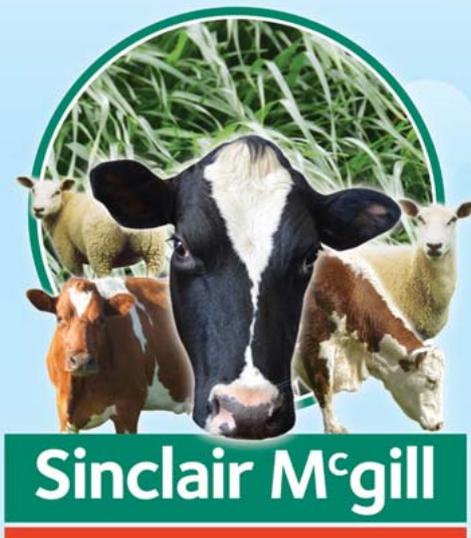


EXTENSIVELY REVISED & EXPANDED EDITION



GRASS AND FORAGE CROPS HANDBOOK



Now with additional
LGAN Mixtures

2017-2018

Limagrain 

INTRODUCTION

As we move closer to a post-Brexit era, uncertainty about the future should serve as a stimulus to plan a profitable and sustainable farming enterprise.

If exports to Europe do become more difficult, then cost-efficient production of food for our domestic market and exciting new, more distant markets come sharply in to focus. It is vitally important that every crop grown on the farm, including grass and forage crops, have the genetic potential to produce optimum returns.

The development of Near Infrared Spectroscopy to measure all the attributes of forage nutrition has enabled us to formulate mixtures that not only perform agronomically, but also nutritionally to produce more meat and milk. This technology is now used on all Sinclair McGill mixtures, but only short and medium term mixtures with the highest nutritional value are awarded the LGAN accreditation.

Sustainability is not a buzzword we can ignore either and reinvigorating our soils is central to this. The government here and all over the world recognise that soils have to be preserved and improved. Recent legislation on greening and cover crops is testament to this. Additionally, we can also employ a more proactive method by utilising mycorrhizal and soil bacterial products such as Smart Rotations (see page 32) when reseeded. This really is a “win-win” product, as it not only increases the organic content of the soil, but dramatically increases crop yields as well!

We hope you find this handbook a useful tool to plan your profitable and sustainable farming future.



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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.

GERMINATION STANDARDS

Species	EU	HVS
Perennial Ryegrass	80%	80%
Italian Ryegrass	75%	75%
Hybrid Ryegrass	75%	75%

PURITY STANDARDS

Species	EU	HVS
Perennial Ryegrass	96%	98%
Italian Ryegrass	96%	98%
Hybrid Ryegrass	96%	98%

HVS= Higher Voluntary Standard

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

TABLE 1: POSSIBLE WEED CONTENT IN AN OFFICIAL SAMPLE OF PERENNIAL RYEGRASS (60g of seed)

Weed	EU	HVS	Sinclair McGill
Docks*	5	5	Less than 1
Couch*	120	10	Less than 1
Blackgrass*	100	10	Less than 1

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

TABLE 2: POSSIBLE INERT MATERIAL IN 10 ACRES OF PERENNIAL RYEGRASS

Inert Material	EU	HVS	Sinclair McGill
Dead Seed	30 kilos	30 kilos	7 kilos*
Impurities	6 kilos	3 kilos	1 kilos*

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

FORAGE QUALITY & ANIMAL NUTRITION

What is LG Animal Nutrition?

The LG Animal Nutrition accreditation is used to denote varieties and mixtures that deliver superior nutritional value, whilst maintaining excellent agronomic qualities and yield. Independent trials conducted by leading scientific institutes have shown clear increases in animal performance using LG Animal Nutrition products.

More Efficient Production

Feeding grass with improved quality allows producers to maximise efficiency and reduce production costs. Animal feed, whether in the form of bought in concentrates or home grown forage, makes up a significant proportion of production costs. Increasing the nutritional quality of this feed helps increase milk and meat production.

Sinclair McGill has always been at the forefront of bringing the benefits of mixtures with enhanced nutritional benefits to our customers, so we were pleased to be the first to introduce LG Animal Nutrition (LGAN) accredited mixtures to the market.

LGAN offers a 'holistic' approach to mixture formulation; balancing the important attributes of WSC (sugars) with digestible fibre (DADF), balanced protein, energy and D value. In doing so we have also ensured the mixtures will exceed expectations for yield, ground cover, winter hardiness, disease resistance and most important; palatability.

As explained in previous editions of this handbook, the use of NIRS (Near Infrared Spectroscopy) has enabled us to evaluate the nutritional attributes of a huge number of varieties. Having this knowledge at our fingertips enables us to make much more informed choices when formulating grass and clover mixtures. Although many mixtures will not achieve LGAN accreditation due to other agronomic attributes taking precedence, such as persistency in long term leys, it does ensure that we can make vital tweaks to improve the nutritional quality of all of our mixtures.

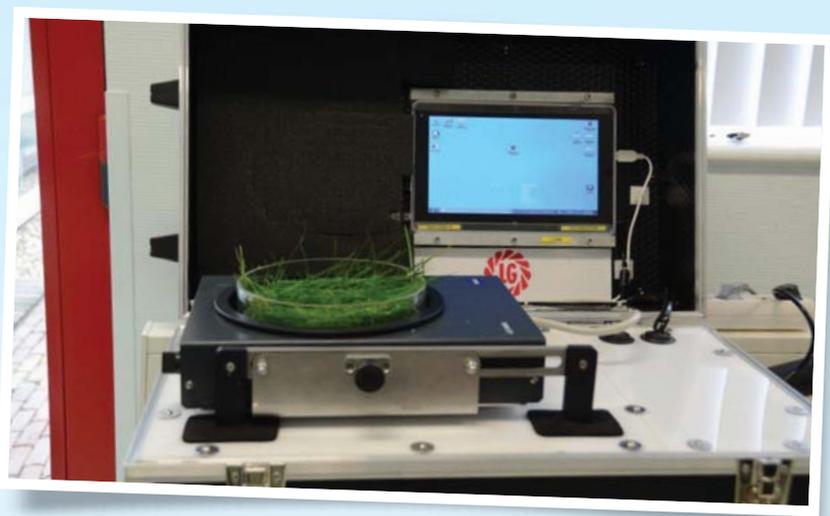


Proof of Concept

Work carried out at the Schothorst Research Institute in the Netherlands in 2013, compared a group of cows fed a diet including a high quality LGAN grass mixture, with a second group fed a control dual purpose mixture. The group of animals being fed the LGAN mixture produced **an additional 1.4 litres of milk per day**. This increase in production is worth **an additional £84** a year, per cow herd, at a milk price of 20 pence per litre.

- 5% Higher Feed Efficiency
- 5% More Milk
- An Extra £84 Per Cow

SCHOTHORST INSTITUTE ANIMAL FEEDING TRIALS 2013	CONTROL DUAL PURPOSE MIXTURE	LG ANIMAL NUTRITION DUAL PURPOSE MIXTURE
Feed Efficiency Milk production per kg fed	1.24	1.30
Milk Yield Litres per cow per day	28.5 litres	29.9 litres
Extra Milk Per Cow Per Year Assuming 300 milking days	-	+420 litres
Extra Profit Per Cow Per Year Assuming 20p per litre	-	+£84



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 when formulating a mixture are carried through to in field performance.



The table (right) shows the average difference in feed quality between Sinclair McGill Turbo and a "Low Quality" mix formulated using recommended varieties shown to be of poor nutritional value.

At first glance the differences may appear minor but a small change in quality can have a big impact. An increase of 1% DNDF for example has been shown to increase milk yield by 0.25kg per day and intakes by 0.17kg per day (Oba and Allen, 1999).

	LOW QUALITY MIX	TURBO	DIFFERENCE
ME	13.78	13.91	0.13
Protein	16.14	16.89	0.75
Sugar	20.94	21.15	0.21
DNDF	81.49	82.71	1.22

Source: Limagrain Trials 2014-2016

Dartington Mixture Trials

In 2014 and 2015, grass mixture trials were carried out at NIAB TAG in Dartington, Devon. LGAN grass mixtures were tested to determine their forage quality under conservation and simulated grazing regimes, compared with a control mixture consisting of varieties selected from the Recommended List, shown to be of poor nutritional value in Limagrain forage quality trials.

- 17% Higher Energy Yield
- More Sugar and Digestible Fibre
- An Extra £887 per Ha

The results clearly show that there can be a huge difference between the energy value of different grass mixtures, and that using recommended varieties is not a guarantee of forage quality. The LGAN mixture produced significantly more energy per year than the low feed value control mix. An additional 23,518 MJ/Ha is equivalent to **an additional 4,437 litres of milk worth £887/Ha**, at a milk price of 20 pence per litre.



2014/15 MEAN RESULTS	LOW FEED VALUE CONTROL	 TURBO	TURBO BENEFIT COMPARED TO CONTROL MIX
Dry Matter Yield (T/Ha)	9.81	11.46	1.65
Energy Content ME (MJ/Ha)	13.69	13.8	0.11
Energy Yield (MJ/Ha)	134,508	158,026	23,518

MIXTURE SELECTION CHART



	PREDOMINANTLY GRAZING	DUAL PURPOSE	PREDOMINANTLY CUTTING
Short Term 1-4 years			
COLOSSAL® SILAGE 			Page 5
COLOSSAL® RED 			Page 5
SCIMITAR®			Page 6
ADMIRAL'S CHOICE 			Page 6
POLYCROP® 		Page 7	
EARLY START	Page 7		
Medium Term 4-8 years			
TURBO® 	Page 8		
PROSPER® 		Page 9	
SCOTSWARD®			Page 10
PROGRESS®		Page 10	
LAMBTASTIC	Page 11		
EXTRA LAMB	Page 11		
Matrix Medium Term 4-8 years			
MATRIX 40 Enhanced® Ryegrass 	Page 13		
MATRIX 70 Enhanced® Ryegrass 	Page 13		
MATRIX Enhanced® Ryegrass & Timothy	Page 13		
MATRIX Sheep & Lamb	Page 13		
Long Term 8-12 years			
CASTLEHILL®		Page 14	
CASTLEHILL® RED		Page 15	
LAMBHILL	Page 15		
CASTLEPARK		Page 16	
EMERALD HILL	Page 16		
Pasture Renovation Mixtures			
Pasture Renovation Short Term Mixture		Page 17	
Pasture Renovation Long Term Mixture		Page 17	
Pasture Renovation Long Term Mixture (without clover)		Page 17	
Specialist Mixtures			
Meadow Mixture		Page 18	
Drought Buster		Page 18	
Power Grass		Page 18	
Smallholder		Page 18	



SCIMITAR®

Mainly Cutting

- Highest yielding mixture in our portfolio
- Contains LOFA; a Festulolium cross between Italian Ryegrass and Tall Fescue
- 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

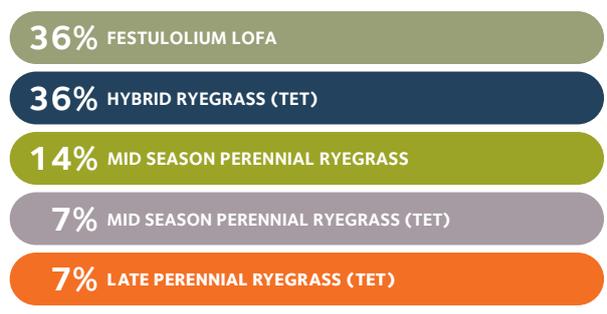


This mixture is treated with

HEADSTART® GOLD

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

Guide cutting height:
10 cm (4 inches)



ADMIRAL'S CHOICE

Mainly Cutting

- 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 Ryegrass is more persistent than Hybrid Ryegrass, matching the better persistence 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 leaved Tetraploid varieties for more even yields over 3 or more cuts and better persistency



This mixture is treated with

HEADSTART® GOLD

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

Guide cutting height:
10 cm (4 inches)





POLYCROP®

Dual Purpose

- High sugar mixture
- High Tetraploid content (77%) 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
- Including Pensel, with improved digestibility for better conversion to meat or milk
- 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: 10 cm (4 inches)



This mixture is treated with



47% HYBRID RYEGRASS (TET)

20% LATE PERENNIAL RYEGRASS (TET)

13% MID SEASON PERENNIAL RYEGRASS

10% MID SEASON PERENNIAL RYEGRASS (TET)

10% LATE PERENNIAL RYEGRASS

EARLY START

Mainly Grazing

- 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: 10 cm (4 inches)



This mixture is treated with



14% HYBRID RYEGRASS (TET)

15% EARLY PERENNIAL RYEGRASS

5% EARLY PERENNIAL RYEGRASS (TET)

20% HYBRID RYEGRASS (TET)

10% MID SEASON PERENNIAL RYEGRASS

17% MID SEASON PERENNIAL RYEGRASS (TET)

14% LATE PERENNIAL RYEGRASS

5% WHITE CLOVER BLEND

MEDIUM TERM MIXTURES



TURBO®

Mainly Grazing | **England & Wales**

- New formulation using  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 by as much as 8p per litre
- Suitable for both paddock grazing systems and set stocking

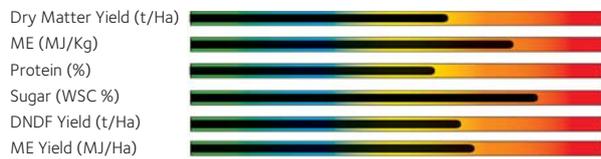


This mixture is treated with



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

LG ANIMAL NUTRITION PERFORMANCE



- 7% MID SEASON PERENNIAL RYEGRASS
- 6% MID SEASON PERENNIAL RYEGRASS (TET)
- 30% LATE PERENNIAL RYEGRASS
- 44% LATE PERENNIAL RYEGRASS (TET)
- 7% MATRIX ENHANCED® RYEGRASS
- 6% WHITE CLOVER BLEND

TURBO®

Mainly Grazing | **Scotland & N Ireland**

- Suitable for both paddock grazing systems and set stocking
- If you have not grown TURBO® before, you might well be surprised by the speed of regrowth after grazing
- Includes Timothy for early bite; particularly useful after a hard winter
- Now includes Matrix for an even longer grazing system



This mixture is treated with



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

LG Animal Nutrition Performance
See England & Wales



- 7% MID SEASON PERENNIAL RYEGRASS
- 10% MID SEASON PERENNIAL RYEGRASS (TET)
- 25% LATE PERENNIAL RYEGRASS
- 20% LATE PERENNIAL RYEGRASS (TET)
- 7% MATRIX ENHANCED® RYEGRASS
- 15% MID/LATE SEASON PERENNIAL RYEGRASS (TET)
- 6% WHITE CLOVER BLEND
- 10% TIMOTHY



PROSPER[®]

Dual Purpose | **England & Wales**

- 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



This mixture is treated with

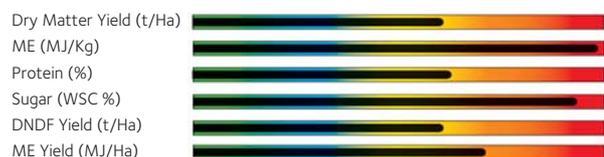


Suggested seed rate:
13-16kg/acre (32-40kg/ha)

Guide cutting height:
7.5cm (3 inches)



LG ANIMAL NUTRITION PERFORMANCE



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**

- 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



This mixture is treated with



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

Guide cutting height:
7.5cm (3 inches)



LG Animal Nutrition Performance
See England & Wales

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



Russell and Lorraine Gaw

Farm contractors **Russell and Lorraine Gaw** from Port William in Dumfries and Galloway, south west Scotland, grow 81 hectares (200 acres) of **Scotsward** for a neighbouring dairy farm.

“The seed mixture is an integral part of the operation,” says Russell. “I have tried other mixtures in the past but **Scotsward** seems particularly suited to this area with its fairly mild and wet climate. We get exceptional growth, which means that we get three good cuts of silage each year and then the leys are grazed by cattle, followed by lambs until the end of February. This is really important for the customer - he’s looking for plenty of good quality forage.”

Slurry and fertiliser applications boost growth ready for first cut silage at the end of the first week of May.

Supplied by LS Smellie, Russell is impressed with **Scotsward’s** longevity as well as the high yields, seeing, in some cases, 10 years of productive life. “It never seems to stop growing,” he adds.

SCOTSWARD®
Mainly Cutting with Quality Grazing

Medium to long term cutting mixture

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



This mixture is treated with



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

PROGRESS®
Dual Purpose

- Versatile and dependable dual purpose mixture for all classes of livestock
- Excellent spring growth for early turn out
- 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
- Especially recommended for extended grazing regimes
- This is the mixture for you if you require a source of herbage from early spring until late autumn



This mixture is treated with



13% EARLY PERENNIAL RYEGRASS

15% EARLY PERENNIAL RYEGRASS (TET)

9% MID SEASON PERENNIAL RYEGRASS

11% MID SEASON PERENNIAL RYEGRASS (TET)

21% LATE PERENNIAL RYEGRASS

20% LATE PERENNIAL RYEGRASS (TET)

6% TIMOTHY

5% WHITE CLOVER BLEND



LAMBTASTIC

Mainly Grazing

- 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)



This mixture is treated with



HEADSTART GOLD

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 – GRASSLANDS CHOICE

5% FORAGE PLANTAIN – TONIC

7% CHEVIOT WHITE CLOVER BLEND

EXTRA LAMB

Dual Purpose

- 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

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



This mixture is treated with



HEADSTART GOLD

13% MID SEASON PERENNIAL RYEGRASS

30% MID SEASON PERENNIAL RYEGRASS (TET)

40% LATE PERENNIAL RYEGRASS

10% TIMOTHY

7% CHEVIOT WHITE CLOVER BLEND

MATRIX MIXTURES



Lambs grazing a Matrix Ley Mixture in January near St. Austell, Cornwall on the farm of Michael Grigg.

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.

WHAT IS MATRIX FOR?

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.

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 ENHANCED® RYEGRASS MIXTURES MANAGEMENT GUIDELINES

SOWING RATE

We recommend a sowing rate of 12.5kg/acre but it can be sown at higher seeding rates. The pack size is 25kg.

SOWING TIME

Treat as you would any conventional grass/clover mixture. Depending on where you are located, the clover may not germinate if sown too late in the autumn when soil temperatures are falling. Spring to mid-August is ideal.

SOWING METHOD

Treat as any grass mixture, drill or broadcast into a fine, firm seed bed and roll in afterwards. If drilling, we recommend that Matrix Enhanced® Ryegrass mixtures are cross drilled.

GRAZING

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 should be grazed hard or cut low late in the autumn, before the onset of winter, to avoid winter kill.



Matrix 70 being grazed by New Romneys at Dave Sanders farm, Bodmin, Cornwall.

MATRIX 40 ENHANCED[®] RYEGRASS MIXTURE

- Our most popular Matrix Enhanced[®] Ryegrass mixture
- Suitable for most areas in England, Wales and southern Scotland
- Best suited to intensive grazing
- Inclusion of conventional grasses help protect the Matrix from winter damage
- High (10%) White Clover content helps to feed the grass with clover nitrogen and increases protein and mineral content of the sward



This mixture is treated with



40% MATRIX ENHANCED[®] RYEGRASS

35% LATE PERENNIAL RYEGRASS (TET)

15% LATE PERENNIAL RYEGRASS

10% WHITE CLOVER BLEND

MATRIX 70 ENHANCED[®] RYEGRASS MIXTURE

- Only recommended for the warmer parts of the UK (not Scotland or Northern Ireland) **unless** overseeding an existing pasture
- For overseeding we recommend a minimum rate of 8 kilos per acre
- Enables farmers in mild winter areas to exploit the value of the long season production of Matrix to the full



This mixture is treated with



70% MATRIX ENHANCED[®] RYEGRASS

20% LATE PERENNIAL RYEGRASS (TET)

10% WHITE CLOVER BLEND

MATRIX ENHANCED[®] RYEGRASS MIXTURE WITH TIMOTHY

- Early to grow in the spring - both Matrix and Timothy will grow at lower temperatures than Perennial Ryegrass, thus making a greater contribution to early turnout
- This mixture was very high yielding in our trials
- The inclusion of Timothy also makes this mixture more winter hardy



This mixture is treated with



40% MATRIX ENHANCED[®] RYEGRASS

15% TIMOTHY

20% LATE PERENNIAL RYEGRASS (TET)

15% LATE PERENNIAL RYEGRASS

10% WHITE CLOVER BLEND

MATRIX SHEEP AND LAMB MIXTURE

- This Matrix Enhanced[®] Ryegrass mixture has been specially formulated for grazing by sheep and lambs
- In addition to Matrix it contains Perennial Ryegrass varieties that will tolerate very close grazing
- Stoloniferous, small leaved White Clovers persist well under sheep grazing and help finish lambs faster
- Grasslands Choice Chicory can also be supplied separately to mix in the drill or for sowing in strips through the field to help maintain your livestock's health and nutrition



This mixture is treated with



40% MATRIX ENHANCED[®] RYEGRASS

10% MID SEASON PERENNIAL RYEGRASS (TET)

10% MID SEASON PERENNIAL RYEGRASS

10% LATE PERENNIAL RYEGRASS (TET)

20% LATE PERENNIAL RYEGRASS

10% WHITE CLOVER BLEND

LONG TERM MIXTURES



Willie Ralston Campeltown with Ayrshires on Castlehill

CASTLEHILL®

Dual Purpose | **England & Wales**

Castlehill® is the long term ley with rock solid performance

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



This mixture is treated with



Suggested seed rate:
13-18 kg/acre (33-45 kg/ha)
Guide cutting height:
7.5cm (3 inches)

Please note that we can also supply Castlehill® with the appropriate percentage of organic seed to meet the current regulations. More information available upon request.

12% MID SEASON PERENNIAL RYEGRASS

23% MID SEASON PERENNIAL RYEGRASS (TET)

20% LATE PERENNIAL RYEGRASS

24% LATE PERENNIAL RYEGRASS (TET)

16% TIMOTHY

5% WHITE CLOVER BLEND

CASTLEHILL®

Dual Purpose | **Scotland & N Ireland**

Castlehill® is the long term ley with rock solid performance

- Suitable for most soil types and climate
- Excellent feed for all classes of livestock
- Superb disease resistance
- Delivers the performance of a medium term ley, combined with the persistence of a long term ley
- Reliable top quality grazing and cutting
- Invest in Castlehill® for the ultimate in long term productivity
- Includes Meadow Fescue which will outyield Perennial Ryegrass under low fertility conditions



This mixture is treated with



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)

10% LATE INTERMEDIATE PERENNIAL RYEGRASS (TET)

20% LATE PERENNIAL RYEGRASS

12% LATE PERENNIAL RYEGRASS (TET)

5% MEADOW FESCUE

16% TIMOTHY

5% WHITE CLOVER BLEND



CASTLEHILL® RED

Dual Purpose

The country's most respected long term ley with Red Clover as well as White Clover blends for special applications

- The inclusion of Red Clover has been proven to increase liveweight gain in lambs, particularly in upland situations
- Red Clover contains oestrogen which helps finish lambs, but ewes should be kept off Red Clover six weeks prior to and post tupping, to avoid fertility problems and miscarriages
- Like White Clover, Red Clover is rich in protein, minerals and trace elements, essential to the health and performance of your livestock
- The high clover content in Castlehill® Red will allow savings on your fertiliser bills by the fixation of atmospheric nitrogen



This mixture is treated with



12% MID SEASON PERENNIAL RYEGRASS

20% MID SEASON PERENNIAL RYEGRASS (TET)

19% LATE PERENNIAL RYEGRASS

20% LATE PERENNIAL RYEGRASS (TET)

13% TIMOTHY

5% MEADOW FESCUE

4.5% WHITE CLOVER BLEND

6.5% RED CLOVER BLEND

LAMBHILL

Mainly Grazing

- Formulated for harsh environments and marginal land
- Suitable for upland reseeds and bogs
- Excellent long term sheep grazing mixture
- Lambhill is also 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!



This mixture is treated with



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

8% EARLY PERENNIAL RYEGRASS

5% MEADOW FESCUE

8% EARLY PERENNIAL RYEGRASS (TET)

13% TIMOTHY

29% INTERMEDIATE PERENNIAL RYEGRASS (TET)

7.5% CREEPING RED FESCUE

21% LATE PERENNIAL RYEGRASS (TET)

3% ALSIKE CLOVER

5.5% CHEVIOT WHITE CLOVER BLEND



CASTLEPARK

Dual Purpose

- 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)



This mixture is treated with



HEADSTART GOLD

9% EARLY PERENNIAL RYEGRASS (TET)

7.5% MID SEASON PERENNIAL RYEGRASS

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

- Developed especially 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)



This mixture is treated with



HEADSTART GOLD

12% MID SEASON PERENNIAL RYEGRASS

7% MID SEASON PERENNIAL RYEGRASS (TET)

48% LATE PERENNIAL RYEGRASS

28% LATE PERENNIAL RYEGRASS (TET)

5% WHITE CLOVER BLEND

PASTURE RENOVATION

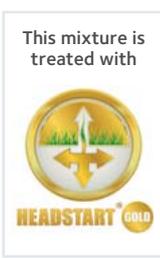


Available by telephoning us on 01472 370117 or e-mail enquiries@limagrain.co.uk to get a PDF copy

PASTURE RENOVATION

Short Term

- 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



18.75% ITALIAN RYEGRASS

31.25% ITALIAN RYEGRASS (TET)

50% HYBRID RYEGRASS (TET)

PASTURE RENOVATION

Long Term

- 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



50% MID SEASON PERENNIAL RYEGRASS (TET)

43% LATE PERENNIAL RYEGRASS (TET)

7% WHITE CLOVER BLEND

PASTURE RENOVATION

Long Term without Clover

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



50% MID SEASON PERENNIAL RYEGRASS (TET)

50% LATE PERENNIAL RYEGRASS (TET)



SPECIALIST MIXTURES

MEADOW MIXTURE

- 45% Meadow Fescue
 - 10% Rough Stalked Meadow-grass
 - 7.5% Smooth-Stalked Meadow-grass
 - 7.5% Creeping Red Fescue
 - 17% Timothy
 - 2% Crested Dog's Tail
 - 0.5% Meadow Foxtail
 - 2.5% Bird's Foot Trefoil
 - 2% Alsike
 - 3% Aberystwyth S184 White Clover
 - 3% Grasslands Bounty White Clover
- 100%**

A traditional mixture without ryegrass for farmers wishing to recreate the meadows of yesteryear.

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.

DROUGHT BUSTER

- 28% Tall Fescue
 - 22% Matrix Enhanced® Ryegrass
 - 22% Intermediate Perennial Ryegrass (tet)
 - 14% Late Perennial Ryegrass (tet)
 - 9% Late Perennial Ryegrass
 - 5% White Clover Blend
- 100%**

This mixture is designed to withstand drought and maintain production.

Tall Fescue is widely used in Europe and is tolerant of both heat and drought. Matrix has proven ability to recover rapidly from drought and the Tetraploid Ryegrasses have deep roots that can search for available moisture. Herbie is one of only a few varieties of diploid Perennial Ryegrass used in Spain, where drought is expected every year.

Our Ensign Plus White Clover blend grows well in the mid summer period when grass growth slows down, thus helping to fill this gap in production.

Recommended sowing weight

**12.5 – 16kg/acre
(31 – 40kg/ha)**

**Drought Buster is packed in
25kg LG bags**

This mixture is
treated with



POWER GRASS

- 15% Westerwolds Ryegrass
 - 15% Westerwolds Ryegrass (tet)
 - 35% Italian Ryegrass
 - 35% Italian Ryegrass (tet)
- 100%**

Power Grass is designed for the biogas market but could equally be useful for after maize, after potatoes or any catch crop situation.

Life span 12 months to two years.

Recommended sowing rate

15 kilos per acre

Packed in 25 kilo LG bags

This mixture is
treated with



SMALLHOLDER

- 15% Mid-Season Perennial Ryegrass
 - 15% Late Perennial Ryegrass
 - 8% Late Perennial Ryegrass (tet)
 - 20% Amenity Perennial Ryegrass
 - 15% Meadow Fescue
 - 15% Creeping Red Fescue
 - 7% Timothy
 - 5% White Clover
- 100%**

A blend of dense and hard-wearing grasses suitable for all classes of stock, including pigs and poultry.

- Offers long season grazing over a number of years
- If closed off a high quality hay cut can also be achieved
- Ideal for pigs and poultry or for low stocking rates of sheep and cattle
- Includes White Clover for nitrogen fixation
- A fail-safe mixture designed especially for low input systems
- For horse only paddocks, use Equipaddock Original mixture (see page 29)

Packed in 15 kg / acre LG bags

Seed is natural & untreated.



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

This is for farmers converting to organic or seeking a fertility building mixture which can also provide high protein hay or silage. Contains Red Clover, Italian Ryegrass and Tetraploid Hybrid Ryegrass. Similar to Colossal® Red, (see page 5).

Mixture 2 GRAZING MIXTURE

This grazing mixture differs from conventional mixtures in that it has a high White Clover content and a more open sward which enables the clover to thrive. The mixture also contains mid and late season perennials – including some very palatable Tetraploids.

Mixture 3 CUTTING MIXTURE

Intensive silage regimes tend to put high pressure on the longevity and performance of a mixture and thus the fertiliser requirement is particularly high. Our organic cutting mixture contains a high proportion of a clover blend to ensure optimum fixation of atmospheric nitrogen so the ley does not prematurely 'run out of steam'. The optimum blend of several mid and late season Perennials includes a number of high performance Tetraploids.

Mixture 4 DUAL PURPOSE MIXTURE

Similar to Progress® (see page 10), but with a higher content of White Clover. Very good early bite and the ability to adapt to different management conditions and diverse livestock enterprises.



Mixture 5 LONG TERM, LOW INPUT MIXTURE

A traditional mixture that harks back to the days when all livestock farms were organic. It includes Meadow Fescue and Timothy, both of which have the potential to outyield Perennial Ryegrass in lower fertility conditions. The inclusion of a high proportion of White Clover seed enables the ley to rapidly achieve maximum clover levels for optimum fixation of atmospheric nitrogen.

CASTLEHILL® ORGANIC MIXTURE

This is the organic version of our best selling long term mixture. It differs from the conventional version by having a higher White Clover content and containing the requisite organic seed content to conform to the current regulations.

ORGANIC FORAGE CROPS

We can offer the following range of crops to produce high quality feed for a range of animals and systems.

Stubble Turnip *Dynamo*

An excellent variety for finishing lambs from November to January. *Dynamo* is very leafy (good protein content) and also has good root anchorage that helps reduce grazing wastage. To add extra winter hardiness and to extend the period of use, *Dynamo* can be mixed with forage rape.

Forage Pea *Magnus*

Forage peas deliver a high crude protein feed which is ready for harvest 12-14 weeks from sowing. *Magnus* is a semi-leafless type which prevents the crop lodging and reduces soil contamination. *Magnus* is an excellent break

crop between grass leys and will also fix an amount of 'free' nitrogen.

Lucerne

This underrated crop is extremely productive, rich in protein and exhibits good resistance to drought. It begs the question why is it not more widely grown? Lucerne fits well into organic farming systems and our variety is of organic provenance.

Swede *Lomond*

Ideal for finishing lambs post Christmas period. *Lomond* has top rated yields and a disease package ideally suited for growing organically.



KEY VARIETIES IN SINCLAIR MCGILL MIXTURES

	RL England & Wales	SRUC Scotland	DAFM Ireland (Republic)
Early Perennial Ryegrass (Diploid)			
Kimber High yields with good seasonal distribution. Good mildew resistance.	G	1	N/A
Moyola High yields for cutting and grazing with good spring and autumn growth.	G	1	Rec
Early Perennial Ryegrass (Tetraploid)			
Carraig High yields under both managements but relatively poor resistance to crown rust. Classified as intermediate in The Republic of Ireland.	PG	1(P)	Rec
Mid Season Perennial Ryegrass (Diploid)			
Solomon Good yields under both managements with exceptionally good forage quality.	G	1	Rec
Elyria High yields of good digestibility especially under grazing.	PG	1(P)	N/A
Copeland Very good yields for both grazing and cutting. Good spring growth for a later heading variety in the group.	2015	1	N/A
Contrast Good yields under both managements with good spring growth.	2015	1	N/A
Mid Season Perennial Ryegrass (Tetraploid)			
Eurostar Good yields under cutting and grazing, with good disease resistance. Very good forage quality.	G	1(*)	N/A
Pensel NEW Best variety in the group, with outstanding forage quality and top disease resistance.	PS	1(P)	N/A
Trintella Excellent forage quality and very good package of disease resistance. Good yields especially for conservation	S	2	N/A
Montova Excellent yields under both managements, with good digestibility and good disease resistance.	G	1(*)	N/A
Dunluce Good yields under both managements, with good forage quality. Rather open habit.	G	1	Rec

	RL England & Wales	SRUC Scotland	DAFM Ireland (Republic)
Late Heading Perennial Ryegrass (Diploid)			
Drumbo Good yields for both grazing and silage, with good forage quality.	G	1	Rec
Denver Good yields under both managements combined with good seasonal distribution.	N/A	1	N/A
Cancan Good yields, especially for grazing with high sugars.	G	2	N/A
Timing NEW A new variety, with high yields under both managements and good winter-hardiness.	PG	2	In Trial
Matiz High yields of good forage quality. Good ground cover and good disease resistance.	S	3	N/A
Romark High grazing yields, with very good forage quality.	G	2	N/A
Pastour Good yields under both managements and a dense sward. Good winter-hardiness.	G	1	N/A
Late Heading Perennial Ryegrass (Tetraploid)			
Aspect High yields for silage and grazing of excellent forage quality. Good disease resistance package.	G	1	Rec
Drift Good silage yields of high quality, with very good grazing yields and early spring growth from a late heading variety.	PG	1	N/A
Novello Good yields combined with excellent disease resistance.	G	2	N/A
Xenon The best grazing Tetraploid, with dense swards of high forage quality. Good winter hardiness and above average disease resistance.	S	2	Rec
Solas High yields under both managements with good D values. Poor resistance to crown rust makes it less useful in the south of England and Wales, hence why it is not used in mixtures for these countries.	PG	2	Rec

KEY

RL England & Wales

G = Fully Recommended for general use
S = Recommended for specific use
P = Provisionally Recommended

SRUC Scotland

1 = 1st Choice
2 = 2nd Choice
***** = Downgrading

DAFM Ireland (Republic)

Rec = Fully Recommended
In Trial = In Trial
N/A = Not on Recommended List

	RL England & Wales	SRUC Scotland	DAFM Ireland (Republic)
Late Heading Perennial Ryegrass (Tetraploid)			
Meiduno A new variety with high yields under both managements. Erect habit makes it look open but the forage yields are excellent and forage quality is very good too. Excellent resistance to all the major grass diseases.	PG	1 (P)	In trial
Twymax Very good yields, especially under grazing and conservation. High sugars and good all round forage quality.	G	1	Rec
Enhanced[®] Ryegrass (Grazing Festulolium)			
Matrix A unique New Zealand bred Festulolium with the potential to extend the grazing season by up to 3 weeks each in spring and autumn.	N/A	N/A	N/A
Hybrid Ryegrass (Tetraploid)			
Enduro High yielding hybrid that leans towards its perennial parentage. Excellent resistance to all the major grass diseases.	G	2	N/A
Amalgam Very good yields under both managements with an excellent disease resistance package.	G	3	N/A
Hymer A very high yielding but less persistent variety that inherits its high yields from its Italian parents.	N/A	1	N/A
Scapino Very persistent perennial type with leafy growth and good yields. Very good forage quality with acceptable resistance to most disease, except Ryegrass Mosaic Virus (RMV).	PS	2	N/A

	RL England & Wales	SRUC Scotland	DAFM Ireland (Republic)
Italian Ryegrass (Diploid)			
Davinci Very high ME yields combined with good disease resistance.	G	1	Rec
Belluna High annual yields and good winter hardiness	G	1	N/A
Meribel High yields and good ground cover. Poor resistance to RMV and crown rust.	S	1	N/A
Italian Ryegrass (Tetraploid)			
Udine Exceptionally high yields in the year of sowing. Good resistance to diseases.	G	3	N/A
Gemini Very high yields with good D values. Good resistance to mildew and brown rust. Poor resistance to crown rust.	S	1	N/A
Timothy			
Comer Very high yields for cutting and grazing. Good seasonal yield distribution.	G	1	N/A
Comtal High grazing yields of good digestibility. Has very good conservation yields.	G	1	N/A
Moverdi Late heading variety with high yields under both managements.	S	2	N/A
Motim Latest heading variety with very dense sward. Good yields and excellent persistency.	S	2	N/A

KEY VARIETIES IN SINCLAIR MCGILL MIXTURES

	RL England & Wales	SRUC Scotland	DAFM Ireland (Republic)
White Clover			
Violin High yields with medium to large leaves. Very high yields and good persistency even under hard grazing.	G	1	N/A
Grasslands Demand Small leaved variety with high yields and good persistency.	G	1	N/A
Crusader Medium leaved variety with high yields especially under lighter defoliation.	G	1	Rec
Barblanca Large leaf with good cutting yields.	G	1	Rec
Alice Large leaf (similar to Barblanca).	G	1	Rec
Grasslands Bounty High yields for grazing by all classes of livestock.	G	2	N/A
Aberystwyth S184 Very small leaf and good persistency. Especially useful for sheep grazing.	G	1	N/A

	DL England & Wales	SRUC Scotland	DAFM Ireland (Republic)
Red Clover			
Maro A tetraploid variety with very high yields and good persistency.	✓	N/A	N/A
Merviot Benchmark Diploid variety yields.	✓	1	N/A
Avisto Good yields especially in 2nd harvest year.	✓	DL	N/A
SW Ares Good yields and persistency in our own trials.	N/A	N/A	N/A

KEY

RL England & Wales
G = Fully Recommended for general use
S = Recommended for specific use
P = Provisionally Recommended

SRUC Scotland
1 = 1st Choice
2 = 2nd Choice
DL = Descriptive List

DAFM Ireland (Republic)
Rec = Fully Recommended



Wherever possible, varieties used in mixtures for the different countries are those listed in the respective columns on these three pages. Please consult a SMG distributor in your area if you require full mixture details (see pages 43 - 45)

SPECIALIST CROPS & MIXTURES & FORAGE HERB MIXTURES

Lucerne

The realisation that lucerne offers such a high protein content – good drought tolerance and is relatively long lived – has prompted a revival of interest in this very underrated crop. Lucerne can be baled for hay or made into big bale silage and its potential yield will be in the order of 14-15 tonnes of DM/ha/year. The crop can provide excellent yields for three full years (following a summer sowing).

Contact your Authorised Distributor if you would like more information on lucerne and the range of varieties we have available. You will also find more information about lucerne on our comprehensive website www.sinclairmcgill.co.uk

Agricultural Mustard

Depending on soil fertility and soil moisture a good crop of mustard for ploughing in can be obtained from applying 30-40 units of N. You can expect around 15 tonnes of green manure/acre which can be achieved from 80 units of N.

Santa Fe

This variety offers fast growth potential, excellent leaf production and good tolerance to drought. The rapid establishment of this variety means that it can compete successfully against weeds in late autumn.

Salvo

This is a variety which develops considerable bulk with a good dry matter yield – an important requirement for successful green manuring. A key feature with Salvo is that the variety can help to reduce free living nematodes – particularly sugar beet nematodes (*Heterodera schachtii*). Secretions from the roots of Salvo encourage the nematodes eggs to hatch. However, Salvo is not actually a host plant and so the nematodes die – consequently the nematode population on that particular field can be greatly reduced.



GAMECOVER MIXTURES

If you want to encourage game birds onto your farm, then you need to have access to a range of sensibly priced and commercially proven mixtures and individual crops. Fortunately, our technical staff have spent many years working with the acknowledged experts in this field and, as a result, we have been able to bring together all the information you need to make the right cropping decisions based on your individual needs.

This vital information can be found in our **HiBird Gamecover catalogue** which features crops like millets, giant sorghum, maize and quinoa. In addition, the HiBird catalogue also provides helpful hints on how to establish and manage the mixtures and individual crops which are featured.

Ask for
a copy
today!



FORAGE HERB MIXTURES & CHICORY

Forage Herb Mixtures

These mixtures offer an improved variation in diet for your stock as well as significant agronomic and nutritional properties.

Agronomic benefits include improvements in drought tolerance and soil structure.

Nutritional benefits derive from the mixtures high mineral content and palatability. Chicory has been shown to increase live-weight gain in lambs even faster than White Clover.

Health benefits aids the natural expulsion process and creates a hostile gut environment.

The following mixtures are best sown in distinct strips or small open paddock blocks freely accessible to stock. Allow sufficient time for the herbs to fully establish before allowing access to stock. Once fully established, the mixtures should be grazed hard to prevent the herbs running to seed or becoming "woody".

Lamb Tonic is a new concept which was developed in New Zealand. The use of plantain provides additional mineral content and faster finishing. The crop has the ability to regrow after initial grazing.

Cheviot Chicory Mixture

35% Forage Chicory (**Choice or Chico**)

20% Comer Timothy

20% Trintella Intermediate Perennial Ryegrass (tetraploid)

10% Elgon Late Perennial Ryegrass (tetraploid)

15% Cheviot White Clover Blend

100% Sow at 14 kilos per hectare (5.7 kilos per acre)

White Clover, Timothy and Tetraploid Ryegrasses make excellent companions for Chicory and this mixture provides a complete summer diet for finishing lambs.

Forage Herb Mixture

30% Forage Plantain (**Tonic**)

20% Forage Chicory (**Chico or Choice**)

20% Trintella Intermediate Perennial Ryegrass (tetraploid)

15% Comer Timothy

15% Cheviot White Clover Blend

100% Sow at 14 kilos per hectare (5.7 kilos per acre)

Similar attributes to Cheviot Chicory mixture but the inclusion of Tonic Forage Plantain elevates the mineral content.

Lamb Tonic

25% White Clover

12.5% Plantain Tonic

62.5% Chicory

100% Sow at 10 kilos per hectare (4 kilos per acre)

Stock Finisher

30% Forage Chicory (**Choice or Chico**)

40% Red Admiral Red Clover Blend

15% Cheviot White Clover Blend

15% Trintella Intermediate Perennial Ryegrass (tetraploid)

100% Sow at 14 kilos per hectare (5.7 kilos per acre)

Up to three year mixture for intensive finishing of livestock.

A very high source of protein which is ideal for finishing early lambs. Full season production.

FORAGE CHICORY

Advantages:

- Increased milk production
- Higher live-weight gain in lambs and beef animals
- Good drought tolerance and mid-summer growth
- Elevated mineral and trace elements
- Contributes to the creation of a hostile gut environment for healthy livestock
- Persists for two to four years

Management:

Drill in to warm (10°+) well drained soils at a depth of about 10mm.

Sow at 3 to 6 kilos per hectare straight or 1 to 4 kilos in a mixture with grasses and clovers.

Best sown in herbal strips or blocks rather than through an entire ley, as if it bolts (flowers) the ley might need to be taken out of production.

Best rotationally grazed. Re-grazing should only be undertaken when 2 to 4 leaves per plant have fully regrown.

Preferred Varieties:

Grasslands Choice

- Very high yields in temperate climates
- Extremely tolerant of drought
- The best variety for dairy units as Grasslands Choice was especially bred to reduce the concentrations of lactones that cause bitterness and can lead to milk taint

Chico

- Very high yields from an upright and leafy variety of good ME and digestibility
- Good drought tolerance. The tap root can exceed one metre in length!



Lambs finish faster on Chico Chicory.

Forage
Chicory
Growers Guide
Available

WILDLIFE CONSERVATION MIXTURES

Our FWAG co-designed "BASIC HABITAT" mixture was the first affordable conservation mixture to be introduced to encourage farmers to make their set aside more attractive to wildlife. It still provides you with the most value to wildlife for your money.

Why not consider enhancing the value of Basic Habitat further with the addition of native wild grasses or "islands" of wildflowers from one of our wildflower supplementary mixtures?

Alternatively we also offer a range of ready mixed grass and wildflower mixtures specifically designed for a variety of soil types and habitats. For those of you who miss the poppies and corn marigolds we even offer a Cornfield Annuals mixture!

Basic Habitat Co-designed by FWAG. This mixture contains low maintenance grass combined with clump-forming species to provide maximum benefit to wildlife. Red Fescue (Chewings), Sheeps Fescue, Common Bent, Rough-stalked Meadowgrass, Smooth Stalked Meadow Grass, Meadow Fescue, Tall Fescue, Timothy, Cocksfoot, Crested Dog's Tail. Updated to include Red Clover as a nectar source.

Grass/Wildflower Mixtures

AWF No. 1 Shaded Areas

AWF No. 2 Wetland Soils

AWF No. 3 Lime/Chalk Soils

AWF No. 4 Clay Soils

AWF No. 5 Acid Soils

AWF No. 6 Loam / Alluvial Soils

AWF No. 9 Flowering Lawn

AWF No. 10 Pollinators Mix

Cornfield Annuals 100% Traditional cornfield annual wildflowers.

Nesting Cover A mixture of tufted grasses for nesting game birds, skylarks etc. Also makes a useful beetle bank.

WM1 Wildbirds Seed Mixture - Annual mixture of Kale, Triticale and Sandoval Quinoa best sown in minimum 6 metre margins for a succession of food for wild and game birds.

EF4 Pollen and Nectar Mixture - A mixture of nectar and pollen rich plants for foraging insects and wild birds.

GRASS MARGINS

Farmers are being urged to sow 6 metre grass margins adjacent to crops of Oilseed Rape and Winter Beans and along water courses. This has been shown to reduce herbicide leaching by as much as 50%. It also affords the opportunity to enhance the wildlife and game value of your farm.



BIRD FEEDING MIXTURES

Linnet

- Will produce an abundance of small seeds
- Also suitable for tree sparrow and grey partridges

Contains: Kale, Oilseed Rape, Red Millet, White Millet, Linseed, Mustard, Oilseed Radish

Supplied in 20kg one hectare units

Finch

- Fantastic source of seeds favoured by finches
- Seed use from September to February
- Suitable for greenfinches, chaffinch and goldfinch

Contains: Sunflower, Kale, Oilseed Rape, Teasel and Oilseed Radish

Supplied in 15kg one hectare units

Bunting

- Cereal based mixture
- Seed use from September to February
- Also suitable for house sparrow, yellow hammer and skylarks

Contains: Triticale, Spring Wheat, Spring Barley, Quinoa, Red and White Millet

Supplied in 20kg half hectare units

Turtle Dove

- Formulated to support 'Operation Turtle Dove'
- Fantastic feed source

Contains: Vetch, Birdsfoot Trefoil, White Clover, Black Medic, Red Clover and Fumitory

Supplied in 10kg one hectare units

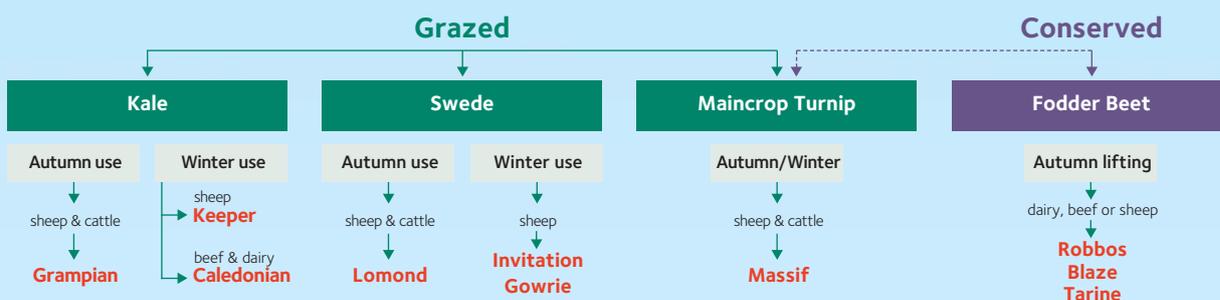
FULL SEASON CROPS

These crops require a full season production cycle but can offer the highest yield potential



Crop Data	Kale	Turnips	Swede	Fodder Beet
Sowing Date	April-July	Late May-early June	Early May-mid June	Early March-April
Sowing Rate (kg/ha)	Nat. 4-5 Gr. 1-2	Nat. 2.5-5 Gr. 0.6-0.85	Nat. 3-5 Gr.0.6-0.85	100,000 seeds
Utilisation Period	Sept-March	Oct-Feb	Oct-March	Nov-April
Fresh Yield (tonnes/ha)	60-65	59-69	70-90	80-90
% DM	14-16	8-10	10-13	15-22
Total DM (tonnes/ha)	8-10	5.50-6	7-10	13-15
Crude Protein % of the DM	16-17	15-17	10-11	12-13
D Value	68%	80%	82%	78-80%
Metabolisable Energy MJ/kg D	10-11	11	12.8-13.1	12.5-13.0

Nat. = Natural Gr. = Graded



Caledonian FBT

The first Kale bred for club root resistance. Caledonian's 'huge' yields make it ideal for utilisation by dairy and beef cattle.

Bred by The James Hutton Institute

Keeper FBT

A medium/shorter type ideal for fattening store lambs and providing high quality winter keep.

Grampian FBT

An improved marrow stem type with huge yields, good standing ability and is well suited for strip or zero grazing.

Bred by The James Hutton Institute

Lomond FBT

A high yielding variety with both powdery mildew and club root resistance.

Invitation FBT

A very uniform variety which is resistant to most races of club root. Ideal for utilisation after Christmas. Invitation also has excellent resistance to powdery mildew.

Bred by The James Hutton Institute

Gowrie FBT

A very high yielding variety ideal for post Christmas grazing.

Bred by The James Hutton Institute

Massif

A new yellow fleshed variety with a very high yield, and is ideal for pre and post Christmas utilisation. Massif is a first class replacement for Aberdeen Green Top Scotch.

Bred by The James Hutton Institute

Many of our varieties are offered with a flea beetle seed treatment. These are marked: **FBT**

Blaze

Blaze combines very high dry matter yields with an excellent clean root. Its bright red roots are ideally lifted with leaf lifting equipment and can be fed whole due to their medium dry matter content.

Robbos

Very high DM yields. It has a clean, yellow root and medium DM content - an ideal variety for feeding cattle.

Tarine

This is a new pink skinned variety with the potential to produce high dry matter yields. Tarine is Rhizomania tolerant.

Benefits of Forage Crops

- Improved profitability
- Reduced reliance on purchased feed
- Full traceability
- Flexible cropping options
- An excellent break crop

The Importance of Mixed Forage Crops

Mixed forage diets will help increase intakes and ensure optimum rumen stability, improved feed utilisation and animal performance.

Many forages are now better understood leading to improved intake predictions, and accurate assessments for both energy and protein requirements.

As milk yields have risen, so has the drive to increase the amount of food the cow will eat, allowing the opportunity for UK farmers to exploit the use of cheaper home grown forages.



FODDER MIXTURES

Autumn Keep Mixture

MIXTURE COMPOSITION

Hobson Forage Rape	1.00 kg
Samson Stubble Turnip	0.50 kg
Rondo Stubble Turnip	0.75 kg
Keeper Kale	0.25 kg
	2.50 kg

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

Sow at: 2.5 kg/acre

Sowing Time: Summer/early Autumn

Late Lamb

MIXTURE COMPOSITION

Rape/Kale Hybrid Interval	1.00 kg
Stubble Turnip Rondo	1.00 kg
Italian Ryegrass	5.00 kg
	7.00 kg

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

Sow at: 7 kg/acre

Sowing Time: Summer/Autumn

WHOLECROP PEAS

Wholecrop peas can be sown straight or mixed with cereals and are capable of producing a heavy yielding crop that is high in both protein and starch. It can be undersown with a Spring ley or will act as an excellent entry for an Autumn reseed. Sown in March or April the crop can be harvested in 16-20 weeks.

Magnus pea is recommended for its standing power and high yields.



ARABLE SILAGE MIXTURES

These mixtures contain different combinations of both cereals and peas that can provide a valuable source of protein and starch. The ensiled crop can produce excellent winter feed rations for dairy, beef or sheep.

- Excellent yields in 13-16 weeks
- Can be undersown with a new grass ley
- Ideally used as part of a mixed forage diet

Prostile

60%	Forage Pea
40%	Spring Barley
100%	

Protein Plus

40%	Spring Barley
35%	Spring Oats
25%	Forage Pea
100%	

Sow at 125-150 kilos/ha undersown with grass.

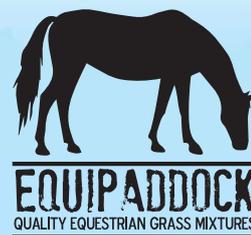
Sow at 175-200 kilos/ha for best results.

EQUIPADDOCK RANGE

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 (which are packed in 10 kilo bags) 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.

The requirement in a mixture can vary depending on the type of horse involved and these mixtures cover the range of requirements we have had over the years from racing gallops to pony paddocks.



Horse Paddock Mixture

7%	Smooth Stalked Meadowgrass
14%	Creeping Red Fescue
17%	Timothy
62%	Late Perennial Ryegrass

100%

- Mixture formulated to provide grazing for horses and ponies with intermittent rests from grazing to produce a hay crop.
- Depending on any herbs present we would recommend the addition of a minimum of 250 grams of mixed herbs per acre (either mixed with the grass or preferably sown in strips in the sward) to improve the nutritional aspects of the sward.
- The mixture is designed to perform well with moderate inputs of nitrogen, but a good application before closing off for hay will produce the best results.

All natural seed

Sow at 10-15 kg per acre

Equipaddock Original Mixture

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

100%

- Our Equipaddock Original Mixture is available in 1/2 acre plastic buckets containing 7kg of seed and also in 10kg bags.
- A slightly amended mixture to our standard Horse Paddock, this handy pack enables you to reseed areas and at the same time leaves you a plastic container that will be useful around your stables.

All natural seed

Available in 1/2 acre buckets

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

Gallops & Schooling Area Mixture

4%	Crested Dogstail
20%	Slender Creeping Red Fescue
10%	Smooth Stalked Meadowgrass
10%	Creeping Red Fescue
28%	Late Perennial Ryegrass
28%	Turf Type Perennial Ryegrass

100%

- This mixture is designed to produce a very dense, springy sward, capable of withstanding very heavy wear and is of course also perfectly suited to racecourses and polo pitches.
- Naturally the regular maintenance of this area will pay off by ensuring the turf maintains its springy nature.

All natural seed

Sow at 20-40kg per acre

Herb Mixture

35%	Chicory
25%	Burnet
10%	Ribgrass
30%	Sheep's Parsley

100%

- Our herb mixture has been 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.
- Our mixed herbs are included in selected grass seed mixtures, but are also available separately for sowing in strips or islands in the field which often gives better establishment.

Available in 1kg packs

Sow at 250-500g/acre

Haylage Mixture

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

100%

- A short term mixture for the production of quality haylage. High in fibre, but with a good "nose".

All natural seed

Sow at 12-15kg per acre

Horse Hay Mixture

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.
- It will also provide 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.

All natural seed

Sow at 12-15 kg per acre

Stud Paddock Mixture

6%	Crested Dogstail
6%	Smooth Stalked Meadowgrass
15%	Creeping Red Fescue
48%	Late Perennial Ryegrass
20%	Turf Type Perennial Ryegrass
5%	Herb Mixture

100%

- This mixture is designed to produce a good, well balanced sward especially suitable for mares and their foals.
- The deep rooted herbs will improve the calcium and phosphorus levels, being two of the more important trace elements so important for the growth and bone development in young horses.

All natural seed

Sow at 15-40kg per acre

Stallion Paddock Mixture

6%	Crested Dogstail
10%	Slender Creeping Red Fescue
12%	Smooth Stalked Meadowgrass
12%	Creeping Red Fescue
29%	Late Perennial Ryegrass
28%	Turf Type Perennial Ryegrass
3%	Herb Mixture

100%

- The Stallion Paddock mixture is formulated to withstand harder wear whilst still maintaining a dense, springy and nutritious sward.
- Contains MONDIAL turf type Perennial Ryegrass, which is rated very well indeed for its wear tolerance and early growth.

All natural seed

Sow at 15-40kg per acre

AMENITY

Olympic

40% **Melbourne** Perennial Ryegrass
 30% **Bellini 1** Perennial Ryegrass
 30% **Bocelli** Perennial Ryegrass

100%

Winter sports renovation (Football & Rugby) and any situation where good wear tolerance and rapid establishment are the main requirements.

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

Anfield

45% **Platinum** Perennial Ryegrass
 40% **Nagano** Perennial Ryegrass
 15% **Corail** Strong Creeping Red Fescue

100%

For winter sports renovation, playing fields and other areas requiring rapid establishment.

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

**Alderley**

30% **Melbourne** Perennial Ryegrass
 25% **Cleopatra** Perennial Ryegrass
 30% **Wagner 1** Chewings Fescue
 15% **Miracle** Smooth Stalked Meadow Grass

100%

For recreation grounds, good hardwearing lawns and landscaped areas.

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

Universal

25% **Ponderosa** Perennial Ryegrass
 30% **Lourega** Perennial Ryegrass
 10% **Corrida** Slender Creeping Red Fescue
 35% **Trophy** Chewings Fescue

100%

For recreation grounds, good quality hardwearing lawns and landscaped areas.

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

**Stately Home**

30% **Melbourne** Perennial Ryegrass
 20% **Bocelli** Perennial Ryegrass
 25% **Wagner 1** Chewings Fescue
 20% **Smirna** Slender Creeping Red Fescue
 5% **Highland** Browntop Bent

100%

For top quality lawns that will also take some wear and tear. The turf ryegrasses included produce a fine leaved lawn, which will give an excellent appearance.

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

Economy

35% **Melbourne** Perennial Ryegrass
 35% **Pontiac** Perennial Ryegrass
 15% **Calliope** Chewings Fescue
 15% **Corrida** Slender Creeping Red Fescue

100%

For high wear utility areas and winter sports at a competitive price.

Unlike some of our competitors products this mixture does not contain agricultural strains of ryegrass.

Sowing Rate **25-35/m²**
 Cutting Height **25mm**

Trophy

45% **Wagner 1** Chewings Fescue
 25% **Corrida** Slender Creeping Red Fescue
 25% **Corail** Strong Creeping Red Fescue
 5% **Highland** Browntop Bent

100%

For front lawns, landscaped areas, building surrounds and low maintenance areas.

Sowing Rate **35-50g/m²**
 Cutting Height **25mm**

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

**Trafford**

20% **Calliope** Chewings Fescue
 20% **Nikky** Chewings Fescue
 25% **Wagner 1** Chewings Fescue
 30% **Smirna** Slender Creeping Red Fescue
 5% **Highland** Browntop Bent

100%

For ornamental lawns and high quality landscaping.

Produces a dense, fine leaved sward that can be mown as low as 20mm.

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

Putting & Bowling

55% **Wagner 1** Chewings Fescue
 10% **Carousel** Slender Creeping Red Fescue
 15% **Smirna** Slender Creeping Red Fescue
 20% **Arletta** Browntop Bent

100%

For golf greens, putting greens and any other very close mown turf.

Produces a fast, true green.

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

**Shade**

20% **Wagner 1** Chewings Fescue
 10% **Smirna** Slender Creeping Red Fescue
 25% **Corrida** Slender Creeping Red Fescue
 10% **Cocktail** Smooth Stalked Meadow Grass
 10% **Crystal** Hard Fescue
 10% **Southlands** Crested Dogstail
 10% **Dasas** Rough Stalked Meadow Grass
 5% **Highland** Browntop Bent

100%

For partially shaded areas or dry conditions.

This is a very low maintenance mixture and it is also suitable for environmental headlands.

Sowing Rate **25-35/m²**
 Cutting Height **25mm**

GRASS BREAK CROPS

- Blackgrass has become one of the most serious problems on arable farms. Break the blackgrass cycle by drilling a short term grass ley.
- Grass can also be used as a break crop after potatoes.
- Sinclair McGill's **Catchcrop** is a Ryegrass blend and is particularly suited for drilling after maize to prevent nitrates leaching into the environment.
- **Catchcrop** is a short term ley with a productive life of 12 – 18 months.
- Other options are **Colossal® Silage** which is higher yielding and has a productive life of 18 months to 2 years. For a full 2 years production and a first cut in the 3rd year consider **Scimitar**.
- One of the most valuable break crops and one that will leave valuable residual nitrogen for the following crops is **Colossal® Red**. This mixture contains the highly acclaimed **Red Admiral** a blend of at least 3 varieties of Red Clover which give the perfect balance of high yields at every cut, combined with very good persistency.
- **Colossal® Red** will give high yields for up to 3 years. If a 3 – 4 year Red Clover ley is required **Admiral's Choice** has better persistency but is lower yielding.
- If you are an all arable unit with no neighbours with livestock, consider selling the silage from your break crop to an AD plant.
- Grass seed crops for seed merchants also make useful break crops on arable farms.



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. (See separate section on Integrated Pest Management (IPM)).
- 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.

MYCORRHIZAL FUNGI & SOIL BACTERIA

SR2 is a soil conditioning package of Mycorrhizal fungi and Rhizobacteria proven to give significant yield benefits in newly sown leys.

Arbuscular Mycorrhizal Fungi (AMF) grow into the establishing grass roots, increasing the uptake surface area by up to 700 times. This increases nutrient availability and uptake by the plant and improves drought tolerance. Plant defence mechanisms are also improved by the partnership.

Plant Growth Promoting Rhizobacteria (PGPR) are a group of bio fertilisers able to fix atmospheric nitrogen and unlock soil-borne phosphorous that can then be efficiently transported to the plant by the AMF. PGPR support a robust plant immune system and produce plant hormones aiding growth and development.

Application rate:

10kg/Ha

Application Method:

- Granules must be as close to the seed as possible

Apply by:

- Mixing with seed at drilling
- Using granular applicators
- Broadcasting and incorporating into seedbed

Mode of Action

The application of SR2 ensures that inoculated plants can benefit from the association with AMF throughout their lifetime, acting as a vast secondary root system, increasing the root capacity up to 700 times. The beneficial bacteria within SR2, through enzymatic reactions and the production of organic acids, help to break the chemical bonds of soil compounds to release nutrients, to fix nitrogen and to produce plant growth promoting hormones.

TREATED PLANTS	FOLLOW ON CROPS
Inoculation of cover, catch, forage crops and herbal leys at time of planting through direct drilling or broadcasting allows for early association of the germinating seeds with a high bio diversity of AMF and beneficial bacteria.	During the growing season the fungus will continue to develop hyphae (fungal roots) and sporulate throughout the soil, in effect seeding the soil for the next follow on crop.



Put simply, plants grown in SR2 treated soils are:

- Higher yielding
- Healthier
- More drought tolerant
- More efficient at collecting nutrients from the soil

	RELATIVE DM YIELD		
	UNTREATED	TREATED WITH SR2	% YIELD INCREASE
Tetraploid Ryegrass	100	139	39%
Diploid Ryegrass	100	134	35%



INTEGRATED PEST MANAGEMENT

The withdrawal of the pesticide Chlorpyrifos (trade names including Dursban™ and Lorsban™) means growers will need to take a more integrated approach to pest management, to ensure successful establishment of a new ley.

Pests such as Frit Fly and Leatherjackets that could previously be controlled by Chlorpyrifos can cause serious losses in established grassland, and can be devastating to new leys if control measures are not taken.

Damage and Importance

Leatherjackets (*Tipula paludosa*)

Leatherjackets are the larvae of Crane Flies, which feed on the roots and stems of grass plants at or below ground level. Severe infestations in established grassland can lead to yield losses of more than 5t/DM per hectare whilst attacks in newly established leys are more likely to lead to plant death and crop failure.

Frit Fly (*Oscinella frit*)

Frit Fly produce 3 generations of larvae a year and are prevalent in almost all grass swards. The small larvae feed on the central shoot of the plant causing tiller death. Loss of tillers reduces yield and persistency in established leys. Attacks in plants at the seedling stage or with low tiller numbers leads to plant death.



Risk Factors

Damage to newly sown grass leys by either Leatherjackets or Frit Fly are most likely in the following situations:

- Following established grass or grassy cereal stubbles
- In predominantly grassland or mixed arable/grass areas
- In Autumn sown leys – particularly mid to late August, and if conditions are warm and damp
- In leys sown with less than a week interval between cultivation and drilling
- In fields where there is a previous history of damage

Sampling a field to assess the number of Leatherjackets present can help determine the risk level. Indicators of large populations include; birds flocking to feed on the larvae and large numbers of adult Crane Flies (Daddy-long-legs) in July/August.



INTEGRATED PEST MANAGEMENT (IPM)

With no chemical pesticides available, damage by these pests can be reduced or avoided by carrying out some/all of the measures below:

- Ploughing in July before reseeding can reduce leatherjacket populations by 50%
- Establishing a brassica break crop, such as Interval Rape/Kale Hybrid or Delilah Stubble Turnips between grass crops, removes the pests food source
- If sowing grass after grass, leave at least 2 weeks between cultivation and sowing to allow birds to feed on the grubs
- Move to Spring reseeding
- Consider overseeding – sowing into an existing ley may allow seedlings to escape attack as the cover crop provides an alternative food source (Frame et al, 1992)
- Increase seed rate to 15–20kg/acre to neutralize any seedling losses
- Use **Headstart® GOLD** treated seed to ensure rapid establishment and vigorous early growth
- As with any reseed – soil sample prior to seeding, to ensure pH and nutrient status is correct.

See below for examples of rotations designed to reduce the threat from grassland pests and maximise forage production.

Example Crop Rotations

May	June	July	Aug	Sept	–	March	April
	2nd cut Silage	Cultivate - leave fallow for >2 weeks 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			

Wireworms

Grassland is the natural habitat for wireworms and very significant numbers of this pest will often be found in permanent pasture. Not surprisingly when old pastures are taken out the newly seeded grass will be especially vulnerable to attack by this pest (*Agriotes* spp.). The damage may become more severe in the second or third year of the new ley's life.

The wireworms will chew the base of the grass plants – typically just below ground level – and the plants will turn yellow and show signs of wilting. The symptoms can sometimes be confused with the damage seen in grass which has been attacked by frit fly. However, the very 'ragged' nature of the damage along with the presence of the wireworms themselves will confirm the initial diagnosis. Attacks by wireworm are often more serious when the grass crop is already under pressure from another problem – such as soil acidity or poor soil conditions and fluffy seedbeds.

Control measures:

A good seedbed will help your grass crop get off to a good start and will help the plants to withstand a minor attack. If the soil has been



Wireworm @ James Christian-Ilett

sampled and there is the risk of a serious attack then consider an appropriate insecticide which will need to be applied in a high volume spray before drilling. A risk assessment can also be made which is based on previous experience on the farm or local conditions in a specific year.

PEST ATTACKS IN WELL ESTABLISHED GRASS

Farmers may sometimes overlook the fact that a well established ley can still be subject to attack by pests. The damage they can cause can be significant – it may not just be the development of obvious patches in the field, but a decline in the actual population of the desirable grasses.

Grass Aphids

There are several species of aphid that may be found on established grass but only one species is usually responsible for any damage and this may be prevalent after a mild, open winter. If an established ley is invaded by a large number of aphids then the grass may turn brown and have a 'scorched' appearance. If you feel that there is a significant aphid population then it might be worth considering the use of an aphicide – if in any doubt consult one of the major chemical suppliers.

WEEDS

All weeds grow at the expense of your grass crop! The broad leaved weeds will make a serious attempt to smother out the narrow leaved grass plants in their search for light, nutrients and water. Serious weed infestation is bad at any time but is especially serious during the critical establishment phase when the young grass is vulnerable to competition. In particular the control of annual meadow grass and chickweed is vital in any intensive grassland system. The most beneficial time to control them is at establishment before they have a chance to compete for valuable nutrients and reduce both the yield and the quality of the grass.

Patches of weeds which remain uncontrolled in the early stages will, as often as not, remain in the sward for the whole life of the ley. What is more, the weeds will certainly spread over time and inhibit grass output still further.

It is probably safe to assume that a very high proportion of grass fields (perhaps 25% or more) have some level of infestation with broad leaved weeds. In long term leys this infestation probably means a ground cover figure in the 7 to 15% category. This means on a livestock farm with 100 acres of grass, around 15 acres could be made up of broad leaved weeds – which represents a staggering loss of potential yield (and herbage quality).

We must remember that all agricultural soils carry a weed seed burden and the levels involved can easily be as high as 100 million viable seeds a hectare! On this basis, we can't talk about getting more from grass without tackling this potential problem.

Weeds are, unfortunately, a visible sign of rather lax grassland management. Their presence is also indicative of many other problems. These include:

Soil pH

It is important to ensure that your soil has a pH of 6.5 – if it is well below this figure then you need to consider an application of lime. Certainly, if the pH is wrong, this will mean that you are not fully exploiting the value of your fertiliser or other expensive inputs. With the application of lime it is always better to work on a 'little and often' basis rather than making large applications several years apart.

Chafers

The grubs of several species of chafer beetle may cause damage to grass in various parts of the UK. The garden chafer (*Phyllopertha horticola*) is likely to be the most serious. The adult is around 8–9mm long with a metallic green head and thorax and reddish-brown wing cases. The grubs are white and measure about 18–20mm when fully grown. Due to the nature of the life cycle, affected fields tend to be re-infested each summer. The feeding action by the grubs (they sever the roots) will produce patches of poorly grown grass and these may turn very brown in dry weather. The damage is most likely to be seen in September and October. There may well be a lot of bird activity on the pasture – as they look for the grubs to eat. If you are concerned that you may have a very high population of chafers you would be advised to contact a suitable agrochemical company for further advice.

Drainage

Check the drainage in your grass fields because heavy infestations of weeds can be a symptom of poor drainage. Wet areas of ground will encourage weed growth and will lead to other difficulties such as poaching and shallow rooting in the grass.

Phosphate & Potash

We recommend that you have a soil analysis done to determine the P and K status of your fields. If a dressing is needed then work it into the seedbed prior to drilling.

Soil Compaction

As with most crops, grass does not like soil compaction. Soil pans mean that the grass roots cannot grow down to where the moisture is in the dry summer months. Regular subsoiling is an important part of good grassland management.

When embarking on a weed control programme it is vitally important to apply the spray when the plants are at their most vulnerable stage. The stage of grass growth is also important. You may well damage the ley if sprays are applied before the grass has tillered and avoid spraying in very dry conditions when the grass plants may be suffering from stress.

It is, of course, essential to follow the instructions supplied by the manufacturer whenever a herbicide is being used. Failure to do this may also lead to some very unwelcome health problems in your grass crop.

A sound back-up policy after spraying will help to ensure success. As part of this programme you need to maintain target stocking levels so that your animals keep on top of your grass growth. Neither under nor over grazing is conducive to good weed control. Top the fields regularly to get rid of unpalatable grass or other species that stock have left and apply fertiliser as appropriate. Alternating mowing with grazing will discourage the production of weeds which favour one or the other regime. If patches of weeds become a problem then use a knapsack sprayer to take them out at the earliest possible opportunity.



SEED & HERB MIXTURE SOWING RATES

Type of Seed		Quality (kilos/acre)	Sowing Date
Barley	(Spring)	65-75	February-March
	(Winter)	50-75	September-October
Wheat		75	September-November
		75	January-March
Oats	(Winter)	75	September-October
	(Spring)	75	September-October
Field Beans	(Winter)	75-100	October
	(Spring)	75-100	February-March
Combining Peas	(Marrowfat)	100-115	February-March
	(Small Blues)	110-125	
	(Large Blues)	100-120	
	(Whites)	90-110	
Linseed		25	Mid March-mid April
Ryegrass	(Hybrid)	14.75-16.25	March-September
	(Italian)	13-16	March-September
	(Perennial)	13-18	March-September
	(Westerwolds)	16	March-May
Clover, Red		3.5-5	March-August
Clover, Tetraploid Red		4.5-5.5	March-August
Lucerne		7.5	April-August
Forage Peas		75*	March-late July
*(Sowing rate is reduced in arable silage blends)			
Forage Rye		75	September-October
Forage Rye/Italian Ryegrass		50/7	September-October
Forage Maize		45,000 seeds	Mid April-mid May
Mustard		5-10	May-August
Fodder Rape		2-4	May-August
Tares (Vetches)		75	January-April or Sept
Stubble Turnips		2-3	April-August
Full Season Turnips	(Natural)	1-2	Late May-early June (N)
	(Graded)	0.25-0.35	June-early July (S)
Fodder Beet	(Monogerm)	50,000 seeds	April-early May
	(Pelleted)		
Kale	(Natural)	1-3	April-June
	(Graded)	0.5-0.75	
Swedes	(Natural)	1-2	Early May-mid June (N)
	(Graded)	0.25-0.35	Late May-mid June (S)



FORAGE MAIZE

This crop has a high energy content and its tremendous yield is achieved with a single harvest operation. With a high DM content and energy that is derived from starch, maize makes an ideal complement to grass silage in livestock rations. Contact your authorised distributor for details on our range of top quality varieties and to request a copy of our Growers Guide.



(N) North (S) South

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!



KEY SPECIES FOR PRODUCTIVE GRASSLAND

The grasses which are used most often when formulating mixtures for livestock farmers in the UK, are detailed below. In addition to the Ryegrasses we also provide information on other species including Timothy, Cocksfoot and the Fescues.

Perennial Ryegrasses (*Lolium perenne*)

This grass species is the most widely used here and is the cornerstone of the vast majority of the ley mixtures sown in the UK. This is not surprising when you consider that it is a persistent, adaptable, long-lived species and is capable of very high yields – especially in the first harvest year. Generally speaking, the Perennial Ryegrasses have good winter hardiness and they establish rapidly.

There are many varieties available and these are basically subdivided into three categories – Early, Mid-Season and Late Flowering. The early varieties will head in mid-May whereas the late varieties generally come into flower in mid-June.

Early Perennials

These early flowering varieties have an erect growth habit and the ability to bulk up rapidly in the spring for conservation cuts. The varieties also grow well in early spring which is a valuable attribute in most grazing mixtures. Early Perennials are more persistent than Italian Ryegrasses but tend to have a lower mid-season production potential.

Mid-season 'Intermediate' Perennials

These have a denser, more prostrate growth habit than the Early Perennials and boast a longer production season. Persistency is good and the yield potential under both grazing and conservation management is high. Mid-Season Perennials are sometimes used to help put some extra 'bottom' into short term mixtures as well as in the primary role of providing good yields in long term mixtures.

Late flowering 'pasture' perennials

Ryegrass varieties in this category should be extremely persistent and consequently provide the essential backbone of any long term ley designed for intensive grazing by cattle or sheep. The dense growth habit associated with Pasture Perennials will give a well designed ley extremely good tolerance to treading. The yield potential is very high and Pasture Perennials generally exhibit good mid-season and end of season growth.

Italian Ryegrasses (*Lolium multiflorum*)

As Italian Ryegrasses offer the highest yields of any Ryegrass species they are the mainstay of conservation mixtures. However, Italians do not have great persistency – they last between 18–30 months – so their use tends to be in short term leys for silage. Italian Ryegrasses have an erect growth habit and are 2–3 weeks earlier than the 'Early Perennials'. The vigorously growing Italians should respond well to nitrogenous fertiliser but as they produce relatively few tillers the sward can become rather open. Italian Ryegrasses are sometimes sown specifically to provide 'early bite' grazing in March or earlier – followed by a leafy silage cut. Note that the winter hardiness of Italian Ryegrasses will be enhanced when all the surplus growth which is present in the autumn is removed. To achieve the optimum level of spring growth with this species it is best to establish it in late summer or early autumn. Italian Ryegrasses really need frequent cutting and tight grazing to maintain quality.

Hybrid Ryegrasses

Carefully bred hybrids between Italian and Perennial Ryegrass parents can exhibit some very useful attributes indeed. They should be more persistent than the Italians and last between 24–48 months depending on the variety. They can be more productive than Perennials and offer quick recovery after cutting or grazing. Hybrids will respond well to applications of nitrogen and will help to improve the persistency of short term conservation mixtures. Hybrids normally exhibit better ground cover than Italian Ryegrass. Hybrid Ryegrass makes an excellent companion to Red Clover for high protein leys.

Tetraploid Ryegrasses

There are Tetraploid versions of both the Italian and Perennial Ryegrasses. The plant size is similar to the traditional Diploid types but the leaves of Tetraploids are normally much broader and the overall growth habit is more erect. Compared with Diploids, the Tetraploid varieties offer a number of plus points, including the following:

- **A higher palatability factor**
- **An increase in soluble carbohydrates (high sugar levels)**
- **Good winter hardiness**
- **More tolerance to drought conditions**

Traditionally, Tetraploids were less persistent but this trait has been largely eradicated by plant breeding. Tetraploids can be up to 2% higher in moisture than Diploids.

Timothy (*Phleum pratense*)

This is a very winter hardy species which will persist well in wet conditions. Timothy (sometimes called catstail) has the ability to maintain its production on poorer soils. In addition, this species provides good mid-summer growth and maintains its palatability when other grasses are losing theirs. With these features, Timothy is often included in both cutting and grazing mixtures which are being sown in the North and West of the country. In cooler and wetter conditions, the Timothy will enhance the palatability of the leys and boost that all-important mid-season production. It is very good for sheep grazing pastures. Timothy commences growth at a lower temperature than Ryegrass thus producing good early bite.

Cocksfoot (*Dactylis glomerata*)

In the past, Cocksfoot has traditionally been added to leys sown on lighter soils to help improve drought tolerance and provide autumn keep in November and December. A good variety of Cocksfoot will boost the mid-season production potential of ley mixtures and most varieties have good winter hardiness. Although Cocksfoot has some strong attributes it also has a major drawback – it very easily becomes 'tussocky' and unpalatable to stock. Cocksfoot has lower digestibility and soluble carbohydrate figures than Ryegrass. Its use tends to be limited to leys which have a very specific role to play on difficult soil types.

Westerwolds (*Lolium multiflorum westerwoldicum*)

These are annual grasses and when sown in the spring or summer will flower in the same year. This is a prolific species when it comes to heading so defoliation by cutting or grazing is essential to prevent a serious decline in digestibility. The key benefit with this species is the rapid production that can be achieved within 12–14 weeks of sowing. Westerwolds are rarely used in ley mixtures – their relatively short life but fast growth potential means they are invariably sown straight. From a spring sowing of Westerwolds, one would expect a typical silage yield of 13.5 tonnes of DM/ha.

Red Fescue (*Festuca rubra*)

This winter hardy early growing species is also used very sparingly in modern ley mixtures. Red Fescue will maintain production on poor soils with a low pH. It offers good mid-season growth and will invariably thrive when grown under cold, wet conditions. Like Cocksfoot, Red Fescue is used in mixtures which have been targeted at quite specific farming situations. It needs tight grazing to maintain leafiness and quality.

Meadow Fescue (*Festuca pratensis*)

A nutritious and leafy species which has traditionally been sown with Timothy in grass/clover leys. This species is less vigorous and has a lower yield potential than Perennial Ryegrass. It is sometimes used in mixtures which are designed for extensive rather than intensive situations.

COMMON ESTABLISHMENT DISEASES

Pre-Emergence Damping-Off

Pre-emergence damping-off can lead to quite a high number of seeds failing to produce a viable plant. The soil borne fungi (usually Pythium and Fusarium species) only have a relatively short time span in which to make an attack. Such attacks will be more successful if the soil conditions are 'suitable' i.e. cold and wet at or soon after the seed has been sown. However, there can still be attacks in warm weather when the soil conditions are very dry! Seeds which fail to produce a seedling will show distinct signs of rotting after the seed coat has been broken. To increase the proportion of seeds which produce a viable seedling, it is important to ensure that careful attention is paid to the preparation of the seedbed and sowing depth. In addition, proven seed treatments represent a major breakthrough – See page 42 for more information on our unique seed treatment HEADSTART® **GOLD**.

Post-Emergence Damping-Off

The two soil borne species mentioned previously (Pythium and Fusarium) along with several other species, notably Rhizoctonia solani, Cylindrocarpon radicola and the seed-borne Dreschlera, can cause this problem. The typical symptoms include the rotting of seedlings at their stem base and damage to their roots. This damage is normally seen after the emergence of the second or third leaf and it may be more prevalent when the soil is very dry and the weather warm. Paying careful attention to the quality of the seedbed and making sure that the grass is given a good start with adequate fertiliser will all help to reduce the risk of damage. Our seed treatment, HEADSTART® **GOLD** will prove very valuable.

DISEASE ATTACKS IN ESTABLISHED GRASS

Overwintering Diseases

Although winterkill is recognised as a key problem in northern areas of the UK it can lead to problems elsewhere in the UK. Several factors contribute to the disease but major pathological causes of death result from attack by Fusarium culmorum and Fusarium nivale (snow mould) and a number of other viruses. The damage is most severe when sudden cold spells follow periods of milder weather.

Grass that has been attacked by snow mould will exhibit patches of yellow which later turns a whitish-grey. This will be most noticeable in February and March. Pinkish white mycelium can often be seen within the matted turf, attacks by Fusarium nivale.

It is important to ensure that swards do not enter the winter in a long, rank state. In northern areas, avoid sowing mixtures which contain a large proportion of less winter hardy varieties.

Crown Rust

Crown Rust is now recognised as one of the most serious leaf diseases of grass, capable of devastating pastures. Once the disease takes a hold there can be a noticeable reduction in tillering and root growth and the foliage will turn yellow. Palatability can be badly affected with stock refusing to eat a heavily infected pasture. The re-growth and response to nitrogen can also be hit by crown rust. Once confined to the south and west, the disease seems to be steadily moving northwards; possibly as a result of global warming.

The disease is often seen in late summer and during the autumn and its spread is encouraged by warm, dry days and cool moist nights. Badly infected fields will take on a very yellow appearance. If you look carefully you should see the overwintering spores on the leaves – these are shiny and black and will appear on both sides of the leaves from mid-autumn onwards.

One of the best methods of control is frequent grazing. If a pasture has already been attacked and stock are rejecting the crop then the

best approach is to top the field and remove the infected herbage. Fertiliser should then be applied to encourage new growth – but ensure that the field is then grazed regularly (ideally at intervals not exceeding three weeks).

There is a degree of varietal resistance and this should be exploited in areas where the disease is known to be a regular problem.

Net Blotch

This is probably the most damaging fungal disease of ryegrasses in this country. It can be found throughout the year in a very large number of fields and can lead to some losses in digestibility. The symptoms of net blotch are sometimes confused with nitrogen deficiency because there is a superficial similarity.

The form of defence is to ensure that grass is grazed regularly so that it does not become long and rank.

Brown Blight

Not surprisingly, this disease may sometimes be confused with net blotch, although the former does not usually cause as much damage to the grass. If crops have been badly infected, it is worth cutting them to prevent further leaf damage.

Leaf Scald

Also called 'spring burn', this disease (caused by two main species of Rhynchosporium) can be especially prevalent in Italian Ryegrasses and it can lead to a loss of quality and yield. In addition, palatability may also be affected. The irregular 'scald-like' blotches are commonly found on the under surface of the leaves and these may also show signs of browning of the edges (which may be confused with windburn). The greatest damage may well have occurred before the ley has been given its first cut of the season. There is evidence of some varietal resistance.

Continued>

DISEASE ATTACKS IN ESTABLISHED GRASS

Drechslera (Leaf Spot)

Another serious disease of grass that is increasing rapidly is Drechslera. In the autumn of 2013 there were reports of this disease from as far south-west as Cornwall and as far north as Scotland. Recent NIAB TAG trials recorded more than 40% of the leaf area of some swards were affected by it.

The disease is encouraged by wet and cloudy weather and is most prevalent in the autumn but unlike many other diseases it can be active well into the winter months, resulting in a decrease in Spring silage yields of as much as 18%.

Drechslera attacks the leaves of the grass plant starting as small speckles which later develop in to brown/black lesions, often with a yellow halo. The leaf eventually dies, reducing grass yield and feed quality. Cattle and sheep will reject infected grass, which in the worst cases can devastate whole pastures, turning them black. Like Crown Rust, there is a degree of varietal resistance to Drechslera. The use of resistant varieties or complex multi-gene mixtures such as Castlehill® will stop, or at least slow down the progress of the disease. Diploid Ryegrasses are more prone to the disease than Tetraploids.

Where the disease has taken hold in established pastures, it is best to remove infected material by light grazing (if not rejected by stock) or failing that, topping, which will inhibit the spread of the disease and reduce the chances of survival into the winter.

In the worst cases, advice should be sought from your crop protection specialist and the grass should be sprayed with a fungicide.

Mildew

Mildew (*Erysiphe graminis*) may be seen in lush, dense crops of ryegrass in the Spring and early Summer. Incidence of the disease can certainly lead to a loss of both yield and quality in Italian and Perennial Ryegrasses. Excessive soil nitrogen, shade and high humidity will all favour the development and spread of mildew. Crops earmarked for conservation are especially at risk.

To check for mildew, look for oval fluffy pustules on the leaves – these will mainly be seen on the upper side. There will be whitish coloured mycelium in the pustules and over time the affected leaves will turn yellow and die.

If mildew has been a problem in the past, take a closer look at varietal resistance as a means of reducing the incidence of this disease.

Bacterial Wilt

This was first recognised as a disease of grasses back in the mid-1970s and has been closely linked to Italian Ryegrass varieties. The symptoms are most noticeable on the flowering tillers where a yellow/orange stripe may be observed on the flag leaf. The development of the disease may lead to leaves wilting and turning a light straw colour. Severe cases are fairly rare.

Ergot

This is caused by a fungus (*Claviceps purpurea*) and can be found throughout the UK but more especially in wetter areas. The main interest with this disease lies in the fungal structures which appear. These 'ergots' (which develop in the flowers of the grass) can cause poisoning in livestock. These ergots vary in length (from 0.25 - 2.00cm) and are hard with a white or purplish centre.

Grass crops which are grazed or cut before flowering should have no ergots present. If you are re-seeding fields which are known to carry infestations of ergot then ensure that they are ploughed well (so as to bury the ergots to a depth of at least 10cm and thereby prevent them from germinating).

Barley Yellow Dwarf Virus (BYDV)

BYDV is spread by aphids and individual fields can have a very high level of infection (up to 85% or more). It may lead to the dwarfing of individual plants and the grasses which are infected will invariably show some yellowing or reddening of the leaves. The best time to make a diagnosis is in May and June but the symptoms can be readily confused with the results of nutritional and environmental stress factors.

Ryegrass Mosaic Virus (RMV)

This is spread by mites and is most prevalent on the ryegrasses, particularly the Italians. The main symptoms are pale green streaks on the upper surfaces of leaves. As the plants get older these streaks may be yellow or brown. Both plant height and tillering may be reduced. RMV can spread very rapidly within a field and lead to losses of up to 30%. Digestibility may also be reduced. There is some tolerance to RMV in individual grass varieties.

SUMMARY

It is worth stressing that good grassland management is one of the major weapons that farmers have at their disposal when fighting diseases. By tight grazing, and where appropriate, regular sward topping you will promote conditions that are unsuited to the majority of grass diseases. In addition, and perhaps even more importantly, regular re-seeding with good quality mixtures will be a major benefit. This is because it introduces newer varieties (which will have better disease tolerance) and young, vigorous grass plants will be naturally more resistant to infection.



COULD YOU MAKE MORE FROM YOUR GRASSLAND?

Grass is the cheapest source of energy for livestock. No-one disputes that. Nor that grassland productivity directly affects the profitability of your livestock enterprise. A fact that is especially relevant given today's feed costs and market economics.

Getting the most from your grassland requires planning and attention to detail. Sward performance is affected by soil structure and condition, nutrient levels, re-seeding frequency and method, seed mixture choice, and the appropriate and timely application of fertilisers and herbicides.

But often time is against you. Every week there are more pressing issues: lame sheep, problem cows, vet visits to prepare for, and yet more paperwork. In busy times, it's easy to fall behind on grassland maintenance, and swards fall short of their potential. This is where the Grassright approach can help you.

Take the Grassright challenge!

The information in the Grassright booklet is designed to help you re-direct your time and efforts to the areas of grassland management which are most limiting to field productivity. After identifying which fields will most benefit from some extra attention, make it your priority this year to focus on improving them.

Follow the guidelines on why, how and when to take the necessary actions. **At the very least, just do one thing extra** to your grassland this year, in addition to your normal practices.

You may opt to rid all weeds from all your grassland. Or you may select key fields for a complete overhaul – plough them up, soil-test, correct P and K indices, destroy leatherjacket populations and reseed with a new ley mixture.

Just do what is manageable.

But do it this year.

And see how much you gain!

Visit www.grassright.co.uk



Grassright farmer Dave Richards (above)



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.

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.

CloverPlus® Pelleted White Clover Blend

- Ideal for introducing clover into existing grass swards.
- Pellet increases the size and weight of the seed enabling easier drill adjustment and more accurate distribution.
- Treated with HEADSTART® GOLD a biological treatment proven to speed up germination and improve establishment.
- Pellet improves seed flow for more even distribution when broadcast.
- Suitable for broadcasting, harrows with a seed box and slot seeding.

HEADSTART® GOLD



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 resumption 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 the 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.

Biostimulants

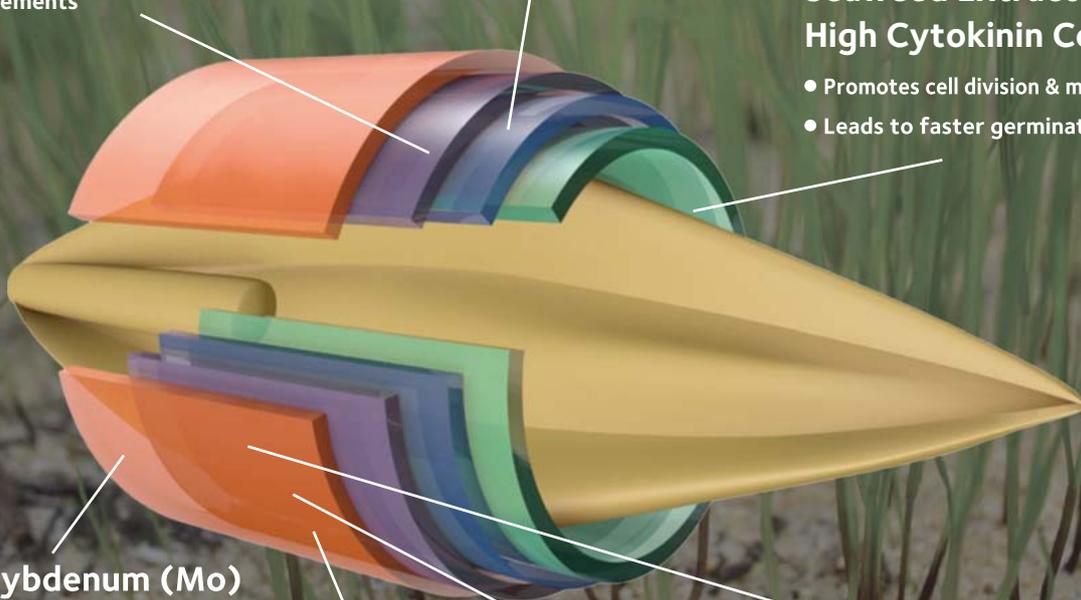
- Promotes the supply of nutrients
- Ensures efficient use of nutrients
- Prevents deficiency of trace elements

Enzyme Activity

- Stimulates growth of roots/shoots
- A catalyst for photosynthesis

Seaweed Extract with High Cytokinin Content

- Promotes cell division & metabolism
- Leads to faster germination



Molybdenum (Mo)

- Essential trace element for initial growth
- Required for enzymes that are involved with protein formation

Copper (Cu)

- Important trace element for re-growth
- Part of enzymes in photosynthesis/metabolism

Sulphur (S)

- Basic building block for production of proteins, hormones & vitamins

Phosphorus (P)

- Essential for photosynthesis and synthesis oils, sugars, starches and enzymes
- Ensures rapid rooting
- Enhances stress resistance