BETTERRETURNS

AHDB

Improving pasture for Better Returns

Manual 1

BEEF & LAMB

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Research data, information and photography have been sourced from AHDB Grass+, Simon Draper Agronomy, Agri-Food and Biosciences Institute (AFBI), AHDB Nutrient Management Guide (RB209), Barenbrug, Institute of Biological, Environmental & Rural Sciences (IBERS), Jenny Gibbons, Kings Crop, Kingshay, Professional Agricultural Analysis Group, Recommended Grass and Clover Lists and SRUC.

Introduction

Grass is the most important, yet often overlooked, resource for livestock production. Well-managed grassland provides the most economic feed throughout the year, either as grazing or conserved forage.

However, all too often grassland underperforms. Inadequate crop nutrition, soil compaction, weed infestation and many other factors will all result in reduced performance.

Permanent pasture is the mainstay of beef and sheep production and its performance will vary based on multiple factors. The aim for most beef and sheep producers should be to make their permanent pasture work harder by ensuring it is well managed. It can be challenging to financially justify a full reseed, unless stocking rates are high, they fit into a rotation or other options for improvement have been exhausted.

Grass leys are being used more within arable rotations to improve soil health and livestock have a key role within these systems. There is increasing evidence of the advantages of mixed farming for soil health.

As production costs continue to rise, there is no doubt that well-managed grassland has an increasingly important role in achieving better returns for beef and sheep producers.

Dr Liz Genever
AHDB Beef & Lamb Senior Scientist

What is the potential?

Improved pasture in most of the UK is capable of growing over 12 tonnes of dry matter per hectare (t DM/ha), but the current average is around 8t DM/ha. Beef and sheep producers are increasingly monitoring pasture growth rates and silage or hay yields to calculate the amount of pasture grown.

The potential of pasture depends on:

- Good soil structure and type
- Optimum soil fertility with appropriate nutrient inputs
- Good biodiversity within the soil
- A sward with productive grasses, clovers and herbs with few weeds
- Well-managed grazing, silage or hay systems

Understanding the potential

Performance between paddocks can vary across the farm. To identify poor-performing fields, monitor grass growth regularly.

In 2014, nine Irish dairy farms measured grass growth using a plate meter throughout the grazing season. The results showed a 280 per cent variation in paddock performance (Table 1).

More information on how to monitor grass yields can be found in the BRP manual **Planning grazing strategies for Better Returns,** available at **beefandlamb.ahdb.org.uk**

Table 1. Variation in paddock performance on nine Irish dairy farms

Farm number	Mean growth (t DM/ha)	Highest paddock (t DM/ha)	Lowest paddock (t DM/ha)
1	11.7	14.1	8.7
2	14.3	16.8	11.0
3	12.3	20.3	7.2
4	14.4	17.8	8.8
5	12.4	15.8	9.0
6	11.0	14.3	8.9
7	9.9	14.8	7.5
8	10.8	12.2	6.0
9	10.1	14.2	5.4

Grass growth class

Grass growth class (GGC) is the ability of a site to respond to nitrogen (N) depending on soil type and rainfall. The better the GGC, the greater nitrogen efficiency and dry matter yield response (see Figure 1).

GGC and N application rate can be used to estimate how much pasture is being grown (see Figure 1). For example, a field with an average GGC with 100kg of N applied would grow between 4–6t DM/ha.

It is worth noting that grazing animals would return 40–60kg of N per ha per year (depending on stocking rate) and this needs to be taken into consideration when estimating N applications.

On good/very good GGC sites, swards dominated by productive grass species respond well to increasing N supply, as soil drainage, temperature and water supply are conducive to growth.

On poor/very poor GGC sites, grass does not respond as well to N applications because of factors such as poor drainage or cooler temperatures (due to aspect or altitude). Applying N fertiliser to these sites can be costly because of inefficient N use and high risk of nutrient loss to the environment.

For more information, see Section 3: Grass and forage crops of the **Nutrient Management Guide (RB209),** available at **ahdb.org.uk**

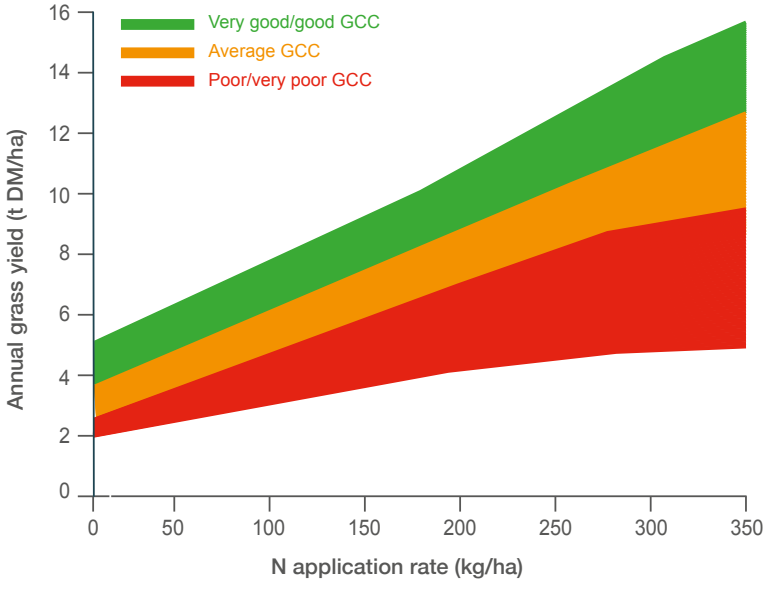


Figure 1. Indicative grass dry matter yield by grass growth class (GGC)

Source: AHDB Nutrient Management Guide (RB209), Section 3

What is the potential?

Utilisation

There is no point growing grass unless it is eaten by animals that can turn it into milk and meat.

Utilisation is a measure of what is eaten or conserved compared with what has been grown. It is a key profit driver in all grassland-based production systems.

Good utilisation occurs when fields are grazed at the right time, to the right height, with the right amount of stock. This means the grazing rotation should be monitored and adjusted in line with grass growth that season and the situation on that farm.

Utilisation of grazed grass can be as low as 50 per cent. However, AHDB trials have shown that where good infrastructure and management is employed, utilisation can exceed 80 per cent (see Table 2). Maximising utilisation is fundamental to improving whole-farm feed efficiencies.

Table 2. Results from the TechnoGrazing™ project in Cornwall in 2016

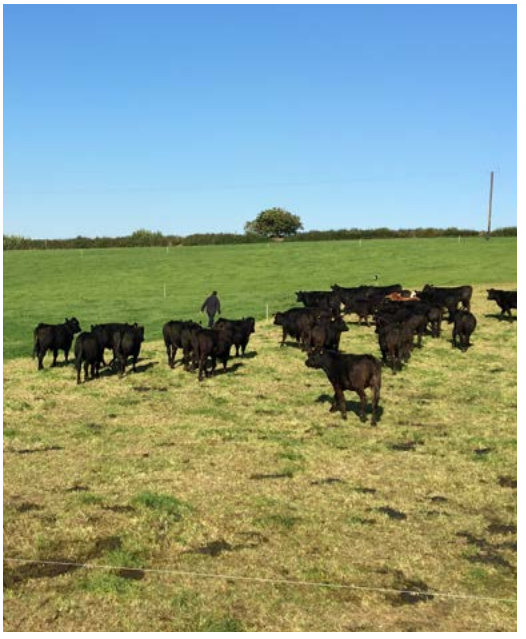
	Farm 1	Farm 2	Farm 3
Average grazing days	200	240	300
Dry matter production (t DM/ha)	21.7	13.3	14.7
Dry matter utilised (t DM/ha)	16.0	11.4	11.0
Utilisation (%)	74.0	86.0	75.0

As part of a Farm Innovation Grant, three TechnoGrazing™ systems were designed and installed by Precision Grazing Ltd on three farms near the Cornwall/Devon border. System size ranged from 4.8–12.2ha, covering a mixture of soil and pasture types. Set-up costs varied from £276–£420 per ha, including design, equipment, installation and training.

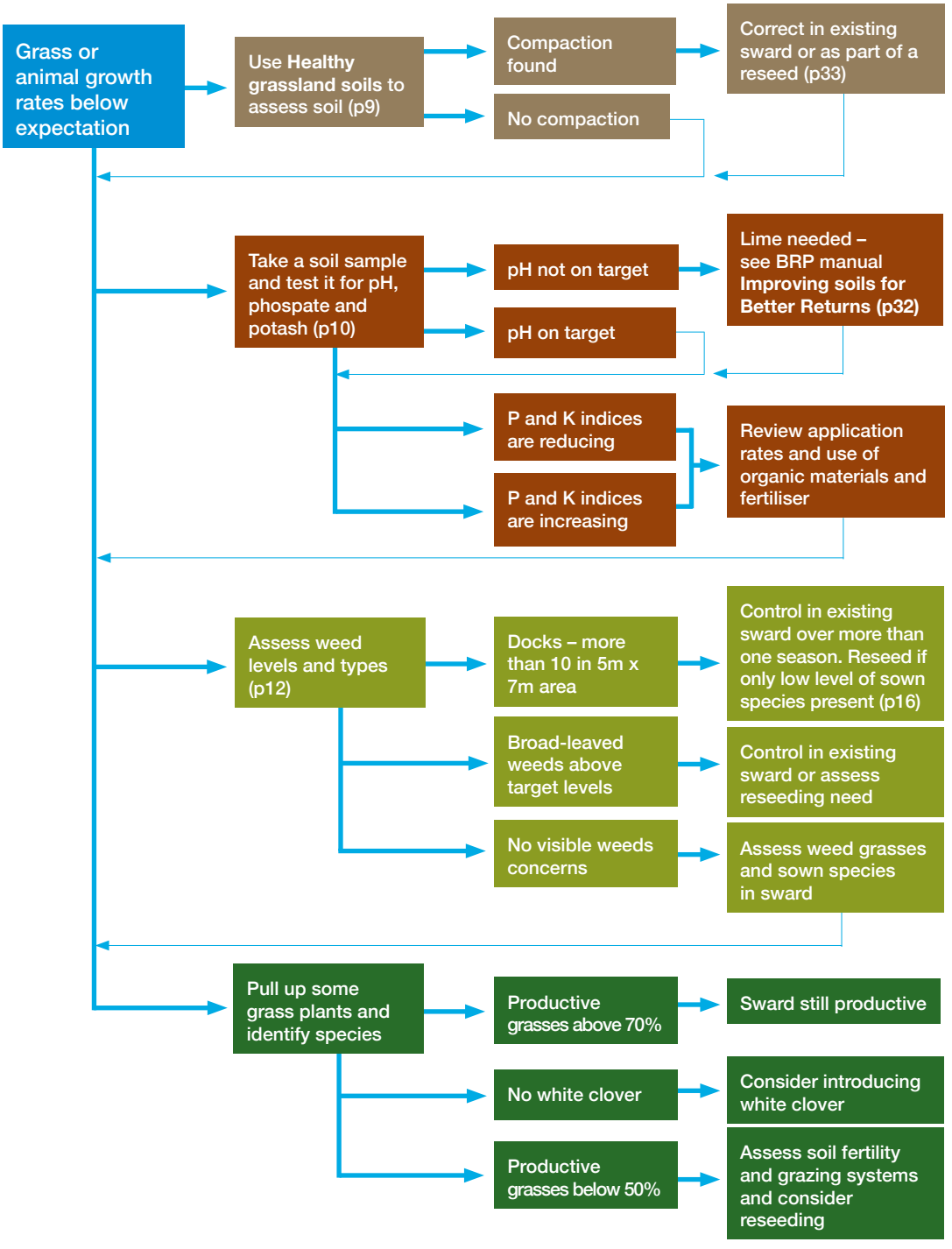
TechnoGrazing™ systems use bespoke electric fencing and water equipment to divide an area of land into precisely defined lanes with great efficiency. These are then subdivided into cells to create a grazing rotation, the length of which can be quickly adjusted to suit requirements while maintaining access to water.

For more information on grass utilisation, see the BRP manual **Planning grazing strategies for Better Returns** and the TechnoGrazing™ project report at **beefandlamb.ahdb.org.uk**

Between 2–12 per cent of the silage crop can be lost in the field. This is influenced by the maturity stage of the grass and the equipment used. For more information on avoiding losses in silage systems, see the BRP manual **Making grass silage for Better Returns**, available at **beefandlamb.ahdb.org.uk**



Pasture improvement flow chart



Source: British Grassland Society

Notes: P and K indices describe the amount of phosphate and potash in the soil, respectively.

Good grassland starts with the soil

Healthy, fertile soil is a dynamic living system with physical, chemical and biological properties that promote plant and animal health and maintain environmental quality. Assessing these three, interdependent features is vital to understanding, maintaining and improving the health of farm soils.

Healthy soils have a mix of large and small air spaces. These are important for water, air and nutrient movement, root growth and soil biology. Soil structure is affected by pressure. High stocking density and heavy machinery can squash the soil particles together, particularly when soils are wet, leading to compaction.

Assessing soil structure

It is important to routinely assess soil structure and **AHDB's Healthy grassland soils** resources can help. A spade is the best tool and the soil should be assessed when it is neither too dry nor too wet, for example late spring or early autumn.

Step one: Surface assessment

Look at sward quality to identify potentially damaged areas that require further assessment. It is worth looking at a part of the field that is poor, as this will help prioritise fields for action.

Step two: Soil extraction

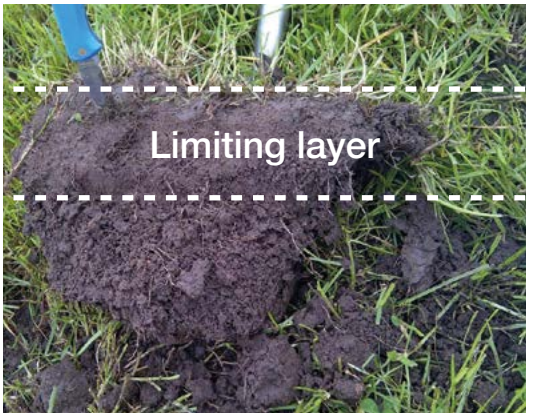
To extract the soil block, cut down on three sides (width and depth about 30cm). Lever the block out, leaving one side undisturbed.

Step three: Soil assessment

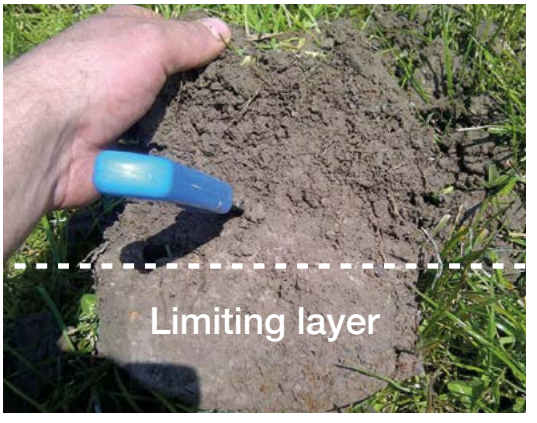
Gently open up the soil block like a book to break it up. The aim is to identify if there is a 'limiting layer'.

The limiting layer is an area of more compacted soil, where the soil particles have been pushed together leaving little space for water, air or root penetration. The depth of the limiting layer will help identify its cause and determine its remedy.

Moderate over Good



Good over Poor



Step four: Soil scoring

Break up the soil into smaller structural units or aggregates (soil lumps). Assign a score by matching the soil to the photos at **healthygrasslandsoils.co.uk** A score of 1 or 2 is good, a score of 3 is moderate and 4 or 5 is poor and requires management action.

The size and shape of the aggregates are key to soil structure assessment. If the soil is only breaking up into large (greater than 10cm) angular aggregates, action is needed.

For more information, see **Healthy grassland soils** resources at **beefandlamb.ahdb.org.uk**

Score 3 – Firm, most aggregates break down.

Adequate soil structure, larger aggregates, some angular, moderate root distribution, no strong smell and less visible pores.

Score 1 – Crumbly aggregates readily crumble with fingers.

Good soil structure, highly porous, many well-distributed roots and sweet earthy smell.

Score 4 – Compact, needs effort to break down aggregates.

Large angular aggregates with low pore numbers, some red/orange mottling, roots clustered in large pores and may smell like sulphur.

Score 2 – Intact aggregates easily break apart.

Good soil structure, porous, good root distribution, earthy smell and some indication of larger aggregates.

Score 5 – Very compact aggregates, difficult to pull apart.

Very large angular aggregates (>10cm) with very few pores. Roots tend to be on the surface or clustered in large pores or cracks, grey colour with red/orange mottling and strong sulphur smell.

Impact of soil nutrients

Like animals, plants need nutrients to grow. If essential nutrients are in short supply, plant health and yield will be reduced, so good nutrient management is key to farm profitability.

Soil test

A soil test is essential to help identify nutrient availability. It is good practice to soil sample every three to five years, although some environmental schemes dictate frequency. The best time to test soil is between October and March. For fields that are being regularly cut for hay and silage, soil samples should be taken every three years as significant levels of nutrients are being removed. For fields that are grazed and historically have optimum fertility levels, soil sampling every five to eight years should be sufficient.

Ideally, samples should be taken in the same season and at least two months after the last application of manure, fertiliser or lime. Remember to take multiple cores, ideally 25 samples from across the field, 7.5cm deep in grassland or 15cm deep if the ground is going to be ploughed for grass establishment. Seal a well-mixed subsample in a plastic bag or box, label and send it to an accredited soil-testing laboratory. Detailed analysis for minerals and trace elements can be beneficial, but expert interpretation is needed.

For more information, see the BRP manual **Improving soils for Better Returns**, available at **beefandlamb.ahdb.org.uk** A list of soil and forage test companies can also be found on the AHDB Beef & Lamb website.

Nutrient management plan

The soil test results should be used to produce a nutrient management plan to match nutrient inputs (fertilisers and organic materials) to crop demand. This means nutrient use is tailored for optimum uptake and yield, minimising nutrient losses to the environment. Nutrient plans should be provided by a FACTS-accredited adviser.

Nutrients are brought on to the farm in purchased feeds and bedding, which eventually reach the soil in manures. The role of fertiliser is to supply the difference between the requirement for a nutrient and its supply from other sources (see Figure 2).

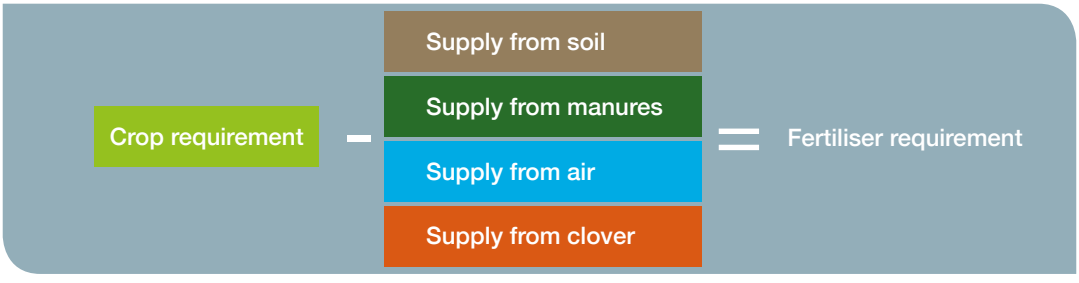


Figure 2. Factors to take into consideration when calculating fertiliser requirement

For more information, see the BRP manual **Managing nutrients for Better Returns** and Section 3: Grass and forage crops of the **Nutrient Management Guide (RB209)**.

Why get the nutrients correct?

pH

It is well known that pH is the main driver for grassland productivity as it affects the availability of other essential nutrients. If pH is not optimal, yield will be reduced. In Figure 3, the field with a pH of 5.0–5.5 will grow nearly 10 per cent less grass over the season than a field with the optimum pH level of 6.0–6.2.

Data from routine soil analysis in the UK shows that 52 per cent of fields tested are below the ideal pH and 21 per cent are above pH 6.5 (see Figure 3).

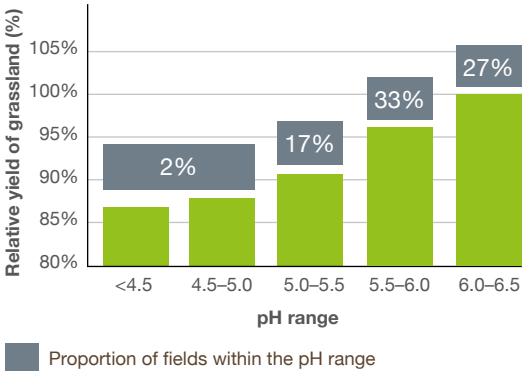


Figure 3. The relative yield of grassland fields with suboptimal pH status and the proportion of grassland fields sampled within pH range

Source: Professional Agricultural Analysis Group

In the UK, there are 5.2 million hectares of permanent pasture (pasture for five years or more) and 1.1 million hectares of temporary grassland (pasture for less than five years). If around 52 per cent of this land is losing around 10 per cent of yield due to poor pH management, this could equate to around 4.6 million tonnes of dry matter based on a target yield of 8t DM per ha.

Phosphate and potash

Phosphate is essential for root development, which is important for anchorage, early season growth, drought tolerance, efficient uptake of N, rapid establishment of new seedlings and is key to survival of clover.

Potash is essential for transportation of nutrients around the plant, including movement from root to leaf, and the efficient uptake of nitrogen and protein production.

For every tonne of DM removed, approximately 8kg of phosphate and 27kg of potash is removed.

The availability of phosphate and potash in the soil is presented on soil test results as indexes, with 2 and 2- being the targets for phosphate and potash respectively. Figure 4 shows the impact of suboptimal levels of phosphate and potash on grass yield.

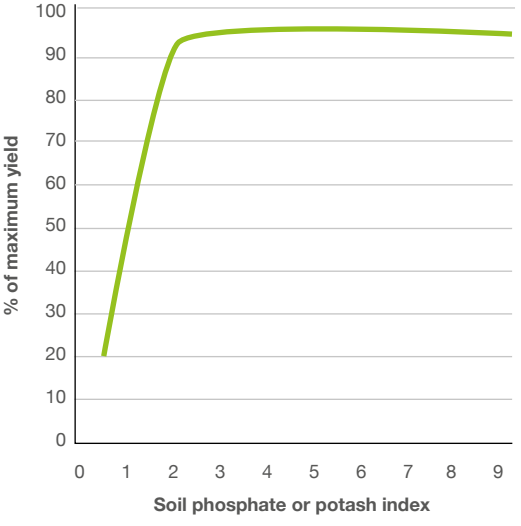


Figure 4. The impact of soil being below target for phosphate and potash

Weed control

Effective weed control, whether by cultural or chemical means, is an important part of grassland management. Controlling weeds can improve forage yields, quality and longevity. Some are poisonous and will spread if they are not controlled.

Weeds are often linked to poor management, such as low pH, P or K indexes, over or under-grazing, poor drainage, compaction or poaching. Always consider why weeds are invading, as they can be an indicator of other issues.

Assess 50 x 50cm squares at various locations around a field. If more than 10 per cent of a square has weeds, the production is being compromised.

Table 3. Characteristics and control options for common weeds

Weed name	Indications and characteristics	Control options
 Buttercups	Indicates low soil fertility, particularly nitrogen Colonises bare areas or when swards are cut low Thrives in wet conditions Mildly toxic	Improve drainage and nutrient status Ensure good reseeding practice is followed Avoid over-grazing Suitable weedkiller use
 Chickweed	Seeds throughout the year and fills bare patches A particular problem in reseeds	Control needed if more than five plants per m^2 Heavy graze in the autumn Harrow in the autumn Include clover in the mix to fill gaps Use a weedkiller suitable for the ley duration and clover presence Can control in a sward, but may need to fill gaps, eg by over-seeding
 Docks	Docks like fertile soil Seeds remain dormant for up to 80 years and seed even after cutting 20 docks in a 5m x 7m area reduce grass yield by 3.4t fresh weight per ha – spraying is likely to be economic at half this level	Often requires repeat treatment as seeds germinate through the year and roots spread Apply weedkiller at the rosette stage in spring or autumn, post-cutting and grazing

Weed name	Indications and characteristics	Control options
 Nettles	Nettles like rich soils Poached areas and open swards encourage establishment Spread by seeds and roots	Topping helps but will not stop spread completely Must control when actively growing Spray weedkillers suited to the ley duration and sward Composition
 Ragwort	Poisonous, particularly when in silage as animals cannot select it out Over-grazed or bare ground can encourage establishment Legal requirement for land occupier to control spread	Best controlled by hand-pulling (wear gloves and mask). Sprays may be needed for large areas and to reduce plant populations Sets seed even after uprooting, so dispose of plants carefully Target control at the rosette stage in autumn and again the following year before flowering
 Rushes	Commonly found on wet pasture Poor drainage and acid soils encourage growth	Check drainage and soil pH Cutting and then using a weedkiller on the regrowth can keep them in check Weed-wiping with glyphosate in late summer
 Thistles	Spread by seeds and roots	Must control when actively growing by frequent topping, then use suitable weedkiller Treatment two weeks after nitrogen application can improve weedkiller uptake Topping helps but will not stop spread completely

For more information, see the BRP+ document **Management and Control of Common (Soft) Rush** at **beefandlamb.ahdb.org.uk**

Weed control

The Voluntary Initiative suggests that little more than 5 per cent of UK grassland receives a weedkiller in any given year and few grassland farmers treat more than 10 per cent of their pasture in any season.

Where weed control is rarely practised, consider whether the job is best left to a qualified contractor with modern NSTS-tested (National Sprayer Testing Scheme) equipment and qualified operators who are members of the National Register of Sprayer Operators (NRoSO).

If you need more information or advice, consult a BASIS-registered agronomist or your supplier for information specific to a given farm or field. Always check the product label.

H_2OK? Think water – keep it clean

Many grassland weedkillers are detected in drinking water sources. Take extra care to avoid overspraying ditches and streams and to avoid any run-off into watercourses when filling and washing the sprayer. A number of grassland weedkillers may face further restrictions unless users take more care with regards to when and where these products are applied.

Best practice to avoid weedkillers reaching watercourses is:

- Using currently approved products recommended by an agronomist
- Keeping weedkillers in a locked, bunded store
- Using trained operators with current qualifications
- Regularly checking and testing spray equipment
- Filling in areas away from drains and watercourses
- Clearing up spills immediately
- Spraying when soil and weather conditions are suitable, ie no risk of drift and soils not too wet
- Leaving buffer strips between watercourses and sprayed areas
- Cleaning and washing down sprayers at the end of the day

For more advice, visit **www.voluntaryinitiative.org.uk**

Complying with latest spray legislation

These measures now apply to grassland weedkillers. Demonstrate integrated pest management (IPM) is followed on your farm. The sprayer operator on your farm must hold a recognised certificate. Grandfather rights are no longer valid.

All pesticide application equipment (excluding handheld equipment) in use must have a valid National Sprayer Testing Scheme (NSTS) certificate.

These measures are legal requirements for farmers through the UK's Sustainable Use Regulations. Non-compliance could lead to prosecution and threaten your Single Farm Payment. They will also feature in Red Tractor standards.

Preparing for a reseed

Six months before reseeding, it is important to check the following:

- Make sure the field drainage system is working and fit for purpose
  - Look for wet areas and indicator species such as rushes
  - Clear drainage ditches and ensure all outflows are working correctly
  - More information can be found in the **AHDB Field drainage guide**
- Soil test the field
  - Walk the field in a 'W'. Avoid gateways and feeding areas
  - Twist a sampling auger/soil corer down to 15cm (if planning to plough) or 7.5cm (if only cultivating the surface)
  - Collect 25 plugs of soil in a bucket and mix well, take out a subsample
  - Seal the soil in a plastic bag and label
  - Send the sample to a soil laboratory (via local co-op, fertiliser merchant or independent company)
  - Sample at least two months after the last application of manure, fertiliser or lime

Assess the soil structure using the four steps in the **AHDB Healthy grassland soils pocketbook:**

1. Surface assessment
2. Soil extraction
3. Soil assessment
4. Soil scoring

If the soil scores 1, 2 or 3, a 'minimum-til' reseed rather than ploughing may be sufficient. However, if the soil scores 4 or 5, then ploughing would be recommended (see Figure 5).

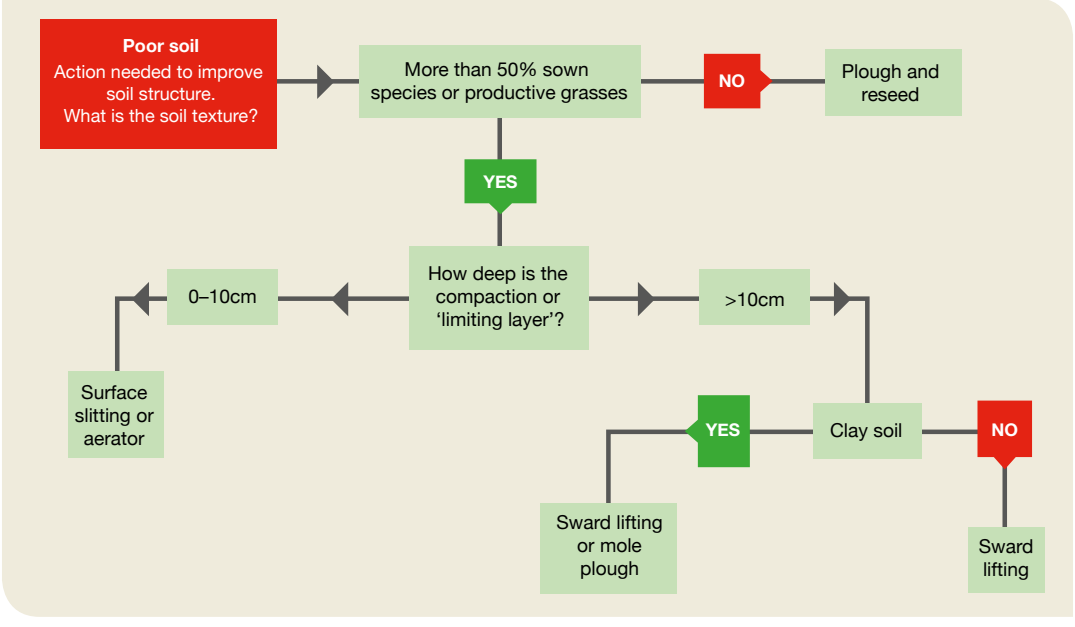
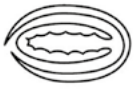


Figure 5. Decision tree for soils scoring 4 and 5 (from **Healthy grassland soils pocketbook)**

Grass identification

It is important to identify what species you currently have in the sward to decide what you need to do to improve it.

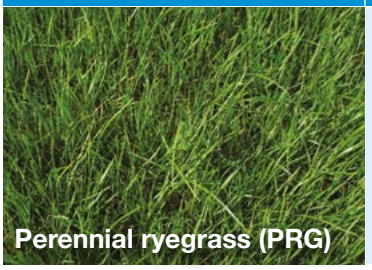
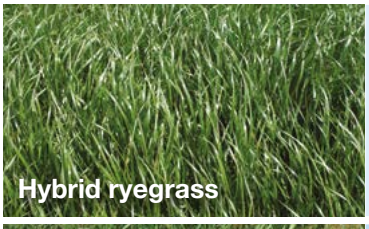
Table 4. Summary of grass characteristics

Grass name	Description	
Perennial ryegrass Productivity ***** Feed value *****	  Leaf blade folded in bud	Large, dark green, tufted plant. Hairless leaf blades folded in shoot Shoots at the base of the plant have a red colour. Flower head is flattened, with spikelets on opposite sides of the stem Spikelets are awnless, unlike Italian ryegrass
Italian ryegrass Productivity ***** Feed value **	  Leaf blade rolled in bud	Large, stout, fast-growing and densely tufted plant with red bases to the shoots Dark green, hairless leaf blades rolled in stem Flower head is flattened with spikelets arranged alternatively on opposite sides of the stem Spikelets are awned, unlike perennial ryegrass
Timothy Productivity *** Feed value ***		A light greyish-green, tuft-forming plant with short rhizomes Leaves are rolled in the bud and have a twisted top tapering to a point Young leaves are soft and hairless. The bottom of the stem is generally bulbous. The flower head looks like a cat's tail and has two needles on every spikelet

Grass name	Description	
Cocksfoot Productivity **** Feed value ***		Large, densely tufted plant Often forming large tussocks Coarse-looking grass often bluish-green in colour, with white ligules Dull green or greyish-green leaf blade which is rough, broad and sharply pointed Folded-in flattened shoot Strongly keeled Flower head is one-sided, usually as a triangular cluster Spikelets are small, flattened and condensed into oval-shaped clusters
Yorkshire fog Productivity ** Feed value *		Tufted, very hairy plant Pale greyish-green leaves narrowing to a fine point Rolled leaves in the stem, very hairy and velvety to the touch Basal leaf sheaths have pinkish-red stripes Flower heads are whitish, pale green, pinkish or purple No rhizomes
Annual meadow grass Productivity * Feed value **		Small, pale green, loosely tufted plant Blade often crinkled or puckered and hairless, with boat-shaped tip Blade is slightly keeled, with ‘tramlines’ and is folded in shoot Flowering head is branched and spreading, triangular in outline Spikelets are small and awnless

Grass species

Table 5. Summary of grass species and why they are used

Grass name	Reason for use
 Perennial ryegrass (PRG)	Most effort by plant breeders has concentrated on PRG Establishes rapidly, even from autumn sowing High yields in first harvest year High sugar content makes it good for silage making Produces dense and persistent swards and is useful for long-term leys and establishing permanent pasture
 Italian ryegrass (IRG)	Relatively easy to establish Yields higher than perennial ryegrass but poor persistence – only one to two years of production Better suited to silage than grazing Cut three to five times a year, with grazing late in the season if necessary
 Hybrid ryegrass	A perennial/Italian ryegrass cross Can be productive for three years, potentially up to five years Suits being grown along with red clover
 Timothy	Slow to establish Yields less than ryegrass in high nitrogen systems, can out-yield ryegrasses in lower input systems Does well in wetter, heavy soils and can cope with winter sheep grazing Late heading and palatable in early season
 Cocksfoot	Lower palatability than ryegrass, although modern varieties have improved feed quality Yields less than ryegrass Suits dry conditions due to drought tolerance Early heading date
 Westerwolds	One year of production only Very high-yielding Used for early grazing and cutting but quality can be poor

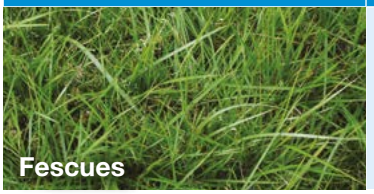
Grass name	Reason for use
 Fescues	Tall or meadow fescues can be sown Can be crossed with ryegrasses to produce festulolium Yields less than ryegrass Useful in hill grazing or low-intensity situations
 Festulolium	A rygrass/fescue hybrid mix Lower yields than ryegrass and reduced digestibility with the addition of fescue strains Varieties being developed for drought tolerance, to increase water infiltration rates and reduce risk of flooding See **www.sureroot.uk** for more information

Table 6. Summary of the typical performance of different grass species

	Perennial ryegrass		Italian ryegrass		Hybrid ryegrass	Timothy	Cocksfoot
	Diploid	Tetraploid	Diploid	Tetraploid			
Grazing DM yield (t/ha)	10.5	10.5	-	-	-	11.4	-
Grazing D-value	75.9	76.3	-	-	-	72.1	-
Silage DM yield (t/ha)	15.2	15.5	18.1	18.2	16.3	13.8	15.3
Silage D-value	73.4	73.7	70.8	71.8	70.7	64.3	70.5
Ground cover (1=poor, 9=good)	6.6	5.8	3.8	3.6	4.2	5.3	6.3
Winter hardiness (1=poor, 9= good)	6.5	6.7	6.8	7.0	7.1	7.0	5.5
Suitable for	Five to six-year leys Grazing Silage		Two-year leys Silage		Three to four-year leys Silage Rotational cattle grazing	Wetter soil Extensive grazing	Dry soils Silage

Clover species

Clovers can replace some or all bagged nitrogen in both conventional and organic swards. How much nitrogen is fixed depends on the clover content in the sward.

Clovers require:

- Warmer soils for growth to begin (8°C compared to 5°C for grass)
- Soil pH to be 6–6.2 and P and K indexes above 2 (as with grass)

Benefits of clovers:

- Provide a high-protein and palatable crop, which often improves animal performance
- High intakes due to its palatability
- Drought-tolerant
- Summer production is often higher than grass alone
- Relatively easy and cheap to grow once established
- Fix nitrogen for subsequent crop, as well for the grass
- Increased first cut silage/early grazing yields if strategic nitrogen applications are practised

Extra care is needed when ensiling high DM crops as the leaves shatter easily. Clovers also limit weed-control choices as many weedkillers are not suitable for use in a grass mix that contains clover.

Match clover type to stock

Small-leaved white clover – suits continuous, hard sheep grazing

Medium-leaved white clover – suits frequent cutting and rotational grazing

Large-leaved white clover or red clover – suits cutting and rotational grazing

White clover

White clover typically fixes 150kg N/ha, although it can be up to 280kg N/ha. It suits both grazing and silage and can increase yields by up to 15 per cent, depending on clover content and N inputs.

- Sowing is best in April to August, adding or replacing 2.5kg/ha (1kg/acre) seed. Broadcast or drill to an optimum seed depth of 5–10mm
- Clover can be established at a later date to a main reseed by over-sowing, either at a more suitable time of year, such as after first cut silage or after weed control in a reseed. Avoid introducing clover until the spray residual has been denatured
- A longer-term crop, less disease-prone than red clover
- Newer varieties can tolerate higher N levels, but this reduces the amount of N fixed from the atmosphere
- For every 10 per cent increase in white clover, the protein content of forage will be 1 per cent higher. In late summer swards, crude protein content can increase to 25 per cent

- Target 25–35 per cent of sward DM as white clover. Be patient for full N-fixing effect in grass production as it takes a full season or more before it achieves full N-fixing ability
- Up to 50 per cent of sward can become clover and look like an entire clover sward from above
- Weed-control options are limited

Red clover

Red clover swards can fix between 200–300kg N/ha, producing the same yield as a short-term ley with the same amount of N applied.

- Sowing is best in spring, or mid-July to end-August, replacing 7.5kg/ha (3kg/acre) of grass seed with clover seed. Broadcast or drill to an optimum seed depth of 5–10mm
- Best sown with grass, especially hybrid ryegrass, to optimise forage yield
- Crude protein content in silage can be up to 19 per cent, depending on the amount in the sward and cutting date
- High protein content makes it excellent for finishing lambs and cattle in autumn
- New UK breeding programme began in 1998
- Cutting too low, overgrazing in autumn or winter or wet conditions damages plant crown and can reduce persistency
- Soil-borne disease and pest control create need for a rotation, with breaks of five to eight years between red clover crops
- Unsuitable for grazing breeding ewes during tupping and six weeks either side

For more information, see the BRP manual **Managing clover for Better Returns** and **Recommended Grass and Clover Lists** at **beefandlamb.ahdb.org.uk**

Other clover varieties

Other clover varieties are offered in mixtures, particularly for cover crops or green manures.

Berseem (or Egyptian) clover

A fast-growing, annual clover, which makes it good to use in arable rotations. It will fix nitrogen once established and will produce a reasonable amount of growth. Can be grazed by stock carefully – introduce slowly with a fibre source. It is easily killed by frosts.

Crimson (or Italian) clover

A fast-growing, annual clover that is more winter-hardy than berseem clover. It will fix nitrogen once established and will produce a reasonable amount of growth. Can be grazed by stock carefully – introduce slowly with a fibre source.

Subterranean clover

A slow-growing, annual clover that is native to north-west Europe but grown widely in Australia and America. It can thrive in poor-quality soil and is an excellent weed suppressor. It is self-fertilising, produces its seed underground and regenerates itself for the next year.

The decision to reseed

Assessing sward condition

The percentage of ryegrass (or other sown species) is a better indicator of a need for reseeding than the age of the ley. When a ley is not very old, consider why it has deteriorated and correct problems, eg lime, before reseeding.

Target: 70 per cent of sown grass and clover species

Consider reseeding when sown species falls below 50 per cent, depending on species and weeds.

Weed grasses, eg annual meadow grass, make up the rest. These are lower yielding, have poor feed quality and a lower response to nitrogen.

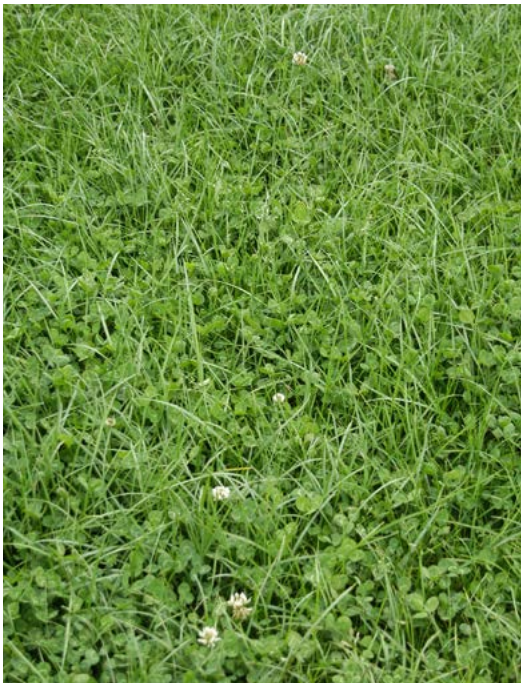


Table 7. The progress of a grass reseed

PRG content (%)	Production (t DM/ha)	Herbage ME (MJ/kg DM)	Lost ME grown (MJ/ha)	Milk equivalent of lost ME (litres/ha)	Meat equivalent of lost ME* (kg LW/ha)	Concentrate cost to replace lost ME^ (£/ha)
95	13.5	12.0				
90	12.6	11.8	13,320	1,885	133	197
80	11.2	11.5	33,200	4,698	332	491
70	9.8	11.3	51,260	7,254	513	759
60	8.4	11.0	69,600	9,849	696	1,030
50	7.0	10.8	86,400	12,226	864	1,279

PRG = Perennial ryegrass, ME = Metabolisable energy, DM = Dry matter, *assuming 100MJ per 1kg of gain for 350kg growing cattle, ^based on 1.4p per MJ of ME

Is a reseed needed?

Research has shown that increasing the proportion of the farm reseeded each year increases the amount of grass grown and utilised on the forage platform, resulting in increased farm net profit on Irish dairy farms (see Figure 6).

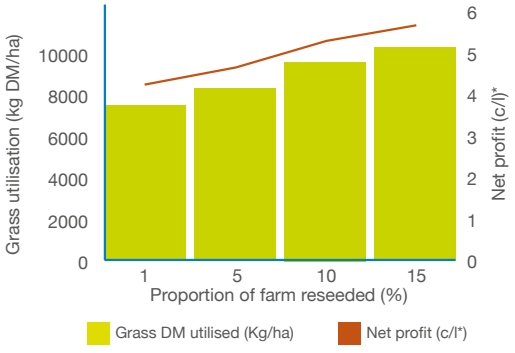


Figure 6. Results from research work on Irish dairy farms on the benefit of reseeding on net profit *cents/litre

Some farmers may opt to reseed a set proportion of the farm each year, eg 10 or 15 per cent, in a rotational pattern to ensure grass swards are regularly renewed. There can be large variation in the performance of paddocks across the farm, so the best way to identify swards eligible for reseeding is to measure grass growth regularly to identify the poorest performing fields.

Benefits of reseeding:

- Improves pasture yield and quality, driving higher farm output and reducing bought-in feed requirements
- Addresses soil compaction problems
- Introduces improved grass genetics with improved productivity, durability and disease resistance
- Reduces weed burden
- Increases pasture response to fertiliser, through using more nitrogen-efficient varieties
- Introduces clover into the sward

A full reseed, including ploughing, costs around £375/ha (£150/acre), however, this will quickly be recouped. Tackling other issues that reduce output before reseeding will maximise the benefit of reseeding. Establishing an additional autumn crop of kale or stubble turnips will help reduce short-term production loss.

Diploids and tetraploids

Tetraploids have twice the number of chromosomes of diploid varieties, increasing the size of the plant's cells. They have larger seeds and leaves and tend to establish quickly. They are also more able to compete when over-seeding pastures. Tetraploids have a more upright growth habit and are suited to drier growing conditions.

Diploids are more persistent and tiller more freely, producing denser swards than tetraploids. They are generally better suited to wetter growing conditions.

Renew or reseed?

Recently, it has become more common to renew existing swards by over-seeding or slot seeding. This reduces the cost compared to a full reseed. Typically, over-seeding will cost £175–200/ha (£70–80/acre).

Commercial trials which have used an over-seeding machine which harrows and sows seed show up to 40 per cent more grass yield in the following year.

Alternatively, harrow before and after broadcasting or drilling seeds, or use a slot seeder/direct drill without cultivation.

Over-seeding is useful when:

- You do not want to plough (or environmental restrictions prevent it)
- There are gaps in the sward, eg after poaching
- Soil structure is good and a base in the sward is required to carry stock
- More ryegrass or newer varieties are wanted
- Clover needs to be introduced

However, over-seeding works best with large seeded varieties, such as tetraploids, which compete successfully with the existing grasses. It is a short-term fix, as the process may need repeating or a full reseed may be delayed.

To plough or not to plough?

It is important to assess whether ploughing is right for your farm. Consider both the costs and the environmental rules applying to the fields, especially if grass is classed as permanent pasture.

Ploughing can improve soil structure, particularly if compacted, and can reduce run-off in the long term. However, the leaching risk is high as it can also lead to the release of nitrogen from the soil with no crop to use it.

Direct drilling

If soil structure is appropriate, direct drilling can be successful and is an economic operation costing around £320/ha (£130/acre). It is quick and less disruptive to the ground, sward or stock. However, there is a high machinery cost and a risk that the existing weeds and grass can outcompete the new seeds.

When to reseed – spring or autumn?

Successful establishment can be achieved in both the spring and autumn. There are pros and cons to both (see Table 8). In each case, there needs to be significant soil moisture to assist germination and it is important to make sure the soil conditions are correct before proceeding. Plan the timing of reseeding to minimise the effect of yield loss that taking an area of land out of grass production will have.

For more information on available techniques, see the **AHDB Reseeding guide**, available at **beefandlamb.ahdb.org.uk**

Table 8. The pros and cons of spring and autumn reseeding

	Spring	Autumn
Pros	Greater window of good conditions for establishment No heading in first season Better opportunity to outcompete weeds	Minimal impact on yield loss Seedbed has time to settle over the winter, allowing good structure to form
Cons	Lose peak growth Shorter window for soil to settle before carrying stock	Weed competition can be significant with late reseeds Narrower window of good establishment conditions

Grass mixtures

Currently, most reseeds are a mixture of diploid and tetraploid perennial ryegrasses and white clover. However, other types of ryegrass and species such as clover, cocksfoot and timothy may have a role to play in certain situations.

Work with your seed supplier

Tell your seed supplier about the field to be reseeded and your plans for its future use and management. This will ensure that the mixture is matched to each field's particular needs.

Think about what the grass is going to be used for and ensure you have some recent soil test results, information about nutrients applied recently and any disease problems you have encountered. All of this information can be used to ensure the mixture is optimised for the system.

Formulating grass mixtures

Mixtures are commonly sown for three reasons:

- Risk management – to minimise the risk of a crop of seed failing
- To ensure sward quality throughout the grazing season
- To achieve a balance of desirable traits

Do mixtures yield more?

Studies undertaken in Northern Ireland have shown that, over a three-year period, under simulated grazing (in year two) and silage management (in years one and three), there was very little difference between the annual DM yield of nine varieties grown as straights or in a range of mixture combinations (see Table 9).

Table 9. Results from experiments in Northern Ireland comparing straights and mixtures

	Straights (t DM/ha)	Mixtures (t DM/ha)
Year 1	13.0	12.8
Year 2	10.5	10.6
Year 3	12.2	12.0
Mean	11.9	11.8

When varieties with close heading dates are sown together, this increases competition between varieties, resulting in an increase in DM yield compared to the average yield of the component varieties sown separately. In contrast, mixtures with a very wide heading-date range have a lower yield than the corresponding weighted average of their components.

Mixture dynamics

In the first year after sowing, most mixtures are likely to change in their composition from what was sown. Early studies suggest that in mixtures managed for grazing, later-heading varieties become more dominant, while in silage mixtures, the contribution of earlier-heading varieties tends to increase.

In addition, mixtures with a greater heading-date range will change more than those with a smaller heading-date range. However, much remains unknown about mixtures and how these changes can be minimised through variety selection and management.

Recommended Grass and Clover Lists

AHDB support the **Recommended Grass and Clover Lists (RGCL)** as they provide a valuable resource for producers to select the appropriate varieties for their system. They provide information on the best-performing grasses and clovers available today.

In a recent reseeding survey, nearly 70 per cent of respondents used the RGCL to help their reseeding decisions.

The RGCL should be used to complete the three key steps to selecting varieties.

Step 1: Is it on the Lists?

Check that the varieties listed are present on the latest version of the RGCL, available at **britishgrassland.com/rgcl**

In the UK, the RGCL are drawn up after rigorous testing for attributes such as yield, persistency, quality and disease resistance. Varieties are tested over a number of years at sites across England, Scotland, Wales and Northern Ireland to provide information on their performance over a range of climates and soil types.

From this testing, the best-performing varieties are selected. As few as one in 20 varieties tested actually make it to full recommendation, classified as G.

Step 2: What will the sward be used for?

Individual varieties can perform better under silage than grazing management and vice versa. It is important to consider whether the reseed will be mostly cut or mostly grazed, as selecting the correct variety for use can have a significant impact on financial returns.

The RGCL testing programme provides specific data for all varieties for both silage and grazing management.

There is more information on the performance of individual varieties in the **RGCL Merchants' Guide** found at **britishgrassland.com/rgcl**

Step 3: Choose which traits are most important for the farm

Once the purpose of the ley has been chosen and a subset of varieties identified from the RGCL, individual traits most important to the farm should then be considered. Varieties are also tested for attributes such as seasonal growth, ground cover and disease resistance.

For more information, see the Recommended Grass and Clover Lists, available at britishgrassland.com/rgcl

You will also find an online tool to compare the performance of perennial ryegrasses.

The Recommended Grass and Clover Lists are updated on an annual basis.

Alternative species

Interest is growing, among both conventional and organic farmers, in alternative species to boost yields and animal performance.

Chicory

- Used in many parts of the world as a source of forage, chicory helps to draw essential minerals from the soil for grazing livestock. Improved chicory varieties, including perennial varieties lasting over two years, are now available
- Chicory is a herb as opposed to a legume, so requires additional nitrogen for growth. Clover is a good companion crop
- Very productive, reaching two metres in height if not grazed
- High artificial nutrient input required to sustain growth
- Deep taproot means it grows well in dry conditions, so is suited to well-drained soils with medium-to-high fertility
- Must practise rotational or strip grazing when grazing swards with high proportions of chicory
- Growth rates of lambs grazing chicory is generally between 178g–300g per day, but vary depending on management. With good management, growth rates of 300g–400g per day have been achieved
- Growth rates of lambs on chicory are better than those on grass-based pastures and similar to those grazing forage legumes
- Limited trials on benefits of grazing cattle on chicory

Plantain

Narrow-leaf plantain, or ribgrass, is a perennial herb with a broad distribution, used as a stand-alone crop and as part of a sward mixture in the native grasslands of the temperate world.

- Adapted to a wide range of soils but does not thrive in deep sands or waterlogged soils
- Requires annual rainfall above 500mm
- Active in winter, although growth rates lower than perennial ryegrass
- Moderately tolerant to drought and frost
- Accesses minerals that grasses and clovers can't due to deep taproot
- Growth rates of lambs grazing plantain vary widely, depending on management, but generally reach 250g–300g per day when rotational grazing is in place
- Growth rates are generally better than those from grass-based pastures and similar to those grazing forage legumes

For more information, see the BRP+ document **Using Chicory and Plantain in Beef and Sheep Systems,** available at **beefandlamb.ahdb.org.uk**

Alternative species

Sainfoin

Sainfoin is a silage or hay crop that can also be grazed.

- Drought-resistant due to long taproot
- Needs no nitrogen and little phosphate fertiliser
- Doesn't cause bloat
- Thrives on free-draining, alkaline and chalky soils (pH 6.2 or above) and in a wide range of temperatures
- Not suitable for moisture-retentive or acidic ground
- Lasts up to five years or more
- Avoid heavy grazing and poaching that may damage roots

See **legumeplus.eu/farming-sainfoin** for more information.

Lucerne

Lucerne is a high-yielding legume, providing a useful source of protein for feeding to cattle and sheep.

- Deep taproots naturally fix nitrogen, making it a cost-effective crop on its own or alongside carefully selected companion grasses or cereals
- Will not grow on heavy land or waterlogged soils that may rot its roots
- Can be slow to establish and needs nurturing in early stages with adequate micro- and macro-nutrients
- Can last four to five years, but the crown must be protected at all times when cutting or grazing

For more information, see the BRP+ document **Growing and Feeding Lucerne**, available at **beefandlamb.ahdb.org.uk**

Forage vetches

Vetches are from the legume family.

- Fast-establishing and continue to grow and fix nitrogen at lower temperatures than clovers, so are useful when sown in autumn
- Improve soil health
- Can be grown with cereal eg forage rye or with grass in short-term silage crops

Research on diverse leys

Research work is being conducted at University College Dublin and the University of Reading on the benefits from diverse pastures or herbal leys on animal performance and yields.

Diverse Forages Project at the University of Reading is due to finish in 2020 and is part funded by AHDB. Diverse pastures provide greater resilience to extreme weather, deliver ecosystem services such as improved soil structure, local biodiversity and do not require N fertilisation to grow, making them an extremely sustainable feed source for grazing ruminants. This project will add to existing knowledge on herbal leys by investigating best-practice agronomy and feeding strategies for three mixtures with increasing species complexity.

For more information, see the BRP+ document **Growing and Feeding Lucerne**, available at **beefandlamb.ahdb.org.uk**

Basic payment scheme (BPS) greening

Catch and cover crops:

These are part of the ecological focus area (EFA) regulations and must include at least two different cover types – one cereal (barley, rye or oats) and one non-cereal (mustard, vetch, phacelia, oilseed radish or lucerne).

Nitrogen-fixing crops:

These can include pure stands of clover, lucerne or sainfoin or a mixture of these crops, or a mixture of these crops and others, as long as over 50 per cent is nitrogen-fixing crops.

Management tips for first season

Assessment post-drilling

It is important to monitor new reseeds so any problems can be resolved quickly.

A newly sown sward takes about 11 months to fully establish. During this time it is important the sward is encouraged to tiller as much as possible and is protected from any damage.

Tiller development

Once a plant has germinated and the third or fourth leaf appears on the main tiller, daughter tillers will start to appear. These will eventually form leaves and roots and will allow the plant to spread and the sward to thicken.

An established perennial ryegrass sward typically contains 5,000–7,000 tillers/m^2 (see Figure 8). This helps to create a dense sward, minimising soil damage and reducing space available for weed infestation.

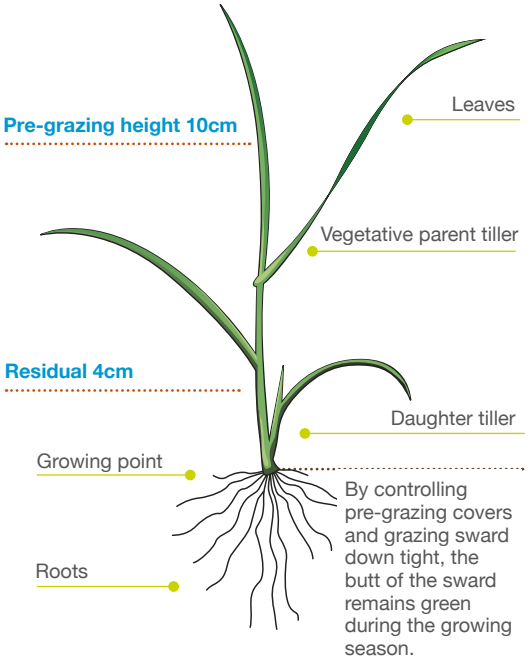


Figure 7. Diagram of a tiller

Sward management

The tillering process in new swards is strongly aided by grazing. Grazing removes the existing leaf and encourages a new generation of tillers to emerge at the base of the sward. Under continuous stocking regimes, a stable population of small tillers develops. Although rotational grazing encourages a slightly lower tiller population, individual tiller size and growth rate are greater.

Avoid cutting silage swards in the first six months as it does not encourage the sward to tiller.

First grazing

Graze the new reseed as soon as it is not possible to pull the plants out of the ground by hand. This is usually at the two-leaf stage or when the grass has produced about 2,200–2,500kg DM/ha.

Use sheep or young cattle for the first grazing to minimise any potential soil compaction, particularly in wet conditions.

Following grazings

Aim to graze autumn reseeds before the first winter to encourage tillering.

Teagasc work suggests grazing at around 6–8cm in the autumn, but making sure it is grazed tight (4cm) before the winter. The challenge is to do this without over-grazing or poaching and the lightest class of stock available should be used.

Do not apply excessive slurry.

Pests and diseases

Table 10. Symptoms and control options for pests and diseases

Pest	Pest activity and plant symptoms	Control
Leatherjackets	Feed on roots and shoots Plants yellow and die More common in grass fields and after cool autumn weather	Improve soil damage May be potential for biocide use, eg *Bacillus thuringiensis*, but no clear scientific support yet
Slugs	Eat young plants Common in damp conditions Plant damage and pests are easily visible	Use resistant white clover varieties Apply molluscicide to kill pests
Frit fly	Cause new shoots to die Most common when direct drilled, in autumn and in Italian ryegrass swards	Use resistant ryegrass varieties Reseed four weeks after sward destruction Increase seed rates
Chafers	Larvae feeding produces patches of poorly grown grass Grass may turn brown in dry weather Damage is most likely to be seen during Sept–Oct Substantial bird activity may indicate infestation	Insecticide*
Sitona weevil	Characteristic notching at leaf margins of clover Larvae feeding can also predispose the plant to damage by crown or root-rotting fungi	No insecticide* is specifically approved for weevils, but treatment for frit fly or leatherjackets is likely to reduce the population
Barley yellow dwarf virus	Spread by aphids Bright yellow upper leaves, gradually spreads throughout the sward, leading to severely stunted plants	Apply insecticides* Use aphid monitoring information to time applications Sow tolerant varieties
Ryegrass mosaic virus	Light green streaking of leaves, which eventually turn brown and die	Autumn rather than spring sowing will delay the ingress of the mite Use resistant ryegrass varieties
Crown rust	Strikes mainly in late summer and early autumn and results in distinctive yellow-orange pustules on the leaves	Ensure grass receives sufficient nutrients to fight off the disease Cutting or topping the grass to remove the leaf ‘food supply’ for the fungus Choose resistant varieties

*Seek advice from a qualified professional and ensure sprayer operators are fully qualified.
See the **AHDB Reseeding Guide** for more information and **Recommended Grass and Clover Lists** (Merchants’ copy) for details on disease resistance for varieties.

Focus on permanent pasture

Currently only 6 per cent of agricultural land has grass established per year, so permanent pasture plays a significant role in UK livestock production.

The value of long-term grassland is often underrated. The maximum annual yield that can be achieved is less than for a new ley – 9t DM/ha compared to 12t DM/ha, but the cost of production is less. It has a denser sward and is able to carry more stock, especially through the winter months, and the diversity of plant species gives livestock more choice in their grazing.

On the downside, the growing season for permanent pasture is shorter and the quality of the grass can be poorer, depending on the percentage of ryegrass and clover present.

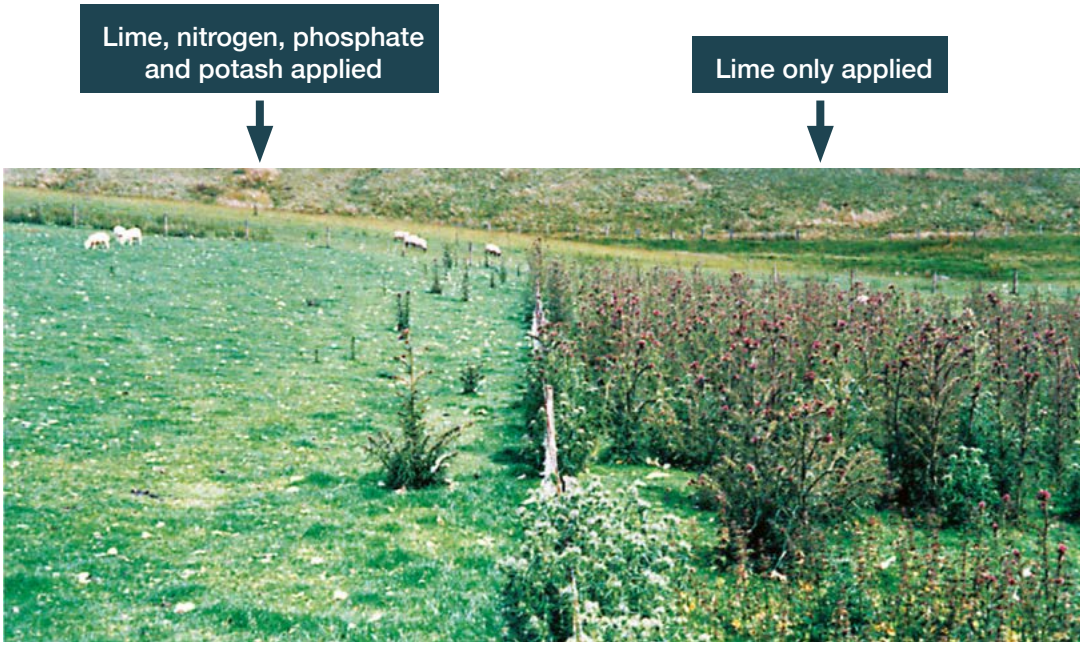
Management input needed

Permanent pasture needs managing as much, or even more, than a newly sown ley. If the soil and the sward are managed well, grass and animal production can be very good and no herbicides or mechanical topping will be needed to control weeds or maintain quality.

Soil nutrient shortfalls are very common under permanent grass and addressing any deficits is crucial for improving production and feed value. Grasses produce stem and go to seed much faster if soil nutrient levels are below optimum for growth.

Up until a decade ago, when fields were ploughed, lime was regularly applied. With a greater focus on cheaper methods of seed introduction, lime has been overlooked. This means many soils under long-term grass are now more acidic than the ideal pH 6.0–6.2.

Pastures that have been cropped for silage or hay and have not had nutrients replaced to balance offtake will also underperform. Where land is not under any environmental restrictions, a soil test should be taken so appropriate fertiliser inputs can be applied.



Reduce compaction

Soil structure is important for grass health and production. Over the years, soils can easily become compacted, restricting the movement of air, water and nutrients down through the soil profile.

As ploughing is often not an option to break up horizontal pans, alternative methods such as aeration may be needed to allow adequate root development and nutrient uptake.

Having adequate drainage is important to prevent unproductive and unpalatable species such as rushes encroaching into the pasture.

For more information, see BRP+ document **Management and Control of Common (Soft) Rush**, available at **beefandlamb.ahdb.org.uk**

Sward content

A good-quality, permanent sward should consist of at least 50 per cent ryegrass and 20 per cent white clover.

In a permanent sward, there may be eight to 12 different grasses and a similar number of broad-leaved species. Some of these plants will be less desirable plants such as thistles. Good nutrition and tight grazing down to a uniform height to produce a dense sward of around 40,000 tillers per m^2 will make it hard for unwanted species to establish themselves.

In commercial trials, using an over-seeding machine which harrows and sows seeds resulted in up to 40 per cent more grass yield the following year.

If swards do become damaged and ryegrass contents dip below the desired 50 per cent, extra seed can be introduced by over or slot seeding. If the ryegrass percentage falls to 30 per cent or less, a complete reseed after ploughing may be the best option. Poached areas in gateways and around feed troughs should be reseeded annually to prevent ingress of weeds.

Research on the environmental impacts of reseeding

AHDB is funding three PhDs at the North Wyke Farm Platform in Devon, which is part of Rothamsted Research. The platform has three hydrologically separated farmlets. One is permanent pasture, one has been reseeded with grasses and clover and the third has been reseeded with grasses and receives artificial fertiliser. Each farmlet has its own flock of ewes and a group of growing cattle.

Two of the PhDs are looking at the full environmental impact of reseeding in terms of emissions to the air and nutrient losses compared to the potential improved pasture growth rates and animal performance. One of these PhDs is looking at the sheep and the other at the cattle. The work will demonstrate the trade-off between the short-term impact of grass establishment for emissions and nutrient losses compared to the longer-term benefit of improved grass and clover types that improve performance off grass. The permanent pasture farmlet acts as the control.

The third PhD is looking at grazing techniques for sheep to demonstrate improving performance off pasture.

Hills and uplands

Livestock producers relying on grass in hill and upland areas face different and more difficult challenges to those farming in the lowlands.

The air temperature drops 1°C for every 100m rise above sea level, which directly impacts grass growth, in particular the length of the growing season. North-facing pastures also take longer to get going in spring than south-facing pastures.

At these higher altitudes, annual rainfall is much higher and soil depth and quality significantly poorer. The soils tend to be acidic and lacking in nutrients as these are leached away with the rain.

Appropriate grasses

In upland areas, winter hardiness and the ability to grow at low temperatures may be the principal requirements from a grass crop, as opposed to total yield. New varieties of late-heading, perennial ryegrasses which produce early spring growth and good ground cover are worth considering.

Other grass species such as fescues and timothy have greater roles to play in upland swards. In trials, red fescue and timothy swards gave 70 per cent and 30 per cent more lamb output per hectare in spring, respectively, than ryegrass on wet peaty soils.

Reseeding

The introduction of new seeds is limited to late spring (April or May) or late summer (July or August), when the temperature is warmer and there is adequate soil moisture. Leaving reseeding later than early August is not advised as the risk of frost damage to tender, young plants, particularly clover, increases greatly.

White clover will fix nitrogen in upland swards as it does in the lowlands, but lime and phosphate deficiencies often limit its growth and activity. Investing in lime and phosphate will reap dividends. Research is being carried out to develop clovers capable of good performance under low phosphate levels.

Fertiliser applications

A spring application of nitrogen fertiliser will kick-start spring growth. Timing should be governed by soil temperature, assuming ground conditions are good enough to travel. Measuring soil temperature using a soil thermometer is the most accurate way of deciding when to apply.

As a guide, soil at 10cm deep should reach 5°C for at least five days. Records over 30 years in mid-Wales showed 9 April to be the average date that this occurs, but the range was from 7 March to 4 May.

Invest in soil inputs

Sheep research at Bronydd Mawr in mid-Wales during the 1990s and 2000s demonstrated the importance of investing in soils and nutrients for better returns. Plots were grazed by yearling ewes and single lambs from April to August, then ewes alone through to November. Table 11 shows the treatments used. See photo on page 32, which compares treatments 1 and 3.

Table 11. The treatments used in Bronydd Mawr experiment and the stocking rate sustained

Treatment	Nutrients applied	Stocking rate (ewes/ha)
1	Lime, nitrogen, phosphate and potash	30
2	Lime, phosphate and potash	25
3	Lime	15
4	Nil	7

Results

- Increased perennial ryegrass and clover in treatment 2
- Much shorter grazing season in treatment 4
- Replacement ewe lambs from a no nutrient input scenario were 6kg lighter than in treatments 1 and 2
- Treatments 1 and 2 were commercially viable

Which system pays?

Upland and hill farmers have the option of producing finished or store animals. Recently, more producers in these areas have taken lambs through to slaughter. However, careful consideration is needed to work out whether the store market may generate better returns, as input costs will be much lower.

Agri-environment schemes can potentially supply an alternative revenue stream. Different land classifications such as sites of special scientific interest (SSSI) and semi-natural rough grazing have grazing restrictions. However, during their growing season, these pastures can deliver respectable animal performance with no input costs.

Beef and sheep BRP Manuals

Manual 1	Improving pasture for Better Returns
Manual 2	Assessing the business for Better Returns
Manual 3	Improving soils for Better Returns
Manual 4	Managing clover for Better Returns
Manual 5	Making grass silage for Better Returns
Manual 6	Using brassicas for Better Returns
Manual 7	Managing nutrients for Better Returns
Manual 8	Planning grazing strategies for Better Returns
Manual 9	Minimising carcase losses for Better Returns
Manual 10	Growing and feeding maize silage for Better Returns
Manual 11	Using medicines correctly for Better Returns

See the AHDB Beef & Lamb website **beefandlamb.ahdb.org.uk** for the full list of Better Returns Programme publications for beef and sheep producers.

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