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Improving red clover productivity

Why grow red clover?

Red clover is an increasingly important forage legume for sustainable grassland systems. It has the ability to fix between **150-250kg** of nitrogen/ha/year and with the correct management, mixed swards of red clover and perennial ryegrass can yield between 15 and 20t of dry matter/ha/year. Red clover is high in protein and red clover silage typically has a crude protein content of **18%**.

However, sometimes it proves difficult to grow because it lacks persistence in the sward, particularly under a grazing system. This is because it grows from crowns that are vulnerable to over grazing and can also be damaged by severe frosts.

Red clover is also susceptible to diseases, including crown rot (*Sclerotinia*) and stem nematodes (Eelworm).

What is Sclerotinia?

Sclerotinia trifoliorum is a soil borne fungal pathogen. During spring growth, its rapid development can have major effects on the productivity of the sward.

Sclerotinia is very hard to spot in spring as its initial symptoms looks like normal winter damage. But any plant which looks to be reduced in size and very brown is a cause for concern. Small matting of hair-like strands (see photo) with a similar look to a dense spider's web, could be the fungal mycelium.

Sclerotinia has two ways of getting into a sward: one is by the mycelium through soil movement from field to field, either by animal or machinery; the second is by spores emitted from the fruiting body stage of the fungus' life cycle. The spores are spread by the wind, and spore infection is most common at the end of summer and the autumn months.



What are stem nematodes?

Stem nematodes are present in soil. There are many types, of which most cause no damage to plants. The parasitic strain which causes damage to red clover is called *Ditylenchus dipsaci*. It is naturally present in the soil in small numbers. Infection happens when the natural population is altered.

Stem nematode causes red clover to twist, crinkle and swell. This leads to stunting of plant growth. The life cycle of the nematodes takes a few generations for the effect to be seen easily. Infection usually happens in the autumn and spring but can occur at any time.

Nematode infection is spread by soil transfer via;

- Animals and people
- Machinery
- Water courses

The photo shows an infected plant. The red swollen area is where the nematodes have infected the plant.



Controlling these diseases

For sclerotinia, if the infection is discovered early then spraying with a fungicide is a possibility. But no product on the market is 100% effective and the infection continues to spread and causes further damage. The same problem exists with stem nematodes as there are no chemicals available that are 100% effective. For both diseases, the only current option is to plough the field and leave it out of rotation for clover species for up to 10 years. Vigilance and biosecurity measures are the best ways to reduce the risk of further infection. Avoid transporting soil from field to field and remove any diseased plants as soon as they are spotted.

The future

Red clover with good resistance to these pathogens is the best solution. A project at IBERS, Aberystwyth University funded through ERDF funds via SMARTExpertise, is aiming to achieve this goal through breeding varieties that are more resistant to these pathogens. Researchers at IBERS are working with Germinal, Hybu Cig Cymru – Meat Promotion Wales and Farming Connect to develop varieties that are better suited to the environment and modern farming systems to enable farmers to make the most of this valuable crop.



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