasional individuals are seronegative. A positive result indicates exposure to infection within the last 3 months or so.
- **Haematology** (blood collected in EDTA anticoagulant). Elevated eosinophil counts can be a diagnostic guide but are not specific for lungworm infection.

Therefore, in most cases it is best to sample faeces and clotted blood from a group of 6-10 animals that have been affected the longest. These blood samples may also be used to assess exposure to common respiratory viruses.

Summary

Lungworm infection can be a major cause of ill thrift and disease in young cattle. Clinical diagnosis may be confirmed by examination of faeces for lungworm larvae (minimum 15g or a tablespoonful required) and/ or examination of blood for the presence of lungworm antigens by ELISA testing. Once a diagnosis has been confirmed, treatment with an approved anthelmintic should be carried out. Because lungworm infection can predispose to viral or bacterial pneumonia, lungworm infection should be treated before the animals are housed for the winter.