

12 Renewing swards

Objective:

- To preserve a high content of perennial ryegrass and white clover in the sward through good long-term management.

Challenge:

- Plan a series of progressive improvements to your pastures over the next three years
- Review each of your fields to establish how the desired sward quality can be achieved at minimum expense.

Target

Maintain high quality swards without re-seeding non-rotational pastures more than once every 15 years.

Sward Re-vitalisation

Sward vitality can be most cost-effectively maintained by attention to detail in management and/or the use of renewal techniques which do not involve existing sward destruction. Good management, in particular, is recognised as the single most important determinant of continued sward productivity.

Re-seeding can undoubtedly improve sward production and quality. However, it can also add considerably to grassland costs while putting additional pressure on the whole system by taking land out of production for an extended period.

It should, therefore, only be considered once other avenues for improvement have been exhausted and following a full appraisal of the likely costs and benefits.

What's in this section?

- Reducing the need for re-seeding through management
- Evaluating over-sowing or slot-seeding opportunities
- Calculating the cost of re-seeds
- Valuing new varieties.

Contents

Management Planning	Page 12:3
Renewal Techniques	Page 12:4
Improved Varieties	Page 12:8

No matter how long pastures have been down none of the growing ryegrass tillers are ever more than a year old.

Action plan

To maintain high quality swards without re-seeding non-rotational pastures more than once every 15 years.

1. Prioritise Tight Grazing Management

Employ tight grazing management as your primary way of preserving sward quality, considering renewal only when all else fails (**Page 12:3**).

2. Manage Sward Renewal with Care

Renew your swards by over-sowing, slot-seeding or re-seeding only after carefully assessing the likely benefits and costs (**Page 12:4**).

3. Select Improved Varieties for New Seeds

Include improved ryegrass and clover varieties in new seeds mixtures, ensuring the mixes suit your location and management requirements (**Page 12:8**).

Management planning

Tight grazing management is the best way of maintaining sward productivity. Cutting or grazing regularly to a height of 4-5cm encourages ryegrass tillering and gives the grass a competitive advantage over other less vigorous species (Section 10).

A stable soil pH and good drainage are fundamental to the vitality of any sward.

In addition, the regular, planned application of N fertiliser (**Section 11**) and effective control of grassland weeds (**Section 10**) will help promote optimum ryegrass contents.

Ryegrass plants tiller freely, typically producing 15,000–50,000 tillers/m² under grazing regimes and 6000–15,000/m² under cutting regimes.

Ryegrass tillering is promoted by close grazing, particularly during spring as the rate of growth accelerates.

An optimum of 70%+ ryegrass in the sward is the key target, with a minimum of 30% (Section 10).

A target mid-season clover content of around 20% will add significantly to the productivity and quality of the sward (Section 10).

It is always advisable to give a sward a good health check before embarking on a programme of renewal to ensure soil conditions are right to support good growth.

Particularly important are:

- pH – 6-6.5 is ideal for grass swards, 6.5 for grass/clover swards
- P and K – the phosphate index should be 2 in grass swards, over 2-3 potash index should be 2 in grass/clover swards
- Drainage – any wet areas need tackling
- Weeds – excessive levels should be treated with the appropriate proprietary spray
- N – sufficient levels of routine fertilisation are essential.

Factsheet 9 provides practical advice on checking sward health.

Renewal should be considered if these key conditions have been met and the ryegrass content of a sward is lower than 30% and unresponsive to good management.

Under these conditions, the extra cost of additional purchased feeds or silage for a longer winter can easily outweigh the cost of renewal.

The impact of the reduction in available pastureland during renewal, of course, needs to be considered carefully as part of the planning process.

Pasture renewal should always be planned at a time and rate that least compromises grazing availability.

Renewal techniques

There are four primary techniques for pasture renewal:

- Over-sowing (in bare areas or to increase the amount of clover)
- Slot seeding (to improve ryegrass and/or clover content)
- Re-seeding
- Under-sowing.

Over-sowing Swards

Over-sowing allows entire fields or parts of them to be rejuvenated with perennial ryegrass/clover mixtures without the need to completely destroy the established sward.

This can be especially useful for:

- Steep, sloping or stony ground
- Where only a limited area requires improvement
- On land near buildings inconvenient to take out of grazing
- Careful management is required for maximum success in establishing clover by over-sowing (**Section 10**).

Slot Seeding Swards

Slot seeding allows new seeds to be 'stitched-into' existing swards, again without losing them completely from the grazing or silage-making rotation.

It is rarely as effective as a full re-seed and depends on good weather for success.

The success of slot seeding is improved by:

- Starting with open swards that are free of weeds – with dead grass or sward matting removed before seeding
- Grazing-down or cutting swards closely prior to seeding – to maximise the chance of the seed reaching the soil
- Using a specialist slot seeder for very well-grazed, open swards and worn-out ryegrass stubbles
- Seeding at a time when grass and clover growth is less vigorous – to allow new seedlings the best opportunity to compete. A light grass or chain harrow may assist this by creating a tilth prior to sowing, particularly if the seed is broadcast
- Good mixing of clover seed – to minimise separation during spreading
- Avoiding deep drilling – to optimise germination and establishment. Clover seed is best broadcast to avoid this problem
- Cambridge rolling at an angle to drilling slots – to ensure good soil contact and moisture retention
- Applying slug pellets to protect seedlings.

Re-seeding Swards

The expense of re-seeding means a careful consideration of the economics is essential before deciding to go ahead.

Better grass-growing sites give a bigger yield response from re-seeding and the benefits also tend to be greater from renewing older than younger swards.

Re-seeding is particularly valuable in replacing swards badly infested with weeds, helping to remove the effects of poaching or compaction problems and improving production from swards that have become patchy and open.

These problems can soon re-appear in re-seeded swards if management changes are not made to address the underlying causes of the deterioration.

Financial Re-Seeding Considerations

There is little reward from re-seeding leys older than five years with perennial ryegrass contents of more than 50%.

Research funded by DairyCo has shown an annual yield improvement of 12.5% in such cases does little more than pay for the cost of re-seeding and the lost production during the process.

With lower yield benefits re-seeding can actually reduce profitability.

The overall cost of re-seeding varies according to:

- Whether the work is carried out by a contractor, using the facilities of a machinery ring or with farm staff and machinery
- The amount of seedbed preparation required, primarily dependent on whether a standard or direct drill is used
- The amount of desiccant required to kill the old sward, governed by the type of weeds present
- The type of seed mixture used – grass only or a grass/legume mix
- Whether or not treatments against frit fly, slugs and weevils are used
- The need for any control over seedling weeds in the seedbed.

Typical re-seeding costs in 2008 are shown in **Table 12.1**.

Table 12.1: Forage Establishment, Variable and Contractor Costs 2008

	Grazed Grass	3 cut Silage	4 cut High Value Silage	Big Bale Silage
Establishment Costs				
Ploughing	55	55	55	55
Power harrowing	27	27	27	27
Sowing (rolling, harrowing, etc)	40	40	40	40
Seed	95	95	95	95
Lime	75	75	75	75
Fertiliser	50	50	50	50
Sprays	20	20	20	20
Total	362	362	362	362
Total/year	24*	52**	36***	52**

*Assumes 15 year life

**Assumes 7 year life

***Assumes 10 year life

Source: Kilpatrick C, Keady T, Cushnahan A and Murphy J (2002), *Cost of Forage on the Northern Ireland Dairy Farm (updated with 2008 input costs)*

New leys and improved seed mixtures have shown to improve dry matter yields, see **Section 4: Table 4.3** on pages 4-5, but this does depend upon ryegrass % content of the sward so it is important to assess options field by field.

Since operations and materials vary widely from farm to farm it is important to assess the cost:benefit of re-seeding for each unit (**Example 12.1**).

Example 12.1: Assessing Annual Re-seeding Cost:Benefits

Element	Original 5 Year+ Sward		Original 20 Year+ Sward	
	Min	Max	Min	Max
1. Basic yield increase (tonnes/ha/year)	0	1.0	0.50	1.0
2. New variety yield increase (tonnes/ha/year)	0.25	0.25	0.50	0.50
3. Grass value (£/tonne)	80	80	80	80
4. Yield benefit (1 + 2) x 3 (£/ha/year)	20	100	80	120
5. Silage additive cost saving (£/ha/year)	0	37.50	0	37.50
6. Overall Benefit 4 + 5 (£/ha/year)	20	137.50	80	157.50
7. Loss of production during re-seeding (tonnes/ha/year)	0.50	0.50	0.50	0.50
8. Cost of lost production 7 x 3 (£/ha/year)	40	40	40	40
9. Cost of re-seeding (£/ha/year)	52	72	52	72
10. Overall Cost 8 + 9 (£/ha/year)	92	112	92	112
11. Cost: Benefit Min 6 – Max 10 and Max 6 – Min 10 (£/ha/year)	-92	+45.50	-32	+65.50

Source: DairyCo report 99/R5/04 Time to reseed: Is it the right decision?

Worksheet 15 provides a pro forma for individual cost:benefit assessments.

Practical Re-Seeding Considerations

The two main approaches to re-seeding – ploughing-in the old pasture and conventional drilling, or direct-drilling – each have their own particular management requirements.

Whether re-seeding is carried out in the autumn or spring will be governed by the needs of the rotation and the pressure within the system to minimise the time the sward is out of production.

Factsheet 11 provides practical guidance for achieving good performance from re-seeds.

Under-sowing Swards

On mixed farms under-sowing either spring cereals or peas with grass is a valuable way of renewing swards while minimising out-of-production time.

The new seeds then establish in the base of the cover crop to grow away following crop removal.

The financial and practical considerations involved are similar to those for a conventional re-seed other than seedbed preparation which has to be undertaken to suit the primary crop and can also be costed in with it.

The best under-sown cereals results are achieved by:

- Preparing a finer seedbed than usual
- Reducing the cereal seed rate by 20-25%
- Broadcasting and rolling-in the grass/clover seed as soon as possible after cereal drilling to minimise competition
- Cutting the cereal early for fermented whole crop silage, where possible
- Avoiding cereal lodging at all costs.

Another alternative to minimise out-of-production time and cost is to autumn drill the re-seed following a crop of winter cereal silage or maize.

Improved Varieties

Improved modern varieties of grass and clover have higher yields and better agronomic characteristics than older varieties, offering the potential to improve both the level and timeliness of sward production.

The NIAB and SAC lists of recommended grass and clover varieties provide the best basis for putting together balanced mixtures with reliable production characteristics.

It is important to select varieties to suit specific production requirements and farm circumstances and buy appropriate mixtures with named varieties.

Key criteria in grass variety selection include:

- Nutritional quality – primarily high digestibility and intake characteristics
- Compatibility with the grazing system
- Spread of production across early, mid and autumn growth
- High overall yields – especially for silage
- Efficient use of fertiliser N
- Persistency and disease resistance (ie crown rust)
- Palatability
- Heading dates
- A balance of tetraploid varieties for promoting intake, and diploid varieties for promoting sward persistence.

Key criteria in clover variety selection include:

- Competitiveness – especially under high N regimes
- Compatibility with the grazing system
- Earliness of spring growth
- Mid-season production abilities
- Persistency and disease resistance
- Nutritional quality – especially high digestible protein content and intake characteristics.

Farm trials at Newton Rigg in Cumbria, on the Duchy of Cornwall Estates and Gelli Aur in Carmarthenshire have highlighted the ability of new leys sown with improved seed mixes to increase pasture DM production by around a third (**Table 12.3**).

Table 12.2: Production with New Leys (1 April – 31 Oct 1999)

	Growth (kg/ha/day)	Total Yield (tonnes/ha)
Newton Rigg		
Overall farm	50.2	10.7
New leys*	62.8	13.5
Duchy		
Overall farm	48.1	10.3
New leys*	67.8	14.5
Gelli Aur		
New leys*	63.8	13.4
Mean of three farms		
Overall farm	49.2	10.5
New leys	64.8	13.8
Improvement (%)	32	32
Value of improvement**		£198/ha

* New leys mix: 11kg/ha tetraploid hybrid grass; 11kg/ha diploid intermediate perennial ryegrass; 11kg/ha diploid late perennial ryegrass; 4kg/ha, large and medium white clover.

**Assumes grass at £60/tonne DM.

Source: Moseley G, *Progressive Practice for Grassland Dairy Farms*, DairyCo publication.

Table 12.3: High Sugar Ryegrass Performance

Ryegrass Type	Early Lactation Cows		Late Lactation Cows	
	High Sugar	Conventional	High Sugar	Conventional
Grass intake (kg DM/day)	15.3	13.1	11.6	10.7
DM digestibility (%)	75	72	71	64
Milk yield (kg/day)	32.7	30.4	15.3	12.6
Value of extra milk* (p/day)	57		67	

* Assumes milk 24.9p/l

Source: DairyCo Project 95/R2/08 (updated with 2008 prices).

Alternative Grasses and Legumes Offering Specific Production Benefits

Perennial ryegrass forms the basis of most sward mixtures, with improved varieties providing better yields, a wide range of maturities and greater persistency into the autumn. They yields they produce may vary, with the intermediates best for this, while others, such as late heading varieties, are more suited to grazing. They are also less stemmy in mid-summer than Italian varieties and as such have higher digestibility ratings in mid-summer.

Legumes

In addition to white clover, a number of different legumes, including red clover, lucerne, birdsfoot, sainfoin and vetches, can be used alone or in mixtures to improve grassland productivity (Section 13).

Factsheet 6 provides practical guide on choosing seed mixtures.

Summary

- Tight management through rotational grazing is the best way of maintaining sward productivity
- Part or whole fields can be rejuvenated with perennial ryegrass/clover mixtures without the need to completely destroy the established sward through over-sowing or slot seeding
- Re-seeding is an expensive operation and should only be considered when all other options have been exhausted and after careful evaluation of the likely cost:benefits
- Better grass growing sites give a higher yield response from re-seeding and the benefits also tend to be greater from renewing older (20+ years) rather than younger (5+ years) swards
- There is little reward from re-seeding leys older than five years still containing over 50% perennial ryegrass
- New improved grass and clover varieties have higher yields and better agronomic characteristics, offering the opportunity to provide more grazing when it's needed and higher silage yields.

See also...	Section 10:	Maximising Sward Productivity
	Section 11:	Optimising Fertiliser Practice
	Section 13:	Managing Organic Swards
	Section 15:	Factsheet 6: Sward Mixtures Factsheet 9: Sward Health Check
	Section 16:	Worksheet 15: Re-seeding Costs