

Case Study: Grassland & clover management



Climate change is bringing about a new set of challenges and opportunities for agriculture. While global warming may lead to extended crop growing seasons, it could also lead to unpredictable weather, new pests and diseases, and a requirement for farmers to substantially reduce their carbon footprint.

Soil Association Scotland is running a skills development programme to help farmers and growers improve their business sustainability, cut greenhouse gas emissions, reduce agriculture's carbon footprint and increase resilience to climate change.

Grassland and clover management

Improving the sustainable production and utilisation of grass-clover swards - that is without reliance on artificial fertilizer - will result in savings on input costs and a reduction in the greenhouse gas emissions associated with fertiliser production and application. Clover is a legume, which means it can naturally 'fix' nitrogen from the atmosphere within their roots, making it available to crops.

Once established, the improved rooting system of the clover sward will mean it has a better ability to deal with both drought and wet conditions. Better quality swards and silage will also reduce reliance on expensive purchased feeds (and associated transportation). The role of grazing cattle and sheep on long-term grasslands in storing carbon in the soil (known as carbon sequestration) is also a key part of the climate change equation, and a strong argument for red meat production as part of a sustainable farming system.



Beyond the Burn, run by the Lochhead family

Beyond the Burn is a 134ha dairy farm near Mouswald, Dumfries, with a herd of 150 milking Brown Swiss cows. The land is mostly sand or sandy loam, ranging from about 50ft to 250ft above sea level, situated in two parcels approximately two miles apart.

The Lochhead's have been using clover-based leys for 11 years. Red clover leys are used for silage only and white clover leys are used mainly for grazing, although some white clover fields are taken for silage after spring grazing. Since there are no sheep on the farm, the Lochhead's only use medium and large-leafed varieties of white clovers together with mostly tetraploid ryegrasses, as these give a more open sward in which the clover can tiller. The white clover swards are replaced over a 5-7 year period.

Three cuts of silage are taken from the red clover leys, with the first cut usually in late May or early June. In 2010, the late spring meant that first cut was taken at the end of the first week in June, although this still resulted in silage of 11.6 ME. Red clover swards are based on the variety Milvus as it seems to suit the local soil type, with the companion grass being hybrid ryegrasses.

The Milvus swards generally last about four years with the main enemy being soil compaction from heavy silage and slurry equipment. This is because red clover does not tiller, so if it is damaged, the plant is lost and is more likely to be replaced by weeds. For this reason the Lochhead's have recently started to add a small amount of white clover to the red clover ley mix so that the white clover will tiller into any open spaces. This technique appears to be working well.

Clover: The benefits

Clover content naturally varies throughout the growing season and is at its strongest during late summer, although you should aim to have 30%-50% of clover to grass through out the year. The aim is to produce a quality sward which has plenty of clover to produce the optimum amount of N per hectare, which can range from 150-200kg nitrogen/ha.

If a sward contains sufficient levels of clover it can achieve yields of 13t DM/ha. In other words, white clover leys will produce the same yield as a grass only ley - but without the need for nitrogen fertiliser.

White clover has a high protein content at around 27%, while perennial ryegrass conations about 17% protein. A combination of both clover and ryegrass will increase the overall protein content from between 2% to 20%.

Like other forage legumes, clover results in a higher voluntary intake than grasses. Its low structural fibre/soluble plant cell content ratio also means that it passes faster through the rumen. Clover's improved palatability and higher digestibility means that stock will eat more forage, resulting in an increase in live weight gain.

Red clover: High yielding

Red clover is a high yielding, high quality and high protein forage. It is most commonly used for silage production and also as a fertility building break, as it fixes high levels of nitrogen for subsequent exploitative crops in the rotation.

Due to its deep rooting nature, red clover is relatively drought tolerant and winter hardy. It is not a very persistent plant and will usually last 2-3 years, meaning that it fits particularly well as the fertility break in an arable rotation. It is best grown along with grasses as this provides a higher total forage yield and makes better silage. However, you should avoid feeding red clover to ewes 6 weeks before and after conception due to its high natural oestrogen content.

White clover: A versatile forage

Although it may yield less, white clover is more popular than red clover because it persists longer in the sward and is more adaptable - it can be grazed hard and cut for silage. White clover differs from other clovers in having a stem that runs along the ground, which produces edible leaves and flower heads at low levels. This makes it highly suitable for grazing.

A large number of white clovers are available and are classified by leaf size. In general terms, the smaller the clover leaf size, the more tolerant it is to close grazing. The medium leafed varieties are more productive when cut for silage or hay. Large leaf clovers are best utilised in silage production or for grazing cattle, as they do not survive when grazed hard by sheep.

Sowing and establishment

Compacted soils which are low in pH, potassium and phosphate will never reach its full production potential. To get the most from your clover ley, try to address any soil compaction issues and aim for a soil pH of around 6.0.

When sowing clover, attention should be paid to timing and depth of seed bed. Clover requires a soil temperature of at least 7°C before satisfactory germination will take place and there must also be sufficient moisture. The seed will not germinate satisfactorily if it is sown at a depth of more than 1cm. Clover seeds are smaller than grass seeds so they should be sown in to a well consolidated seed bed. Rolling the seedbed before and after sowing is essential to ensure that the clover seed is in direct contact with the soil for maximum germination.

If you are looking at reseeding a field it makes real sense to look at introducing clover in your sward. It will save you time, money and energy in the long run, particularly as fertiliser prices and fuel costs are predicted to rise further.

Sources of Further Information

James Bretherton, AgScope, Feeding soil plant and animal
Tel: 01772 685677. Email: james@agscope.co.uk Website: www.agscope.co.uk

Jimmy Goldie, Dairy Select Manager, SAC. Tel: 01387 263961
Email: Jimmy.Goldie@sac.co.uk

Dods of Haddington, Haddington, Edinburgh,
Tel: 01620 823305 Email: dodseed@lineone.net

Cotswold Seeds Ltd, *The Case for clover*
Website: www.cotswoldseeds.com

Soil Association Scotland

18C Liberton Brae, Tower Mains, Edinburgh, EH16 6AE
Website: www.soilassociation.org/Scotland.aspx

For further information on the Climate Change Programme, please contact
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