

Reap the rewards from reseedling

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Permanent grass clover leys are a vital component of productive organic grassland farms. In all, there are 3 main ways to re-seed - full reseeding of permanent pastures, under-sowing with a cereal crop and thirdly over-sowing onto an existing sward. In this article aspects of full reseeding of permanent pastures will be discussed.

The objectives of reseeding permanent pastures with grass clover swards are to:

- 1) Increase the overall productivity of the farm
 - a) Increase the carrying capacity (stocking rate)
 - b) Increase the quality, utilisation, palatability and mineral content of the sward
- 2) Create a sward that is responsive to soil nutrient inputs
- 3) Allow white clover to establish and be maintained

How will you gain?

Grass-clover swards are the cheapest source of feed for ruminant animals. Well established grass-clover swards can produce up to 40% more dry matter compared to old permanent pasture even with zero N application. This additional grass yield is particularly noticeable in Spring and Autumn. If well managed, these grass-clover swards can last up to 15 years. Despite this, reseeding levels in Ireland are low. Less than 2 per-cent of our annual grassland area is reseeded annually. Nationally there is huge potential to increase output of organic beef, lamb and milk from relatively cheap grass-clover swards.

Principles of re-seeding with grass-clover swards

The objective must be to achieve by the Spring of the first year after sowing, a full dense ground cover of grass and clover such that the sward is capable of full productivity in the first harvest year, including the Spring growing period.

In order to do this, special emphasis needs to be placed on:

1. Soil fertility - eg. FYM and slurry - "feed the soil to feed the plant".
2. High levels of white clover in the grass-seed mix
3. Correct timing of sowing
4. Good levels of management pre and post-sowing to control weeds and create a dense sward.

Which re-seeding method to choose?

A common question asked by many farmers who decide to reseed is 'What is the best method of reseeding to establish a good grass-clover sward?'

Recently reseeding methods demonstration for both conventional and organic farmers was organised by the authors in Kilbeggan, Co. Westmeath to address this question.

Farmers have a wide range of establishment methods to choose from, whether they be plough-based or minimum cultivation. The demonstration in Kilbeggan examined a range of reseeding methods, using machines which were available to local farmers in the area.

Benefits of Ploughing for Reseeding

Some farmers choose to plough when reseeding, as it provides an opportunity to level fields, particularly after land reclamation work. Ploughing can also help to improve land drainage. A fine firm seedbed is essential in establishing a good grass-clover re-seed, and ploughing will help achieve this, together with burying older grasses and weeds. Ploughing reduces the risk of a reseed failing to establish, due to a high level of soil to seed contact in a fine seedbed, and more available moisture. In addition ploughing aids the release of natural nitrogen from the soil organic matter.

Benefits of Minimum Cultivation for Reseeding

In circumstances where ploughing is not suitable this is where minimum cultivation methods has a role. Minimum cultivation is an ideal method where ground contains a lot of stone or where there is rock near the surface. As there is minimum ground disturbance, a return to grazing is possible within 60 days in ideal conditions. Minimum cultivation is generally cheaper than ploughing, and the most fertile soil remains at the surface where nutrients are needed. However, in the organic situation where herbicides are not permitted special care must be taken to ensure that weeds are controlled effectively through grazing management as initially weeds may not be controlled satisfactorily.

Reseeding Demonstration

The following were our own observations of the pros and cons of each of the reseeding methods used for the Kilbeggan event.

The site chosen for the reseeding demonstration was a field which had been cut for hay and/or silage continuously over the past number of years, with the sward containing old grasses, plantain and buttercup. The field had not been reseeded for decades. The field was soil sampled to establish the P, K and Lime status.

Half the site was ploughed and the remainder was left uncultivated. All plots were sown in mid-June using seven different treatments, as outlined in Table 1. Farmers visited the site on 1st August when the results of each of the reseeding methods were clearly visible. Although this trial was not carried out under organic conditions, many of the observations and lessons derived were important and relevant to organic farmers. An organic demonstration plot was also established which will be discussed later in the article.

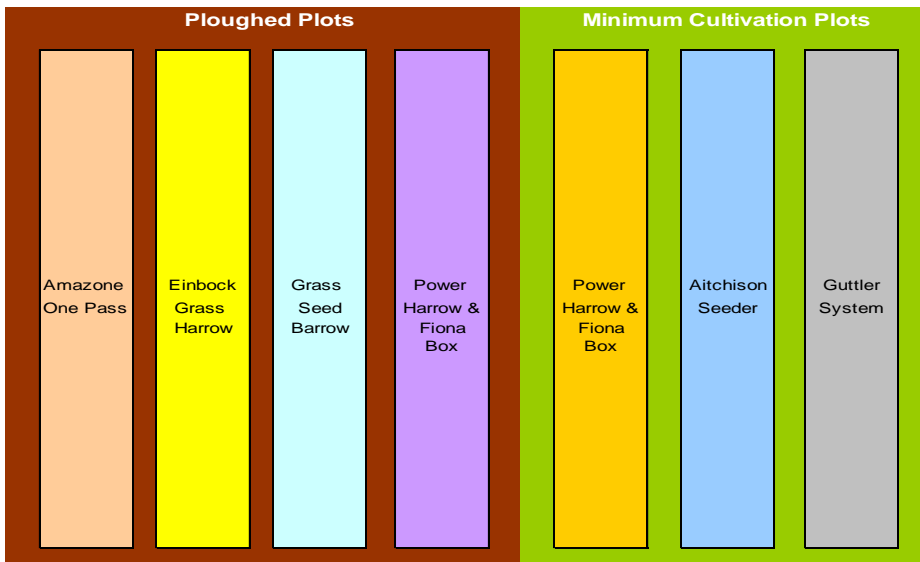


Table 1 Site layout of the reseeding method demonstration

Ploughed Plot Observations

Amazone One-Pass.

For: Created an excellent seedbed with one pass. Grass was sown with the tilling operation and avoided further tracking. The machine was easily and accurately calibrated.

Against: Grass established in rows, similar to a cereal crop. However this can be addressed with good post grazing management to promote tillering and improve ground cover. Care needs to be taken not to bury the seed too deep - small seed such as clover and timothy should be at or near the surface. However this can be achieved by setting the coulters on the machine to trail on or near the soil surface.



Figure 1 Amazone One-Pass

Einbock Grass Harrow

For: We observed that grass seed was very evenly and widely distributed and the tines gave seed sufficient cover to aid germination. This method is ideal for spreading small seeds such as timothy and white clover which are commonly found in organic seed mixes.

Against: The seedbed has to be fully prepared prior to using this machine. This means that there is an additional sowing cost and there is additional driving over tilled seedbed which may lead to tracking.



Figure 2 Einbock Grass Harrow

Grass Seed Barrow:

For: The grass seed barrow is available free of charge to farmers from local merchants.

Against: We found it very difficult to calibrate the seed barrow for even seed distribution. We had to use a ring roller to give sufficient soil to seed contact.



Figure 3 Grass Seed Barrow

Power Harrow & Fiona Grass Seed Box - both on ploughed and unploughed plots

For: It is a specialised one-pass machine for sowing grass-clover mixes. We used this machine on both ploughed and unploughed plots. We found that the best results were seen where this machine was used on the ploughed area, but sward establishment was quite satisfactory on unploughed plots also. We found it easy to set the seeding rate and calibration was accurate.

Against: We had to use a ring roller on the ploughed area to give sufficient seed cover for better germination.



Figure 4 Power Harrow and Fiona Seed Box

Unploughed Plot Observations

Aitchison Grass Stitcher

For: This was the cheapest reseeding method we had on demonstration. We found it to be a very simple grass seed sowing machine with limited ground disturbance.

Against: With drilling, the seed is placed in lines, leaving bare space between the rows for possible weed invasion - potentially more of an issue for organic farmers than for non-organic farmers, who can resort to herbicides. The grass could potentially be slow to establish full ground cover. Good tight grazing after establishment is thus key to the success of this method.



Figure 5 Aitchison Grass Stitcher

Guttler Grass Seeder:

For: We observed that this pneumatic seed distribution machine sowed a ley that established evenly. It was the second cheapest method of reseeding at our demo.

Against: Post sowing there was quite a lot of dry weather which did not suit this method. We conclude that this method requires plenty of moisture after sowing as there is minimum soil to seed contact for germination. Similar to the other minimum cultivation techniques, tight grazing post emergence is vital to it's success.



Figure 6 Guttler Grass Seeder

Organic demonstration

At the Kilbeggan event, a separate demonstration showed how grassland swards could be re-seeded under organic conditions. There are many methods for establishing good grass clover pastures under organic conditions. Regardless of the method used, **clover seed or other small grass seeds such as timothy must not be sown deeper than 1 cm**. This is because unlike larger seeds such as ryegrass, such small seeds do not have the reserves to support the seedling while it is trying to reach the surface.

Seedbed preparation

Prior to re-seeding, the plot was mowed tightly and 10 tonnes per acre of FYM was spread (Figure 7). The plot was ploughed and cultivated using a power harrow. With very good ploughing old grasses and weeds were successfully buried. The demonstration plot received 1 ton per acre of ground limestone. The plot was then rolled prior to sowing to consolidate the seedbed and avoid burial of the clover seed. Ploughing aids in the release of natural soil Nitrogen in an old permanent sod but it should not be deeper than 15cm (Figure 8). Deeper ploughing will bury any available nutrients out of the reach of the new emerging seed.



Figure 7 10 tonnes/acre FYM was applied prior to ploughing



Figure 8 Ploughing depth should be less than 15cm

Seeding method and rate:

In the organic demonstration, the seed was sown using an Einboch grass harrow. The Einboch avoids burying the seed too deep yet the tines gave the seed sufficient cover to aid germination. Organically certified grass seed with 20% white clover in the mix was sourced from a local merchant. One of the key factors in achieving good levels of production on grassland organic farms is the introduction and maintenance of white clover into the new reseed. Seeding rate for new organic grassland swards should be approx. 10 kg of grass seed and 1.5 to 2kgs of white clover seed per acre. In fields where there is a known high weed seedbank, increasing the seed rate will increase the competitiveness of the sown species and may reduce weed ingress. Organic farmers must make every effort to use organically certified seed in accordance with IOFGA standards.

Time of sowing:

Organic swards should be sown in Spring or before late August. The main advantage of sowing in this period is that the soil is warm, and providing there is sufficient soil moisture, germination is rapid. Clover germinates and grows from seed more slowly than ryegrass and other grasses and therefore a later Autumn sowing may result in poor clover establishment. Given the importance of clover to productivity in organic systems, and the need to ensure a full establishment of clover in the sward by the following Spring, as indicated earlier, ensuring a sufficiently early sowing date is very important.

Post emergence management:

80% of the success of getting grass-clover swards established is in the post-sowing management. Well managed grass-clover swards can last up to 15 years. To achieve this, emphasis needs to be placed on:

1. Maintaining soil fertility
2. Good post-emergence grazing and weed management

Soil fertility:

Clover requires good levels of soil fertility (pH levels 6.5 to 7.0 and Index 3 for P and K). As mentioned before, many grass and clover seeds are small, as are their seedlings and root systems. During establishment, the ability of the root to find nutrients is therefore limited. Thus it is important that soil nutrient status is satisfactory for the major nutrients lime, phosphorus (P) and potassium (K) ideally before or if not at the time reseeding takes place. According to soil test results, phosphorus (P) was Index 2 and potassium (K) was Index 2 for the demo plot. Watery slurry was spread at a rate of 2,000 gallons/acre, approximately 4 weeks after sowing. This along with the FYM spread before ploughing met the NPK requirements of the new organic re-seed in full.

Grazing and weed management:

The aim in organic grassland re-seeding is to produce a uniform, well tillered, dense sward of grass and clover. New swards should be grazed as soon as the new grass and clover plants are strong enough to withstand grazing (ie. roots stay anchored in the ground when pulled between the finger and thumb). Grazing also encourages branching of clover stolons and tillering of grass which increases ground cover, helping to further control any emerging weeds. Grazing with calves or sheep would be preferred initially as ground conditions may be fragile depending on the re-seeding method used. Frequent grazing of the re-

seed in the first year post establishment will have a beneficial effect on the sward long term but it is important to avoid poaching which will increase the possibility of weeds and may effect stolon development. New organic re-seeds ideally should not be closed for silage in their first year of production as the shading effect of heavy covers of grass will inhibit clover and tillering of the grass plant resulting in a more open sward which would be liable to weed ingress. The following grazing heights showed be used as a guideline:

1. Down to 4 cm between turnout and mid-April.
2. Down to 5 cm during the main grazing season.
3. Graze the sward to 4 cm before it is closed for the Winter.
4. Avoid heavy covers over the Winter- if you do get them grazed by early March conditions permitting.

Cost of organic re-seeding:

In general, the overall costs of organic re-seeding are similar to that of conventional but with a focus on different input costs. In organics, there may be higher costs associated with more expensive organic seed (+30% more expensive approx.) and possible extra contractor costs for spreading and sourcing slurry and FYM but these are off-set by no costs for artificial sprays and fertilizers. Table 2 and 3 show the material and machinery costs of the organic demonstration plot in Kilbeggan. It is important to remember that extra costs may be incurred where slurry and FYM have to be sourced off-farm.

Table 2 Material costs of organic re-seed demonstration

Material Costs per acre	
FYM 10 T (sourced on farm)	0*
Organic grass seed	90
Lime - 1 tonne	25
Slurry 2,000 gallons watery - post emergence (sourced on -farm)	0*
Total Materials	€115

**Note: extra costs may be incurred if slurry and FYM are imported onto the farm or if commercial organically approved mineral fertilizers are used)*

Table 3 Organic re-seed machinery costs per acre

Organic re-seed machinery costs per acre	
FYM spreading	25
Ploughing	30
Rolling	7
Power Harrow x1	30
Einboch Grass Harrow	20
Rolling	7
Slurry spreading	20
Total Machinery	€139

Conclusion:

Organic farmers face challenges in terms of increasing output and maximising their returns. Grazed grass is the cheapest feed available to increase live-weight gain for grassland farmers. In grassland based organic farming systems, re-seeding with grass-clover swards plays a vital role in achieving higher margins. There are many methods available to establish successful grass clover pastures under organic conditions. Every field and farm situation is different, so there is no 'one size fits all' in terms of methods of reseed. All methods have their advantages and disadvantages, as outlined above, but the key is choosing the right method for your own farm situation. Regardless of the method chosen, good management (slurry and FYM for NPK, regular grazing and avoiding poaching) are especially important to produce a long lasting successful organic re-seed.
