GRASS AND FORAGE CROPS HANDBOOK






Limagrain

INTRODUCTION

Welcome to the latest Sinclair McGill Handbook.

Sinclair McGill's roots can be traced back over 170 years. Through this time our philosophy has remained simple and steadfast - to ensure Sinclair McGill offers the best quality products, backed up with the highest levels of expertise.

Remaining true to this philosophy ensures that our customers can be confident that they're buying the best.

This Sinclair McGill Handbook is packed full of information to help you make the right choice for your farming enterprise. Whether you're feeding dairy, beef or sheep, producing feedstock for an anaerobic digester, or looking for alternative break crop in an arable rotation, we have something that will fit your every need.

The Sinclair McGill team are truly passionate about grass and forage crops. Taking the best modern varieties and using expertise built up over decades, to formulate mixtures that will perform best in any given scenario.

Mixtures are tested at our innovation site to ensure they meet our requirements for yield, forage quality and agronomic strengths, such as; disease resistance, ground cover and persistence.

Our seed meets the very best germination and purity standards, and seed treatments are included where relevant, to help aid fast and successful establishment. All this attention to detail means that when buying a Sinclair McGill product, you really are getting "Performance you can rely on."

Whether you're looking to improve production from home-grown forage, capitalise on a market by growing a catch/cash crop, or build long-term resilience and sustainability into your enterprise, there's information in this handbook that will help you.

John Spence
Forage Crops
Product Manager

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SINCLAIR MCGILL

SEED QUALITY

LESS WEED SEEDS AND MORE LIVE SEEDS IN EVERY BAG!

When it comes to grass seed quality, our no-compromise approach is simple - we aim to deliver less weed seeds and more live seeds than any other company. By specifying the **Sinclair McGill** brand, you really can make a significant difference to the performance of your new ley mixture.

THE CORNERSTONE OF A SUCCESSFUL LEY IS A TOP QUALITY SEED MIXTURE FROM THE SINCLAIR MCGILL RANGE

GERMINATION STANDARDS

Species	UK Standard	Higher Voluntary Standard	Sinclair McGill Target
Perennial Ryegrass	80%	80%	90%+
Italian Ryegrass	75%	75%	85%+
Hybrid Ryegrass	75%	75%	85%+

POSSIBLE WEED CONTENT IN AN OFFICIAL SAMPLE OF PERENNIAL RYEGRASS (60gm of seed)

Weed	UK Standard	Higher Voluntary Standard	Sinclair McGill Target
Docks*	5	5	Less than 1
Couch*	120	10	Less than 1
Blackgrass*	100	10	Less than 1

* Note: *There is no UK Standard or test for blackgrass or couch in 60gm so the figures quoted are an estimate based on our laboratory experience.*

POSSIBLE INERT MATERIAL IN 10 ACRES OF PERENNIAL RYEGRASS

Inert Material	UK Standard	Higher Voluntary Standard	Sinclair McGill
Dead Seed	30 kilos	30 kilos	7 kilos*
Impurities	6 kilos	3 kilos	1 kilo*

* Note: *Based on the laboratory analysis of our own contract crops and 10 acres being equivalent to 150 kilos of seed.*

PURITY STANDARDS

Species	UK Standard	Higher Voluntary Standard	Sinclair McGill
Perennial Ryegrass	96%	98%	98% +
Italian Ryegrass	96%	98%	98% +
Hybrid Ryegrass	96%	98%	98% +

FORAGE QUALITY – FROM FIELD TO RATION

LG Animal Nutrition – or LGAN – is a stamp of approval given to carefully selected grass mixtures, which can deliver a proven combination of nutritional and agronomic qualities.

LG Animal Nutrition - the proof

The agronomic and feed values attributed to LG Animal Nutrition varieties and mixtures are supported by independent trials at national research institutes.

The Schothorst Research Institute in the Netherlands compared the performance of a group of cows fed a diet based on a high quality LGAN mixture with a control group fed on a diet based on a dual-purpose grass mixture.

Cows on the LGAN grass-based diet averaged 1.4 litres of milk per cow more than the control group. Based on a milk price of 30ppl, this additional 427 litres is worth £128 a cow during a 305-day lactation, as shown below.

Feeding trials comparing grass mixtures in dairy diets

	LG Animal Nutrition MIXTURE	CONTROL MIXTURE
Feed Efficiency (milk/kg feed)	**1.30**	**1.24**
Milk Yield (litres/day/cow)	**29.9**	**28.5**
Additional milk yield in 305 days (litres)	**427**	
Milk value (based on 30ppl)	**£128.10**	

Schothorst Research Institute feed trials 2013

LG ANIMAL NUTRITION BENEFITS

- IMPROVEMENT IN FEED EFFICIENCY OF 5%
- MILK YIELD INCREASE OF 5%
- ADDITIONAL INCOME (£128 @ 30PPL)

LG Animal Nutrition – a boost for efficiency

The use of near infrared spectroscopy (NIRS) has enabled us to evaluate the nutritional attributes of our grass varieties.

We have used this information to formulate the Sinclair McGill portfolio of grass mixtures.

LGAN accredited mixtures have been formulated to provide a careful balance of sugars (WSC) with digestible fibres (DNDF), protein, energy, and D value. These nutritionally enhanced mixtures offer farmers and growers increased efficiency.

Research and field trials have shown that these products also excel in agronomic traits such as yield, ground cover, winter hardiness, disease resistance and in palatability.

Even Sinclair McGill mixtures without the LGAN accreditation have been tweaked to improve their feed value based on our improved knowledge. These mixtures typically offer important agronomic qualities, such as persistency in long-term leys that takes precedence over LGAN accreditation criteria.

FORAGE QUALITY TRIALS

Not only do we measure the forage quality of individual grass varieties, but we also test our mixtures to ensure that the balance of characteristics we aim for are carried through to the field.

The first independent forage mixture trials to demonstrate the LGAN principal were carried out in 2014 and 2015 at NIAB TAG in Dartington, Devon. LGAN grass mixtures were trialled under conservation and simulated grazing regimes and compared with a control mixture consisting of non-LGAN Recommended List varieties.

The results below show the huge difference between the energy yield of different grass mixtures.

The LGAN mixture TURBO produced an additional 23,518 MJ/Ha. This is equivalent to an additional 4,437 litres of milk worth £1,331/Ha, at a milk price of 30 pence per litre.

- 17% HIGHER ENERGY YIELD
- MORE SUGAR AND DIGESTIBLE FIBRE
- AN EXTRA £1,331 PER HA

2014/15 MEAN RESULTS	CONTROL MIX	TURBO MIXTURE	TURBO BENEFIT, COMPARED TO CONTROL MIX
Dry Matter Yield (T/Ha)	9.81	11.46	+1.65
Energy Content ME (MJ/Ha)	13.7	13.8	+0.1
Energy Yield (MJ/Ha)	134,508	158,026	+23,518

Source: Limagrain Trials 2014-2016

Sinclair McGill Mixture Trials

At our Innovation site in Lincolnshire we continue to test both varieties and mixtures every year. Mixture trials are fully replicated and managed under either conservation or grazing regimes that closely follow NIAB trial protocols.

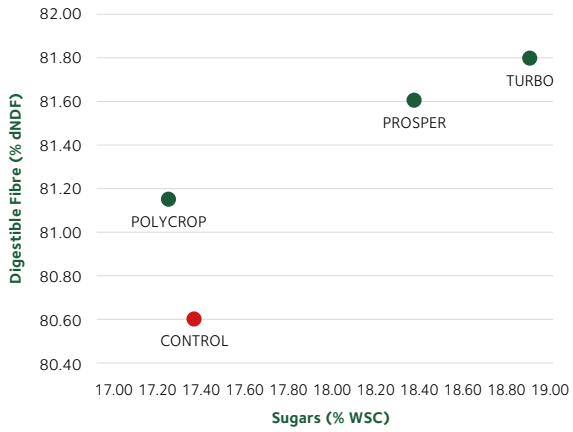
What makes the trials unique is that we measure the forage quality, as well as dry matter yield of every mixture at every cut rather than just in the spring when quality is usually at its best. This gives us a better insight into the mixture's performance all the way through the growing season.

Sinclair McGill mixtures consistently outperform control or competitor mixtures and are particularly strong when it comes to forage quality.

SINCLAIR MCGILL FORAGE QUALITY

The chart (right), shows the average digestible fibre (dNDF) content and sugar (WSC) content of the LGAN mixtures TURBO, PROSPER and POLYCROP compared to a competitor control mixture.

TURBO and PROSPER both have dNDF levels over 1% higher than the control. Small changes in digestible fibre levels can have a big impact. An increase of 1% dNDF has been shown to increase milk yield by 0.25kg per day and intakes by 0.17kg per day (Oba and Allen, 1999).



GRASS MIXTURE SELECTION CHART

Short Term 1-4 years	PREDOMINANTLY GRAZING	DUAL PURPOSE	MAINLY CUTTING
COLOSSAL® SILAGE			Page 10
COLOSSAL® RED			Page 11
SCIMITAR®			Page 12
ADMIRAL'S CHOICE			Page 13
POLYCROP®		Page 14	
EARLY START	Page 15		

Medium Term 4-8 years	PREDOMINANTLY GRAZING	DUAL PURPOSE	MAINLY CUTTING
TURBO®	Page 16		
SCOTSWARD®			Page 17
PROSPER®		Pages 18 & 19	
EXTRA LAMB		Page 20	
PROGRESS®		Page 21	
MATRIX 40 ENHANCED® RYEGRASS	Page 22 & 23		

Long Term 8-12 years	PREDOMINANTLY GRAZING	DUAL PURPOSE	MAINLY CUTTING
CASTLEHILL®		Page 24 & 25	
LAMBHILL	Page 26		
CASTLEPARK		Page 27	
EMERALD HILL	Page 28		
MEADOW MIXTURE		Page 29	

Multi Species Mixtures/ Herbal Leys	PREDOMINANTLY GRAZING	DUAL PURPOSE	MAINLY CUTTING
CASTLEHERB	Page 35		
LAMBTASTIC	Page 35		

Pasture Renovation Mixtures	PREDOMINANTLY GRAZING	DUAL PURPOSE	MAINLY CUTTING
PASTURE RENOVATION SHORT TERM MIXTURE		Page 30	
PASTURE RENOVATION LONG TERM MIXTURE		Page 31	
PASTURE RENOVATION LONG TERM MIXTURE (WITHOUT CLOVER)		Page 31	
CLOVERPLUS		Page 31	

SHORT TERM MIXTURES

COLOSSAL® SILAGE:
Mainly Cutting

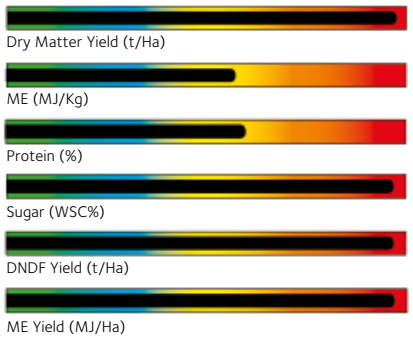
This mixture is treated with

- Highest yielding mix in our portfolio
- Close 'D' Value cutting dates make this a very easy mixture to manage
- The high sugars and high fibres stimulate rumen activity and maximise conversion to milk
- COLOSSAL SILAGE outyields Perennial Ryegrass based leys in the autumn
- Includes the new generation of Italian Ryegrass varieties, with improved digestibility

Suggested seed rate:
10-12kg/acre (25-30kg/ha)

Guide cutting height:
10cm (4 inches)

LG ANIMAL NUTRITION PERFORMANCE



66% ITALIAN RYEGRASS
17% HYBRID RYEGRASS (TET)
17% ITALIAN RYEGRASS (TET)

COLOSSAL® RED:
Mainly Cutting

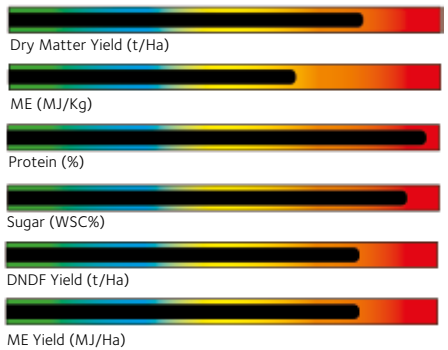
This mixture is treated with

- Protein rich 3 year ley
- A powerful combination of high yielding Tetraploid Hybrid Ryegrasses and our Red Admiral Red Clover blend
- In a 3 year farm scale trial in Devon, Red Admiral blend gave consistently higher yields over all cuts in all 3 years, than single varieties
- Predominantly a cutting mixture but it can also be grazed by lambs and ewes in the late summer

Suggested seed rate:
10-12kg/acre (25-30kg/ha)

Guide cutting height:
10cm (4 inches)

LG ANIMAL NUTRITION PERFORMANCE



30% RED CLOVER BLEND
70% HYBRID RYEGRASS (TET)

SCIMITAR®:
Mainly Cutting

This mixture is treated with

- High yields over 2-3 years
- Contains Italian Ryegrass/Tall Fescue type Festulolium which gives increased stress tolerance
- Good forage quality and high in sugars
- Higher yields than conventional Italian and Hybrid based mixtures with more leafy regrowth
- Scimitar® gives best results with liberal applications of nitrogen

Suggested seed rate:
13-18kg/acre (32-45kg/ha)

Guide cutting height:
10cm (4 inches)

36%	FESTULOLIUM
36%	HYBRID RYEGRASS (TET)
14%	MID SEASON PERENNIAL RYEGRASS
7%	MID SEASON PERENNIAL RYEGRASS (TET)
7%	LATE PERENNIAL RYEGRASS (TET)

ADMIRAL'S CHOICE:
Mainly Cutting

This mixture is treated with

LG Animal Nutrition

- Formulated to produce high yields of protein rich silage
- Slightly later than Colossal® Red
- High sugars to complement the protein in the clover
- Late Tetraploid Perennial Ryegrasses are more persistent than Hybrid Ryegrasses, matching the better persistency of some of the newer Red Clover varieties such as Maro
- Red Admiral blend contains both early and later flowering Red Clovers, Diploid and larger leafed Tetraploid varieties for more even yields over 3 or more cuts and better persistency

Suggested seed rate:
10-12kg/acre (25-30kg/ha)

Guide cutting height:
10cm (4 inches)

70%	LATE PERENNIAL RYEGRASS (TET)
30%	RED CLOVER BLEND

POLYCROP®:
Dual Purpose

This mixture is treated with

- High sugar mixture
- High Tetraploid content (80%) makes Polycrop® very palatable and extremely productive
- Expect improved liveweight gain in beef and lambs
- Multiple cutting potential with excellent aftermath grazing
- True dual purpose mixture with a productive lifespan of at least 3 years
- Includes Late Tetraploid Ryegrasses to enhance grazing potential
- Also available with White Clover

Suggested seed rate:
13-18kg/acre (32-45kg/ha)

Guide to first cut: 20th May (70D)
26-31st May (67D)

Guide cutting height: 10cm (4 inches)

47%	HYBRID RYEGRASS (TET)
13%	MID SEASON PERENNIAL RYEGRASS
10%	MID SEASON PERENNIAL RYEGRASS (TET)
7%	LATE PERENNIAL RYEGRASS
23%	LATE PERENNIAL RYEGRASS (TET)

EARLY START:
Mainly Grazing

This mixture is treated with

- 3-4 year ley with exceptionally early spring growth for spring lamb production
- Also suitable for early turnout with cattle or dairy cows
- After spring grazing, the ley can be closed up for a late silage or hay crop
- Early Start is the ideal complement to Lambhill for lowest cost lamb production

Suggested seed rate:
13-18kg/acre (32-45kg/ha)

Guide to first cut:
20th May (70D) 26-31st May (67D)

Guide cutting height:
10cm (4 inches)

14%	ITALIAN RYEGRASS
20%	HYBRID RYEGRASS (TET)
20%	EARLY PERENNIAL RYEGRASS
10%	MID SEASON PERENNIAL RYEGRASS
17%	MID SEASON PERENNIAL RYEGRASS (TET)
14%	LATE PERENNIAL RYEGRASS
5%	WHITE CLOVER

MEDIUM TERM MIXTURES

TURBO®: Mainly Grazing

This mixture is treated with

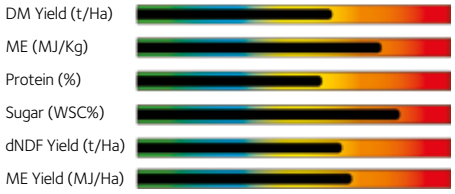
- New formulation using LG Animal Nutrition to optimise production of milk and meat
- Fast growing grazing mixture with potential for one cut of top quality silage
- Tweed White Clover Blend fixes atmospheric nitrogen and provides minerals and protein
- Grazing TURBO® can reduce costs of milk production
- Suitable for both paddock grazing systems and set stocking

Suggested seed rate:
13-18kg/acre (32-45kg/ha)

Guide to first cut: 20th May (70D)
26-31st May (67D)

Guide cutting height: 10cm (4 inches)

LG ANIMAL NUTRITION PERFORMANCE



- 7% MID SEASON PERENNIAL RYEGRASS
- 17% MID SEASON PERENNIAL RYEGRASS (TET)
- 22% LATE PERENNIAL RYEGRASS
- 41% LATE PERENNIAL RYEGRASS (TET)
- 7% MATRIX ENHANCED® RYEGRASS
- 6% WHITE CLOVER BLEND

SCOTSWARD®: Mainly Cutting with Quality Grazing

This mixture is treated with

- A later heading mixture capable of producing high ME silage
- Particularly well adapted to the harsher climates of Scotland & Northern Ireland
- Two or more cuts of high quality silage plus aftermath grazing
- The inclusion of Timothy enables Scotsward to stand up to the mower
- White Clover contributes to quality aftermath grazing

Suggested seed rate:
13-16kg/acre (32-40 kg/ha)

Guide cutting height:
7.5cm (3 inches)

- 19% MID SEASON PERENNIAL RYEGRASS
- 11% MID SEASON PERENNIAL RYEGRASS (TET)
- 23% LATE PERENNIAL RYEGRASS
- 30% LATE PERENNIAL RYEGRASS (TET)
- 12% TIMOTHY
- 5% WHITE CLOVER BLEND

PROSPER®:
Dual Purpose | **England & Wales**

This mixture is treated with

- Balanced nutritional formulation to produce more milk and meat
- Two cuts of top quality silage plus palatable grazing
- The perfect mixture for beef and dairy units

Suggested seed rate:
13-16kg/acre (32-40kg/ha)

Guide cutting height: 7.5cm (3 inches)

LG ANIMAL NUTRITION PERFORMANCE

DM Yield (t/Ha)
ME (MJ/Kg)
Protein (%)
Sugar (WSC%)
dNDF Yield (t/Ha)
ME Yield (MJ/Ha)

- 17% MID SEASON PERENNIAL RYEGRASS
- 41% MID SEASON PERENNIAL RYEGRASS (TET)
- 16% LATE PERENNIAL RYEGRASS
- 21% LATE PERENNIAL RYEGRASS (TET)
- 5% WHITE CLOVER BLEND

PROSPER®:
Dual Purpose | **Scotland & N Ireland**

This mixture is treated with

- Potential to reduce silage making costs by £20 per tonne of dry matter
- Production is concentrated on intermediate heading varieties to produce the highest forage quality
- Includes Timothy for early bite and improved mid-summer grazing

Suggested seed rate:
13-16kg/acre (32-40kg/ha)

Guide cutting height:
7.5cm (3 inches)

- 17% MID SEASON PERENNIAL RYEGRASS
- 38% MID SEASON PERENNIAL RYEGRASS (TET)
- 13% LATE PERENNIAL RYEGRASS
- 20% LATE PERENNIAL RYEGRASS (TET)
- 7% TIMOTHY
- 5% WHITE CLOVER BLEND

Jeremy West, a client of Bodle Bros, Sussex uses Extra Lamb mixture, he says: 'We get early grass growth from the Extra Lamb with plenty for ewes and lambs in the spring - and it's persistent – it keeps growing through spring and summer.'

EXTRA LAMB: Dual Purpose

This mixture is treated with

- Ideally suited to intensive sheep enterprises
- Combines early spring growth for lambing outside
- Very persistent under close grazing
- Cheviot White Clover blend has been specially developed for sheep and lambs and has been proven to increase liveweight gain
- Rich in protein, minerals and trace elements essential for healthy livestock
- Extra Lamb can be closed off for a high yielding cut of quality silage, if desired

13%	MID SEASON PERENNIAL RYEGRASS
30%	MID SEASON PERENNIAL RYEGRASS (TET)
40%	LATE PERENNIAL RYEGRASS
10%	TIMOTHY
7%	WHITE CLOVER BLEND

Suggested seed rate:
13-17kg/acre
(32-42kg/ha)

PROGRESS®: Dual Purpose

This mixture is treated with

- Versatile and dependable dual purpose mixture for all classes of livestock
- Excellent spring growth for early turnout
- A fail-safe mixture which is also highly suitable for extensive systems
- Produces a succession of fresh herbage for palatable grazing, silage or quality hay
- If you require a source of herbage from early spring until late autumn, this is the mixture for you

20%	EARLY PERENNIAL RYEGRASS
9%	MID SEASON PERENNIAL RYEGRASS
19%	MID SEASON PERENNIAL RYEGRASS (TET)
21%	LATE PERENNIAL RYEGRASS
20%	LATE PERENNIAL RYEGRASS (TET)
6%	TIMOTHY
5%	WHITE CLOVER BLEND

Suggested seed rate:
13-16kg/acre
(32-40kg/ha)

MEDIUM TERM GRASS MIXTURES

Matrix shown here on the left showing superior spring growth, adjacent to a conventional perennial ryegrass.

WHAT IS MATRIX ENHANCED® RYEGRASS?

Matrix was developed by Cropmark® in New Zealand and it is a complex inter-generic hybrid consisting of 80% diploid pasture Perennial Ryegrass and 20% Meadow Fescue.

BENEFITS OF MATRIX ENHANCED® RYEGRASS

- Grows at lower temperatures than Ryegrass, giving up to 3 weeks extra growth in the spring!
- Matrix also grows much later in the autumn than Ryegrass, giving up to another 3 weeks extra grazing!
- Very rapid regrowth, particularly when defoliated at the 3 leaves per tiller stage
- Very dense fine-leaved sward resists poaching and treading
- Complex genetic make-up enhances forage quality and digestibility. For best results, graze when there are 3 true leaves per tiller

Matrix was bred as a high quality grazing grass with an extended grazing season and very rapid regrowth. This makes it especially suited to paddock management or rotational grazing systems, but it can also be used for set stocking.

GRAZING MANAGEMENT

Mixtures are more easily managed on a paddock grazing system as pioneered in New Zealand, where Matrix was developed. When the Matrix in the mixture has 3 true leaves per tiller, it is ready for grazing. At this point, it is likely to yield between 2500 to 2800 kg DM/ha. After grazing, the residual grass should be 1400 to 1600 kg DM/ha for cattle and 1000 to 1200 kg DM/ha for sheep. If grass gets beyond the 3 leaf stage prior to grazing, quality will drop and regrowth will be slower. If you are using a rising plate meter, you will need to make allowances for the improved density of a Matrix based mixture.

On a typical New Zealand system, every paddock will be grazed 10 to 12 times a year.

MATRIX 40 ENHANCED® RYEGRASS MIXTURE

This mixture is treated with

- High yielding grazing mixture designed for rotational grazing
- Very fast regrowth between grazings
- Continues growing at lower temperatures extending the grazing season
- Excellent sward density
- High (10%) White Clover content helps to feed the grass with clover nitrogen and increases the protein and mineral content of the sward

40%	MATRIX ENHANCED® RYEGRASS
35%	LATE PERENNIAL RYEGRASS (TET)
15%	LATE PERENNIAL RYEGRASS
10%	WHITE CLOVER BLEND

LONG TERM MIXTURES

CASTLEHILL®:
Dual purpose | **England & Wales**

This mixture is treated with

Castlehill® is the long term ley with rock solid performance.

- Suitable for most soil types and climates
- Excellent feed for all classes of livestock
- Superb disease resistance
- Delivers the performance of a medium term ley, combined with the persistency of a long term ley
- Reliable top quality grazing and cutting
- Invest in Castlehill® for the ultimate long term productivity mixture

Suggested seed rate:
13-18 kg/acre (33-45 kg/ha)

Guide cutting height: 7.5cm (3 inches)

12%	MID SEASON PERENNIAL RYEGRASS
23%	MID SEASON PERENNIAL RYEGRASS (TET)
20%	LATE PERENNIAL RYEGRASS
29%	LATE PERENNIAL RYEGRASS (TET)
11%	TIMOTHY
5%	WHITE CLOVER BLEND

CASTLEHILL®:
Dual purpose | **Scotland & N Ireland**

This mixture is treated with

- Proven high performance on farms from the Orkneys, to the borders
- Palatable grazing, silage and hay for all classes of livestock
- Winter-hardy and persistent with good longevity
- Offers a seriously significant return on your investment
- A failsafe mixture

Suggested seed rate:
13-18 kg/acre (33-45 kg/ha)

Guide cutting height: 7.5cm (3 inches)

12%	MID SEASON PERENNIAL RYEGRASS
20%	MID SEASON PERENNIAL RYEGRASS (TET)
20%	LATE PERENNIAL RYEGRASS
22%	LATE PERENNIAL RYEGRASS (TET)
5%	MEADOW FESCUE
16%	TIMOTHY
5%	WHITE CLOVER BLEND

LAMBHILL:
Mainly Grazing

This mixture is treated with

- Formulated for harsh environments and marginal land
- Suitable for upland reseeds and bogs
- Excellent long term sheep grazing mixture
- Lambhill is perfectly suited to extensive farming systems and all classes of livestock
- Despite the name, Lambhill is also suitable for both beef cattle and dairy cows!

Suggested seed rate:
13-18 kg/acre (33-45 kg/ha)

16%	EARLY PERENNIAL RYEGRASS
28%	LATE PERENNIAL RYEGRASS
22%	LATE PERENNIAL RYEGRASS (TET)
7.5%	CREEPING RED FESCUE
5%	MEADOW FESCUE
13%	TIMOTHY
3%	ALSIKE CLOVER
5.5%	WHITE CLOVER BLEND

CASTLEPARK:
Dual Purpose

This mixture is treated with

- Dual purpose mixture for drought prone areas
- Excellent early bite followed by reliable production throughout the season
- Includes TWEED White Clover blend to fix 'free' nitrogen and provide nutritional benefits to stock
- Now includes Tall Fescue which is widely used in Northern Europe for its tolerance to drought and heat

N.B: Castlepark should be grazed hard to prevent Cocksfoot from forming clumps

Suggested seed rate:
13-18 kg/acre (33-45 kg/ha)

Guide cutting height:
10cm (4 inches)

7.5%	MID SEASON PERENNIAL RYEGRASS
9%	MID SEASON PERENNIAL RYEGRASS (TET)
10%	LATE PERENNIAL RYEGRASS
27%	LATE PERENNIAL RYEGRASS (TET)
16%	TALL FESCUE
5%	MEADOW FESCUE
10%	TIMOTHY
8.5%	COCKSFOOT
7%	WHITE CLOVER BLEND

EMERALD HILL:
Mainly Grazing

This mixture is treated with

- Developed specifically for Ireland
- A later heading mixture for stem free production for much of the season
- Very dense sward for maximum resistance to poaching and treading
- Easy to manage and reliable mixture
- Suits both extensive and intensive livestock systems

Suggested seed rate:
13-18 kg/acre (33-45 kg/ha)

12%	MID SEASON PERENNIAL RYEGRASS
15%	MID SEASON PERENNIAL RYEGRASS (TET)
48%	LATE PERENNIAL RYEGRASS
19%	LATE PERENNIAL RYEGRASS (TET)
6%	WHITE CLOVER BLEND

MEADOW MIXTURE:
Specialist Mixture

- A traditional mixture without ryegrass for farmers wishing to recreate the meadows of the past.
- Meadow mixture is well suited to low fertility situations, flood meadows and conservation areas.
- Mixed herbs or chicory can be supplied separately for mixing in the drill, to enhance the nutritional benefits of the sward.

Sowing rate:
12.5kg/acre (31kg/ha)
Packed in 25kg LG bags

Seed is natural & untreated.

45%	MEADOW FESCUE
10%	ROUGH STALKED MEADOWGRASS
7.5%	SMOOTH-STALKED MEADOWGRASS
7.5%	CREEPING RED FESCUE
17%	TIMOTHY
2%	CRESTED DOG'S TAIL
0.5%	MEADOW FOXTAIL
2.5%	BIRD'S FOOT TREFOIL
2%	ALSIKE CLOVER
6%	WHITE CLOVER

PASTURE RENOVATION

PASTURE RENOVATION:
Short Term

This mixture is treated with

- This mixture will really "pep up" your pasture and give it a new lease of life
- Best cut for silage or hay but will also give useful aftermath grazing
- Designed to perform for 12-18 months after sowing

19%	ITALIAN RYEGRASS
31%	ITALIAN RYEGRASS (TET)
50%	HYBRID RYEGRASS (TET)

PASTURE RENOVATION:
Long Term

This mixture is treated with

- A longer term solution to pasture renovation
- White Clover will fix free nitrogen to feed your ley and provide nutritional benefits to your livestock
- All the grasses are larger seeded Tetraploids which compete better in the existing swards and improve both yields and forage quality

58%	MID SEASON PERENNIAL RYEGRASS (TET)
35%	LATE PERENNIAL RYEGRASS (TET)
7%	WHITE CLOVER BLEND

PASTURE RENOVATION:
Long Term without Clover

This mixture is treated with

- This mixture is the same as the above but excludes clover on the assumption that there is sufficient clover in the existing sward

60%	MID SEASON PERENNIAL RYEGRASS (TET)
40%	LATE PERENNIAL RYEGRASS (TET)

CLOVERPLUS
A blend of white clover varieties, coated in a pellet and treated with HEADSTART GOLD

This mixture is treated with

- Increased seed size and weight makes equipment calibration easier and distribution more even if broadcast
- Increased weight ensures seed is able to get down through the existing sward to ensure good soil/seed contact
- CLOVERPLUS is the perfect product to add white clover into an existing grass ley.

ORGANIC GRASS & CLOVER MIXTURES

This mixture range contains the requisite amount of organically produced seed to satisfy the demands of the organic certification authorities. Further details are available on request.

Mixture 1
SHORT TERM FERTILITY BUILDER
A 2 year mixture for farmers converting to organic or seeking a fertility building mixture which can also provide excellent yields of high protein hay or silage.

Mixture 2
GRAZING MIXTURE
A long term grazing mixture with all late heading perennial ryegrasses to ensure good palatability through the season. A high white clover content gives excellent digestibility and protein.

ORGANIC GRASS & CLOVER MIXTURES

Mixture 3
CUTTING MIXTURE
A medium term cutting mixture with high yielding intermediate perennials and Timothy for excellent spring growth. Late perennials and high white clover content also help to give good aftermath grazing.

Mixture 4
DUAL PURPOSE MIXTURE
A long term dual purpose mixture designed to produce a succession of nutritious herbage all through the season for both cutting and grazing.

Please contact us to find out our full range of Organic forage crops.

WHY GROW WHITE CLOVER?

White clover is the most important forage legume currently grown in the UK. Whether you are milking dairy cows, finishing cattle or feeding sheep, this flexible species has an important part to play in the ley mixtures on your farm.

White clover has the potential to improve the quality of any leys cut and conserved as silage or grazed in the field, whilst also fixing atmospheric nitrogen - reducing fertiliser costs.

- High quality feed
- High protein and digestibility
- Rich in minerals
- Increased voluntary intakes and animal performance
- Good drought resistance and mid-season growth
- Can fix over 160Kg/ha of nitrogen
- Reduced N fertiliser use
- Improves soil structure

CLOVER BLEND TECHNOLOGY

Sinclair McGill pioneered the development of clover blends in the 1980s in association with IBERS (Institute of Biological, Environmental and Rural Sciences). Certain principles were established that are still valid today but the varieties we now use are far superior.

White Clover Blends

CloverPlus®
This blend is for inclusion in ley mixtures designed for beef and dairy systems. It includes varieties with a range of leaf sizes that can adapt to grazing with cattle and cutting for silage.

Pelleted CloverPlus is also available pelleted and treated with Headstart Gold. See page 31 (pasture renovation) for details.

Cheviot®
A specialist blend primarily made up of very small leaved varieties with excellent persistence to stand up to the rigours of intensive and close grazing by sheep. As sheep are selective grazers it also includes some clover with large leaves which act as a "decoy" during the establishment phase.

Tweed®
A highly adaptable and persistent blend, for inclusion in long term mixtures. The range of leaf sizes enables Tweed to adapt to suit all classes of livestock and most management systems.

WHY GROW RED CLOVER?

Red clover offers the opportunity to reduce reliance on purchased concentrate feeds, due to its big yields of very high protein forage.

Sown straight or as part of a mixed grass/clover sward, red clover can produce up to 4 cuts a year with quality aftermath grazing. Like other leguminous plants, red clover also fixes atmospheric nitrogen, helping to bring down fertiliser costs.

- High yields of protein rich forage
- Predominantly used for silage but can also be grazed
- Much higher yielding than white clover
- Reduces N fertiliser use
- Improves soil structure
- Drought tolerant

RED CLOVER BLENDS

Red Blend

Red Admiral®
Red Admiral is a blend of diploid and tetraploid red clover varieties with a range of flowering dates, that has been proven to deliver consistently high yields for three harvest years.

Sowing Information
Sowing rate
5-6kg/acre (12.5-15kg/Ha) straight

3kg/acre (7.5kg/Ha) as part of a grass/clover mix

WHY GROW LUCERNE?

- High protein forage
- Drought tolerant
- Four cuts per year possible
- 3-5 year potential
- Clamp, big bale or hay
- Nitrogen benefit for subsequent crop

Sowing Information

Sowing period
April to mid-August

Direct drill
20-30kg/ha
(8-12kg/acre

Broadcast
25-30kg/ha
(10-12kg/acre)

Yield & Feed Quality

Average dry matter yield
10-12 tonnes/ha

Dry matter
25-30%

Digestibility value
62-64%

Average fresh yield
35-40 tonnes/ha

Crude protein
17-22%

Metabolisable energy
10-10.5 Mj/kg DM

Mezzo

The top-rated variety in France with a dormancy rating of 3.6 making it worth considering for more northerly areas of the UK & Ireland previously considered unsuitable for growing Lucerne.

Exceptionally fast growth rate and outstandingly high yields of protein rich forage. High resistance to all the main diseases and nematodes.

Marshal

This variety can produce very high dry matter yields. It is well adapted to UK conditions and can be harvested for either silage or hay.

Marshal has thinner stems and is therefore very palatable.

WHY GROW FORAGE CHICORY?

- Highly palatable
- Summer production
- Drought tolerant
- Quick recovery after grazing
- No bloat problems
- Grown on its own or mixed with a grass seed ley mixture
- Rich source of trace elements and minerals

Sowing Information

Sowing period
April to-August

Sowing Rate
2-6kg/acre
(5-15kg/ha)
Straight

1-4kg/acre
(2.5-10kg/ha)
as part of a grass/chicory mix

Grasslands Choice chicory

Grasslands Choice chicory is UK proven and has the ability to deliver high quality forage for finishing lambs. Choice can also be mixed with Forage Plantain to help increase the copper and selenium content.

WHY GROW FORAGE PLANTAIN?

- Very palatable
- Excellent source of calcium, sodium, copper & selenium
- Drought tolerant
- Positive impact on animal performance

Sowing Information

Sowing period
April to mid-August

Sowing Rate
3-4kg/acre
(8-10kg/ha)
Straight

1-2kg/acre
(2.5-5kg/ha) as part of a grass/plantain mix

Tuatara

Tuatara has a deep, coarse rooting system, giving it a degree of drought tolerance and is able to be persistent in a wide range of soil types. It is also highly palatable to stock. Tuatara has shown, in our UK trials, to have exceptional late spring growth and faster recovery after grazing.

Lamb Tonic

25%	White Clover
15%	Plantain Tonic
60%	Chicory Choice
100%	Sow at 4kg/acre (10kg/ha)

Lamb Tonic is a great way to combine the benefits of clover, plantain and chicory. Sown on its own in strips, or mixed with grass, this mixture will give 3 to 4 years of nutritious, leafy grazing.

MULTISPECIES MIXTURES - HERBAL LEYS

Could this be the future for low cost, environmentally friendly and sustainable livestock production?

Well formulated multi-species mixtures really represent a win-win solution for farmers wishing to produce livestock on the lowest possible cost platform, as they also improve soil fertility and the overall environment.

Multi-species advantages:

- Faster liveweight gain in beef and potential to finish lambs one week earlier than grass and clover mixtures, and two weeks earlier than ryegrass only mixtures.
- Improved voluntary intake in dairy cows and overall production can equal grass leys receiving 250kg of N/ha.
- Legumes fix atmospheric nitrogen and provide protein, trace elements and minerals. A good legume content can reduce, or even eliminate the requirement for applied nitrogen.
- Deep rooting herbs draw up the minerals from the soil that are vital for animal health. Most herbs also exhibit high resistance to drought. At low nitrogen levels, weed ingress is reduced too.
- Multi-species mixtures improve carbon sequestration and the ability of the soil to retain moisture.

CASTLEHERB: Multispecies Herbal Ley - Mainly Grazing

- Scientifically formulated mixture containing 40% grasses and 60% legumes and herbs
- Four year ley, suitable for all classes of livestock
- For lowest cost livestock production, improved animal health coupled with huge benefits to the soil and environment
- Rich in minerals, protein and trace elements
- Excellent tolerance of drought

Suggested seed rate:
11 -13kg/acre (27 – 32kg/ha)

10%	MATRIX ENHANCED® RYEGRASS
5%	TIMOTHY
15%	LATE PERENNIAL RYEGRASS (TET)
5%	TALL FESCUE
5%	MEADOW FESCUE
10%	RED CLOVER
5%	WHITE CLOVER BLEND
5%	ALSIKE CLOVER
4%	BIRD'S-FOOT TREFOIL
10%	FORAGE CHICORY
10%	SAINFOIN
10%	FORAGE PLANTAIN
4%	SHEEP'S BURNET
2%	YARROW

LAMBTASTIC®: Mainly Grazing

This mixture is treated with

- This mixture is an adaptation of work done in New Zealand to exploit the lamb finishing attributes of deep rooting Forage Chicory and Plantain, combined with the well understood complementary properties of White Clover
- The inclusion of Matrix Enhanced® Ryegrass, combined with Timothy and Early Perennial Ryegrass, all ensure that the sward gets a sprint start in the spring, making it ideal for early lambing
- Lambtastic remains very productive throughout the summer and well into the autumn, and it can be utilised by all classes of livestock

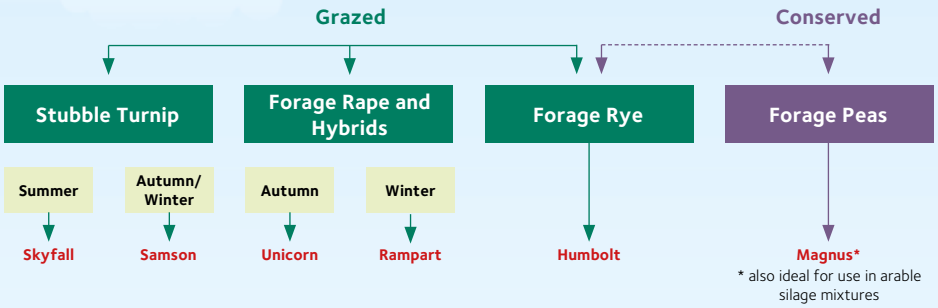
Suggested seed rate:
11 -13kg/acre
(27 – 32kg/ha)

5%	EARLY PERENNIAL RYEGRASS
10%	MID SEASON PERENNIAL RYEGRASS
22%	MID SEASON PERENNIAL RYEGRASS (TET)
22%	LATE PERENNIAL RYEGRASS
8%	TIMOTHY
10%	MATRIX ENHANCED® RYEGRASS
11%	FORAGE CHICORY
5%	FORAGE PLANTAIN
7%	WHITE CLOVER BLEND

CATCH CROPS

Catch crops are ideal for maximising the use of your crop rotations, as they can produce 'fast food' from a short growth cycle.

Crop Data	Stubble Turnip	Forage Rape & Hybrids	Forage Rye	Forage Peas
Sowing Date	April - August	May - August	Sept - Oct	March - late July
Sowing Rate (kg/ha)	4-6	6-8	185	125-150
Utilisation Period	June - Dec	July-Jan	Feb - April	Mid June - early Oct
Fresh Yield (tonnes/ha)	40-50	24-35	20-24	20-25
% DM	8-9	12-13	25	20-25
Total DM (tonnes/ha)	4.5-5	3.5-4.0	5-6	8-10
Crude Protein % of the DM	17-18	19-20	11-12	18-20
D Value	Bulb 80 Leaf 70	65%	67%	65%
Metabolisable Energy MJ/kg DM	11	10-11	10	10 (silage)



WHY GROW STUBBLE TURNIPS?

- Fast growing catch crop
- Autumn or winter feed
- Finishing lambs
- Summer buffer feed for dairy cows
- Economical to grow
- Flexible sowing options
- Helps reduce winter feed costs

Sowing Information

Sowing period
(1) May to June
(2) July to August

Direct drill
4-5kg/ha (2kg/acre), Natural seed

Broadcast
6-7kg/ha (3kg/acre), Natural seed

Yield & Feed Quality

Average dry matter yield
4-5.5 tonnes/ha

Dry matter
8-9%

Digestibility value
68-70%

Average fresh yield
40-50 tonnes/ha

Crude protein
17-18% (mainly leaves)

Metabolisable energy
11 MJ/kg DM

Samson

Samson can produce huge tankard shaped purple bulbs which are very palatable to both sheep and cattle.

In trials, Samson has shown to be preferentially grazed, which can lead to higher intake and liveweight gains.

Delilah

This cultivar has outperformed many existing varieties in our trials for several years. Delilah is ideal for finishing lambs and will produce huge, white tankard shaped bulbs.

Good resistance to mildew.

WHY GROW FORAGE RAPE/HYBRIDS?

- Fast growing, leafy catch crop
- High protein content
- Longer lasting than stubble turnips
- Winter hardy hybrids available
- Finishing lambs
- Flexible sowing period
- Sheep, dairy or beef production

Sowing Information

Sowing period
May to end August

Direct drill
6kg/ha (2.5kg/acre), Natural seed

Broadcast
8kg/ha (4kg/acre), Natural seed

Yield & Feed Quality

Average dry matter yield
3.5-4 tonnes/ha

Dry matter
12-13%

Digestibility value
65%

Crude protein
19-20%

Average fresh yield
24-35 tonnes/ha

Metabolisable energy
10-11 MJ/kg DM

Interval

When it comes to filling the gap in your winter feed programme, Interval rape/kale hybrid can really boost your profits. Interval's exceptional yield potential, disease resistance and palatability is ideal for finishing lambs or dairy cows. Interval is very fast to establish, with some crops ready to utilise within 12-14 weeks of sowing.

Unicorn

A brand-new variety which can provide a highly palatable forage for autumn and winter grazing.

Unicorn has some re-growth potential providing the stems are not fully grazed, and with this additional growth, dry matter yields per hectare can be boosted.

FODDER MIXTURES

Autumn Keep
MIXTURE COMPOSITION

Rampart Forage Rape	40%
Samson Stubble Turnip	20%
Rondo Stubble Turnip	30%
Kale	10%
Total	**100%**

- Very fast establishment for autumn use
- Good disease resistance to ensure quality
- Value autumn feed

Sow at:
6kg/Ha (2.5kg/acre)

Sowing Time:
Summer/early Autumn

Late Lamb
MIXTURE COMPOSITION

Interval Rape/Kale Hybrid	14%
Rondo Stubble Turnip	14%
Italian Ryegrass	72%
Total	**100%**

- Ideal for later use
- Winter hardy varieties
- Italian ryegrass improves crop density

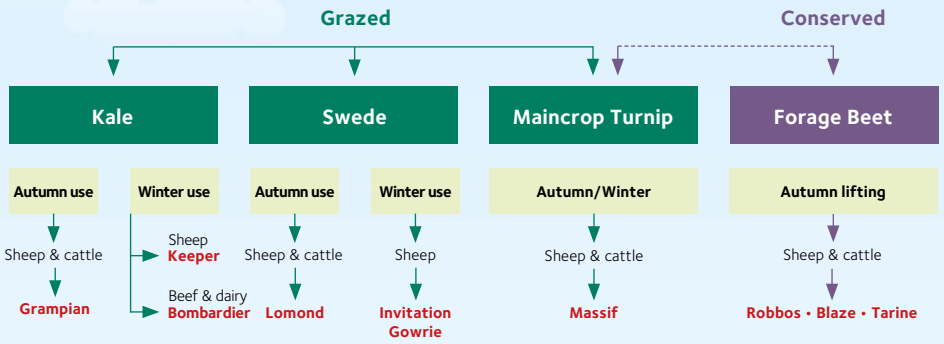
Sow at:
18.0kg/Ha (7kg/acre)

Sowing Time:
Summer/Autumn

FULL SEASON CROPS

These crops require a full season production cycle but can offer high yield potential.

Crop Data	Kale	Turnips	Swede	Fodder Beet
Sowing Date	April-July	Late May-early June	Sept - Oct	March - late July
Sowing Rate (kg/ha)	Nat. 2-4	Nat. 2-3	Nat. 3-4	100,000 seeds
Utilisation Period	Sept-March	Oct-Feb	Oct-March	Nov-April
Fresh Yield (tonnes/ha)	60-70	59-69	70-90	90-100
% DM	14-16	8-10	10-13	15-22
Total DM (tonnes/ha)	8-10	5.50-6	7-10	15-18
Crude Protein % of the DM	16-17	15-17	10-11	12-13
D Value	68%	80%	82%	78-80%
Metabolisable Energy MJ/kg DM	10-11	11	12.8-13.1	12.5-13.0



WHY GROW FODDER BEET?

- Huge yields
- Ideal replacement for cereals
- High energy feed
- Clamp and store over winter
- Improved milk yields
- Palatable and nutritious
- Can be grazed in situ for outwintering systems

Sowing Information

Sowing period
Late March - late April

Direct drill
125,000 seeds/ha
50,000 seeds/ acre

Seeds sold in one acre packs (50,000 seed units)

Yield & Feed Quality

Average dry matter yield
15-18 tonnes/ha

Dry matter
15-23%

Digestibility value
78%

Crude protein
12-13% (mainly leaves)

Average fresh yield
80-100 tonnes/ha

Metabolisable energy
12.5-13 Mj/kg DM

Tarine

A new variety which has performed outstandingly in our trials. Tarine has unique, clean, pink roots, with a slightly higher DM content % than other varieties, which enables crops to be harvested later. Tarine is one of the new generation of fodder beets, bred for maximum feed potential from every hectare.

Rhizomania tolerance completes its outstanding package.

Brick

New, high yielding variety, ideal for growers looking to produce a high quality feed with a higher DM content %. Brick is a true fodder beet and therefore exhibits cleaner roots, but will still deliver very high dry matter yields for maximum feed potential. Rhizomania tolerant.

Robbos

Robbos has been a consistent performer in the UK & Ireland.

High dry matter yields from a medium DM content means Robbos is ideally suited for first time fodder beet growers and its clean yellow roots are easily harvested and can be fed whole or chopped.

Blaze

Blaze has the potential to produce excellent dry matter yields with very clean, bright red roots. Blaze is a medium dry matter variety which enables the roots to be fed whole or chopped. Low dirt contamination ensures high intakes with no scouring.

WHY GROW KALE?

- Higher yields than rape/kale hybrids
- Buffer feed for dairy cows during dry summers
- Flexible utilisation period
- Excellent crude protein content
- High yields and economical to grow
- Outwintering systems

Sowing Information

Sowing period
April - early July

Direct drill
4-5kg/ha (1-2kg/acre), Natural seed

Broadcast
8kg/ha (3kg/acre), Natural seed

Yield & Feed Quality

Average dry matter yield
8-10 tonnes/ha

Dry matter
14-16%

Digestibility value
70-75%

Crude protein
16-17% fresh

Average fresh yield
60-70 tonnes/ha

Metabolisable energy
10-11 MJ/kg DM

Bombardier
A new variety with the potential to deliver high dry matter yields ideal for dairy, beef or lamb production.

Bombardier will maximise the yield potential per hectare, but this variety has been enhanced to ensure that the feed produced will be of a higher quality. Bombardier is also clubroot tolerant.

Caledonian
Caledonian is the highest yielding kale in our trials. It is clubroot tolerant, which now enables growers to continually sow kale on clubroot infected sites. Caledonian's huge yield makes it ideal for utilisation by dairy and beef cattle.

Grampian
This is a variety bred in Scotland which will produce excellent autumn or winter feed for both sheep and dairy cows. Grampian exhibits very high dry matter yields combined with some clubroot tolerance and can be used in outwintering systems.

Keeper
Keeper is very winter hardy and exhibits good lodging resistance.

It is a medium/short type, ideal for finishing lambs and providing high quality winter keep. It has low SMCO levels (anti-nutritional chemical).

WHY GROW SWEDE?

- Excellent high energy winter feed
- Low production costs
- Finishing lambs or winter maintenance
- High dry matter yields
- Cost effective (even where yields are only moderate)

Sowing Information

Sowing period
April to June

Direct drill
3kg/ha (1kg/acre) Natural seed

Broadcast
5kg/ha (2kg/acre), Natural seed

Precision drill
350g-850g/ha (150g-350g/acre) Grade H

Yield & Feed Quality

Average dry matter yield
7-10 tonnes/ha

Dry matter
10-13%

Digestibility value
82%

Crude protein
10-11%

Average fresh yield
70-90 tonnes/ha

Metabolisable energy
12.8-13.1 MJ/kg DM

Gowrie
Gowrie is a variety bred in Scotland and can be utilised pre or post-Christmas. It can produce high dry matter yields and exhibits good tolerance to both clubroot and powdery mildew.

Lomond
High, fresh and dry matter yields make this variety ideal for finishing lambs post Christmas. Lomond has both powdery mildew and clubroot tolerance and trials show it suffers less from rots and splits in its root.

Invitation
Invitation is a very uniform, clubroot tolerant variety, ideal for utilisation after Christmas. It also has excellent tolerance to powdery mildew and will produce large leaves for extra grazing potential. Invitation is winter hardy and is suitable for sheep or cattle.

WHY GROW MAINCROP TURNIP?

- Very high fresh yields
- Autumn or winter feed
- Finishing lambs
- Economical to grow
- Flexible sowing options
- Slower growth than stubble turnips

Sowing Information

Sowing period	Direct drill	Broadcast
June to July	5kg/ha (2kg/acre), Natural seed	7.5kg/ha (3kg/acre), Natural seed

Yield & Feed Quality

Average dry matter yield	Dry matter	Digestibility value
5.5-6 tonnes/ha	9-10%	68-70%
Average fresh yield	**Crude protein**	**Metabolisable energy**
50-60 tonnes/ha	17-18% (mainly leaves)	10-11 Mj/kg DM

Massif
A traditional yellow fleshed turnip that can be sown from May to August. Huge yields from a short growing period and a good alternative to swedes.

Imperial Green Globe
A white-fleshed turnip that can be sown from May to August. Useful dry matter yields from a short growing season.

WHY GROW FORAGE PEAS?

- Very high protein content (16-20%)
- Easy to harvest using forage machinery
- Suitable for undersowing with new grass leys
- Impressive field performance
- Great for organic situations
- Some nitrogen fixation to enhance soil and next crop
- Excellent break crop

Sowing Information

Sowing period	Direct drill	Broadcast
March to early June	1.25kg/ha (50kg/acre)	150kg/ha (60kg/acre)

Yield & Feed Quality

Average dry matter yield	Dry matter	Digestibility value
4-6 tonnes/ha	20-25%	62-64%
Average fresh yield	**Crude protein**	**Metabolisable energy**
20-30 tonnes/ha	16-20%	10.5 MJ/kg DM

Magnus is a semi-leafless forage pea variety, which ensures the crop is self-supporting. This reduces the damaging effect of lodging often seen in traditional full-leaved varieties.

Magnus is very fast growing and can be harvested between 11-14 weeks after sowing. Because of its growth habit (semi-leafless and open to the light), Magnus crops are ideally suited to undersowing with a new grass ley.

Magnus is a true catch crop with tremendous flexibility and is UK proven.

Prosile Arable Silage Mixture

60% Forage Pea
40% Spring Barley
100%

Sow at:
50-60kg/acre (125-150kg/ha) undersown with grass.

Sow at:
70-80kg/acre (175-200kg/ha) for best results.

Our popular range of equestrian mixtures continue to satisfy the demands of a diverse range of requirements from horse hay to herbs.

All our mixtures have been specifically formulated after extensive consultation with Equine Nutritionists. They therefore avoid high sugar grasses, popular in agriculture, because they can increase the risk of Laminitis in horses and induce "stroppy" temperaments in mares.

Equipaddock Original

15%	Early Perennial Ryegrass
30%	Mid-season Perennial Ryegrass
23%	Late Perennial Ryegrass
12%	Timothy
4%	Smooth Stalked Meadowgrass
16%	Creeping Red Fescue
100%	

- Equipaddock Original is a flexible grazing or cutting ley designed specifically for use by horses and ponies.
- Forms a very dense, rhizomatous sward suited to hard grazing and is also capable of producing good yields of high quality horse hay.

Equipaddock Gold

NEW!

12.5%	Timothy
30%	Meadow Fescue
25%	Strong Creeping Red Fescue
10%	Sheeps Fescue
5%	Tall Fescue
15%	Smooth Stalked Meadow grass
2.5%	Bentgrass
100%	

- A high quality non-ryegrass long-term mix with high fibre and low sugar content to help avoid dietary issues.
- Very dense sward tolerates very close grazing and helps prevent pasture damage. Produces excellent quality hay.

Horse Hay

15%	Timothy
5%	Cocksfoot
5%	Meadow Fescue
75%	Late Perennial Ryegrass
100%	

- This mixture is designed to produce high quality horse hay with that special 'nose' that can only come from a good Timothy content.
- Provides useful grazing in the early spring and during late summer and autumn. In winter, it should only be grazed lightly if a good hay crop is desired.

Herb Mixture

35%	Chicory
35%	Plantain
25%	Burnet
5%	Yarrow
100%	

- Specially developed for horses and ponies and includes a number of deep rooting and nutritious species, which provide a good source of minerals and trace elements.

Available in 1kg packs
Sow at 250-500g/acre

Haylage

8%	Timothy
50%	Italian Ryegrass
22%	Mid-season Perennial Ryegrass
20%	Hybrid Ryegrass
100%	

- A short term, high yielding mixture for the production of quality haylage.
- High in fibre and with a good inclusion rate of Timothy to give a good "nose."

SOWING RATES:
For complete re-seeds we recommend a sowing rate of 15-20kg per acre and for overseeds or improvements; 10-15 kg per acre, depending on how much the sward has deteriorated.
Our seed is supplied in handy 10kg packs

AMENITY GRASS MIXTURES

Suburban

25%	Platinum Perennial Ryegrass
30%	Nagano Perennial Ryegrass
35%	Corail Strong Creeping Red Fescue
10%	Caldris Chewings Fescue
100%	

An excellent multipurpose lawn and landscape mixture that establishes quickly with high wear tolerance and good appearance.

Sowing Rate **35g/m²**
Cutting Height **20mm**

Prize Lawn

30%	Cyrena Perennial Ryegrass
20%	Nagano Perennial Ryegrass
25%	Caldris Chewings Fescue
20%	Smirna Slender Creeping Red Fescue
5%	Highland Browntop Bent
100%	

A high quality lawn and landscape mixture with ryegrass that produces a fine, dense sward with good colour and wear tolerance.

Sowing Rate **35-50g/m²**
Cutting Height **13mm**

Formal

50%	Heidrun Chewings Fescue
20%	Smirna Slender Creeping Red Fescue
25%	Trophy Strong Creeping Red Fescue
5%	Highland Browntop Bent
100%	

Produces an attractive, fine, dense sward for use on non-ryegrass ornamental lawns and landscape areas. The inclusion of rhizomatous grasses provides resistance and strength to the sward.

Sowing Rate **30-50g/m²**
Cutting Height **15mm**

Estate

15%	Columbine Perennial Ryegrass
20%	Platinum Perennial Ryegrass
20%	Gladys Perennial Ryegrass
15%	Tetramagic Tetraploid Perennial Ryegrass
30%	Corail Strong Creeping Red Fescue
100%	

An economical landscape ryegrass mixture that establishes quickly, giving rapid cover and good wear tolerance. Estate contains only true amenity cultivars.

Sowing Rate **35g/m²**
Cutting Height **20mm**

Action Replay

35%	Cyrena Perennial Ryegrass
25%	Melbourne Perennial Ryegrass
20%	Columbine Perennial Ryegrass
20%	Nagano Perennial Ryegrass
100%	

An excellent mixture to use when renovating winter sports pitches and high wear areas.

Action Replay will germinate and establish very quickly, producing a dense, hard-wearing sward.

Sowing Rate **35-50g/m²**
Cutting Height **20mm**

Greens

40%	Trophy Chewings Fescue
40%	Nikky Chewings Fescue
20%	Highland Browntop Bent
100%	

A high quality traditional 80:20 greens mixture that produces a dense, fine-leaved, attractive sward with good colour throughout the year.

Sowing Rate **35g/m²**
Cutting Height **5mm**

All our amenity mixtures are treated with **HEADSTART® GOLD** and packed in 10kg or 20kg bags. All varieties are subject to change.

Wicket Renovation

30%	Nagano Perennial Ryegrass
40%	Cyrena Perennial Ryegrass
30%	Nagano Perennial Ryegrass
100%	

This mixture contains a blend of fine-leaved, fast to germinate, quick recovering ryegrasses that have good wear tolerance.

Ideal for cricket square overseeding and end of the season renovation.

Sowing Rate **35-50g/m²**
Cutting Height **5mm**

WHY RESEED?

Why is reseeding so important?
Good grass mixtures contribute hugely to lowering production costs, but as a sward ages, its yield and feed quality decreases significantly. This is caused largely by the ingress of lower yielding, lower quality weed grasses.

Reseeding gives the opportunity to replace older varieties and weed grasses with the newest genetics that offer a multitude of benefits.

BENEFITS OF RESEEDING

Improved Feed Quality

- Higher ME
- More digestible
- Higher sugars
- Increased protein

More Forage

- Increased silage yields
- Increased grazing yields
- Better disease resistance

Increased Palatability

- Increased voluntary intakes

More Efficient Use of Inputs

- Better yield response to fertilisers
- Nitrogen fixation from clover

Better Stock Holding Capacity

- Extended growing season
- Increased drought tolerance

VALUE OF RESEEDING

Reduced feed bills
The table below shows how the yield and energy content of a typical mixture changes over time and how this can lead to increased concentrate costs. A regular reseeding programme reduces money spent on bought-in feeds.

Age of Sward (Years)	Ryegrass Content (%)	Yield (T DM/HA)	Herbage ME (MJ/KG DM)	Lost ME Grown (MJ/HA)	Concentrate Cost to Replace Lost ME (£/HA)
2	95	13.5	12.0	-	-
3	90	12.6	11.8	13,320	197
5	80	11.2	11.5	33,200	491
7	70	9.8	11.3	51,260	759
9	60	8.4	11.0	69,600	1,030
11	60	7.0	10.8	86,400	1,279

Souce: AHDB

RUN A HEALTH CHECK ON YOUR GRASS

Take a good look at all your grass fields this year and if you can answer 'yes' to any of these questions then you need to think very seriously about the various options that are open to you.

Q: Are your leys struggling to support the numbers of livestock they did in the past?

Q: Is the speed of re-growth after silage cuts slower than it was?

Q: Have your fields been attacked badly by pests and/or diseases in recent years?

Q: Do you see more and more patchy areas on some fields?

Q: Is the population of weeds and weed grass much higher than you thought?

Q: Have your fields been badly poached in recent years?

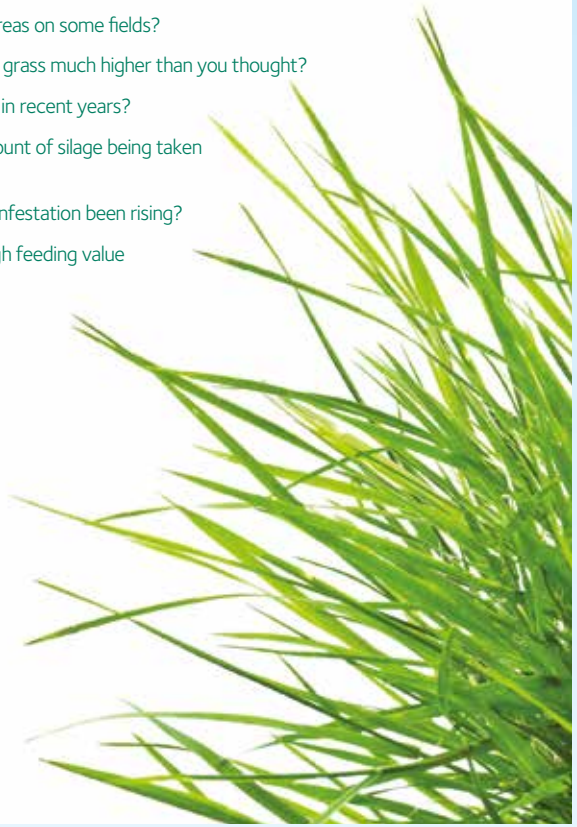
Q: Do you detect a reduction in the amount of silage being taken off each field every season?

Q: Has the level of broad-leaved weed infestation been rising?

Q: Could you make better use of the high feeding value of legumes like White Clover?

You have various options if you have answered 'yes' to any or all of these questions. It may be that in some cases you will be able to bring the ley back up to speed by close attention to the control of weeds and pests. Alternatively, it may be necessary either to consider a complete re-seed or perhaps an overseeding operation.

The key point to remember is that it is important not to look at the cost of reseeding but instead consider the cost of not reseeding!



HOW TO ESTABLISH A NEW GRASS LEY

- Lime the field if necessary so that seed is sown into soil with a pH as close to 6.5 as possible. Try to maintain a stable pH in the future.
- Check the drainage status as undesirable weed grasses will invade waterlogged fields. Consider sward lifters, mole ploughs and other means of relieving compaction if you discover that this is a problem. Digging a few deep holes in the field to check soil structure is a worthwhile investment of your time and effort.
- Analyse the soil and correct any obvious nutrient imbalances.
- Prepare a fine, firm and weed free seedbed.
- Timing of the sowing is important. Spring sowing from March to mid-May and Autumn from July until late September – depending on where you are located and the altitude. Mixtures with clovers are best sown when soil temperatures are higher; from April through May and July and August. Clovers require soil temperatures of at least 5-10°C to germinate and higher temperatures to achieve satisfactory growth.
- Ensure the seedbed is sufficiently moist and if possible, avoid mid-summer seeding in drought-prone years.
- Ring roll prior to seeding to close any gaps and again after sowing to ensure close contact between the seed and the soil.
- Broadcast or cross drill and then roll or very lightly harrow. Ensure that the seed is placed no deeper than 6mm.
- If you use a cover crop, make sure that it is suitable to establish a grass ley and that the seed rate is not too heavy or the grass may get crowded out.
- Watch for any signs of pest attack and consult your agronomist if you see anything.
- Specify a Sinclair McGill mixture treated with **HEADSTART® GOLD** to improve establishment, increase plant stand and get your new ley off to a vigorous start.

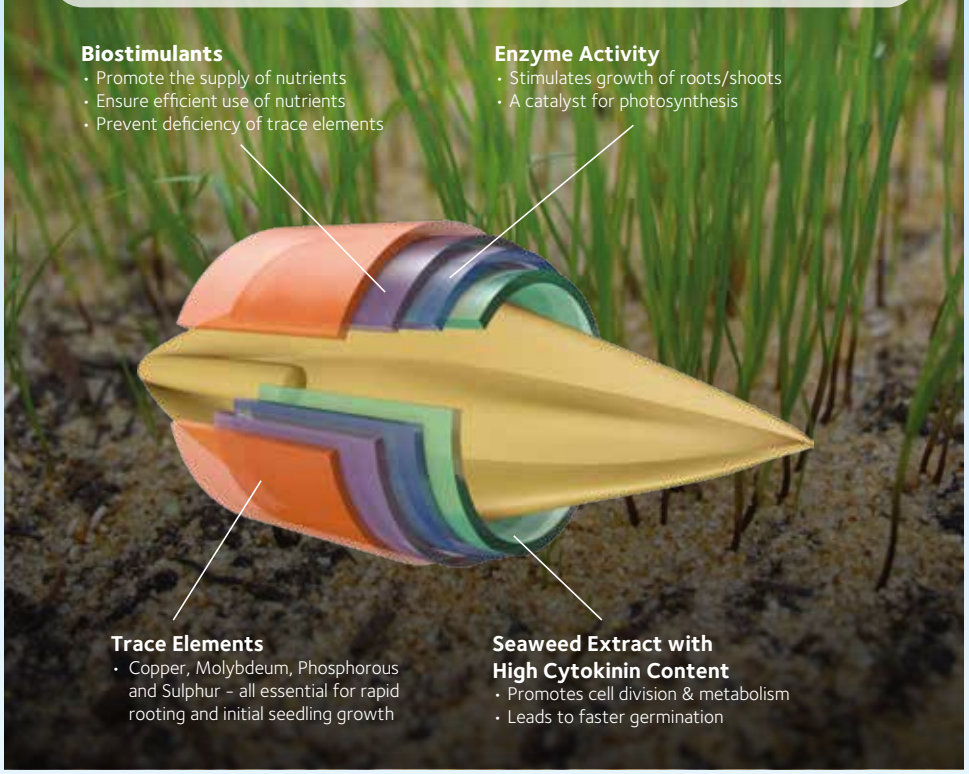
HEADSTART® GOLD

HEADSTART® GOLD

HEADSTART® was originally developed in response to pleas by groundsmen to give them something that would speed up the renovation of winter sports pitches in the short "window" between the end of one season and the start of play and training. **HEADSTART®** proved to be so successful that it is now used by about 60% of football clubs in the English Premiership as well as rugby clubs and famous pitches throughout Europe. Growers of cultivated turf also took to it, finding it not only improved cover, but rooting as well, enabling both faster establishment and earlier harvesting of the turf.

We recognised that the many benefits of **HEADSTART®** translated to forage grass as well, and in difficult seasons farmers have often found that seed applied with **HEADSTART®** established well, when untreated seed has struggled.

The introduction of **HEADSTART® GOLD** retains all the advantages of the original formulation but adds a scientifically balanced package of minerals and trace elements, essential for the successful establishment of seedlings; further insurance that your grass seed gets off to a flying start.



USING GRASS TO HELP INCREASE SOIL ORGANIC MATTER

Soil is one of the most important assets on any farm and whilst most farmers and growers recognise this fact, Soil Organic Matter (SOM) levels have fallen in many agricultural soils over the past decades.

Reducing tillage, incorporating crop residues and using cover crops may all help prevent a reduction in SOM levels and are useful tools to have in the armoury but adding rotational grass into the rotation is one of the best and simplest methods if the aim is to increase SOM levels.

Why is Soil Organic Matter Important?

SOM is made up of plant or animal tissue in various stages of decomposition, the micro-organisms that feed on it, and the substances that are synthesises in the process.

Soils with a higher SOM content are generally deemed to be more "healthy," allowing crops the opportunity to reach their full potential whilst also being more resilient to climatic, disease or pest stress.

Benefits of Increasing SOM

Physical Benefits	Chemical Benefits	Biological Benefits
■ Improved water holding capacity ■ Increases water infiltration ■ Improved soil structure ■ Roots penetrate soils more easily ■ Increased soil workability ■ Soil is more resistant to compaction	■ Increased soil pH buffering capacity – improving ability to resist pH change so less need for lime ■ Increased nutrient storage capacity ■ Improved nutrient availability and plant uptake	■ Improved microbial activity which can help supress pests and disease ■ Increased food for other soil organisms such as earthworms which further help improve soil structure

Making it Work

The longer a grass ley is kept down, the more beneficial it will be for SOM content. However even a 1 year catch crop of grass is better than no grass at all.

The long-term soil health benefits make including grass worthwhile but of course it must also pay in the short term. The best mixture choice will therefore be the one that fits best to the chosen market.

Mixture Choice

Grass Use	1-2 year Duration	2-4 year duration
Anaerobic Digesters	**COLOSSAL® SILAGE**	**POLYCROP®**
Grazing	**EARLY START**	**TURBO®**
Hay/Haylage	**HAYLAGE MIXTURE**	**HORSE HAY MIXTURE**
Grass seed crop	Please contact us for more information	
Countryside Stewardship	Please contact us for a copy of our HiBird Conservation and Gamecover crops brochure	

USING GRASS TO HELP MANAGE BLACKGRASS

Blackgrass is one of the most problematic weeds in arable crops. Although not a new weed, it has become a major problem in the last 50 or so years due to changes in cropping and tillage systems, together with widespread herbicide resistance.

Successfully bringing the weed under control is possible by taking a multifaceted approach that can be enhanced by incorporating grass into the rotation.

When looking to formulate an integrated management plan for blackgrass it is important to understand the key characteristics of the weed. These traits allow actions to be taken to help reduce weed plant populations and therefore reduce the impact on crop yield:

Blackgrass Characteristic	Action
80% of blackgrass seedlings emerge in early Autumn	Delay drilling until later in the Autumn or move to Spring cropping
Seed emergence generally occurs in the top 5cm of soil	Consider the need for deeper cultivation or ploughing if weed seed shed in the previous crop was high
High tiller numbers and seeds per head mean seed return can be as high as 50,000 seeds per square metre	Ensure any control methods are at least 95% effective to avoid population increase
Seed longevity in the soil is relatively short with numbers of viable seeds decreasing by around 74% each year	Introduce fallow or use a break crop of grass in the rotation to prevent seed shed, reducing the soil seed bank

Making it Work

Reducing blackgrass populations using a grass break crop takes advantage of the relatively short longevity of blackgrass seed in the soil. A 2-year break can potentially reduce viable seeds to less that 10% of their original numbers but we would recommend a minimum grass ley duration of 3 years.

The ley can be grazed or cut over the 3 years but to be successful it is absolutely crucial that the field is managed in a way that prevents any blackgrass seed returning to the soil. This means that topping may be necessary if grazing isn't preventing the formation of blackgrass seed heads. Silage cuts may need to be taken earlier than usual before blackgrass seed heads mature.

Mixture Choice

Purpose	Mixture
Predominantly Grazing	**TURBO®**
Dual Purpose or Cutting	**POLYCROP®**

GRASSLAND PESTS, WEEDS AND DISEASES

Infestations of pests, weeds and diseases can cause major losses in the productivity of grassland. Not only are yields suppressed, but sward longevity can be affected and, equally important, the feed value of the crop will be severely reduced. This has a knock-on effect on busines efficiency.

PEST MANAGEMENT IN NEWLY SOWN LEYS

Risk factors

Pests – such as frit fly, leatherjackets, slugs and wireworm – can cause serious losses in grassland and are a particular problem in new leys.

Frit fly and **Leatherjackets** pose a particular threat where:

- The new ley follows established grass, or is sown into grassy cereal stubbles
- The area is predominantly grass or mixed arable land
- Leys are sown in mid-to late-August, or even later if conditions are warm and damp
- There is a very short period between cultivation and drilling
- There has been a history of damage

Slugs are most active in wet conditions and are a particular problem on heavy soils or if drainage is not adequate. Damage is usually worst in the Autumn and grass reseeds following cereals tend to be at higher risk.

Wireworms are often found in permanent pasture and pose a threat to new leys that follow old pasture. The damage caused can get progressively worse in year two or three of the ley's life. Attacks by this pest will have more serious consequences if the crop is already under stress, for example, acidic or poor condition soils.

DAMAGE AND IMPORTANCE

Leatherjackets

Leatherjacks are crane fly larvae. They feed on the roots and stems of grass at or below soil level. Yield losses of more than 5 tonnes of dry matter per hectare are possible in severe attacks, with crop failure possible in newly sown leys.

Frit fly

Frit fly produces three generations of larvae a year and are found in almost all grass swards. The larvae feed on the plant's central shoot and cause tiller death, which reduces yield and persistency in established leys. In younger leys this can lead to plant death.

Slugs

The most significant damage by slugs occurs when newly germinated and young seedlings are attacked. Fast growing or more established plants can tolerate slug grazing but the seed itself can also be destroyed leading to patchy emergence.

Wireworms

This pest chews the base of grasses, typically just below ground level, causing the plant to turn yellow. Although similar, the damage caused by wireworm will be more 'ragged' than that caused by frit fly.

INTEGRATED PEST CONTROL

Integrated pest control

Control of grassland pests, in the absence of chemicals, includes some or all these measures:

- Soil sample prior to sowing to check pH and nutrient status
- Clear crop residues from the soil surface, break up clods of old turf and produce a well consolidated seedbed to help minimise slug damage
- Plough in July before reseeding. This can reduce leatherjackets by 50%
- Leave at least two weeks between cultivation and sowing in consecutive grass crops to allow birds to eat the pests
- Increase seed rate to between 15kg and 20kg per acre (38-50kg per Ha) to compensate for any losses
- Reseed in spring
- Use seed treated with **HEADSTART® GOLD** to promote rapid establishment and vigorous early growth
- Establish a brassica break crop between grass crops to remove the pests' food source.
- Implement longer breaks between grass crops of 3 years or more if wireworms are a major issue
- Overseed into an existing ley so that pests have an alternative feed source whilst new seedlings establish

Example Crop Rotations

May	June	July	Aug	Sept	March	April
	2nd cut silage	Cultivate – leave fallow for > 2 weeks Sow Forage Rape	Sow Delilah Stubble Turnip or Interval	→	Plough – leave fallow for > 2 weeks	Sow Sinclair McGill grass ley
1st cut silage	Cultivate – leave fallow for > 2 weeks	Sow Gowrie Swede or Grampian Kale	→	→	Plough – leave fallow for > 2 weeks	Sow Sinclair McGill grass ley
1st cut silage	Cultivate – leave fallow for > 2 weeks	Sow Tyfon Stubble Turnip	→	Sow Sinclair McGill grass ley		

PEST MANAGEMENT IN WELL-ESTABLISHED LEYS

It's not just newly sown grass that is impacted by pests, well-established leys are also subject to pest attack. In addition to those pests causing damage in new leys, aphids and chafer grubs can also be problematic in older grass. Damage may be in patches and will cause a reduction in desirable grasses.

Grass Aphids

Several species of aphid can be found on established grassland, but only one causes damage, particularly after a mild winter. Aphid damage can cause the grass to turn brown and look scorched.

Aphid damage is not usually significant enough to warrant control.

Chafers

Several species of chafer beetle can cause damage, but the most serious is the garden chafer (Phyllopertha horticola). Adults are eight to nine millimetres long with a metallic green head and thorax and reddish-brown wing cases. The grubs are white and up to two centimetres long.

Affected fields tend to get re-infected every year and the chafer will sever the roots and restrict growth, with grass turning brown in dry weather. Most damage is done in September and October. Excessive bird activity may be a tell-tale sign that the grass is infected with chafers.

Controlling chafers in established grassland presents a challenge. Rolling the ground to restrict grub movement may have limited success. Taking a break from grass in the affected area is the only way to reduce populations significantly.

WEED MANAGEMENT IN GRASS LEYS

Weeds compete with both established grass and newly sown leys for water, nutrients and light. Hampering establishment and restricting productivity.

All agricultural soils carry a weed-seed burden and levels can be as high as 100 million viable seed per hectare. So it is to be expected that newly sown grass will show some degree of weed infestation.

It's estimated that 25% of grassland has some level of broad-leaved weed infestation and that the ground cover of that infestation in long-term leys could amount to 15%. This represents a significant loss in grass yield and quality.

Tackling any weed problems early is key to keeping them in check. Chemical control using herbicides will be more successful when weeds are smaller and prevents them reaching a point where weed seed is shed.

The presence of weeds in grassland can be indicative of other underlying issues in the field. Addressing these will improve the performance of the sown species and reduce the impact and competitiveness of the weeds present. The table below lists some common potential problems.

Soil pH

A pH of 6.5 is required for grassland.

Lower pH soils should be treated with lime with 'little and often' applications rather than large amounts every few years.

Drainage

Wet areas will encourage weed growth, be prone to poaching, and limit grass growth.

Phosphate and Potash

Analyse soil to identify the P and K status. Any corrective dressing should be worked into the seed bed before drilling.

Soil compaction

Regular sub-soiling to avoid soil compaction – or a soil pan that will prevent root growth and access to water in dry summer conditions.

Herbicide considerations

It is essential that any herbicide application is carried out under the recommendation of a BASIS qualified agronomist and that the manufacturers instructions are adhered to.

There are also some key tips to help achieve optimum weed control and avoid any crop damage.

- Always try to spray when the weed plants are at their most vulnerable
- Ensure grass is at a sufficient growth stage to avoid chemical damage
- Avoid spraying when the grass is under stress, such as in very dry conditions

A sound spray program can be supported by:

- Using the correct stocking rates to avoid under or over grazing
- Topping grass when required to remove unpalatable grass or other species
- Alternating between cutting and grazing to discourage weeds that favour one management type
- Applying fertiliser as appropriate
- Spraying any patches of weeds at the earliest opportunity.

DISEASE MANAGEMENT IN NEW GRASS LEYS

Damping-Off

Pre-emergence damping off can result in high numbers of seeds failing to produce a viable plant. This is caused by soil borne fungi (usually Pythium and Fusarium species). These fungi have a short time span for attack, but they will typically – but not exclusively – be more successful in cold and wet conditions or very soon after sowing.

Post-emergence, the fungi Pythium and Fusarium, along with several other species, such as Rhizoctonia solani, Cylindrocarpon radicola and Dreschlera, can cause root damage and rotting stem bases in seedlings. This typically occurs after the second or third leaf has emerged. Damage is more prevalent in dry, warm conditions.

Control: Good seedbed preparation and correct sowing depth will increase the proportion of viable seedlings. Adequate fertiliser will reduce the risk of damage.

Using Sinclair McGill seed treated with **HEADSTART® GOLD** will prove valuable in giving seeds the best start.

DISEASE MANAGEMENT IN ESTABLISHED GRASS LEYS

Major diseases

Winterkill is often associated with northern areas, but it can lead to problems across the UK.

Attack by Fusarium culmorum and Fusarium nivale (snow mould) are among the main causes of plant death at this time. Damage is usually worst when a cold spell is followed immediately by mild conditions.

Snow mould causes patches of yellow grass, which will turn whiteish-grey, typically seen in February and March. Pinkish white mycelium can be seen in the matted turf.

Control:

Ensure swards don't enter winter with too much growth. Consider topping if pre-winter grazing is not viable.

Select mixtures with hardy grass varieties in areas prone to this damage

Crown Rust is a serious leaf disease in grasses and can devastate swards. Tillering and root growth is reduced, and badly infected swards appear very yellow and shiny, black overwintering spores can be seen on both sides of the leaves from mid-autumn. Palatability is affected with livestock refusing to eat heavily infected areas. Re-growth and response to fertiliser is limited.

Crown Rust affects grass in late summer and autumn, when conditions are warm and dry, with cooler, moist nights. It is predominantly a disease of the south and south west of England but has been recorded through the midlands and into Yorkshire.

Control: Frequent grazing is one of the best methods but if stock are rejecting the crop then top the grass to remove infected herbage. Then fertilise to encourage new growth and graze regularly, ideally at intervals of less than three weeks.

Some grass varieties are more resistant than others, so select mixtures with those known to be more resistant, particularly in areas where Crown Rust is known to be a problem.

Mildew is seen in lush dense crops of ryegrass in spring and early summer and is an issue particularly in Eastern England. It is encouraged by excessive soil nitrogen, shade, and high humidity. Conservation swards are particularly vulnerable. Mildew infestations affect grass yields and quality.

Oval, fluffy pustules, mainly on the upper side of leaves, are signs of mildew. These pustules have whitish coloured mycelium. Over time the leaf will turn yellow and die.

Control: Select mixtures with resistant varieties.

Drechslera – also called Leaf Spot – is found throughout the UK. It is most prevalent in autumn, in wet and cloudy weather, and can extend into winter, affecting spring silage yields by up to 18%. Livestock will reject infected grass.

Diploid ryegrasses are more prone to Drechslera than tetraploids. It causes small speckles on grass leaves, which develop into brown/black lesions, often with a yellow halo. The leaf eventually dies. In the worst cases, whole swards turn black.

Control: Mixtures with resistant varieties, or those with higher tetraploid content can be considered to slow down or stop the disease progressing.

Infected material is best removed by light grazing or topping to prevent spread and reduce its survival into winter.

Heavily infected swards should be sprayed with fungicide, following the advice of a crop protection specialist.

Rhynchosporium is commonly known as "Leaf Scald," or "Spring Burn," and causes yield and quality losses, particularly in Italian ryegrasses. More prevalent in wet conditions, Rhynchosporium is normally found in the south west of England and Wales. Scald-like blotches are typically found on the under surface of leaves, which may have browned edges, and should not be confused with windburn. Most damage is likely to occur in the Spring before the sward has had its first cut.

Control: There is some evidence of varietal resistance which can be considered when selecting mixtures.

Ryegrass Mosaic Virus (RMV) is spread by mites and particularly affects Italian ryegrasses, causing pale, green streaks on the upper surface of the leaves that can turn yellow or brown as the plant ages. Plant height and tillering may be reduced.

RMV is predominantly found in the east as the mite prefers drier conditions but can spread rapidly, resulting in up to 30% losses in sward productivity, with reduced digestibility.

Control: Select mixtures with tolerant grass varieties in areas where RMV is known to be a threat.

Minor diseases

Bacterial Wilt is closely linked with Italian ryegrasses. Although severe cases are rare, noticeable symptoms are a yellow-orange stripe on the flag leaf, which cause it to change to a light straw colour and wilt.

Ergot is caused by the fungus Claviceps purpurea and is found throughout the UK, but particularly in wetter areas.

These ergots, which are 0.25 to 2cm in length and are hard with white or purple centre, develop in the flowers of grasses and can poison livestock.

Ensure grass is cut or grazed before flowering to prevent the formation of ergots.

Plough swards known to carry infections before reseeding to bury the ergots to at least 10cm and prevent them from germinating.

Barley Yellow Dwarf Virus (BYDV) is spread by aphid vectors. In severe cases, up to 85% of the sward can be infected, leading to dwarfing of plants and yellowing or reddening of infected leaves. Infections can be identified in late spring and are often confused with nutritional or environmental stress.

KEY SPECIES FOR PRODUCTIVE GRASSLAND

Ryegrasses are the most commonly used species in Sinclair McGill grass mixtures but are often complemented with other grassland species, such as Timothy, Cocksfoot and fescues. These offer additional benefits to suit specific situations.

Perennial Ryegrasses (Lolium perenne)
This is the cornerstone species of UK grass seed mixtures due to its persistency, adaptability, longevity and high yield characteristics.

There are many perennial ryegrass varieties, usually subdivided into 3 groups categorised by the date at which they reach maturity. Early varieties typically produce a seed head in England and Wales in Mid-May, Intermediate varieties towards the end of May, and Late varieties in early June. In Scotland heading dates will on average be 2 weeks later due to the different climatic conditions.

Early Perennials

These varieties grow well and bulk up in early spring, making them ideal for early grazing and for conservation cutting.

Intermediate (Mid Season) Perennials

A denser, more prostrate growth habit than early perennials, these varieties have a longer production season with high persistency and yield potential in grazing and cutting systems.

Mid-season perennials can be used to increase ground cover and forage quality in short-term mixtures and to boost yields in long-term mixtures.

Late Perennials

These varieties are extremely persistent and used in long-term mixtures, particularly those designed for intensive grazing. They offer excellent forage quality as they remain leafy and palatable for longer than other types, with good mid and late season growth and a good yield potential.

Italian Ryegrasses (Lolium multiflorum)
Italian ryegrass is the highest yielding of the ryegrass species lasting 18 to 24 months so is typically a mainstay short term conservation mixture. An excellent species to provide bulk but lower in forage quality than perennial ryegrasses. Their fast germination and establishment make them ideal for sowing as a catch crop.

Italian ryegrasses need frequent grazing or cutting to maintain their quality. They grow vigorously and respond well to nitrogen fertiliser but produce relatively few tillers so the sward can be fairly open. Surplus growth in autumn is best removed to promote winter hardiness.

Hybrid Ryegrasses (Lolium hybridum)
These carefully bred hybrids offer the benefits of both Perennial and Italian species. They are more persistent than Italian Ryegrass, lasting for between two and four years, and have higher yields than Perennial Ryegrass. They will typically offer better ground cover than Italian ryegrasses increasing their suitability to grazing and are used successfully in mixtures with red clovers to make high-protein sward mixtures.

Tetraploid Ryegrasses
There are tetraploid varieties of both Italian and perennial ryegrasses. Tetraploids have a similar plant size but tend to have broader leaves, a more erect growth habit and deeper root systems compared with diploids. Tetraploids offer several advantages over the diploids, including:

- **Increased palatability**
- **Higher sugars (Water soluble carbohydrates)**
- **Increased winter hardiness**
- **Increased tolerance to drought conditions**

Timothy (Phleum pratense)
Timothy brings many advantages to grass seed mixtures and is often included in grazing and cutting mixtures for use in the north and west of the UK, where conditions can be colder and wetter.

Timothy grows at lower temperatures than ryegrasses which makes for excellent early Spring growth. It is very persistent and winter hardy, coping with wetter conditions and poorer soils. It will also continue to maintain palatability in mid-summer when other grasses may be past their peak production.

Timothy is a good variety choice in swards for grazing sheep.

Cocksfoot (Dactylis glomerata)
Cocksfoot has an extensive root system and is used in mixtures grown on lighter or drought prone soils. It has rapid regrowth and good summer production when other species may be affected by lack of moisture.

However, Cocksfoot is lower in digestibility and sugars than ryegrasses and it can easily become 'tussocky' and unpalatable for livestock if managed incorrectly.

Westerwolds (Lolium westerwoldicum)
These are annual grasses with vigorous growth giving very high yields. Their short life span of a single year, but rapid growth potential, means that Westerwold varieties are predominantly sown straight as a catch crop rather than being used in mixtures. They are well suited to bulk up silage production and zero grazing but need regular defoliation to prevent a fast decline in forage quality.

Creeping Red Fescue (Festuca rubra)
Winter hardy and early growing, on acidic soils and in wet and cold conditions if necessary, makes red fescue an option in specific situations. It is used sparingly in grass seed mixtures.

Meadow Fescue (Festuca pratensis)
Meadow fescue is a nutritious leafy species and traditionally grown with Timothy in grass/clover swards. It is often included in mixtures designed for extensive grazing due to its good performance in low fertility or low input situations.

SEED & HERB MIXTURE SOWING RATES

Type of Seed		Sowing Rate Kg/acre (Kg/ha)	Sowing Date
Ryegrass	(Hybrid) (Italian) (Perennial) (Westerwolds)	13-16 (32-40) 13-16 (32-40) 13-18 (32-45) 13-16 (32-40)	March-September March-September March-September March-September
Clover, Red		3.5-5 (9-12.5)	March-August
Clover, Tetraploid Red		4.5-5.5 (11-14)	March-August
Lucerne		8-12 (20-30)	April-August
Forage Peas *(Sowing rate is reduced in arable silage blends)		40-60 (125-150)*	March-late July
Forage Rye		75 (190)	September-October
Forage Maize		45k seeds (112.5k seeds)	Mid April-mid May
Mustard		5-10 (12.5-25)	May-August
Fodder Rape		2.5-4 (6-8)	May-August
Tares (Vetches)		75 (190)	January-April or Sept
Stubble Turnips		2-3 (5-7.5)	April-August
Full Season Turnips	(Natural)	2-3 (5-7.5)	Late May-early June
Fodder Beet	(Monogerm) (Pelleted)	50K seeds (125k seeds)	April-early May
Kale	(Natural)	1-3 (4-8)	April-June
Swedes	(Natural) (Graded)	1-2 (3-5) 150g-350g (350g-850g)	Early May-mid June (N) Late May-mid June (S)
Chicory	Straight Grass/Chicory mixture	2-6 (5-15) 1-4 (2.5-10)	
Plantain	Straight Grass/Plantain mixture	3-4 (8-10kg) 1-2 (2.5-5)	

(N) North (S) South

DISTRIBUTORS AND STOCKISTS

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