agrovista seeds

techni sward GRASS SEED

Grass and forage crops

2025 season

growing through ***innovation***

agrovista
seeds

The farming landscape is an ever changing one and 2024 has seen more changes than most.

The Sustainable Farming Incentive (SFI) has driven many decisions on cropping over the past year and the October budget has put even more pressure on farms struggling to make a profit.

More than ever the need to minimise costs and optimise performance is paramount. Home grown forage has and will always be the cheapest feed available to ruminant livestock business's and when coupled with the right SFI actions appropriate to the enterprise, can help to relieve some of the pressure on profitability.

As the person responsible for producing the TechniSward range of grass seed mixtures I am in the rare and very fortunate position of being able to source the very best varieties available from all the major seed breeders and put them into one bag. This means that every mixture we sell is as technically correct for its intended use as possible.

For the most part the TechniSward range of grass leys contain only the top varieties from the BSPB/AHDB recommended lists, the SRUC Scottish lists and the Teagasc PPI index. However, through working closely with the seed breeders we are sometimes able to identify varieties that have particular desirable traits but for one reason or another do not appear on the recommended list. Where we use non listed varieties in our mixtures it is always for their ability to bring desirable traits to the mixture, and never to reduce the price at the cost of performance as is the case with some of our competitors.

Quality and innovation are at the forefront of our mixtures, and we are proud to support the SRUC via the levy payment and the British Grassland society through corporate membership. TechniSward grass mixtures combine varieties with high fibre digestibility and high sugar to ensure maximum animal performance and make use of the latest grass breeding innovations to produce a sward that will stand up to the rigours of an increasingly unpredictable climate.

At Agrovista we believe that growing quality forage crops starts with the soil and no other company is better placed to be able to advise on all aspects of soil health, mixture selection, crop nutrition and agronomy. In addition, our highly experienced rural consultants can help you tailor your farming operations around other land use considerations including Countryside Stewardship and the Sustainable Farming Incentive, ensuring the right actions are coupled with the right seed requirements for your business.

Please contact your local Agrovista agronomist or contact enquiries@agrovista.co.uk for further details.

NIGEL STORER

Forage and Environmental Seeds Technical Manager

Contents

The technology behind TechniSward

TechniSward grass seed mixtures combine the top varieties from the UK's recommended grass and clover lists to produce swards with outstanding production and quality traits. The ability to pick the best varieties from all the leading seed breeders means that quality is never compromised.

Balance is the key to producing seed mixtures that work well in the field and the rumen. Using varieties that contain higher levels of water-soluble carbohydrates (sugars), allows the rumen bacteria to convert more of the plant protein into meat and milk, meaning less protein is wasted, resulting in improved performance and lower ammonia and methane emissions.

Cell wall components contain up to 60% of the energy found in a grass plant, and it is for this reason that Ruminants developed their multi chambered digestive tract, enabling them to make use of cell wall carbohydrates, something no other mammal can do. Using grass varieties that exhibit greater cell wall digestibility means that much more of the plants energy is available for rumen fermentation.

The combination of high sugar and available cell wall carbohydrates make TechniSward grass leys some of the most productive, cost effective and environmentally friendly options available.

In an age when environmental responsibility is as important as food security, being able to produce sustainable, energy and protein rich food for a growing population from grasses and legumes that we ourselves cannot eat, and often from ground, upon which we cannot grow food crops for human consumption makes perfect sense.

Added to this grasses and forage legumes are also very good at recycling and storing carbon, removing greenhouse gasses from the environment, and helping to combat climate change.

Festuloliums

A festulolium is a type of intergeneric hybrid that possesses a wider range of agronomic traits than traditional interspecific hybrids.

The word festulolium comes from the Latin names for fescue; *Festuca* and ryegrass; *Lolium*. The parent plants of a festulolium can be any ryegrass crossed with any type of fescue. The most common crosses are between Italian or perennial ryegrass and meadow fescue or tall fescue.

The resulting hybrids demonstrate:

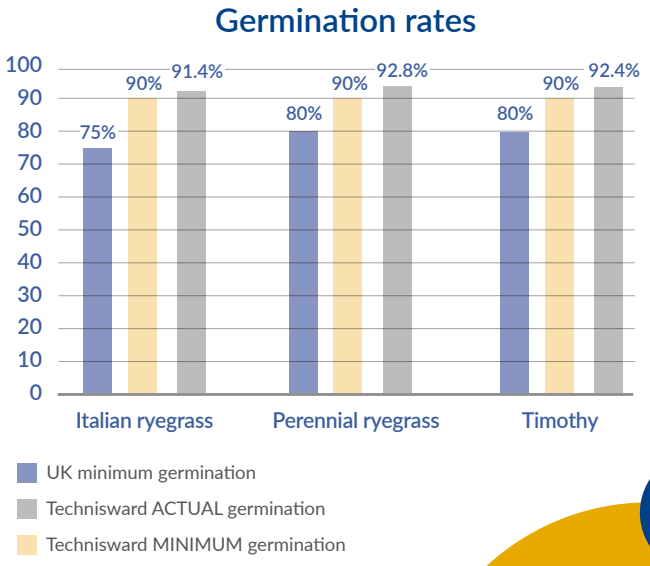
- Greater stress tolerance
- Deeper roots
- Improved disease resistance
- Higher yields (up to 3 tonnes more DM per year compared to the parent ryegrass)
- Higher levels of hybrid vigour

The combination of high sugar and available cell wall carbohydrates make TechniSward grass leys some of the most productive, cost effective and environmentally friendly options available.

Seed quality

All seed varieties used in TechniSward grass mixtures are produced to the very highest standards, far exceeding the HVS minimum standards for germination and weed seed contamination.

Each variety and mixture has been submitted to extensive trial work before being chosen, and almost all varieties in TechniSward mixtures are listed on the BSPB recommended list and SRUC list for Scotland.



TechniSward mixtures could contain up to 1 million more viable seeds per acre compared to the government minimum standard

Reseeding pays

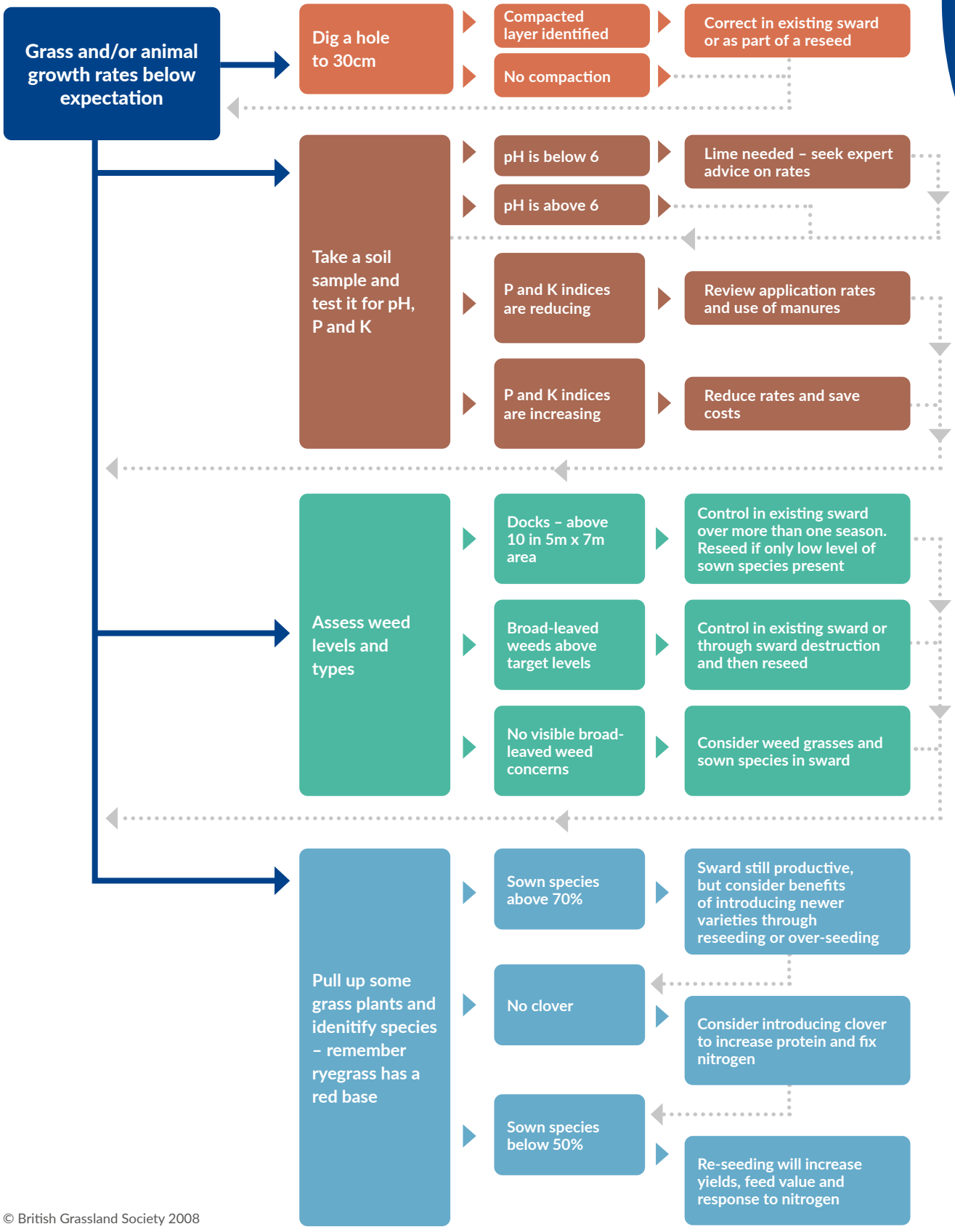
Research has shown that increasing the proportion of the farm reseeded each year increases the annual grass yield across the total forage area with farm profitability running in line.

In addition to the yield enhancements associated with a reseed, new leys perform better. Utilisation is greater and nitrogen use efficiency is also improved.

Each year new grass varieties find their way onto the recommended grass and clover lists. These new varieties have, on average, taken 18-20 years to come through the breeding and trials process and represent significant genetic improvements compared to the varieties that they replace. Using genetics to increase production rather than throwing more fertiliser at tired and unresponsive swards can represent significant cost savings.

Deciding if a reseed is needed

Pasture improvement flow chart



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Understanding Ryegrasses

Maturity grouping	Heading date range	General characteristics	Uses; Diploid	Uses; Tetraploid
Early	8th to 19th May	Good yields of early spring growth. Stemmy re-growth in early summer can be a problem. In recent years, use of this group has declined.	Early grazing for sheep or cattle on extended grazing systems possibly followed by one or two cuts.	Multi cut silage systems where early growth is followed by regular cuts with short intervals.
Intermediate	20th to 31st May	Varieties from this group are suited to a broad range of management systems. Generally, their spring growth is not as good as for early perennials, but total dry matter yield is similar, and ground cover is better.	Dual purpose mixtures where grazing and therefore ground cover is the major consideration.	Cutting mixtures and dual-purpose mixtures where silage quality is the main consideration and ground cover is not as important.
Late	1st June onwards	Characterised by a prostrate growth habit, high tiller densities, and good ground cover late perennials are well suited to long term mixtures.	Long term grazing mixtures. The later the heading date the less likely they are to need continuous topping to control seed head production.	Long-term cutting and grazing mixtures. Often included in traditional type dual-purpose mixtures for their grazing quality.
Italian ryegrass	19th to 25th May	Biennial species providing up to 2 years full production. Produces an upright stem with few tillers and an open sward. High dry matter yield potential.	Generally found in cutting mixtures but the slightly more prostrate habit suits aftermath grazing.	Cutting mixtures. The very open base to the sward makes them ideal companions for fast growing legumes and forage brassicas in catch crops.
Westerwolds ryegrass	12th to 25th May	Annual species capable of producing large yields of good quality forage.	Diploid varieties are not common but can be found in catch crop mixtures that are mainly used for cutting or early grazing.	Mainly cutting. Similar characteristics to tetraploid Italians but with a shorter lifespan.
Hybrid ryegrass	16th to 28th May	An interspecific hybrid of perennial and Italian ryegrasses. Possessing the best of both parents they are capable of high yields of good quality forage. Better suited to aftermath grazing than Italian ryegrass.	Diploid varieties are a useful addition to cutting mixtures, improving sward density and aftermath grazing potential.	Often found in short to medium term cutting mixtures to provide early bulk or to extend the lifespan of Italian dominated mixtures.

Overseeding

Key benefits

- Cost effective solution where a short-term boost to production is needed
- Enables rejuvenation of worn-out pastures where ploughing is not an option
- Effective means of establishing clover into a sward after weed control has been carried out
- Overseeding clover into an existing sward could be eligible for the SFI NUM2 and CNUM2 actions

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Overseeding, or “stitching in” of a new ley into an old sward can bring multiple benefits.

Over time swards naturally lose their vigour and become open in the bottom. This space is quickly taken up with weed grasses and broad-leaved weeds reducing the productivity of the sward.

Overseeding offers a cost-effective solution without the short term loss of production or cost associated with a complete reseed.

Key benefits

- Cost effective solution where a short-term boost to production is needed
- Enables rejuvenation of worn-out pastures where ploughing is not an option
- Effective means of establishing clover into a sward after weed control has been carried out

Introducing clover

Clover safe sprays are now virtually non-existent meaning that reseeding with a mixture containing clover can be problematic. Introducing clover into a new ley by overseeding after weed control has been carried out is a cost effective and practical solution to this problem and could make the ley eligible for the SFI NUM2 and CNUM2 actions worth £102/ha.

Typically, overseeding white clover at 1.5kg/acre will provide sufficient clover in the established sward to boost protein yield, increase dry matter intakes and provide up to 180kg/ha of nitrogen.

Red clover seeds are almost twice the size of white clover and so a more robust seed rate of around 3kg/acre is needed to produce a suitable plant population.

Establishment

The key to success with overseeding is achieving a good seed to soil contact and reducing competition from existing grasses. Therefore, the optimum time for overseeding is in mid-summer when grass growth slows, as long as moisture is present. Overseeding earlier than this will mean that existing grasses will be growing more vigorously and will compete with the emerging seedlings for light, space, and nutrients.

As with a complete reseed, pH and P & K requirements should be met. pH should be a minimum of 6 and ideally 6 to 6.5. P & K should be at index 2 or above. Nitrogen should not be applied until the seedlings are well established at around 4 to 6 weeks. Applying nitrogen prior to this will lead to excessive growth in the existing grasses and weeds which will compete with the emerging seedlings.

Overseeding immediately after a defoliation, either by cutting or grazing but not topping is advised and scarification to remove thatch and shallow rooted weed grasses is also highly beneficial.

Use of a tined grass harrow for scarification will also produce a fine surface tilth where soil is exposed. If overseeding into an old permanent pasture, effective scarification is essential, and excessive amounts of removed thatch should be gathered up and removed from the field where possible.

Specialist overseeding drills are now widely available and are by far the best means of establishment, though a grass harrow with an air seeder attached can do a good job in optimum conditions, especially with clover seed. Heavier cereal disc drills can be used successfully but care must be taken not to place the seed too deep. 1cm to 3cm is deep enough and anything deeper than this can reduce seedling viability especially if moisture is in short supply.

If using a cereal drill, sowing at half rate, and using two passes at 45° to each other is recommended to ensure a dense sward is achieved. Rolling, ideally with a ring roller is a must with all establishment methods to ensure good seed to soil contact.

Livestock can continue to graze after sowing thus reducing competing grasses as well as helping to tread the seed in. Upon seedling emergence stock must however be removed or they will take out the emerging seedings. Sheep or cattle can be used but care needs to be taken with sheep as they will graze too low if left in for too long and will nibble off the emerging seedlings at or near soil level.

Grazing lightly after 4-5 weeks can encourage the seedings to tiller but care should be taken not to graze too hard. Grazing at this point with cattle can rip up the new seedlings if roots are not well established.

TechniSward **Multi-purpose overseeding mixture**

Lofa festulolium has rapid establishment coupled with excellent yields and forage quality. Festuloliums are renowned for their drought and stress tolerance

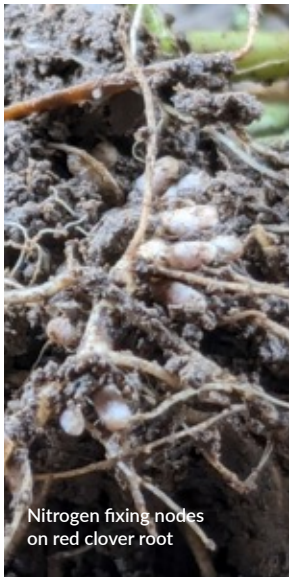
Seagoe tetraploid intermediate perennial ryegrass has exceptional yield potential and is the second highest rated in its class for ME yield under conservation management in the BSPB recommended grass and clover lists.

Spectre tetraploid late perennial ryegrass has good yields under both grazing and cutting management and is a first choice variety in the SRUC Scottish recommended lists.

- TechniSward Multi-purpose overseeding mixture has been designed to provide a three to four year boost to production and is suitable for grazing, long term, cutting and multi-use leys.
- For short term cutting leys TechniSward Turbo charge is a more cost effective solution.
- Optimum sowing rate 10kg/acre (25kg/ha)

	Lofa	Seagoe	Spectre	Red clover	White clover
Multi-purpose overseeding no clover	30%	35%	35%	-	-
Multi-purpose overseeding + white clover	30%	30%	30%	-	10%
Multi-purpose overseeding + red clover	28%	28%	28%	16%	-

TechniSward **Clover blends**



Nitrogen fixing nodes on red clover root

- TechniSward clover blends can be added to any grass mixture or be used for overseeding into new leys following weed control or for boosting clover content in existing swards

White clover blends	Grazing	Dual purpose	Cutting
Small	54%	27%	-
Medium	46%	23%	-
Large	-	30%	60%
Very large	-	20%	40%

Red clover blend	
Diploid	70%
Tetraploid	30%

Mixture selector

Mostly cutting

Mixture	Page	Cutting	Grazing	Duration (years)	Clover options	Organic version available
Catch crop	15	✓✓✓✓	✓	1-2		
Turbo charge	15	✓✓✓✓		2-3	Red	
Multi-cut plus	16	✓✓✓✓		3-4	Red	✓
Super cut	16	✓✓✓✓	✓	4-5	Red	
Endurance	17	✓✓✓✓	✓✓	5+	Red or white	✓
Haymaker	18	✓✓✓✓	✓✓✓	5+		
Haylage	18	✓✓✓✓		2-3		

Multi-purpose leys

Mixture	Page	Cutting	Grazing	Duration (years)	Clover options	Organic version available
High hill	19	✓✓✓	✓✓✓	5+	White	
Dual purpose	19	✓✓✓	✓✓✓✓	6	White	✓
Cut and graze	20	✓✓✓✓	✓✓✓	6	White	
HS Dual purpose	20	✓✓✓	✓✓✓✓	5+	White	
Long term	21	✓✓✓	✓✓✓✓	6+	White	✓
Drought prone	22	✓✓✓	✓✓✓✓	5+	White	
Flood prone	23	✓✓✓	✓✓✓✓	5+		

Mixture selector

Mostly grazing

Mixture	Page	Cutting	Grazing	Duration (years)	Clover options	Organic version available
HS Intensive graze	24	✓✓	✓✓✓✓	5+	White	✓
Early bite	25	✓✓	✓✓✓✓	6+	White	

TechniSward herbal and traditional grassland mixtures

Mixture	Page	Cutting	Grazing	Duration (years)	Compatible actions
Herbal light land	28	✓✓	✓✓✓✓	4+	GS4, SAM3, CSAM3
Herbal medium to heavy land	28	✓✓	✓✓✓✓	4+	GS4, SAM3, CSAM3
Herbal sheep grazer	29	✓✓	✓✓✓✓	4+	SAM3, CSAM3
Herbal overseeding mixtures	30	✓✓	✓✓✓	3	SAM3, CSAM3
MeadowMax	31	✓✓	✓✓✓✓	6+	WBD4, WBD5

Equine mixtures

Mixture	Page	Cutting	Grazing	Duration (years)	Compatible actions
Horse paddock	35	✓✓	✓✓✓✓	6+	
Herbal horse paddock	35	✓✓	✓✓✓✓	5+	SAM3, CSAM3

Amenity mixtures

Mixture	Page	Situation	Duration
TechniSward Multi-purpose landscaper	37	General landscaping and amenity	Long term
TechniSward Pro Master 51	37	General purpose lawn	Long term
TechniSward Pro Master 52	37	Fine quality lawn	Long term

Standard grass seed mixtures

Key benefits

- TechniSward standard grass seed mixtures are premixed meaning that delivery lead times are shorter than with bespoke mixtures
- Mixtures designed to fit most situations, eliminating the need for more costly bespoke mixtures
- Tried and tested over time meaning complete reliability

TechniSward **Catch crop**

1-2 years

50% Sikem *Italian ryegrass*

50% Turgo *(T) Italian ryegrass*

Italian ryegrass blend specifically designed to fill short term gaps in a crop rotation

✓	Intensive cutting		Beef grazing
✓	Cutting		Sheep grazing
	Dairy grazing	✓	Aftermath grazing

- Minimum suggested sowing rate of 12kg/acre (30kg/ha)
- Provides good early production for cutting or grazing
- Can be autumn or spring sown
- Vigorous establishment and winter hardiness lends to sowing after maize
- High sugar content provides a rapid lactic fermentation

TechniSward **Turbo charge**

2-3 years

Variety	Heading date
Hunter *(T) Italian ryegrass*	20 May
Alamo *Italian ryegrass*	23 May
Perseus *Festulolium*	25 May
Astoncrusader *(T) Hybrid ryegrass*	21 May

A highly productive intensive cutting ley suitable for aftermath grazing

✓	Intensive cutting		Beef grazing
✓	Cutting		Sheep grazing
	Dairy grazing	✓	Aftermath grazing

- Minimum suggested seed rate 14kg/acre (35kg/ha)
- 5 day spread of heading dates for optimum silage quality
- Intensive cutting with good aftermath grazing
- Quick recovery after cutting
- Ideal for haylage production
- Contains Perseus ryegrass plus™ for yield, persistency and disease resistance
- 15% red clover option available

Optional Red Clover

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TechniSward **Multi-cut plus**

3-4 years

Variety	Heading date
Lofa *Festulolium*	22 May
Perseus *Festulolium*	25 May
Astoncrusader *(T) Hybrid ryegrass*	21 May

High production specialist multi cutting mixture containing 75% ryegrass plus festuloliums for improved yield, persistency and stress tolerance

✓	Intensive cutting		Beef grazing
✓	Cutting		Sheep grazing
	Dairy grazing	✓	Aftermath grazing

- 6 day spread of heading date for optimum quality
- Minimum suggested seed rate 14kg/acre (35kg/ha)
- 4-6 cuts per year plus aftermath grazing
- High sugar content provides a rapid lactic fermentation and drives intakes
- 22% red clover option available
- Up to 3.5 tonnes/ha more dry matter from ryegrass plus varieties compared to standard Italian ryegrass
- Organic version available

Optional Red Clover

ORGANIC VERSION AVAILABLE

TechniSward **Super cut**

4-5 years

Variety	Heading date
Lofa *Festulolium*	22 May
Utopial *(T) Hybrid ryegrass*	21 May
Galgorm *Intermediate perennial ryegrass*	22 May
Seagoe *(T) intermediate perennial ryegrass*	22 May

Tried and tested medium term cutting mixture producing huge yields of excellent quality silage

✓	Intensive cutting		Beef grazing
✓	Cutting		Sheep grazing
	Dairy grazing	✓	Aftermath grazing

- Minimum recommended sowing rate 14kg/acre (35kg/ha)
- Huge yield potential
- Suitable for Multicut systems and zero grazing
- High sugar content provides a rapid lactic fermentation and drives intakes
- Tight range of heading dates for optimum silage quality
- Available with 20% red clover

Optional Red Clover

TechniSward **Endurance**

5+ years

This specialist long term, late heading cutting mixture is now TechniSward's top selling mixture with many growers saying they will use nothing else

	Intensive cutting	✓	Beef grazing
✓	Cutting		Sheep grazing
✓	Dairy grazing	✓	Aftermath grazing

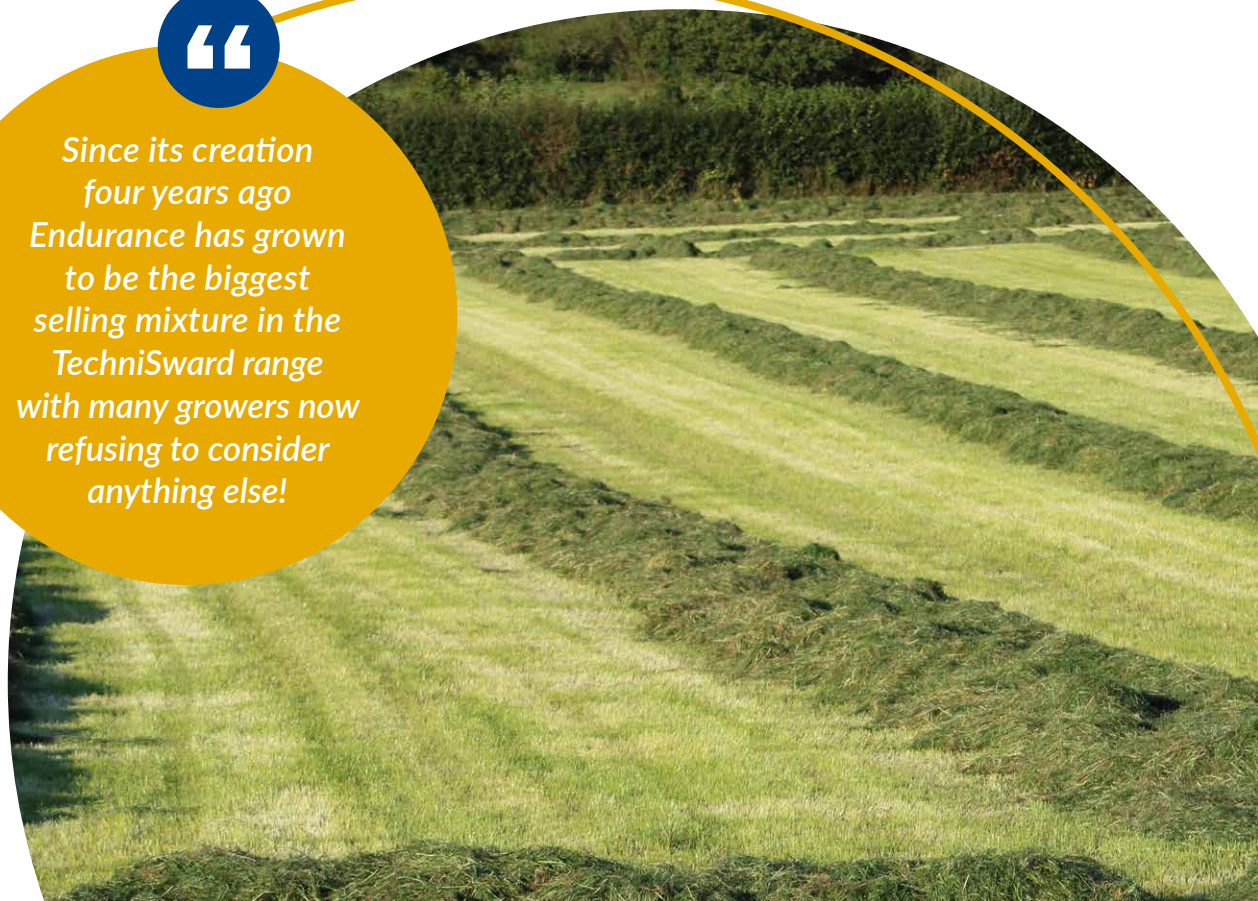
Variety	Heading date
Agaska *Intermediate perennial ryegrass*	28 May
AberSpey *(T) Intermediate perennial ryegrass*	29 May
Diwan *(T) Intermediate perennial ryegrass*	30 May
Nashota *(T) Late perennial ryegrass*	3 June
Gracehill *(T) Late perennial ryegrass*	1 June

- Minimum recommended sowing rate 15kg/acre (37kg/ha)
- Incredibly dense hard-wearing sward
- Huge yield potential over multiple cuts
- High sugar content provides a rapid lactic fermentation and drives intakes
- 6 day spread of heading dates for optimum quality
- Excellent sward density supports aftermath grazing
- 66% fiber energy varieties maintain digestibility even where cutting is delayed
- 7% White clover option available

Optional White Clover

ORGANIC VERSION AVAILABLE

Since its creation four years ago Endurance has grown to be the biggest selling mixture in the TechniSward range with many growers now refusing to consider anything else!



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TechniSward **Haymaker**

5+ years

Specialist hay mixture with 100% diploid varieties, ensuring rapid, even drying

	Intensive cutting	✓	Beef grazing
✓	Cutting	✓	Sheep grazing
	Dairy grazing	✓	Aftermath grazing

- The high inclusion of Timothy will produce a hay crop that is fine textured and palatable with an appealing aroma
- Hipast festulolium, though early heading, possesses excellent cell wall digestibility meaning forage quality is maintained longer
- Provides a very dense sward suitable for winter sheep grazing

Variety	Heading date
Fojtan *Festulolium*	20 May
Agaska *Intermediate perennial ryegrass*	28 May
Nifty *Intermediate perennial ryegrass*	22 May
Swan *Late perennial ryegrass*	5 June
Laura *Meadow fescue*	5 June
Comer *Timothy*	8 June

TechniSward **Haylage**

2 full years

Tried and tested medium term cutting mixture producing huge yields of excellent quality silage

	Intensive cutting		Beef grazing
✓	Cutting		Sheep grazing
	Dairy grazing	✓	Aftermath grazing

- Produces excellent coarse hay/haylage suitable for all classes of stock
- 100% tetraploid inclusion ensures a rapid fermentation when wrapped
- Provides good quality aftermath grazing
- Over grazing should be avoided as with all tetraploid grasses

Variety	Heading date
Perkins *(T) Hybrid ryegrass*	20 May
Hunter *(T) Italian ryegrass*	22 May
Alamo *Italian ryegrass*	21 May

TechniSward **High hill**

5+ years

Variety	Heading date
Agaska *Intermediate perennial ryegrass*	28 May
AberZeus *Intermediate perennial ryegrass*	25 May
Nolwen *(T) Intermediate perennial ryegrass*	22 May
Bowie *Late perennial ryegrass*	15 June
Wetherby *Late perennial ryegrass*	29 May
Nashota *(T) Late perennial ryegrass*	3 June
Thegn *(T) Late perennial ryegrass*	5 June
Comer *Timothy*	7 June
Dual Purpose white clover blend	

High hill is a long term, multi-purpose mixture specifically designed for higher altitudes and challenging conditions

	Intensive cutting	✓	Beef grazing
✓	Cutting	✓	Sheep grazing
✓	Dairy grazing	✓	Aftermath grazing

- Minimum recommended sowing rate 15kg/acre (37kg/ha)
- Varieties have been chosen for optimum ground cover and winter hardiness
- The balance of high sugars and improved cell wall digestibility improves animal performance
- Season long performance whether cutting or grazing
- 6% White clover as standard
- No clover option available

Optional White Clover

TechniSward **Dual purpose**

5+ years

Variety	Heading date
AberZeus *Intermediate perennial ryegrass*	25 May
AberSpey *(T) Intermediate perennial ryegrass*	22 May
Galgorm *Intermediate perennial ryegrass*	22 May
Cancan *Late perennial ryegrasss*	9 June
Wetherby *Late perennial ryegrass*	29 May
Nashota *(T) Late perennial ryegrass*	3 June
Thegn *(T) Late perennial ryegrass*	5 June

A truly dual-purpose mixture. Denser than cut and graze and therefore more suited to long periods of hard grazing

	Intensive cutting	✓	Beef grazing
✓	Cutting	✓	Sheep grazing
✓	Dairy grazing	✓	Aftermath grazing

- Minimum suggested sowing rate of 15kg/acre (37kg/ha)
- Suitable for all classes of grazing livestock
- Capable of producing multiple cuts of quality silage
- 62% diploid varieties ensures tremendous sward density
- Excellent digestibility drives intakes
- Season long performance
- White clover option available
- Organic version available

Optional White Clover

ORGANIC VERSION AVAILABLE

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TechniSward **Cut and graze**

5+ years

High yielding multi-purpose mixture with a slight leaning towards more cutting than grazing

	Intensive cutting	✓	Beef grazing
✓	Cutting		Sheep grazing
✓	Dairy grazing	✓	Aftermath grazing

- Minimum recommended sowing rate 14kg/acre (35kg/ha)
- 62% Tetraploid inclusion provides sugars for a rapid fermentation
- 2-4 cuts plus quality grazing
- Inclusion of DLF Fiber Energy™ varieties gives flexibility around cutting dates without compromising digestibility
- White clover option available

Optional White Clover

Variety	Heading date
Galgorm *Intermediate perennial ryegrass*	22 May
Convey *(T) Intermediate perennial ryegrass*	29 May
Seagoe *(T) Intermediate perennial ryegrass*	22 May
Agaska *Intermediate perennial ryegrass*	28 May
AberGrain *(T) Late perennial ryegrass*	3 June
Nashota *(T) Late perennial ryegrass*	3 June

TechniSward **HS dual purpose**

5+ years

A dual-purpose, medium-term, high sugar mixture that will thrive in any situation

	Intensive cutting	✓	Beef grazing
✓	Cutting	✓	Sheep grazing
✓	Dairy grazing	✓	Aftermath grazing

- High levels of water-soluble carbohydrates ensure a rapid, stable fermentation when ensiled and high voluntary intakes when grazed
- High sugar levels also ensure that more energy is left for the animal after fermentation demands
- HS dual purpose produces a dense hard-wearing sward that produces large quantities of quality forage throughout the growing season
- Available with AberDairy white clover blend
- Optimum sowing rate 15kg/acre (37kg/ha)

Optional White Clover

Variety	Heading date
AberImage *(T) Hybrid ryegrass*	28 May
AberZeus *Intermediate perennial ryegrass*	26 May
AberGreen *Intermediate perennial ryegrass*	29 May
AberSpey *(T) Intermediate perennial ryegrass*	29 May
AberChoice *Late perennial ryegrass*	10 June
AberBann *Late perennial ryegrass*	4 June
AberGain *(T) Late perennial ryegrass*	4 June

MULTI USE MIXTURES

TechniSward **Long term**

6+ years

Variety	Heading date
Galgorm *Intermediate perennial ryegrass*	22 May
Agaska *Intermediate perennial ryegrass*	28 May
Fojtan *Festulolium*	20 May
AberySpey *(T) Intermediate perennial ryegrass*	29 May
Cancan *Late perennial ryegrass*	9 June
Wetherby *Late perennial ryegrass*	29 May
Thegn *(T) Late perennial ryegrass*	3 June
Comer *Timothy*	8 June
Laura *Meadow fescue*	5 June

An extremely versatile long-term mixture that will thrive in any area of the UK

✓	Hay/haylage	✓	Beef grazing
✓	Cutting	✓	Sheep grazing
✓	Dairy grazing	✓	Aftermath grazing

- Minimum suggested sowing rate of 15kg/acre (37kg/ha)
- Timothy provides highly palatable early bite
- A dense and durable sward that will withstand hard grazing
- Persistent and winter hardy
- White clover option available
- Organic version available

Optional White Clover

ORGANIC VERSION AVAILABLE

The combination of high yielding modern ryegrasses with Timothy and Meadow Fescue make Long Term both persistent and high yielding

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TechniSward **Extreme drought prone**

5+ years

Fojtan *Festulolium*

Nolwen *(T) Intermediate perennial ryegrass*

Thegn *(T) Late perennial ryegrass*

Donata *Soft leaved cocksfoot*

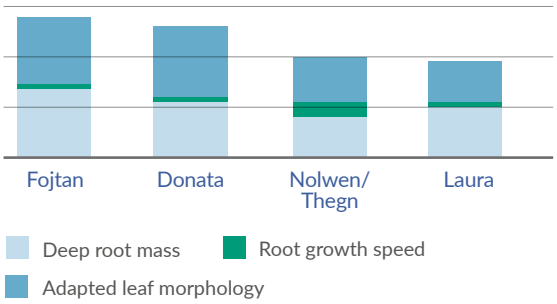
Laura *Meadow fescue*

Dual Purpose white clover blend

A specialist long term mulit use mixture that can withstand long periods of hot dry weather

- Minimum recommended sowing rate 15kg/acre (37kg/ha)
- Incredibly dense hard-wearing sward
- Contains deep rooting varieties including tall fescue plus™ festuloliums
- Available without clover

Drought coping mechanisms



The combination of deep roots and above ground drought coping mechanisms found in Extreme Drought Prone allow for the sward to stay green and productive through extended periods of dry weather

MULTI USE MIXTURES

TechniSward **Extreme flood prone**

5+ years

Fojtan	*Festulolium*
Comer	*Timothy*
Bowie	*Late perennial ryegrass*
Donata	*Soft leaved cocksfoot*
Laura	*Meadow fescue*
Evora	*Smooth stalked meadow grass*
Maxima	*Creeping red fescue*

A specialist long term mixture specifically designed for flood prone land

- Minimum recommended sowing rate 15kg/acre (37kg/ha)
- Incredibly dense hard-wearing sward
- Contains deep rooting varieties including Fojtan tall fescue plus™ festulolium and Donata soft leaved cocksfoot
- Creeping red fescue helps to prevent soil erosion due to its extensive rhizomes that hold the sward together in the face of fast flowing flood waters
- All varieties are proven to be winter hardy, give good ground cover and have excellent stress tolerance
- While no grass sward can withstand months under water this mixture has shown that it fares better than most when faced with fast rising and falling seasonal flood waters

GRAZING MIXTURES

TechniSward **HS Intensive graze**

5+ years

Variety	Heading date
AberZeus *Intermediate perennial ryegrass*	27 May
AberSpey *(T) Intermediate perennial ryegrass*	30 May
AberThames *Late perennial ryegrass*	5 June
AberSevern *Late perennial ryegrass*	6 June
AberGain *(T) Late perennial ryegrass*	4 June

A medium to long term specialist grazing mixture for rotational grazing systems

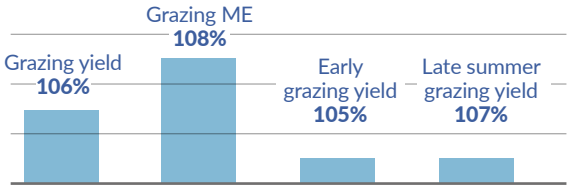
	Intensive cutting	✓	Beef grazing
✓	Cutting		Sheep grazing
✓	Dairy grazing		Aftermath grazing

- Minimum recommended sowing rate 15kg/acre (37kg/ha)
- 100% Aber high sugar grasses
- Produces a dense, palatable, and highly digestible sward that produces right through the season
- Paddocks can be shut up to produce excellent quality silage
- Available with 6% AberPasture white clover blend

Optional White Clover

ORGANIC VERSION AVAILABLE

Intensive graze performance



(Figures expressed as a percentage of the recommended list benchmark figure for perennial ryegrass)

Intensive graze has been designed to meet the demands of extended grazing systems using only Germinal high sugar grasses.

Varieties have been selected to give exceptional production right through the grazing season.

TechniSward **Early bite**

6+ years

A long-term, hard-wearing mixture that will produce quality forage over a long grazing season, early and spring grazing yields are exceptional

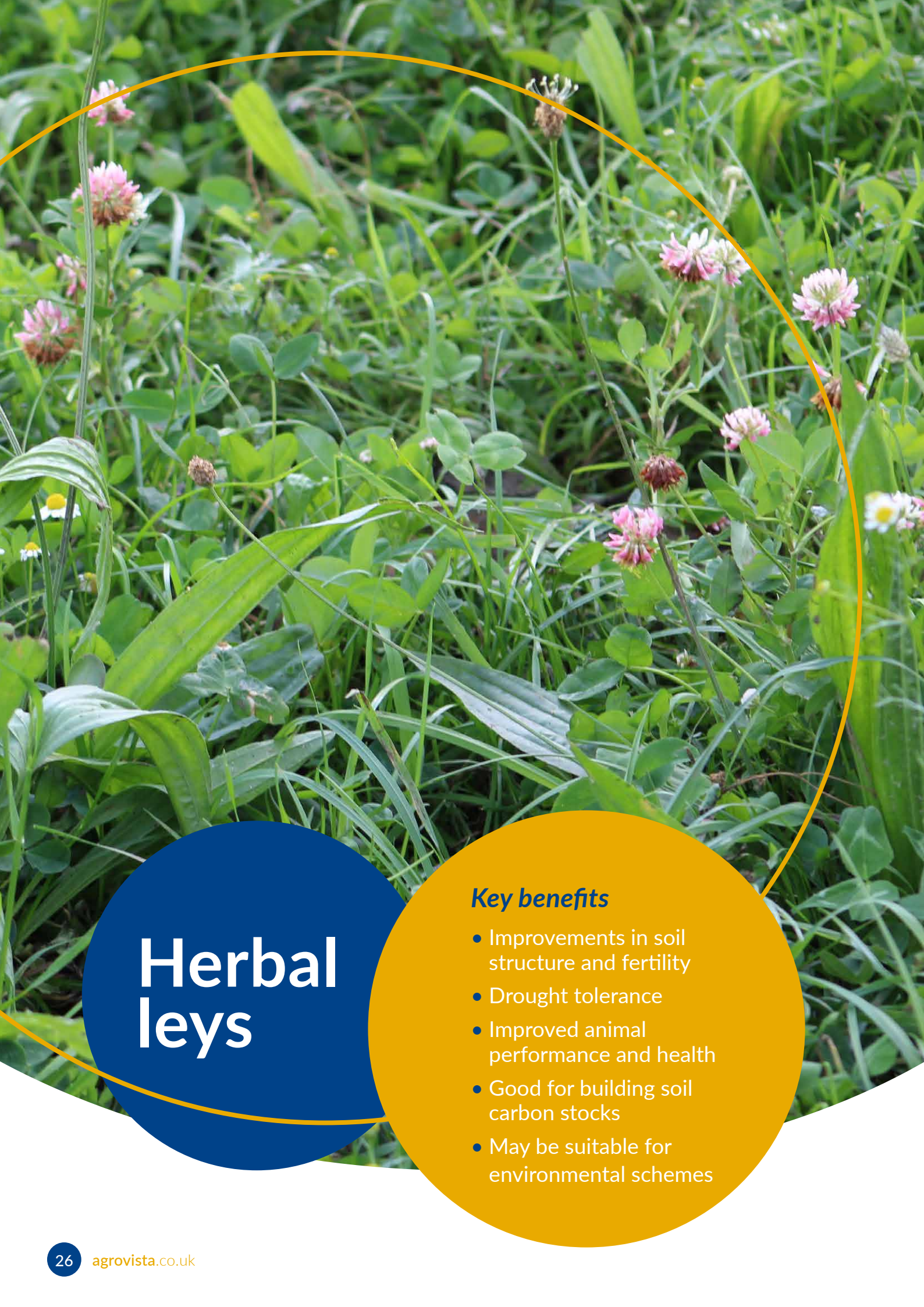
✓	Hay/haylage	✓	Beef grazing
✓	Cutting	✓	Sheep grazing
✓	Dairy grazing	✓	Aftermath grazing

Variety	Heading date
Galgorm *Intermediate perennial ryegrass*	22 May
AberSpey *(T) Intermediate perennial ryegrass*	30 May
AberZeus *Intermediate perennial ryegrass*	27 May
Agaska *Intermediate perennial ryegrass*	28 May
Fotjan *Festulolium*	20 May
Nashota *(T) Late perennial ryegrass*	3 June
Comer *Timothy*	7 June

- Optimum suggested sowing rate of 15kg/acre (37kg/ha)
- Huge early production that persists throughout the season and well into the autumn
- Produces 112% of the BSPB recommended lists benchmark figure for combined early and spring grazing yield
- Produces a very dense, highly palatable sward
- Fojtan festulolium helps to make this mixture very drought tolerant
- Timothy provides early grazing up to a month ahead of ryegrasses
- Available with 6% white clover

Optional White Clover

When compared to the BSPB recommended grass and clover lists average figures for combined early and spring grazing yields Early bite scores an impressive 112%



Herbal leys

Key benefits

- Improvements in soil structure and fertility
- Drought tolerance
- Improved animal performance and health
- Good for building soil carbon stocks
- May be suitable for environmental schemes

Drought tolerance

Diverse swards containing a range of grasses, herbs and legumes have a wide range of root types and depths, from shallow fibrous roots to deep penetrating tap roots that can extend to several metres below ground, breaking through compacted soil to reach moisture at levels that ryegrass could never reach.

Additionally; the diverse root structures in herbal leys help to build soil organic matter and for every 1% increase the soils water holding capacity can increase by up to 188,000l per hectare.

Soil health and fertility

Diverse herbal mixtures are made up of multiple stratified layers both above and below ground with the different species growing to different heights within the sward and with varying leaf sizes and shapes. This allows for maximum capture of sunlight whatever the time of day and position of the sun. This in turn means that more CO^2 and water are converted to sugars. Sugar that is surplus to the plants requirements is released into the soil around the roots and is used by the mycorrhizal fungi encouraging them to colonise the area around the roots where they form a symbiosis with the plant which helps the plant to make use of soil nutrients such as phosphorous.

Animal health and performance

Diverse swards containing herbs and legumes benefit livestock performance in several different ways:

- Legumes are protein rich and have the benefit of fixing N
- The deep roots of many of the species bring up essential minerals, trace elements and vitamins from deep within the soil
- Some legumes are bioactive meaning at they contain condensed tannins or polyphenol oxidase. These compounds can protect protein from rumen fermentation meaning that the risk of bloat is reduced, and the protein is degraded in the hind gut where it is used more efficiently by the animal
- Fermentation within conserved forages is also improved and dry matter losses at ensiling are reduced
- Some herbs and legumes have anthelmintic properties, and so reduce parasitic worm burdens
- The diverse nature of the sward tends to drive up utilisation and dry matter intakes

Herbal ley forage analysis (TechniSward medium to heavy land)

	Fresh (May 2023)	Silage (August 2023)
Dry matter (%)	18.8	30.4
Crude protein (%)	18	16.1
NDF (%)	49.2	44.2
Sugar (%)	12.2	4.4
D Value	70.2	69.00
ME (MJ/kg DM)	11.00	11.30
Oil-A (g/kg)	21	41

The deep roots of many of the species bring up essential minerals, trace elements and vitamins from deep within the soil

techni sward

TechniSward **Herbal light land**

- TechniSward's light land herbal mixture contains species specifically selected to work well in drought prone soils
- Fojtan festulolium with it's tall fescue genetics is deep rooting and incredibly drought tolerant whilst it's perennial ryegrass genetics ensure excellent grazing quality
- Sainfoin and Lucerne are light land specialists that fix nitrogen and provide high quality protein and health benefits
- Compatible with GS4, SAM3 and CSAM3 SFI actions

Variety	Plant family	%
Fojtan *Festulolium*	**Grass**	**20**
Nolwen *Tetraploid intermediate perennial ryegrass*	**Grass**	**14**
Donata *Cockfoot*	**Grass**	**16**
Comer *Timothy*	**Grass**	**7**
Laura *Meadow fescue*	**Grass**	**4**
Altaswede *Red clover*	**Legume**	**8**
Sainfoin	**legume**	**19**
Birdsfoot trefoil	**Legume**	**0.5**
Lucerne	**Legume**	**4**
Plantain	**Herb**	**3.5**
Sheeps burnet	**Herb**	**2.75**
Sheeps parsley	**Herb**	**1**
Yarrow	**Herb**	**0.25**

TechniSward **Herbal medium to heavy land**

- TechniSward herbal medium to heavy land is designed to work across a wide range of growing and soil conditions
- The grasses and legumes have been selected to provide optimum performance in both grazing and cutting scenarios
- Compatible with GS4, SAM3 and CSAM3 SFI actions

Variety	Plant family	%
Lofa *Festulolium*	**Grass**	**24**
Nolwen *Tetraploid intermediate perennial ryegrass*	**Grass**	**26**
Donata *Cockfoot*	**Grass**	**12**
Comer *Timothy*	**Grass**	**10**
Laura *Meadow fescue*	**Grass**	**5**
Red clover	**Legume**	**10**
Alsike clover	**legume**	**4**
Birdsfoot trefoil	**Legume**	**0.5**
Black medick	**Legume**	**0.25**
Plantain	**Herb**	**4**
Sheeps burnet	**Herb**	**2.5**
Sheeps parsley	**Herb**	**1.5**
Yarrow	**Herb**	**0.25**

TechniSward **Herbal sheep grazer**

- Formulated to eliminate the risk of poor ovulation rates associated with the phytoestrogens found in red clovers
- Contains birdsfoot trefoil for it's anthelmintic qualities
- The grasses used in this mixture have been chosen for their excellent grazing on the shoulders of the year
- Fojtan festulolium and Donata cocksfoot are drought tolerant, palatable and have excellent digestibility
- Optimum sowing rate 13kg/acre (32kg/ha)
- Compatible with SAM3 and CSAM3 SFI actions

Variety	Plant family	%
Fojtan *Festulolium*	**Grass**	**18**
Galgorm *Intermediate Perennial Ryegrass*	**Grass**	**18**
Agaska *Intermediate Perennial Ryegrass*	**Grass**	**12**
Bowie *Late perennial ryegrass*	**Grass**	**12**
Thegn *(T) Late perennial ryegrass*	**Grass**	**14**
Comer *Timothy*	**Grass**	**6**
Laura *Meadow fescue*	**Grass**	**5**
Grazing white clover blend	**Legume**	**6**
Tonic *Plantain*	**Herb**	**3.5**
Sheeps parsley	**Herb**	**1.5**
Sheeps burnet	**Herb**	**2.5**
Birdsfoot trefoil	**Legume**	**1.5**

techni sward

TechniSward **Herbal overseeding mixtures**

- TechniSward herbal overseeding mixtures are designed to boost the production of existing herbal leys
- Over time herbs and legumes will naturally begin to recede within a ley, especially under hard grazing or cutting
- Overseeding into the worn-out ley can prolong the productive life of the sward and may help to maintain compliance if grown as part of an environmental scheme
- For overseeding advise see pages 10 and 11
- Herbal overseeding mixtures should be sown at 4-6kg/acre (8-15kg/ha)

	Sheep + chicory	Sheep no chicory	Red clover cutting	Red clover grazing
Ryegrass	✓	✓	✓	✓
Timothy	✓	✓		✓
Festulolium			✓	
Burnet	✓	✓	✓	✓
Yarrow				✓
Plantain	✓	✓	✓	✓
Chicory	✓			
Sheeps parsley		✓		
White clover	✓	✓	✓	✓
BFT	✓	✓		
Red clover			✓	✓

TechniSward **MeadowMax**

6+ years

Variety	%
Laura *Meadow fescue*	20
Maxima *Creeping red fescue*	20
Coma *Timothy*	16
Donata *Soft leaved cocksfoot*	17
Fojtan *Grazing festulolium*	17
Tower *Tall fescue*	10

MeadowMax is a mixture of traditional noncompetitive grasses designed for extensive farming systems and parkland settings

	Intensive cutting	✓	Beef grazing
✓	Cutting	✓	Sheep grazing
	Dairy grazing	✓	Aftermath grazing

- MeadowMax brings together traditional native grasses and modern genetics to produce a sward that is long lasting, hard wearing and environmentally sustainable
- This mixture works well in parkland scenarios where its long growing season makes it suitable for early grazing followed by a cut of hay and then more grazing well into the autumn
- The tussocky nature of MeadowMax when left uncut makes it perfect for use as a field margin or wildlife friendly buffer strip
- Sow at 13-15 kg/acre (32–37kg/ha)

> *The tussocky nature of MeadowMax when left uncut makes it perfect for use as a field margin or wildlife friendly buffer strip*

Maize undersowing and post harvest options

Key benefits

- Reduce nitrate leaching
- Potential for better digestate utilisation
- Improves soil structure
- Helps to reduce soil erosion
- Increase soil organic matter levels
- Potential for winter livestock grazing
- Options available for the following SFI schemes: SAM2, CSAM2 and SOH4

The environmental impact of maize growing in the UK is a topic that continues to cause debate amongst growers, environmentalists and the general public.

However, taking a more holistic approach to maize growing can drastically reduce the impact of the crop. Cover cropping maize ground reduces soil erosion, protects the soil profile and reduces nutrient leaching and one of the most reliable ways to establish a cover crop is by undersowing the growing maize crop.

There are now a number of options for maize growers within the Sustainable Farming Incentive including SAM2 multi-species winter cover crop, CSAM2 multi-species winter cover crop for growers entered into the expanded 2024 offer and SOH4 winter cover crops for maize, also within the expanded offer. All of these options can be undersown with the growing crop.

Agrovista's range of maize undersowing and post-harvest mixtures offer flexibility around sowing, are fully compliant for the relevant SFI actions when grown in a way that meets the aims of the action and come backed by many years of research and experience.

TechniSward **Soilmax**
(SAM2, SOH4)

Hipast *Tall fescue plus™ (festulolium)*	40%
Tower *Tall fescue*	50%
Donata *Soft leaved cocksfoot*	10%

TechniSward **Soilmax Plus**
(SAM2, CSAM2, SOH4)

Hipast *Tall fescue plus™ (festulolium)*	35%
Tower *Tall fescue*	62%
Rivendel *Small white clover*	3%

- Specifically designed to being drilled at the same time as the maize crop (inter-row)
- The slow growing tall fescue and tall fescue PLUS™ helps to suppress weed emergence without competing with the maize
- As the grasses mature the root mass develops, helping to retain any residual nutrients which are left in the soil post-harvest
- The deep rooting grass species also help to improve soil structure
- Sow at 3 to 5kg/acre (7.5–12.5kg/ha)

TechniSward **Enviromax**
(SAM2, SOH4)

Twymax *Tetraploid late perennial ryegrass*	70%
Hipast *Tall fescue plus™ (festulolium)*	20%
Donata *Soft leaved cocksfoot*	10%

TechniSward **Enviromax Plus**
(SAM2, CSAM2, SOH4)

Twymax *Tetraploid late perennial ryegrass*	60%
Donata *Soft leaved cocksfoot*	10%
Common vetch	30%

- Suitable for sowing at the 4-6 leaf stage
- This mixture establishes quickly but then slows as the maize canopy closes above it
- Once maize is harvested the sward will quickly establish effective ground cover to protect the soil over the winter months and then provide a crop of silage the following spring
- Sow at 3 to 5kg/acre (7.5–12.5kg/ha)

Fastmax
(SAM2, SOH4)

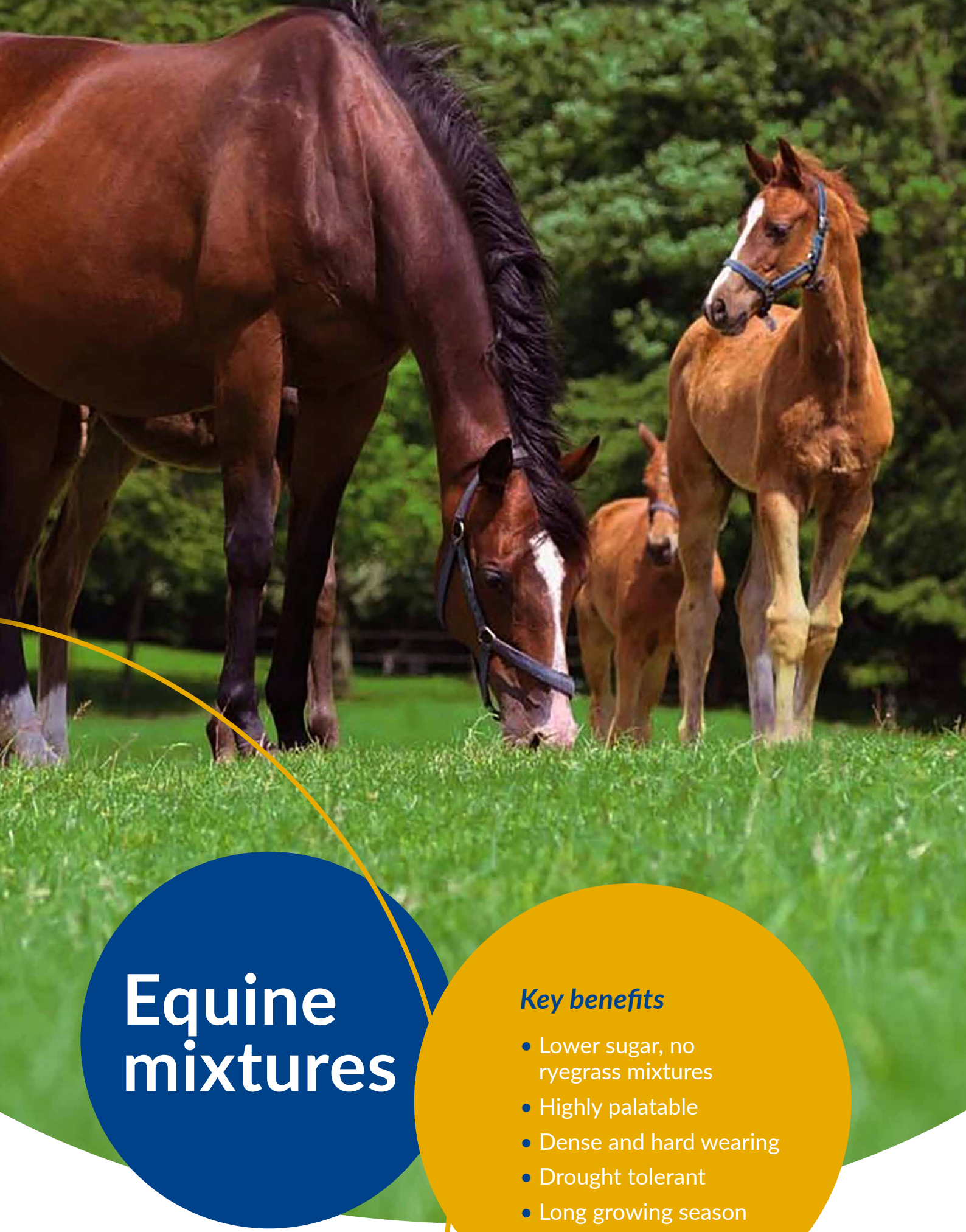
Fox *Diploid Italian ryegrass*	60%
Lofa *Festulolium*	30%
Donata *Soft leaved cocksfoot*	10%

- Designed to be sown at the 4 to 6 leaf stage
- Rapid early establishment slows as the maize canopy closes and then grows quickly post-harvest to provide good winter cover
- Capable of providing an early cut of silage the following spring
- Sow at 7.5–12.5kg/ha

After Maize Cover Crop
(SAM2, CSAM2, SOH4)

Westerwolds ryegrass	56%
Winter vetch	44%

- A fast-establishing winter cover crop for sowing after maize is harvested
- Provides quality late winter grazing or an early cut of high protein silage the following spring
- Care should be take to avoid soil contamination if a silage cut is planned for the following spring. Topping the maize stalks is also advised if a silage cut is intended.
- Sow at 30-37kg/ha before mid-October



Equine mixtures

Key benefits

- Lower sugar, no ryegrass mixtures
- Highly palatable
- Dense and hard wearing
- Drought tolerant
- Long growing season

TechniSward **Horse paddock**

5+ years

26% Fojtan *Festulolium*

14% Comer *Timothy*

16% Donata *Soft leaved cocksfoot*

8% Laura *Meadow fescue*

21% Evora *Smooth stalked meadow grass*

15% Maxima *Creeping red fescue*

A persistent and hard-wearing, ryegrass free paddock mixture that is low in the plant sugars that can cause laminitis in horses

- Though slower to establish than mixtures containing ryegrasses, this mixture will be incredibly dense and resilient once established and will be more drought tolerant than ryegrass mixtures, reducing the need for supplementary feeding during dry summers
- The relatively small seed size of these grasses means that a sowing rate of 14kg/acre will provide a sufficient plant density in most situations. Jumping paddocks and other high traffic areas should be sown at 17-20kg/acre

TechniSward **Herbal horse paddock**

5+ years

25% Fojtan *Festulolium*

14% Comer *Timothy*

10% Donata *Soft leaved cocksfoot*

8% Laura *Meadow fescue*

20% Evora *Smooth stalked meadow grass*

14% Maxima *Creeping red fescue*

3% Rivendel *Small white clover*

2% Ribwort *Plantain*

1.75% Sheeps burnet

1.5% Sheeps parsley

0.5% Birdsfoot trefoil

0.25% Yarrow

A mixture of traditional grasses, herbs and legumes designed for competition horses and brood mares

- The addition of beneficial herbs and the bioactive legume birdsfoot trefoil have been shown to improve health and performance in competition horses. Diverse herb rich swards supply essential minerals such as copper via Yarrow. Copper deficiency in pregnant mares during the third trimester has been linked to Developmental Orthopaedic Disease
- Sow at 14kg/acre
- This mixture may not be suitable for overweight horses and ponies
- Compatible with SFI SAM3 & CSAM3 Herbal Ley actions worth £382 per hectare

Amenity grass mixtures

TechniSward **Pro Master 51**

- Hard wearing lawn with ryegrass that will establish quickly
- Ideal for general purpose lawns. Contains Double 4turf® for improved colour and increased drought tolerance

Double 4turf® *Tetraploid perennial ryegrass*	**30%**
Esquire *Perennial ryegrass*	**20%**
Maxima *Strong creeping red fescue*	**50%**

TechniSward **Pro Master 52**

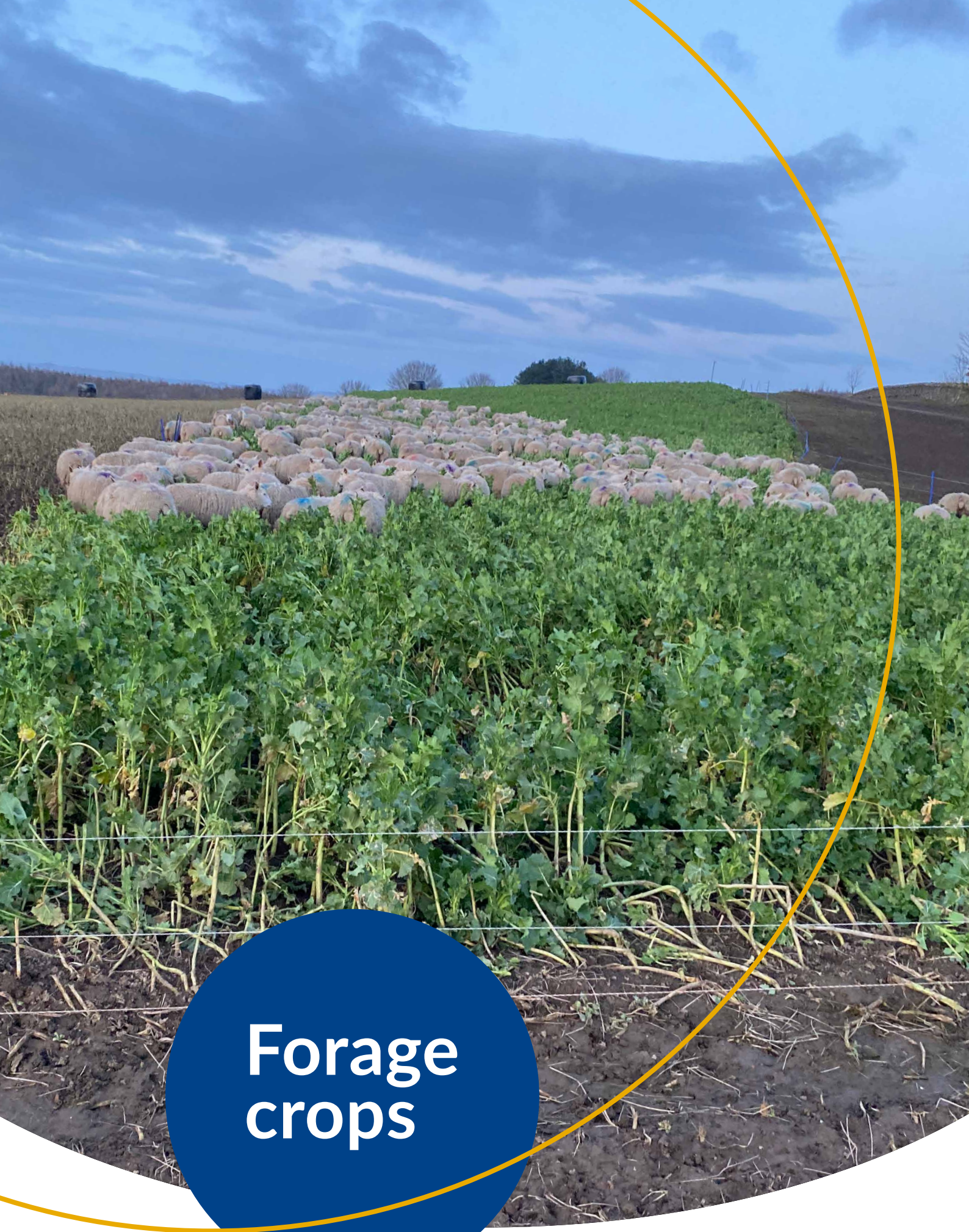
- An economical and hard wearing fine lawn mixture containing only fescues for ease of management
- Suited to cutting with a cylinder mower

Wagner *Chewings Fescue*	**10%**
Smirna *Slender creeping red fescue*	**20%**
Maxima *Strong creeping red fescue*	**70%**

TechniSward **Multi-purpose landscaper**

- 50:50 mixture of amenity ryegrass and creeping red fescue
- Extremely hard-wearing land scaping mixture perfectly suited for use in caravan/camping sites and event car parks

Swan *Late perennial ryegrass*	**50%**
Maxima *Strong creeping red fescue*	**50%**



Forage crops

Forage crop selector

Crop	Sow	Sowing rate (kg/ha)	Use	Average DM yield (t/ha)	Crude protein (%)	Average ME (MJ/kg DM)	D Value	Page
Stubble turnip	April-Sept	4-7.5	July-Jan	3.5-4	17-18	10-11	68-70	44
Leafy turnip	April-Aug	5-7.5	June-Dec	2.5-3.5	17-19	10-11	65-68	45
Maincrop turnip	May-July	2.5-3.5 Drilled 5 Broadcast	Sept-Jan	5-6	17-18	10-11	68-72	45
Forage rape	May-Aug	6-10	Sept-mid-Feb	3.5-4	18-20	10-11	65-68	46
Kale/Rape hybrids	May-mid-Sept	6-10	Sept-Feb	4.5-5 Single 6-8 Multiple	17-19	10-11	65-70	46
Kale	April-July	4-7.5	Sept-March	8-10	16-17	10-11	70-75	48
Swedes	April-June	3-5 Direct 0.35-0.85 Precision	Sept-mid-April	7-10	10-11	12-13	82	50
Fodder beet	March-April	100K-120K seeds/ha	Oct-Feb	15-22	12-13	12-13	78	51
Extended graze *Italian ryegrass/ hybrid brassica*	April-mid-Sept	22-25	July-Jan	6-10 *Multiple grazings*	16-19	10.5-11.5	68-70	55

What to expect from forage crops

Sheep grazing

100% of the ration, based on lambs 35–42kgs	
Forage rape	1ha feeds 100 lambs for 35 days
Kale/Rape hybrid	1ha feeds 100 lambs for 65 days
Stubble turnips	1ha feeds 100 lambs for 40 days
Kale	1ha feeds 100 lambs for 90 days
Swede	1ha feeds 100 lambs for 90 days
Fodder beet	1ha feeds 100 lambs for 140 days

80% of the ration, based on lambs 35–42kgs	
Forage rape	1ha feeds 100 lambs for 43 days
Kale/Rape hybrid	1ha feeds 100 lambs for 81 days
Stubble turnips	1ha feeds 100 lambs for 50 days
Kale	1ha feeds 100 lambs for 112 days
Swede	1ha feeds 100 lambs for 112 days
Fodder beet	1ha feeds 100 lambs for 175 days

Cattle grazing

100% of the ration, based on cows 600–650kgs	
Forage rape	1ha feeds 100 cows for 3 days
Kale/Rape hybrid	1ha feeds 100 cows for 5 days
Stubble turnips	1ha feeds 100 cows for 3.5 days
Kale	1ha feeds 100 cows for 7.5 days
Swede	1ha feeds 100 cows for 7.5 days
Fodder beet	1ha feeds 100 cows for 12 days

80% of the ration, based on cows 600–650kgs	
Forage rape	1ha feeds 100 cows for 3.6 days
Kale/Rape hybrid	1ha feeds 100 cows for 6.5 days
Stubble turnips	1ha feeds 100 cows for 4 days
Kale	1ha feeds 100 cows for 9 days
Swede	1ha feeds 100 cows for 9 days
Fodder beet	1ha feeds 100 cows for 14.5 days

All figures are a guide only

Risk factors associated with grazing brassica crops

Photosensitivity

Compounds within some brassicas cause the skin to become sensitive to sunlight. All grazing livestock including horses are affected.

Affected skin is swollen and often oozes serous fluid which dries to form yellow crusts. Clinical signs in sheep are usually confined to wool-free un-pigmented areas of the face, ears and limbs, but in some sheep breeds the skin of the midline of the back at the parting of the fleece is also affected. Severely affected animals don't eat and rapidly lose body condition. The blood vessels in areas of non-pigmented skin can completely die off and cause cell death in those areas resulting in sloughing of the skin in the affected area.

Bloat

Bloat is simply a build-up of fermentation gasses in the rumen. This gas is produced as part of the normal process of digestion and is normally lost by belching (eructation). Bloat occurs when eructation is prevented.

There are two types of bloat. The least common type is gassy bloat, which occurs when the gullet is obstructed (often by foreign objects such as pieces of beet) or when the animal can't burp (such as with milk fever or tetanus).

The second type of bloat is frothy bloat, which happens as the result of a stable foam developing on top of the rumen liquid, which blocks the release of the gas. This is by far the most common form of bloat, and unlike gassy bloat, it is highly seasonal with peaks in the spring and autumn.

This is because the foam is formed by breakdown products from rapidly growing forages (particularly legumes such as clover). These increase the viscosity of the rumen fluid and prevent the small bubbles of gas formed by rumen fermentation from coming together to form free gas that can be eructed.

> *Cattle are far more susceptible to frothy bloat than sheep.*

Nitrate poisoning usually does not occur rapidly, but over time, depending on how high the nitrate level in the forage is and how much is consumed.

Nitrate poisoning

Nitrate is present to some degree in all forages, and technically, nitrate poisoning is better described as nitrite poisoning. When livestock consume forages, nitrate is normally converted in the rumen from: **nitrate** to **nitrite** to **ammonia** to **amino acid** to **protein**. When forages have an unusually high concentration of nitrate, the ruminal process cannot complete, and nitrite accumulates.

Nitrite is absorbed into the bloodstream directly through the rumen wall or epithelium and converts hemoglobin (the oxygen carrying molecule) in the blood to methemoglobin, which **cannot** carry oxygen. The blood turns a chocolate brown colour rather than the usual bright red. An animal dying from nitrate (nitrite) poisoning effectively dies from asphyxiation. Nitrate poisoning usually does not occur rapidly, but over time, depending on how high the nitrate level in the forage is and how much is consumed.

Nitrate poisoning can occur when: Forage consumed contains high levels of nitrate; the diet changes rapidly; parasitism or other conditions cause anemia; livestock consume supplements containing urea or excessively high-protein feeds along with forage containing moderate levels of nitrate.

Plants need nitrogen for growth and development. However, when drought prevents them from converting the nitrogen they absorb into new growth, nitrate levels may rise and accumulate. Although this can occur in almost any plant, we are most likely to see it when feeding brassicas, especially if high levels of Nitrogen fertiliser have been applied.

Goitrogenic glycosides (Glucosinolates)

Glucosinolates present in brassica crops can cause goitre, reduced growth rates and/or diarrhoea, depending on their composition. Sudden onset blindness in sheep (rape blindness) is also thought to be associated with glucosinolate poisoning. The highest concentration of these glycosides is present in the seeds of mature plants.

Most forage brassicas have low levels of glucosinolates and represent little or no problem however, mustards and fodder radish grown in cover crop mixtures are not specifically destined for animal feed crops and so should be grazed well ahead of flowering to reduce the risk.

Ewes that are heavily in lamb should not be grazed on high-risk brassicas as the ensuing deficiency in iodine can cause lambs to be born with a low birth weight and poor thrift resulting in hypothermia, starvation and mismothering.

Iodine deficiency can also account for high barren rates and low scanning results when ewes are grazed on high-risk brassicas at mating.

Sudden deaths in lambs

Sudden deaths are often seen in lambs within about 2-3 weeks of a move onto forage crops, associated with changes in feed rather than specific toxicities. Conditions such as redgut, pulpy kidney, systemic pasteurellosis and cerebrocortical necrosis (CCN) (thiamine; vitamin B1 deficiency), caused by a sudden change in diet.

Haemolytic anaemia
(Redwater disease or Kale anaemia)

One particularly important toxic substance present in some brassicas including rape and kale but also mustard and radish is a haemolytic anaemia factor, S-methylcysteine sulfoxide (SMCO).

SMCO is converted by bacterial fermentation in the rumen to dimethyl disulphide, which causes haemolysis. Severity of the disease is proportional to the SMCO content of the crop. When present in small amounts, the toxin results in poor growth rates. However, when SMCO is present in high concentrations, lambs become anaemic, with red urine, progressing rapidly to death.

SMCO concentrations in plants can be analysed and *Brassica* crops categorised as low or high potential risk, with most forage brassicas being categorised as low risk. However, SMCO increases with the age of the crop, so even low risk varieties can become potentially hazardous as they reach maturity or if they are fed to excess.

To avoid these risks, long-keep store lambs should not be grazed on *Brassica* crops for prolonged periods and animals should be provided with a pasture run-off or supplementary feed.

When the disease is suspected, animals should be removed from the crop and carefully introduced to supplementary feed. Veterinary examination is needed for an accurate diagnosis.

Management

Care should be taken when introducing stock to any new crop and a gradual introduction is ideal. However, the practicalities of a gradual introduction are limiting, and mitigating management practices should be introduced.

A grass run back allows stock access to more fibrous grazing but if not available then supplementary feeding of hay, haylage or even good quality dry straw will help to overcome most nutritional issues. As a rule of thumb, a brassica crop should never make up more than 70% of the total diet on a dry matter basis.

Stock should never be introduced to a new crop in a hungry condition as gorging exacerbates the situation.

Turnips

STUBBLE TURNIPS

Stubble turnips are a fast-growing catch crop capable of producing high yields of palatable quality feed for livestock.

As the name suggests the crop is often grown following harvested cereals, though earlier planting for summer usage is also possible.

When planting a large area for use over an extended period staggered planning is advised to maintain quality and palatability throughout the usage period.

Sowing rates should be increased during dry periods with seed either broadcast or direct drilled. If broadcasting the sowing rate should be roughly 50% higher than with direct drilled crops.

Stubble turnip seeds are small (2-3mm) but demonstrate high levels of vigour.

Using stubble turnips as a break crop between grass swards can reduce the pest and weed challenge. However, being a brassica consideration should be given to crop rotations containing oil seed rape.

Stubble turnips can be either bulbing types or leafy non-bulbing types.

Variety	Bulb shape	Skin colour	DM content	Usage period
Vollenda	Tankard	Purple	High	Autumn/ winter
Barkant	Tankard	Purple	High	Autumn/ winter
Marco	Globe	Purple	High	Autumn/ winter
Samson	Tankard	Purple	High	Autumn
Rondo	Globe	Green	Medium	Autumn/ winter

Bulbing types

Vollenda (Tetraploid)

A large leaved, highly digestible variety. Early vigour, high yields, bolting resistance and excellent disease resistance make Vollenda a popular choice. Palatability is maintained throughout the season making it especially suited to grazing later in the winter.

Barkant

Large palatable roots coupled with excellent digestibility and winter hardiness make Barkant especially suited to late winter grazing.

Marco (Tetraploid)

Marco is a very fast establishing and early maturing variety with grazing possible from 60 days after sowing.

This highly digestible, high ME variety is both bolting and club root resistant, suited to short term breaks in cropping.

Samson (Tetraploid)

Samson is a consistent and reliable variety suited to autumn grazing or lifting. In replicated trials Samson shows high intakes and daily liveweight gains.

Rondo

This green skinned, leafy variety has excellent disease resistance and winter hardiness.

Root anchorage is excellent, reducing wastage and making it a favourite for out wintered cattle or sheep.

Leafy Types

Jupiter leafy turnip

This fast-maturing brassica has very high dry matter yield and can be grazed in just 6–8 weeks of sowing.

Jupiter can be sown throughout the growing season up to early September and works well in mixtures with Italian Ryegrass and annual clovers.

Appin

Appin, though technically a bulbing type turnip has a leaf to root ratio of approximately 80:20 making it more of a leafy type in practice.

High yields of palatable easily digestible forage drive voluntary intakes with both sheep and cattle. Appin is fast growing and has a wide sowing window.

Summer sowings of Appin have good regrowth potential.

MAINCROP TURNIP

Maincrop turnips are slower to mature than stubble turnips and therefore need to be sown by the end of July if yield is to be optimised.

Grazing is possible after 12–15 weeks from sowing, providing high yields of palatable forage throughout the autumn and early winter.

Green Globe

The soft easily eaten roots of Green Globe are well shaped and firmly anchored making them ideal for in situ grazing by all classes of stock.

High yields and utilisation make this variety a tried and trusted favourite of many growers.

Massif

This traditional yellow fleshed turnip produces high yields of large well anchored roots.

Massif was bred in Scotland and is well suited to harsh climates having excellent winter hardiness.

High energy levels and good palatability make this variety suitable for all grazing stock.

Forage rape

Forage rape is a fast-growing member of the brassica family suitable for grazing by all classes of ruminant livestock.

The wide sowing window makes it a very versatile crop, able to bridge gaps in summer forage production or provide over winter forage for out wintered stock.

Forage rape also works well in winter fodder mixtures with stubble turnips and kale.

Emerald

This rapidly established well proven variety produces medium to tall leafy plants that can be grazed in 10-12 weeks of sowing.

The highly palatable easily digestible fodder is high in protein and winter hardy, maintaining it's palatability well into the new year.

An added benefit is that the widely branched root system improves soil structure making Emerald a useful component in grazable winter cover crops.

Hobson

Winter hardy, palatable and highly digestible, Hobson exhibits excellent resistance to powdery mildew which can reduce palatability in some crops.

A long-standing variety proven over many years on UK farms.

Akela

Akela is a fast-establishing high yielding variety with good winter hardiness.

This variety is well suited to late sowing, up to 20th September for grazing up to the end of February.

Zoom brassica mixture

Zoom is a mixture of Winfred brassica and forage rape. This is a very vigorous and quick growing mixture which is ideal for replacing failed crops or patching spring sown crops.

High seedling vigour gives a reliable establishment of a high leaf to stem ratio crop with carefully selected varieties that have good disease and bolting resistance.

Gorilla forage rape

GORILLA is a dark purple green, re-growing forage rape. The stature of GORILLA is slightly shorter than many current varieties but with good standing ability. The dry matter content of GORILLA is higher than average which leads to high total dry matter yields. GORILLA shows a moderately good resistance to powdery mildew and is quite resistant to club root. With it's good regrowth potential, it can be used for both, silage-mixtures and grazing

Hybrid forage brassicas

Hybrid brassicas combine the positive traits of both parent species along with hybrid vigour.

They are generally more rapid to establish, have a wider sowing window, exhibit greater yield potential and in many cases show regrowth potential when sown at an appropriate time of year.

Mainstar

This highly palatable early maturing hybrid is often referred to as a forage rape but is in fact a cross between kale and a turnip. Mainstar is a highly versatile brassica with very good aphid tolerance. Its main strength lies in its early maturity allowing for a longer grazing period. Regrowth potential is excellent with new tillers appearing rapidly from multiple growing points.

Feed quality is very good with highly digestible stems and a high leaf to stem ratio leading to a high proportion of the plant being utilised.

Spitfire

A fast-establishing Hybrid brassica that works well in mixtures with other brassicas.

Spitfire is a medium tall variety with excellent yields and good aphid tolerance. The low dry matter stem increases utilisation and overall palatability. Regrowth potential is good, but care must be taken not to over graze. Four to six inches of stem should be left post grazing if the regrowth potential is to be realised and back fencing is advised where strip grazing is practiced.

Swift

A kale/rape cross, giving it extra vigour with winter hardiness, which is ideal for late sowing and is suitable for multi grazing. Also widely used for game cover; it can be prone to bolt if it is sown too early.

Redstart

A kale/rape cross, taking 8 weeks to mature, which is quicker than Swift. High quality with good yields and the option to multi graze, it is also winter hardy.

Interval

Interval's exceptional yield potential, disease resistance and palatability makes it ideally suited for finishing lambs or for outwintering systems. Very fast to germinate and establish, some crops can be ready to utilise within 10-12 weeks of sowing.

Skyfall (Bounce back brassica)

Skyfall (BBB) is a leafy brassica ideally suited for grazing. The large strap leaves are soft and are very easily eaten by dairy, beef or sheep livestock. The leaves have the appearance of a stubble turnip leaf, whilst the root is more like forage rape - deeper, elongated and better able to penetrate the soil. With this deeper rooting system, Skyfall can regrow quickly and will tolerate dry soil conditions.

Unicorn

Unicorn is a new rape kale brassica hybrid, bred to produce a quality feed in a short period of time.

It will produce a leafy nutritious feed for dairy, beef or lamb production and can be utilised in summer, autumn or winter. Its large high protein leaves are easily eaten by livestock.

Unicorn exhibits fast growth and early vigour. Crops can be sown from May through to mid-August, with most crops ready to graze within 12-14 weeks of sowing. Unicorn offers grazing flexibility

Kale

Kale is a biennial brassica traditionally sown in the summer for grazing in the autumn and winter.

The stem of kale can become woody in very mature crops and is therefore best strip grazed to avoid excessive wastage and ensure both leaf and stem are eaten. It is advisable to stagger sowing dates to ensure it does not over-mature. Kale is very adaptable and can grow on most sites throughout the UK and can also be used in game cover crops and as a biennial component of two-year winter bird food crops as it produces its seeds in the second year after sowing.

Forage and multipurpose types

Grüner Angeliter

A very high yielding variety with good winter hardiness and excellent feeding quality with fresh yields 15% higher than Caledonian kale and 10% higher than Bittern in German trials.

Grüner Angeliter has been the mainstay forage variety of kale in New Zealand for many years and since its introduction to the UK has become equally popular over here. Its high yields make it ideal for utilisation by dairy and beef cattle and as winter feed for sheep.

Thousand Head

A reliable, consistent, medium tall kale with good standing ability. Thousand Head combines good winter hardiness with excellent yields.

Proteor

An excellent leafy variety with high leaf to stem ratio, therefore increasing palatability and stock utilisation. Proteor is a high yielding, medium height kale with good winter hardiness and disease resistance.

Astera

A very productive and leafy variety, characterised by its high yields of palatable forage. It is a very winter hardy variety producing high yields of crude protein.

Sovgold NEW

Sovgold is a high-performing, New Zealand bred fodder kale that combines excellent forage quality with significant yield potential. This medium to tall variety features a fine stem and a high leaf-to-stem ratio, ensuring optimal forage utilisation and minimal wastage.

Maris Kestrel

This highly digestible, winter hardy variety has a high leaf to stem ratio resulting in high intakes and good utilisation. Ideal for outwintering cattle.

Caledonian

Caledonian is clubroot tolerant, which enables growers to continually sow kale on clubroot infected sites. It is UK proven, and its huge yields make it ideal for utilisation by dairy and beef cattle.

Bombardier

This new kale variety has the potential to deliver high dry matter yields making it ideal for dairy, beef or lamb production.

Bombardier can help maximise the feed potential per hectare through its improved stem utilisation. Bombardier is also clubroot tolerant and possesses an improved marrow type stem and was bred in the UK, for UK conditions.

Pinfold

Fast growing and ideal for early sowing Pinfold will provide excellent yields in a short period of time. It has good digestibility, is proven in the UK and suitable for summer use as well as autumn and winter.

Game cover types

Goldeneye

A giant type kale especially bred for the game cover market, selected for the optimum combination of height and leaf production. It has a leafy top, strong stem, good winter hardiness and good field tolerance of disease, making it the ideal choice for game cover usage.

Goldeneye achieved a higher vigour score than Caledonian kale and better club root tolerance in a trial conducted at the Scottish Agricultural College in Aberdeen.

Surefire kale blend

A combination of three excellent game cover kale varieties, to provide a tall varied canopy. This blend will give superb cover over an extended period and will give second year growth with various bolting times.

The flowering kale attracts insects and provides shed seed, all helping to draw both game and songbirds.

Keeper

The high leaf to stem ratio of Keeper ensures maximum cover and protection for your birds.

Keeper is British bred and therefore perfectly suited to UK conditions, it is fully tested for germination and vigour to ensure maximum establishment.

Swedes

Swedes are a full season root crop which are mainly fed in situ but can also be lifted and stored in a clamp.

They are an excellent high energy winter feed. They are suited to high rainfall areas and are generally grown in the more northerly and western areas of the UK. Swedes can be grown in a wide range of soil types but are sensitive to compaction and poor drainage and require a pH of approximately 6.5. Most swede crops are sown with precision drills requiring a level seed bed. Varieties are generally classed as fodder or culinary types, but dual-purpose types are available. Seed is available as Grade H or Natural with Grade H seed best suited to precision drilling.

Airlie

A low to medium dry matter variety with a very high fresh yield and good disease resistance. It is a dual-purpose variety suitable for fodder and culinary use with purple skin and creamy white flesh. Airlie is an early to intermediate use variety.

Gowrie

Gowrie is a uniform, medium dry matter variety with some club root tolerance and good mildew resistance. This is a dual -purpose variety suitable for fodder and culinary use, with purple skin and yellow flesh.

Kenmore

This early maturing variety with medium dry matter is best suited as stock feed not culinary use. It has good winter hardiness which means it has a very wide utilisation window. Kenmore has bronze skin with white flesh.

Marian

A medium dry matter variety with moderate resistance to club root. Marian is a dual-purpose variety suitable for fodder and culinary use with yellow coloured flesh and purple skin.

Triumph

This is high yielding bronze skinned variety with yellow flesh, suitable for fodder. Medium dry matter yields and good disease resistance make Triumph a solid choice.

Lomond

High fresh and dry yields make this UK bred variety ideal for finishing lambs post-Christmas.

Lomond has both powdery mildew and clubroot resistance and trials show it suffers less from rots and splits in its root.

Invitation

Invitation is a uniform, clubroot resistant variety, ideal for utilisation after Christmas. It also has excellent resistance to powdery mildew and produces large leaves. Invitation is winter hardy and is suitable for sheep or cattle.

Magres

Magres is the professional's choice, grown in the UK as a uniform purple swede with a flexible harvest date.

Used by many growers to supply the supermarkets.

Fodder beet

Fodder beet is a full season root crop that can thrive in a variety of soil types, though lighter free draining sites are ideal and make harvesting easier.

Field access should also be considered as the specialist harvesting equipment needed tends to be large and heavy.

Fodder beet roots are highly palatable and possess excellent digestibility and high levels of fermentable metabolisable energy making them an ideal supplement to high protein silages. Though roots can be grazed in situ harvesting and clamping is more common.

Medium dry matter varieties tend to have more root showing above ground making them suitable for harvesting with a top lifter, while higher dry matter varieties that sit lower in the ground often need to be harvested with a sugar beet type harvester. Higher dry matter varieties tend to have a harder root and higher dirt tare and are more likely to need washing and chopping prior to feeding.

Feeding whole beet to cattle can result in choking and so chopping is usually advised. Transitioning animals onto beet slowly and not allowing them to run short of feed will also reduce gorging and reduce the risk of choking.

Blaze

UK bred variety with medium dry matter content. Blaze has bright red, highly digestible roots with a low dirt tare. This variety can be fed whole or chopped.

Cagnotte

A high yielding, high dry matter variety. This variety is highly palatable when fed in a mix. Cagnotte presents characteristics ideal for harvesting with a sugar beet lifter, with a high dry matter that extends the harvesting window for growers.

With a low dirt tare and easy lift, this variety stores efficiently and presents a highly palatable feed for sheep and cattle.

Fosyma

Fosyma is a diploid fodder beet with pink/rose skin colour. It has good tolerance to bolting.

Fosyma has been bred to provide a high energy feed for dairy and beef and can be mechanically harvested or grazed in situ.

The variety grows approx. 40% out of the ground, making the crop very easy to utilize and harvest. Its root shape is conical - less fangs.

Feldherr

Feldherr fodder beet is a large leaved medium to low dry matter variety that has the ability to produce huge fresh yields from its orange roots which grow 50% out of the ground.

The lower dry matter content makes Feldherr perfect for out wintering young stock.

Bangor

Bangor is an improvement on the illustrious/long-time-acknowledged varieties Kyros and Troya – resulting in a yield increase and uniform roots.

Bangor is easily lifted on all soil types, due to the regular shape of the root and its high position above the ground. With a medium DM in the root, it results in a very high yield of 105%.

Jamon

A very consistent variety producing a clean highly palatable orange root with average dry matter yields. It has good resistance to leaf disease and bolting. Jamon benefits from large top size and has 33% of its root above the ground which allows for easy lifting.

Jamon

Monro

An ideal variety for grazing with its low dry matter of 14.6%. It has exceptional high fresh yields from red roots that are mostly above ground.

Robbos

A medium dry matter variety with clean yellow roots and large leaves. Robbos is a UK proven variety suitable for all sheep and cattle. This is an easy to grow high yielding variety, ideal for first time fodder beet growers.

Enermax

An exciting dual-purpose variety for both fodder and bio-energy production. High yielding with a low dirt tare.

Enermax has a clean, white, smooth-skinned root and is shallow rooting, resulting in a cleaner end product particularly important for the bio-fuel market.

It has a higher root yield when compared with the well-known and popular variety Magnum. Official variety testing (Denmark 2010-2011), has shown that Enermax can produce 21 tonnes/DM/ha from the root only, with the beet tops adding approximately 5 tonnes DM/ha.

Enermax has the additional benefit of being Rhizomania tolerant and so is suitable for growing in the east of the country where sugar beet is a widely grown crop, as well as in the west and other areas.

Variety	Root colour	Rhizomania resistant	Graze in situ	Suitable for sheep	DM content	% of root in ground	Suitable for AD	Lifter type
Blizzard	White				High		✓	Sugar beet
Blaze	Red		✓	✓	Medium	60		Both
Delicante	White		✓	✓	Medium/ high	50		Both
Magnum	White		✓	✓	High	65		Both
Bangor	Yellow/ white		✓	✓	Medium	50		Both
Jamon	Orange		✓	✓	Medium/ high	57		Both
Monro	Red		✓	✓	Low	60		Mainly grazing
Enermax	White	✓			High	70	✓	Both
Robbos	Yellow		✓	✓	Medium/ high	60		Both
Feldherr	Orange		✓	✓	Medium/ low	50		Top lifter
Brick	White	✓	✓		High	75	✓	Both
Tadorne	White				High	75	✓	Sugar beet
Tarine	Pink	✓			Medium/ high	65		Both
Fosyma	Pink	✓	✓	✓	High	65		Both
Brigadier	Orange		✓	✓	Low	45		Both
Brunium	Red	✓	✓	✓	Medium/ high	50		Both
Cagnotte	Yellow	✓	✓		High	48		Both
Lempa	Pink	✓	✓	✓	Medium	75		Both
Viridis	White	✓			Medium/ high	65	✓	Both

Forage mixtures

Growing catch crop mixtures combines the benefits of all the components whilst mitigating risk associated with growing a single species.

These mixtures are excellent for fattening lambs during autumn and can provide winter keep for all classes of stock from tupping ewes to outwintered dairy dry stock and beef sucklers. These mixtures provide a good balance of rumen degradable protein with rapidly and slowly degradable pools of fermentable energy resulting in a balanced rumen.

Rapid root

The forage rape element of this mixture ensures quick establishment and high protein yields, whilst the stubble turnips provide energy and stockholding capacity. The mixture is ideal for fattening stock.

65% Forage rape
30% Stubble turnips
5% Kale
Sow at 5kg/ha

Winter graze

A mixture of palatable, proven varieties exhibiting very good winter hardiness, which is improved by the addition of the kale.

35% Forage rape
60% Stubble turnips
5% Kale
Sow at 5kg/ha

Autumn keep

Rapid establishment and good disease resistance make this an excellent choice for autumn use.

40% Forage rape
50% Stubble turnips
10% Kale
Sow at 6kg/ha

Meat maker

A tried and tested blend designed to provide quality keep throughout the autumn and winter. More winter hardy than Autumn Keep this mixture is a simple 'one stop shop'

65% Forage rape
25% Stubble turnips
10% Kale
Sow at 5kg/ha

Extended graze
(SAM2, CSAM2, SOH4)

Extended graze is a mixture of Italian ryegrass and MainStar hybrid forage brassica. Sown in late summer or early autumn at a rate of 20-25kg/ha, this mixture can be grazed within 8 weeks of sowing and will go on to product quality forage for up to 12 months.

The regrowth potential of MainStar means that the mixture will provide multiple grazings throughout the growing season, and unlike many other hybrid brassicas with regrowth potential, MainStar grows from multiple growing points around the basal crown meaning that you don't need to leave a long stem behind post grazing to provide regrowth.

Extended Graze offers tremendous flexibility as the ryegrass element can be left in place for up to two years.

Sowing following a maize crop is possible up to 20th September.

88% Italian ryegrass
12% Mainstar hybrid brassica
Sow at 20-25kg/ha

Late lamb
(SAM2, CSAM2, SOH4)

The inclusion of varieties with improved winter hardiness makes this mixture ideal for later use. Italian ryegrass ensures the crop has improved density to help keep animals cleaner.

14% Kale/rape hybrid
14% Stubble turnips
72% Italian ryegrass
Sow at 17kg/ha

Lamb tonic

A new concept developed in New Zealand. The crop can be sown in strips or added to grass leys will provide a nutritious leafy food with high mineral content. This mixture is perennial and should last 3-4 years.

25% White clover
12.5% Ribwort plantain
62.5% Chicory
Sow at 10kg/ha

*While Winter Graze, Rapid Root, Autumn Keep and Meat Maker technically comply with the SFI SAM2 Multi Species Winter Cover Crop action, care must be taken to meet the aims of the action. Over grazing will leave bare and potentially damaged soil leading to a failure to meet the aims.

Arable silage mixtures

These mixtures offer an alternative or additional feed to grass or maize silage and are particularly suitable for farmers wishing to increase their levels of home-produced protein and reduce their reliance on purchased feed and fertiliser.

They produce a cost-effective, high-quality forage of consistent quality and palatability, with high yields of dry matter even in dry seasons and cold weather.

These crops can be ensiled in a clamp or baled. If ensiling it is advisable to use a silage inoculant that is designed to combat aerobic deterioration.

These crops can be hard to consolidate in the clamp and oxygen is quickly drawn into the clamp after opening providing oxygen for spoilage organisms.

If the mixture is to be mown and baled it is best to remove the conditioner bars from the mower to reduce grain loss. The cut crop should then be picked up heads first as the whipping motion caused by the crop entering over the pick-up reel can also lead to grain loss.

Vermin control should also be a priority as rats will quickly destroy stacked bales if allowed to.

Conventional mixtures

Pea and barley No.1
66% Spring peas
34% Spring barley

Barley pro plus No.2
50% Spring barley
20% Maple peas
20% Spring peas
10% Spring vetch

Oat pro plus No.3
50% Spring peas
25% Spring barley
25% Spring oats

Organic mixtures

Organic pea and barley No.1
35% Organic spring peas
35% Organic spring barley
30% Spring peas

Organic barley pro plus No.2
50% Organic spring barley
20% Organic spring peas
20% Spring peas or bluetooth peas
10% Spring vetch

Organic oat pro plus No.3
50% Organic spring peas
25% Spring barley
25% Organic spring oats

Silage inoculants

Key benefits

- Enhances the natural fermentation process
- Rapid pH drop
- Reduced dry matter losses
- Optimal nutrient retention

Giving nature a helping hand

Conserved forages form the bulk of most ruminant livestock's daily dry matter intake for much of the year, and as such, the quality of that forage is a major pre-determinant of enterprise efficiency.

In essence silage making is a straightforward process; cut and chop the crop, clamp, or bale it, exclude air, and let the bacteria in the clamp do the rest...simple!

However, much can go wrong, even when best practice is observed, and the knock-on effect on animal performance and farm profitability can be huge.

There are two critical points at which things can go wrong.

Ensiling

The principal objective of silage making is to achieve a rapid pH drop down to a safe and stable level. The more rapid the acidification is, the more we are able to preserve nutrients and reduce dry matter losses.

Feed-out

Once the clamp has been opened and exposed to oxygen, spoilage organisms such as yeasts and moulds will quickly become active, resulting in heating of the clamp and losses of both nutrients and dry matter.

Using an inoculant containing crop specific microorganisms influences and enhances the natural fermentation process and maintains aerobic stability in the presence of oxygen. The result is optimal preservation of dry matter and nutrients, meaning improved animal health and performance.

No matter how good you are at making silage, the results are almost always better when an inoculant is used.

Product	Crop type	Benefits
Pioneer 1188	Grass below 25% DM Grass and clover below 30% DM	• Fermentation • Animal performance
Pioneer 11A44	Grass above 35% DM with good digestibility Cereal silages	• Significantly improves aerobic stability
Pioneer 11G22 Rapid React	Grass or grass and clover 25% DM and above with good digestibility Grass or grass and clover 25% DM or above with poor digestibility Arable silages	• Fermentation • Animal performance • Aerobic stability in as little as 7 days
Pioneer 11GFT	Grass and clover 25% DM and above with poor digestability Cereal silages	• Fermentation • Animal performance • Fibre digestibility • Aerobic stability

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