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Reseeding, fertiliser and white clover for beef systems

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Summary

- Reseeding is one of the most cost-effective on-farm investments.
- With spring reseeding there is no loss in annual grass dry matter (DM) production in the establishment year compared to permanent pasture.
- Management after reseeding is just as important as decisions made at sowing.
- White clover can increase the productivity of beef production systems through increased animal performance and herbage production.
- White clover can be established by reseeding or over-sowing clover into existing swards.
- Excellent grazing management is required for grass-clover swards.

Introduction

Economically, pastures with a low proportion of perennial ryegrass are costing farmers up to €300/ha per year due to a loss of grass DM production and reduced nitrogen use efficiency during the growing season. If the cost of reseeding is estimated at approximately €700/ha, the increased profitability of the reseeded pasture would cover the reseeding cost in just over 2 years. This means reseeding is one of the most cost-effective on-farm investments. In addition, with increased product price volatility and environmental regulations here to stay, as well as increased nitrogen (N) fertiliser prices, there is increasing interest in the use of white clover (*Trifolium repens* L., hereafter referred to as clover) in perennial ryegrass (*Lolium perenne* L.) swards.

In a perennial ryegrass sward, clover has been shown to increase animal dry matter (DM) intake at grazing which can lead to higher liveweight gain. Additionally, clover has the ability to fix atmospheric N, make it available for grass growth and supply between 50 to 150 kg N/ha per year to sward. The proportion of clover in swards varies depending on the time of year and sward management. Generally, in grass/clover swards there are low levels of clover in swards in spring (<10%), and this increases to a peak (of 40-50%) in late summer/early autumn. Clover has a lower growth rate than grass at temperatures below 10°C, which leads to low sward content in spring. Clover growth continues up to 24°C, whereas grass growth peaks at 15-20°C. As a result of their different growth rates, clover and grass growth patterns complement each other with grass growth peaking in May/June followed by a decline, while clover growth peaks in July and August.

Reseeding methods

Paddock preparation for reseeding is dependent on soil type, amount of underlying stone and machine/contractor availability. There are essentially two methods of preparing the seedbed. The most common method is ploughing. In many areas however this is not possible because the ground is too stony, soil is too shallow or topography is too steep. Recent technological advances, such as minimal cultivation techniques, enable reseeding to be carried out without ploughing.

Studies undertaken at Teagasc Moorepark in recent years have investigated the effect of reseeding method on grass DM production. Four methods of reseeding were compared, namely: 1) direct drilling, 2) discing followed by one-pass, 3) one-pass with power harrow and 4) ploughing (conventional). One of the main aims of the studies was to evaluate alternative grassland reseeding

methods in terms of their effect on grass DM production, sward establishment, and sward persistence. Each of the sward renewal methods evaluated was equally as effective as the conventional method of grassland reseeding. The length of the study (2.5 years) may be too short to fully evaluate the lifetime performance of the swards, but 24 months after establishment it appears that prevailing grazing management is more likely to influence grass DM production than the reseeding method.

Timing of reseeding

Most reseeding in Ireland is completed in the autumn. This may make sense from a feed budget perspective but it does have some negative consequences. Conditions deteriorate as autumn progresses – lower soil temperatures can decrease seed germination and variable weather conditions reduce the chance of grazing the new sward. The opportunity to apply a post-emergence spray for weed control is also reduced as ground conditions are often unsuitable for machinery to travel. Therefore, reseeding should be completed as early as possible in the autumn. However, if planning to reseed, the spring period should be considered for at least a proportion of the year.

The effect of timing of reseeding was investigated over a 2 year period. Swards were established in both autumn and spring. The autumn-sown reseed in its first year of production out-yielded an old permanent pasture control sward by 958 kg DM/ha (11,326 versus 10,368 kg DM/ha). In Year 2, this difference increased to 2,410 kg DM/ha (12,749 versus 10,339 kg DM/ha). For the spring-sown reseed there was virtually no difference in grass DM production in the establishment year between the reseeded sward and an old permanent pasture control sward (both swards yielded 9,700 kg DM/ha), whereas in Year 2 there was a difference of 2,033 kg DM/ha in favour of the reseeded swards. A key finding from this study was that there was no loss of grass DM production in the establishment year when reseeding in the spring period. This was due to the new sward being back in production during the main grass growing season, which permitted four grazings to take place post-reseeding in the establishment year. The autumn reseed provided one grazing post-reseeding in the establishment year. These studies indicate that irrespective of timing of reseeding, swards require time to recover after the reseeding process, and to allow perennial ryegrass hierarchy establish. Then the advantage of reseeding becomes apparent.

Management of reseeds

It is vitally important that soil fertility is at recommended levels to ensure high performance from reseeded swards. Prior to reseeding, the old sward should be killed off using glyphosate. When reseeding, ensure that grass varieties from either of the Irish (Republic or Northern) recommended lists are used (in the UK use the AHDB Recommended Grass and Clover list). These varieties have been tested under Irish conditions. The new Teagasc Pasture Profit Index is also a valuable tool to select the most suitable grass varieties for your farm. Teagasc recommendations are to sow 14 kg seed/acre (35 Kg/ha) to ensure good establishment of the sward. It is also advised to sow a minimum of 3 kg of each variety within a mixture.

The best time to control docks and all other weeds is after reseeding. By using a post-emergence spray, seedling weeds can be destroyed before they develop and establish root stocks. The post-emergence spray should be applied approximately 6 weeks after establishment just before the first grazing takes place. Care needs to be taken when grazing newly reseeded swards. The sward should be grazed as soon as the new grass plants roots are strong enough to withstand grazing (i.e. root stays anchored in the ground when the grass is pulled). Early grazing is important to allow light to reach the base of the plant to encourage tillering. Light grazing by animals such as calves, weanlings or sheep is preferred as ground conditions may still be somewhat fragile, depending on the seedbed preparation method used. The first grazing of a new reseed can be completed at a pre-grazing yield of 600 to 1,000 kg DM/ha. Frequent grazing of the reseeds at low pre-grazing yields (<1,400 kg DM/ha or less than 10cm) during the first year post-establishment will have a beneficial effect on the sward. The aim is to produce a uniform, well-tillered, dense sward. If possible, reseeded swards should not be closed for silage in their first year of production as the shading effect of heavy covers of grass will inhibit tillering of the grass plant resulting in an open sward which is liable to weed ingress.

Establishment of Clover

There are two way of introducing clover into the sward – either by incorporating clover in the grass mix (1 – 2 kg) at reseeding or over-sow after a cut of silage. Incorporating clover in a reseed is the

best method of establishing clover in a sward as it gives the clover a better chance to establish and also provides the best opportunity for weed control. When reseeded it is best to sow when soil temperature is greater than 8°C and it is important not to sow the clover seed too deep (>1 cm) as the seed will not germinate. The use of 'clover safe' post-emergence sprays is also important after reseeded. This is the best time to kill weeds (i.e. at the seedling stage) in a grass-clover sward as they can be particularly difficult to eradicate after the post-emergence stage. When over-sowing clover into swards, the following guidelines should be followed:

1. *Soil fertility:* Soil pH should be between 6.0 and 6.5, and soil P and K levels should be adequate (target index 3).
2. *Open swards and weed control:* For over-sowing to work, the clover seed has to come in contact with the soil. Therefore, over-sowing will work only where there is a reasonably open sward. For old dense swards and swards heavily infested with broad-leaved weeds, reseeded is a better option. Weeds, especially docks, should be controlled before over-sowing as once the clover is established the range of herbicides that can be used are more expensive and restrictive, as a 'clover safe' option must be selected.
3. *Sowing rate and date:* The best time to over-sow is during April and May before the ground gets too dry. Moist soil conditions during and after over-sowing are crucial to success. Apply clover seed with 0:7:30 or similar fertiliser at a rate of around half a bag per acre. Apply 5 kg seed per hectare of a mixture of two clover cultivars. Use medium leaved cultivars in a grazing situation – Iona, Buddy, Chieftain, Crusader, Avoca and Aberherald are recommended.
4. *Broadcasting the mixture:* Seed can be broadcast with fertiliser using a fertiliser spreader or using a slug pellet applicator. Mix the clover seed with the fertiliser in the field. This will avoid the fertiliser and seed separating out while on route to the field. While pouring in the fertiliser, simultaneously mix in the seed to ensure an even mixture of fertiliser and seed.
5. *Post-sowing management:* Apply slurry after over-sowing but reduce the level of N fertiliser after the first few grazings. Nitrogen fertiliser will drive on the grass to the detriment of the clover seedlings. Tight grazing is important. Do not allow covers to get too high (>800 to 1000 kg DM/ha) and graze out to low residuals, i.e. <4 cm. As the clover seedlings get established they will start to fix N (after approximately 8 months) and supply it to the sward.

Grazing management of grass-clover swards

As with perennial ryegrass swards, excellent grazing management on grass-clover swards is critical in order to optimise both herbage production and nutritive value. Spring can be a particularly challenging time for managing grass-clover swards for a number of reasons. Tight grazing to 3.5 cm is critical to allow light down to the base of the sward to reach the dormant clover plant to promote stolon growth and production. It is important that poaching on grass-clover swards is minimised as poaching will result in a loss of stolons and reduced herbage production. This can be difficult as grass-clover swards can be more open which, combined with softer ground conditions, means grass-clover swards are more susceptible to poaching. Fertiliser N application on grass-clover swards should be similar to grass-only swards in the spring, as the grass-clover swards require N in the spring as much as grass-only swards. Depending on the soil indexes, P and K should also be applied at the appropriate rate to promote clover growth.

Mid-season grazing management of grass-clover swards is similar to that of grass-only swards. Pre-grazing yield should be maintained at 1300-1600 kg DM/ha and swards should be grazed to a post-grazing sward height of 4.0 cm. Rotation length should be between 18 and 24 days during the main grazing season. Nitrogen fertiliser applications should be maintained at similar levels to grass-only swards for April and May. From June onwards, when there is a high level of clover in the sward (> 25%) and it is actively contributing N to the sward, N fertiliser applications may be reduced. In the autumn, it is critical to graze paddocks out well (~4.0 cm) at the final grazing before closing. The loss of stolons over the winter and the fact that clover growth in spring is very slow makes clover very vulnerable to competition from the grass in the sward in early-spring. It is extremely important to graze paddocks out correctly while minimising poaching damage so that light can penetrate to the base of the dormant clover plant to promote stolon survival and production over winter.

Bloat

Bloat can be an issue in grass-clover swards. Bloat can occur at any time of the year but particular risk times are April/May (due to lush, low DM swards) and from August onwards when sward clover content is highest. Management practices can help to reduce the risk of bloat. There are certain indicators that bloat may occur, these include:

- high clover content (> 60%) in the sward – repeat incidences of bloat can occur in paddocks with consistently high level of clover,
- weather conditions – high rainfall over a prolonged period leading to lower DM swards, or morning where there is heavy dew.
- changing from grass-only to grass-clover swards, and
- hungry cattle going into a paddock with high level of clover.

Grazing management of grass-clover swards should be adapted according to these factors. A routine preventative measure is to add bloat oil to drinking water. Bloat oil can be added either directly to water troughs or dispensed through the water system, usually from June to September.

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