White clover for beef systems

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Summary

- The price of fertiliser nitrogen has doubled in the last decade
- Clover fixes nitrogen from the air and thereby reduces fertiliser costs
- White clover is the most suitable clover for grazing in Ireland
- White clover can supply 50-150 kg N/ha each year on most farms
- Clover needs good grassland management and works best in a paddock system
- Guidelines are provided for establishing and maintaining clover in swards

Introduction

Fertiliser nitrogen (N) price has doubled in the last decade and each 1 kg fertiliser N now costs an average of just over €1. White clover has rhizobia bacteria in its roots that "fix" nitrogen from the air, and this can supply 50-200 kg N/ha per year. Increasing the clover content in grassland can result in increased herbage production and quality (Table 1).

Table 1 — Herbage production, herbage quality and nitrogen (N) fixation from grass and clover plots with zero fertiliser N input at Teagasc Solohead research farm in 2009.

Annual sward clover content (%)	0	15	20	25	30	35
Tonnes herbage DM produced/ha	7.4	9.4	9.8	10.5	11.0	11.1
Crude protein content (% of DM)	21	23	23	24	24	25
Organic matter digestibility (%)	77	79	79	80	80	80
N fixed (kg/ha)	0	89	108	144	160	187

Establishing white clover on your farm

Oversowing: The cheapest way to introduce white clover on your farm is to oversow (broadcast) it on existing grassland using a fertiliser spreader, slug pellet applicator or similar machine during late spring:

1. Get a soil test. The ideal soil fertility for clover is the same as for grass: soil P and K index of 3 and a pH of 6.0 to 6.8. However, clover is not tolerant of low pH.
2. Get weeds such as docks under control before introducing clover. Herbicides that don't kill clover are usually quite expensive.
3. Seed-to-soil contact and high soil moisture are essential. Ideal conditions are an open sward (e.g. after first cut silage) where soil moisture is likely to remain high for the next 4-6 weeks.
4. Oversow 5 kg white clover seed/ha. This can be achieved with a fertilizer spreader by mixing the seed with a zero-N fertilizer (e.g. 0:7:30). The seed and fertilizer will separate out during motion, and should therefore be mixed regularly during the oversowing.
5. Do not apply fertilizer N for the remainder of the year. This may result in lower herbage production from this area during the year of sowing, but is essential for the establishment of the clover.

6. Graze tight late into the following autumn, and graze again in early spring. Do not let heavy covers of grass shade out the newly-established clover during the winter.

Reseeding: Reseeding is a more expensive option but might be recommended to establish more productive perennial ryegrasses on old grassland. The above principles for oversowing clover also apply to establishing clover in a reseed.

Grazing management of white clover

Beef farmers should achieve better success with oversowing and maintaining clover if a paddock system is used. The recommended grazing management for white clover is very similar to the recommended best practices for perennial ryegrass. However, there are certain management practices that promote clover in grassland:

1. Only apply fertiliser N in spring. Excessive use of fertiliser N reduces clover's natural N fixation and can deplete the clover from the sward. Therefore, total fertiliser N use on grass-clover swards should be kept to less than 100 kg per ha in spring, with no fertiliser N applied after April.
2. Graze tight. A post-grazing height of 4 cm is beneficial to herbage production from grass-clover swards. It is particularly important in late autumn and in spring.
3. Extend the grazing season as much as possible. The ground cover by clover in a good grass-clover sward typically reaches a peak of 50-60% each autumn and declines to less than 10% each winter and spring. Therefore, leaving a heavy cover of herbage throughout the winter and spring can shade out clover. Extend the grazing season as much as possible with early turnout and late housing. Use the Teagasc autumn and spring rotation planners to achieve this.

Teagasc research has found clover to be very suitable for building covers in autumn (as long as there is a tight grazing before closing the paddock for winter) and it can also do well after a silage harvest, as long as there is at least one grazing in spring.

Bloat

Clover has an excellent feeding value, and livestock show high intakes and performance when grazing clover-rich herbage. However, clover can cause bloat (a potentially fatal condition). That said, Solohead Teagasc Research Farm has used clover for the last 10 years and has yet to encounter a case of bloat. However, the following points should be observed:

1. Don't put very hungry (e.g. fasted) livestock straight onto clover-rich sward.
2. Introduce livestock gradually to clover-rich swards. Livestock that are not used to clover are at a higher risk of bloat.
3. Be extra careful when livestock are moved from a grass-only sward (particularly a poor quality one) onto a clover-rich sward.
4. If the sward has a high content of clover (> 50%), consider increasing roughage by providing straw or allowing pre-grazing herbage mass to increase.
5. If in any doubt, provide an anti-bloat additive in the feed or water.

For more information on clover, please see the following Teagasc booklets:

1. *A guide to the management of white clover in grassland.*
2. *Using clover to cut costs on dairy and beef farms.*

Both of these booklets can be downloaded from the following website:
http://www.agresearch.teagasc.ie/moorepark/publications/publications_d.asp