Ticks are present throughout the UK, infesting a wide variety of hosts. They require relatively high humidity to survive, so are found predominantly in areas of unimproved ground where thick vegetation provides them with the ideal habitat. Anecdotal reports have suggested that tick numbers are increasing, and ticks are now present in previously uninfested areas. They are important in the spread of diseases in sheep, grouse and humans and could have serious implications for productivity in upland enterprises. It is currently estimated that 300,000 lambs are affected annually by tick borne disease in the UK (Sargison 2008). Although ticks are present in all upland areas, tick borne disease is not. Therefore the potential exists to introduce disease to previously clean areas through sheep movements.
Lifecycle

The sheep tick, *Ixodes Ricinus*, is the most significant to the UK livestock industry. This hard bodied tick is a ‘three host tick’. It requires one blood meal from each of its hosts, before falling off the host and moulting to the next stage. Ticks only spend about 17 days in total feeding in the course of their lifetime, with the remainder of the time spent in a resting state in dense vegetation. As the tick feeds on three different animals during its lifecycle it can transmit disease between its hosts. On average, ticks take three years to complete their lifecycle, however this can take much longer if conditions are not optimal.

Figure 1. Tick Lifecycle
Sheep ticks are normally found on the non-fleeced areas of the body i.e. head, flank and brisket areas. Although the tick itself can cause irritation to sheep, and occasionally in severe cases anaemia, the main problem associated with sheep ticks is the spread of diseases such as Louping Ill and Tick Borne Fever. Practices undertaken to control ticks are in fact predominantly about controlling tick borne disease. In endemic areas adult sheep are usually immune and disease is mainly seen in lambs and yearlings. Colostrum should provide immunity for lambs for the majority of their first grazing season. Problems can occur when naïve sheep are moved into an infected area and severe outbreaks may be seen in animals of all ages.

Figure 2. Adult female tick which has consumed a blood meal (bean shaped and grey coloured, approx. 1 cm long).
Tick Borne Disease

A number of economically important tick borne diseases exist:

- **Tick Borne Fever (TBF):** mainly causes a high fever, reduced feeding and depression of the immune system for a few days. However, it can cause abortion in naïve pregnant ewes, and in some cases, severe illness. In areas where TBF is present disease is normally seen in newborn lambs, especially if colostrum intakes are low, and also in naïve ewes introduced to the flock. TBF can predispose sheep to other infections introduced to the flock. Recovering sheep can carry the disease for up to two years, making control difficult.

- **Louping Ill:** causes neurological signs, incoordination and sometimes sudden death. It is often fatal in red grouse so is economically important to the game industry. A vaccination is available for sheep.

- **Tick pyaemia:** bacteria enter the body through a tick bite, and can cause sepsis of joints and the spine resulting in severe joint ill in lambs. If the spinal column is affected, lambs may be paralysed.

Additionally ticks can spread diseases such as Q fever and Lyme disease to humans with potentially serious implications.

**Control measures**

To control tick borne disease you need to minimise tick infestation when sheep are on rough pasture and use grazing practices to limit exposure to ticks.

- **Grazing practices:** avoid grazing susceptible sheep on tick infested pastures during peak tick activity such as early spring.

- **Chemical control:** tick infestation can be reduced using topical treatments. These should form part of your ectoparasite control plan. Specifics should be discussed with your veterinary surgeon and recorded in your whole flock health plan.

- **Introduction of stock:** as it only takes one infected tick to spread disease, introduced sheep should be quarantined and treated for ticks if necessary.
Case Study

A Farming Connect project to investigate the impact of ticks on hill lambs was carried out in north east Wales. The area is predominantly ffrridd and hill grazing for beef and sheep and woodland habitats. No deer or grouse are reported present in the area. Five farms were involved in the project over a period of three months in summer 2013. All participating farms were members of FAWL’s farm assurance scheme, and agri-environment schemes. Sheep were brought in on all farms, although for most this was just rams.

A sample of hill lambs on each farm were examined for tick burden, location of ticks and body condition score (BCS). Blood samples were taken from six lambs per farm to test for exposure to Louping Ill virus, and to measure trace element levels. Participating farmers completed a questionnaire about their use of ectoparasiticides, and their own personal experience of ticks on their farm.

Tick burden varied between farms reflecting differing control measures and variable time periods between treatments. There was no statistical association found between tick burden and body condition score.
However, on some premises tick numbers were insufficient to allow meaningful analysis. The majority of farms demonstrated good tick control using licensed products. Interestingly, on one holding, lambs examined 48 hours after shower insecticide application had live ticks attached; supporting the view that showers are not 100% effective for control of ticks and other ectoparasites.

A single lamb tested positive for Louping Ill. To confirm the true prevalence of infection in the valley more testing would be required. None of the participating farmers reported seeing symptoms of Louping Ill in their lambs; however on three out of five farms signs of lameness attributable to tick pyaemia were reported.

Trace elements were investigated in this study to determine the need for future supplementation on participant farms. They were found to be satisfactory on all farms, although significant variation was found between individuals. Additionally, adequate trace element levels allowed us to eliminate deficiency as a confounding factor in statistical analysis of lamb tick burden vs body condition score.

All farmers involved felt ticks had become more of a problem over the last 10 years, reporting increased numbers of ticks on both lambs and farm dogs. Despite this, only a single farmer attributed more lamb losses to higher tick burdens, which he has since controlled by the use of pour-ons. In the summer of 2013 all farms used either Crovect™ or Dysect™ on their lambs; additionally some used these products on their adult sheep. Three farms used shower insecticide application.

The questionnaire revealed a larger area of grazing was thought to be infested by ticks, with majority of farmers reporting the presence of ticks on previously clean grazing. Vegetation on hill ground was reportedly more dense on all farms, with increased heather coverage, and two out of five farms reported denser vegetation on improved grazing. According to the farmers involved within the project, their land management practices have changed over the last 10 years. For example the majority of farms used to burn rough vegetation on the hill for control of vegetation, however none now do. All participating farms rely on topping to control vegetation on their ffir id land as practised previously. Stock numbers have also reduced on all surveyed farms, according to the farmers, this is partly due to agri-environment schemes and the changes in direct payments.

All participants felt that sheep farming was likely to still be possible in this area even if tick numbers continued to increase. However, heavy reliance on ectoparasiticides would be necessary, therefore if drug resistance was to develop, or products used in the control of ticks were unavailable, all participants felt sheep production on their farm was unlikely to continue to be viable.
Summary

• The dense vegetation found in upland regions of Wales is the ideal habitat for the sheep tick *Ixodes ricinus*.

• Changes in land management and decreasing stock numbers have expanded this area, and anecdotal reports suggest tick numbers are also increasing.

• The tick lifecycle, on average, takes three years, with a short single blood meal required on each of the three hosts (three animals) it needs. The remainder of the time is spent in the undergrowth.

• Tick borne disease, where disease is transmitted between animals when ticks feed, is estimated to affect 300,000 lambs annually in the UK.

• Sheep are usually immune in endemic areas (where disease already exists) with problems seen in lambs and yearlings. However, if naïve sheep are introduced, disease can be seen in all ages, and can include abortions in pregnant ewes.

• To control tick borne disease, tick infestation must be minimised when sheep are on rough pasture. This can be done through careful grazing management to limit exposure of susceptible sheep to ticks, especially during peak tick activity such as late spring.

• Topical treatments could also be used following veterinary advice and effective quarantine procedures should be in place for bought in stock.

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