Lyme Disease

Lyme disease in the UK occurs principally in dogs, humans, deer, rodents and sheep. It is caused by the bacteria, *Borrelia burgdorferi* which is spread by infected ticks of the species *Ixodes ricinus*. Although the impact of Lyme disease on livestock in the UK is thought to be minimal, it can cause severe and long lasting illness in people and dogs. The measures used to control Lyme disease also aid in the prevention of other tick-borne diseases such as Babesiosis in cattle, Louping ill, Tick pyaemia and Tick-borne fever in sheep, all of which can cause severe economic losses on farm. The disease is a good example of one that depends on a complex ecology and great interaction between farmed and wild animals.

The disease

Infection of people with *B. burgdorferi* doesn't consistently cause text-book Lyme disease, but common signs include include flu-like symptoms, a rash known as "Erythema migrans", headaches, chronic arthritis and some neurological symptoms. Signs of the disease may not occur until several weeks after infection and can be confused with other diseases such as leptospirosis.

This combination of factors can make diagnosis hard for doctors and a knowledge of a history of tick bites can be very helpful.

In dogs, the disease manifests as fever with a loss of appetite, enlargement of the lymph nodes and a shifting, recurring lameness.

In sheep, infection is thought to be mainly asymptomatic, but severe lameness has been associated with high exposure levels on farms in Norway.

Transmission

The sheep tick usually has a 3-year lifecycle in the UK.

After being laid as an egg in the environment, the immature tick hatches in spring/summer and will feed for about a week on one host before dropping off and developing into the next stage. It does this for two years until it is mature. The adult tick then attaches to a host (usually a larger mammal i.e. sheep, deer or human) and feeds for 3-14 days. Mated female ticks then fall off and lay eggs. If the tick feeds from an infected host, then the tick too becomes infected by the bacteria. Infection passes transtadially and although transovarial transmission is felt to play a role in maintaining infection, it has not been demonstrated.
Distribution

As mentioned before, ticks transmit the disease from one animal to another as they feed on a new host with each stage of their development. So for Lyme disease to be prevalent in an area there needs to be a large number of hosts and adequate tick habitat to facilitate the spread and survival of the disease. Ticks spend the vast majority of their life cycle off the host in their environment and over-winter well in the UK as long as they can avoid hard frosts. Ticks prefer wet (annual rainfall >100cm) and very humid conditions with dense, low and medium level foliage such as coarse grasses, rushes, heather and bracken.

The main wild hosts for *B. burgdorferi* in the UK are rodents and deer, with sheep being thought to be the main farm species that act as a reservoir of infection. Deer and larger mammals are regarded as reproduction hosts (needed for the tick to reproduce) with rodents perhaps being the actual reservoir for Borrelia. This therefore presents problems in attempting to control the disease. In Scotland as many as 40% of Hoggs show exposure to the bacteria but with no associated disease, this may be an important factor regarding how *B. burgdorferi* is transmitted to species (such as humans and dogs) that are more susceptible to developing Lyme disease after infection.

Exposure to the bacteria is shown by elevated levels of antibody in the blood and this is quite commonly found in farmers in Cumbria, the New Forest, Salisbury plain, Exmoor, the South Downs, parts of Wiltshire, Berkshire and the West Coast of Scotland. The reason for this is that in these locations tick habitats are used for grazing by sheep and deer, but also by people for work and recreation.

In 2011 there were more than 1,100 human cases reported in the UK, this was a rise of almost 25% on 2010 and was mainly though to be because of climate change increasing tick numbers. The Health Protection Agency believes the real number of cases is likely nearer 2-3,000 per year although some estimate it may be nearer 10,000!

Lyme Disease in people is a Notifiable disease in Scotland.

Control

Ticks are the only natural way the disease can spread. Ticks spend 98% of their life cycle in the environment rather than on the host. Because of this, ticks are very susceptible to environmental changes, especially reduced humidity. Land improvement such as drainage and re-seeding not only allows better live-weight gain from pasture, but can also dramatically reduce tick numbers, especially on relatively low pastures bordering hills. Heather burning has been used historically to reduce tick numbers although it’s thought the actual effect is only short lived.

Sheep and cattle can be treated with pour-ons containing cypermethrin or deltamethrin every 4-12 weeks depending on age and product used to prevent ticks feeding, with dipping is another alternative. Risk periods vary across the country, but are generally Spring and Autumn.

When putting a new tick control measure in place, veterinary advice should be sought to check that natural immunity to other tick borne diseases isn’t allowed to wane before a period of re-exposure as that may precipitate disease.

ZOONOTIC

Lyme is a serious, potentially fatal disease in man. Fever and flu like symptoms with a history of a tick bite, should be treated seriously. Transmission of Borrelia usually takes place two days after a bite, so ticks should be removed as soon as they are seen. There is evidence that a tick dislodged from one host will transmit Borrelia as soon as it reattaches to another host. This has implications for those performing post mortem inspections on sheep.

Further information: www.bada-org.uk