

## **Lungworm infections**

Lungworms (*Dictyocaulus viviparus*) are the cause of parasitic infections of the respiratory tract. Lungworm infections lead to symptoms varying from mild cough to very severe superficial respiration and many coughs. In the past, lungworm was almost only a problem in calves during the first hay season. However for some years now, lungworm is becoming more and more a problem in adult cows.

### **Infectious routes**

An adult lungworm is a wire-shaped worm of 4 to 8 cm long. The worm lives mainly in the lung and in the smallest branches of respiratory tract. One adult lungworm can produce up to 10,000 eggs per day.

In the trachea branches, the lungworm eggs develop itself almost immediately into stage 1 larvae (L1 larvae), are swallowed and secreted via the manure. The secretion takes place at intervals. The L1 larvae develop itself into the infectious L3 larvae. Under optimal conditions, this will take place within 5 to 10 days. The rate of development within the manure heap depends on the outside temperature.

A big difference with gastrointestinal worm larvae is that the spread of L3 larvae can also occur under dry conditions. The fungus 'Pilobolus' plays an important role, as this fungus shoots out the lungworm larvae. In this way, lungworm larvae can spread and reach a few meters from the manure heap, and with strong wind, even further.

The infectious L3 larvae infect grazing cattle, and after uptake, the L3 larvae penetrate the intestinal wall. Then the larvae enter a lymph node and passes through the blood and lymph to the lungs.

Under the influence of heat and moisture, the lungworm develops rather fast. In Dutch and Ukrainian climate conditions, development is possible from April to November. In winter months, lungworm larvae will die in the meadow.

In adult cattle, re-infections can occur annually because new heifers will increase the infection pressure. Good clinical research is very important to define the right diagnosis.

### **Symptoms**

Coughing in the pasture is the main symptom of lungworm infection. The severity of coughing varies greatly. Lungworm infections occur occasionally in cows without grazing. In case of severe lungworm infection, milk production decreases. The sick animal reacts slowly due to a reduced feed intake, increased energy consumption due to respiratory problems and damage of the lungs by the lungworm larvae. Sometimes death occurs among sick animals, due to a blockage of the airways by lungworms and / or larvae and the inflammatory reaction in the airway branches. Infections with bacteria such as *Pasteurellae* and *Mannheimiae* can occur more easily because the lungs are damaged. These infections exacerbate the disease.

### **Diagnosis**

Lungworm infection usually causes clearly visible ("clinical") symptoms such as coughing. The diagnosis can be confirmed by examining manure or blood. Most research must be done on fresh manures (manure available at the laboratory within 24 hours). At the time of the complaints, manure research is often reliable. A few days later, antibodies can also be found in blood. On herd level, the infection of lungworm can be confirmed in bulk tank milk.

If an animal dies, post-mortem research may clarify or exclude other causes. A positive post-mortem outcome may show adult lungworms in the airway branches, scar tissues or cross sections of larvae.

### **Risk Factors**

Grazing is a risk for introducing lungworm infections. Infected animals (carriers) contaminate the meadow during grazing. Heifers can also be carriers if they have already been infected the year before. Sometimes, these carriers excrete large numbers of larvae through the manure without showing symptoms.

### **Treatment**

In case of clinical symptoms in young animals, it is advised to treat the infected animals with a registered lungworm medicine. Lungworms are generally sensitive to most of these registered products. Before using these medical products, consult your vet. Because infected meadows contain contagious larvae for six to seven weeks in the summer, proper grazing management is very important. In addition, the vet can support a grazing advice.

In cases where there is no clean meadow available, it is useful to keep the animals in the stable (barn) until there is a safe meadow available. When the farmer using medical products that have a long lasting effect, keeping the animals in the stable is usually not necessary.

If there are infections on the farm, the advice is take preventative measures for the next full harvesting season. Vaccination of the young stock before the first hay season is a good option. Immunity by vaccination is not permanent. Therefore, re-infection with lungworm larvae is necessary for the development of a sufficiently high and prolonged immunity. On farms or meadows where young cattle (juveniles) only are present, there is a risk that there are no carrier animals present. A re-infection by grazing (after vaccination against lungworm) will often not take place in these cases, which results in no optimal immunity (resistency).