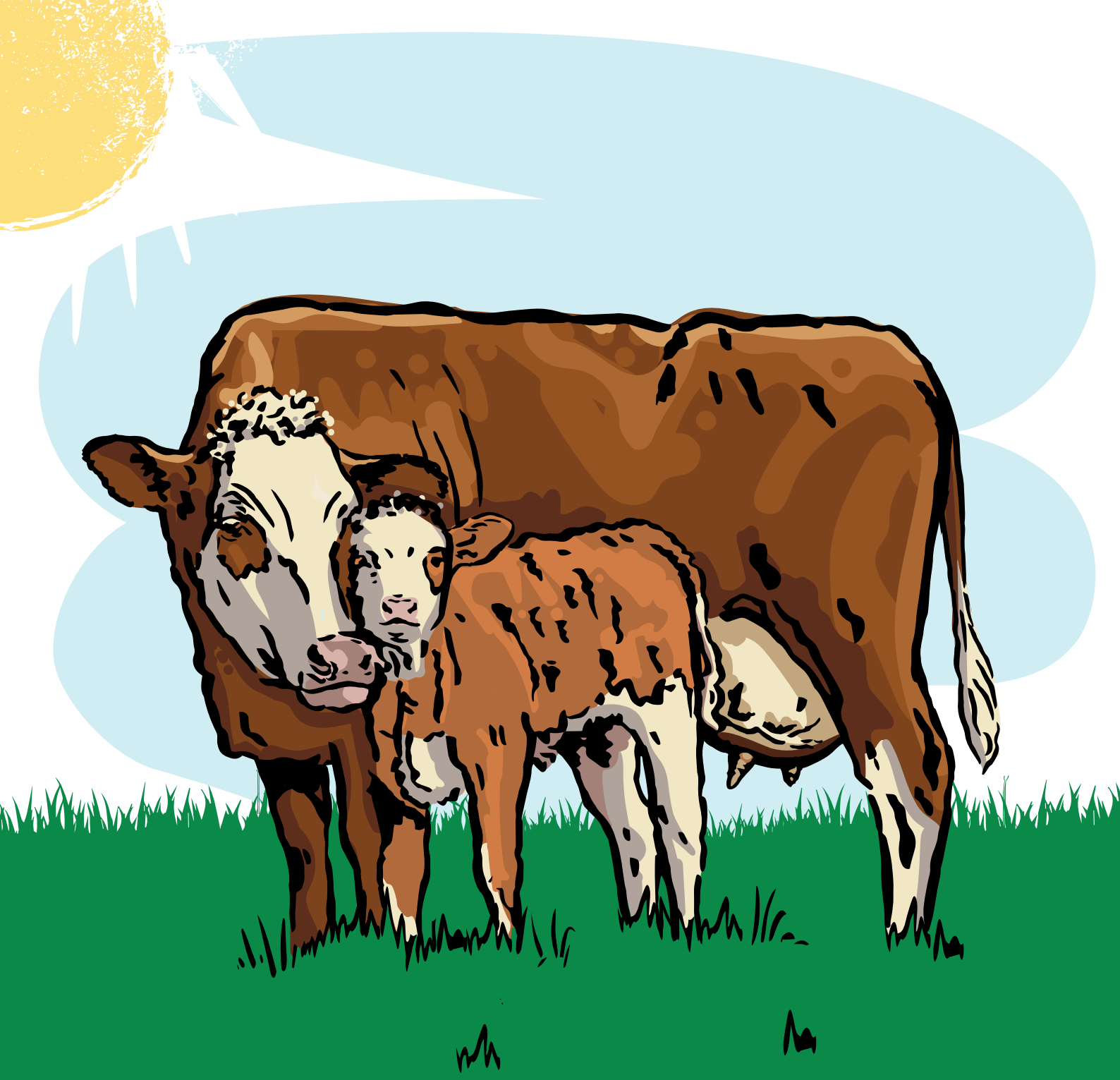


COTSWOLD Grass Seeds DIRECT

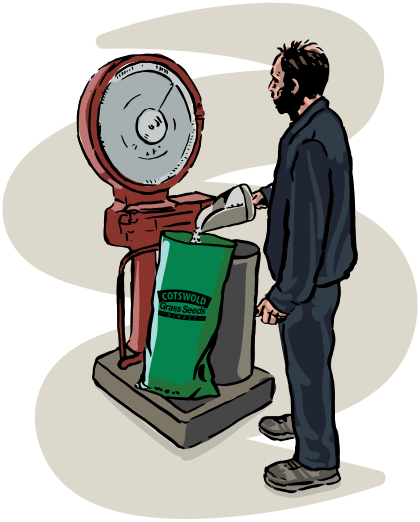
2023

SEED CATALOGUE

50TH EDITION

The right advice...

...fast delivery



...bespoke mixtures

INDEX

...what's on at FarmED?

Come and have a Field Day

at FarmED in Oxfordshire

FarmED

- Come and visit our demo farm and facilities
- Meet other farmers, agriculturalists and foodies
- Join a course or an event and bring your family
- Bring your group, we can organise a day for you
- A great excuse to get off the farm for a day!

For dates & to book online **www.farm-ed.co.uk**

Once again it is a pleasure to introduce you to the new Cotswold Seeds Catalogue for 2023. What a 12 months we have had, most notably the extreme weather and political turbulence across the world, which have contributed to a stressful growing season for many. However the rain did finally come and for most it was just in time for their autumn sowings. Although accessing some seeds was a challenge at times, the shortages were few and isolated.

The rising cost of fertiliser and the recent drought conditions have brought into our minds, once again, how important it is to choose our mixtures and species carefully. We have seen a big surge of interest in our herbal leys and low input, high clover mixtures, which is in direct response to the rising fertiliser costs and dry weather. Since artificial fertiliser can account for a quarter of farm expenditure, and with prices fluctuating to over £1000 per tonne in some cases, it is harder than ever to make a profit, let alone plan for the future.

Why buy expensive fertiliser when high clover leys provide nitrogen and drought tolerance for free?

Along with increased interest in legumes like red clover, even more encouraging is the uplift in the use of diverse mixtures and herbal leys. With their complexity comes not only free N and drought tolerance but also huge benefits for the soil, food quality, livestock health and the wider ecology of the landscape. This can help to build not only resilience in the ecosystem but also for our farm businesses, protecting and building our natural capital - the soil. If you want to find out more about how to get the most from your mixtures, come and have a field day at FarmED by joining one of our workshops or courses. Details on the pages, or check out www.farm-ed.co.uk

We continue to offer our fast mixing and delivery service, and have expanded our mixing plant with another new mixer, more staff and all important training, as well as an additional delivery capacity, so that we can provide the best possible service in our industry. Sam Lane, Lizzie Arnold and their eminently capable technical team are ready to take your call and discuss your requirements - however simple or complex they might be. Nothing is too much trouble so don't be afraid to pick up the phone or visit our website. We look forward to hearing from you.

Paul Totterdell
General Manager

Free delivery on orders over £75

Orders placed by 12 noon on the phone or online are normally despatched the same day to most parts of the UK (not weekends & stock permitting). We try and use our own vehicles for delivery where possible, and use third party carriers for all other areas. We always endeavour to mix your seed and dispatch on the day of ordering.

Payment

Account customers receive 28 days credit.

Payment can also be made by card, cheque, BACS and PayPal.

Payable to: Cotswold Seeds Ltd
Barclays Bank
Acc. no. 80278661
Sort code 20-20-15

IBAN: GB92 BARC 2020 15802786 61
SWIFTBIC: BARCGB22

T&Cs apply - available on website/invoices.

Customers can now order online with clarification of farmers group membership.

Seed varieties

In the event of shortages we reserve the right to use alternative varieties in our mixes without notice. Please check website for latest updates.

ISBN: 978-1-8380163-5-7

Grasses

Grassland is the single most important source of forage for British farmers.

Our climate is ideal for grass growth, making grazed grass easily the cheapest source of forage for livestock. In order to capitalise on this great natural resource, extensive research over many decades has improved UK grassland productivity and its on-farm utilisation dramatically.

However, of the 50 or so different types of grass found in the UK, only a handful are cultivated on any scale, with the most important outlined here.

Ryegrass, which comes in many different forms, is the most widely sown of all grasses. Ryegrasses have high sugars and respond to nitrogen fertiliser better than any other grass species. These two qualities have made it the most popular grass for silage over the last sixty years (since the Plough Up policy of WW2 and the advent of cheap nitrogen fertiliser).

Increased demand resulted in the development of new varieties lead by Sir George Stapledon at the Aberystwyth Plant Breeding Station. Other plant breeders across Europe followed suit and, as a result, we now have a comprehensive range of varieties to select from.

How Long Do Ryegrass Leys Last?

Perennial ryegrass based leys last between three and five years reliably. On good soils they can last longer, but all eventually deteriorate as unsown species such as meadowgrasses and bents increase to make up more of the sward.

There are differences within ryegrass species and between individual varieties. Generally, late heading perennial ryegrasses such as Toddington are very persistent with good ground cover. Earlier heading ryegrasses such as Kirial, a hybrid type, offer early season growth but do not persist as well.

In all circumstances, ryegrass leys should be considered temporary and should not be routinely extended beyond the duration recommended for each mixture. Over-seeding is a good way to prolong their life (see page 8).

1 Perennial Ryegrass (Lolium perenne)

This is the most persistent type of ryegrass and by far the most widely sown. It yields around 13t DM per hectare which is lower than Italian ryegrass. However, it is more flexible in use because it can be grazed or cut and made into silage, haylage or hay. There are many varieties to choose from, some are very leafy with little stem and are excellent for grazing, others have much earlier, upright growth which make them well suited to silage making. Most perennial ryegrasses last around five years or more.

2 Westerwolds Ryegrass (Lolium westerwoldicum)

Westerwolds is the highest yielding ryegrass with similar forage quality to the well known Italian ryegrass. Westerwolds is capable of extremely fast growth, is generous in response to nitrogen fertiliser and is grown largely for silage production. It is an annual, surviving for one season only. It may be sown in the autumn for production the following spring and summer, or planted in the spring for summer cropping. When sown in the spring it is ready for cutting after only 12 weeks and further growth will follow where soil moisture is plentiful.

3 Italian Ryegrass (Lolium multiflorum)

This is a short lived grass lasting for two years. It is very high yielding and reliably provides up to 18t DM per hectare on soils that suit it. (All ryegrasses yield less on light soils, especially in low rainfall areas.) It has a very open growth habit with fewer tillers than other grasses and is therefore better suited to cutting than grazing. Modern varieties offer high yields and good disease resistance.

4 Hybrid Ryegrass (Lolium x boucheanum)

This form of ryegrass is perhaps one of the best grasses available to the intensive farmer. The hybrid is a cross between the Italian and perennial forms of ryegrass and shares characteristics of both. The dominant parent determines how the variety performs in the field. Most hybrid varieties have the Italian gene dominant and the best cultivars provide the same or similar high yields as Italian ryegrass. But, as they also contain some of the persistent genes of the perennial ryegrass parent, they last longer. The genes of the perennial ryegrass parent produce a plant with more tillers and more leaf which gives increased ground cover, making it better for grazing.

Tetraploid Ryegrass

Modern plant breeding has produced tetraploid ryegrass varieties. These are available in Italian, hybrid and perennial form. With double the number of chromosomes of the standard diploid varieties their characteristics differ. Tetraploid ryegrasses are highly palatable which leads to higher voluntary intakes, of great value in seed mixtures. However, they also tiller less than diploids which means that they do not cover so much ground, leaving more soil showing. They are also less persistent. For these reasons, tetraploids should be used at low levels in long term grazing leys but can be used at higher levels in silage leys.

5 Cocksfoot (Dactylis glomerata)

Of all the grasses, cocksfoot has the deepest roots and, when grown on dry or free-draining soil, offers continued growth in dry weather while adding plenty of organic matter to hungry, thin soils. Cocksfoot provides 'early bite' in spring and quick recovery after grazing or cutting. It is very good for up to four years provided it is grazed hard as it will then remain leafy. There are some newer varieties which are leafier, with less stem, remaining palatable and therefore better for grazing.

6 Timothy (Phleum pratense)

Possibly the most important long term agricultural grass, timothy is commonly found in pasture throughout the UK. It will grow abundantly on heavy ground and, although it only has a shallow root structure, persists well on lighter land in dry years. It is very persistent and disease free. The forage it produces is acceptable to most stock and it can be made into silage and hay or grazed. Another form of timothy, smaller catstail *(Phleum bertolonii)*, is shorter, less dominant and lower yielding but is a useful component of mixtures for environmental purposes.

7 Meadow Fescue (Festuca pratensis)

A long duration grass that is often sown with timothy to provide hay or grazing. For longer term leys it is an alternative to perennial ryegrass, especially in upland areas. It will grow on nearly all soils ranging from light, brashy types to stiff clays. It has the same growth habit as perennial ryegrass and, although more persistent and drought tolerant, is slower to establish.

Festulolium

A recent development in plant breeding has produced this natural hybridisation of ryegrass and fescue, combining the stress resistant genes of fescue with the bulky yield of ryegrass, improving drought resistance with high yield.

8 Common Bent (Agrostis capillaris)

This delicately flowered grass is included in the majority of agri-environmental mixes. As it has a tiny seed it is added to mixes at low levels. It is a creeping grass and, although of little agricultural value, is very common in old grasslands. It is adaptable to most soils and is drought tolerant.

9 Creeping Red Fescue (Festuca rubra rubra)

This common grass has creeping roots which enable it to remain green in dry times and give pasture a good bottom. Sometimes this can also be a disadvantage as it stifles some of the more delicate species and should therefore be used with caution. An alternative fescue, such as sheeps, red or slender creeping red will allow the development of finer species. However, creeping red fescue is an inexpensive seed and can be included in simple mixtures, particularly those for low grade amenity use.

10 Meadow Foxtail (Alopecurus pratensis)

A tufted perennial which is widespread throughout the British Isles. It is commonly found in low-lying areas, particularly river meadows. Nutritious and palatable to stock, it is one of the first grasses to flower in the spring. When making hay, it makes a useful contribution to yields.

11 Red Fescue (Festuca rubra commutata)

Also known as chewings fescue, this is a fine leaved, tufted grass. It is distinguished from creeping red fescue by an absence of creeping rhizomes. It tolerates drought well and is common on well-drained, gravelly, chalky and sandy soils in the south. It forms a dense turf and is one of the main species used with bent to form lawns.

12 Sheeps Fescue (Festuca ovina)

The finest leaved and least aggressive fescue which allows other delicate species room to establish. It only grows to 15 – 25cm, is very hardy and can be found in all areas of the UK. Although it provides only low levels of production, the forage it produces is of reasonable quality. It will grow on most soils and tolerates low fertility situations.

13 Crested Dogstail (Cynosurus cristatus)

Traditionally a grazing grass, this compact, tufted perennial is found in abundance in sheep pastures. It is not aggressive and grows well late into the season when other grasses are giving up. It grows in most areas, even on clay soils, but is found naturally in dry areas. It has good winter greenness but is inclined to produce wiry stems if not cut or grazed.

14 Smooth Stalked Meadowgrass (Poa pratensis)

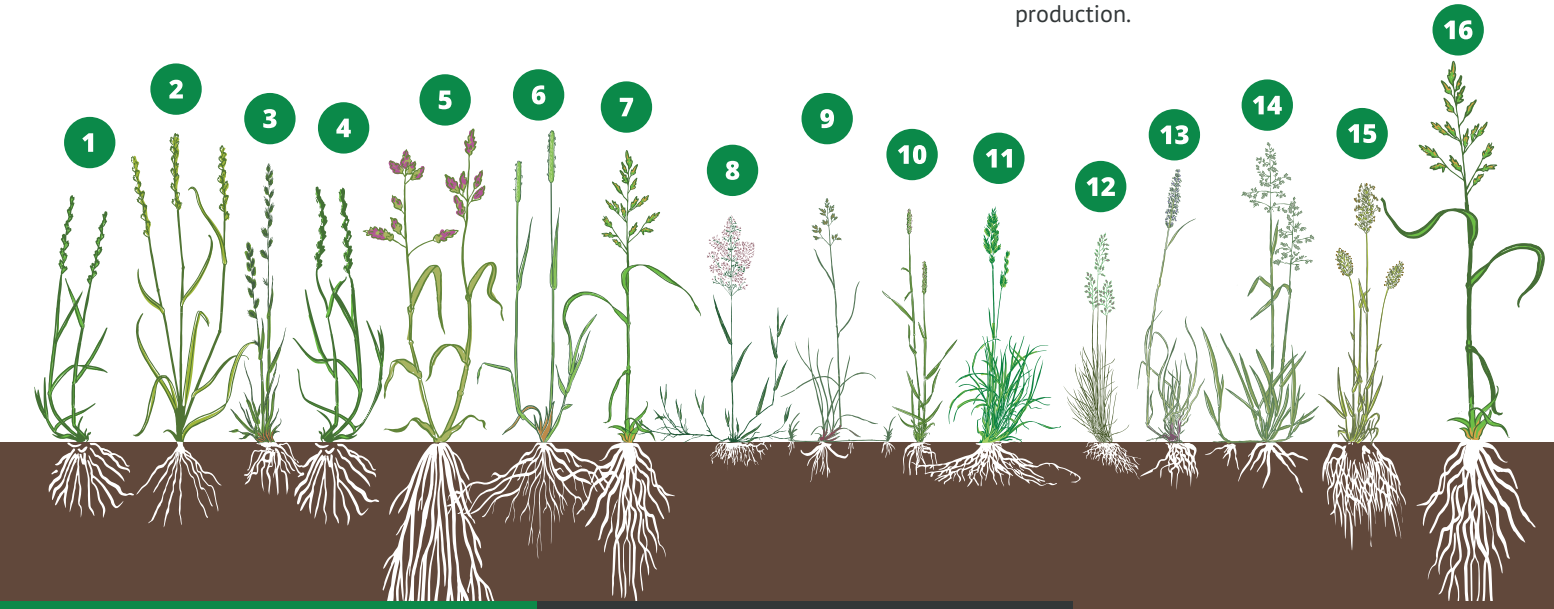
This perennial has creeping rhizomes and is very drought resistant. It is common throughout the UK, particularly on lighter soils. It should not be sown late in the autumn as it is slow to establish. Shallow sowing is also essential as the seed needs light to germinate. Early to grow in the spring, once topped or cut it tends not to re-flower so regrowth is leafy.

15 Sweet Vernal Grass (Anthoxanthum odoratum)

An early flowering grass, strongly scented with coumarin, often found in old pastures and meadows and sometimes included in seed mixtures to give scent to hay. It has a high proportion of stem to leaf and so is unpalatable to stock. It is an attractive grass but seed is expensive so is usually included at a low levels in seed mixtures.

16 Tall Fescue (Festuca arundinacea)

The largest fescue which forms sizable, dense tussocks. It can grow to six feet tall, particularly on damp or wet soils. On light soils it is drought resistant but it is less palatable than meadow fescue and so is less attractive to farmers for forage production.



Legumes

Legumes provide healthy, nutritious forage and free nitrogen.

All legumes share the ability to collect nitrogen from the air and make it available in the soil for plant growth.

Legume-rich forage is therefore low cost as it requires little or no nitrogen fertiliser. Legumes are also high in protein and, because they are particularly relished by livestock, improve animal performance.

There are twelve legumes commonly used including the true clovers, the medics, sainfoin, birdsfoot trefoil and vetches.

True Clovers

1 White Clover (Trifolium repens)

White clover is probably one of the most valuable plants in existence and is the most popular forage legume. It differs from other clovers in having a stolon (or stem) that runs along the ground. This produces edible leaves and flower heads at low levels, making it ideal for grazing. It is long lasting and drought resistant and grows on nearly all soils. White clover has received more research funding than any other legume and so is well understood. In common with most fodder legumes, it is best grown with grasses which increase total forage yield and produce a flexible sward which can be cut or grazed.

Increase livestock productivity

White clover has a high protein content at around 20-25%. Perennial ryegrass contains about 16%. Combining these two together in the field increases the overall protein content of forage by 2-3% to around 20%.

The extra protein available from clover leys has a direct impact on live weight gains. At the same time, grazing animals consume more as they find clover very palatable. This all results in animals fattening faster compared to those on non-clover leys.

A leaf size for every purpose

There is a large range of white clovers available, classified by leaf size, with the tolerance for close grazing increasing as leaf size decreases. Medium-leaved varieties, such as AberSwan and AberDai, are good for grazing, silage or hay. Large-leaved strains, such as Alice, give slightly higher yields but are less persistent when grazed and are therefore for cutting only.

2 Red Clover (Trifolium pratense)

Red clover produces a third more yield than white clover but is less persistent, only lasting for between two and four years. It is normally used to produce silage, although it can be grazed occasionally.

It is an erect and dominant plant that is best sown with aggressive ryegrasses. However, it may be included in more complex seed mixes but its inclusion rate must be low to counter its aggression. It grows on nearly all soils except acidic ones where alsike clover should be used.

Oestrogen and livestock fertility

Red clover contains oestrogen which can cause concern to livestock breeders. Freshly grazed forage causes most concern but the problem can be avoided by moving breeding animals off red clover around conception. Cattle are not normally affected but ewes should be taken off red clover at least a month either side of tupping.

Varieties

Modern plant breeding programmes have increased disease and pest resistance and improved persistence with varieties such as Milvus and Global.

There are two distinct types of red clover: early and late flowering. The former starts spring growth earlier in May followed by another growth flush. The latter flowers 10-14 days later after its one main growth period.

3 Alsike Clover (Trifolium hybridum)

A perennial which is slower to grow in the spring than red clover and is slightly lower yielding but otherwise has similar characteristics. Good for heavy and acidic soils.

4 Crimson Clover (Trifolium incarnatum)

An annual which can be sown after an early harvested cereal to provide winter sheep keep. It can also be used to give soil a fertility boost in a short period of time.

5 Persian Clover (Trifolium resupinatum)

An annual used to provide a quick boost to soil fertility on most soil types. It provides a good forage which may be grazed or conserved.

6 Berseem Clover (Trifolium alexandrium)

Also known as Egyptian Clover, this is a short term, fast growing annual clover, which quickly provides large amounts of biomass and improves soil fertility. The least winter hardy of the true clovers.

Other Key Legumes

7 Lucerne (Medicago sativa)

No one can really understand why so little lucerne (or alfalfa) is grown in the UK, when worldwide there are 13 million hectares cropped for forage. There are however a small number of UK farms now retrying this capable legume. Cut three times a year, it produces a protein-rich 14t DM per hectare without nitrogen fertiliser and on dry land.

Lucerne is a large plant with a similar erect growth habit to red clover. It is deep rooting, very drought resistant and has a yield high enough to be grown on its own. However it is usually sown with a companion grass such as meadow fescue or timothy which fill in the bottom of the crop.

Lucerne is useful to dairy farmers wanting to produce a high protein silage that is complementary to maize. It can be quite slow to establish and is only suitable for free-draining land that is not acidic.

8 Sainfoin (Onobrychis viciifolia)

Along with other forage legumes, sainfoin offers free nitrogen and extra protein content. But it has other benefits that mark it out as unique.

Sainfoin is capable of growing on the thinnest of alkaline soils, particularly the dry chalk and limestone land in the south of England. It is extremely drought-resistant and never stops growing, even in prolonged dry spells. Its root structure leaves

soil in excellent condition and sainfoin can be considered an invaluable part of a light land rotation. It penetrates soil and rock to a great depth where it seems able to extract nutrients better than any other species.

Boosting livestock production and health
Sainfoin contains tannins which aid protein absorption resulting in faster liveweight gains when compared to any other forage. This may also help reduce the amount of methane produced by ruminants, very useful from an environmental perspective. These tannins have another benefit: they mean sainfoin never causes bloat. Trials have shown that as little as 20% of sainfoin in the diet can offset the risk of bloat to near zero.

Sainfoin has a remarkable effect on wormy lambs, being a natural anthelmintic. EU projects 'Healthy Hay' and 'LegumePlus' have confirmed that feeding sainfoin disrupts the lifecycle of parasitic worms, so improving livestock performance yet further.

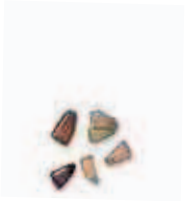
9 Sweet Clover (Melilotus spp.)
Also known as yellow blossom, this biennial which has a feed value similar to lucerne can produce huge quantities of green material in July if sown in May. It is also a very good green manure, fixing a great deal of nitrogen and adding huge amounts of organic matter to the soil.

10 Yellow Trefoil (Medicago lupulina)
This is a low growing, short-lived plant which sheds seeds freely and so regenerates itself. It is sometimes included in seed mixtures to give early spring growth which is unusual as most legumes are quite late to start growing.

11 Birdsfoot Trefoil (Lotus corniculatus)
Like sainfoin, this legume contains tannins and is best suited to poorer soils where it outperforms other legumes. Including birdsfoot trefoil in seed mixes may offer other medicinal benefits, something that is currently being researched.

12 Vetches (Vicia sativa)
This legume, also known as tares, when sown in the autumn or spring can provide one large crop for silage, and is excellent at out-competing weeds, fixing large amounts of nitrogen and improving soil structure.

Herbs



Deep-rooting herbal leys are becoming popular on many farms as they offer huge benefits to livestock and soil structure. Using deep-penetrating roots instead of diesel-consuming tractors, herbal leys are an alternative way to aerate soil.

Agricultural herbs also provide minerals, essential for normal, healthy animal growth. Single species grass swards are often found to be lacking in these micro-nutrients. Deep-rooting herbs are a rich source of these and are currently being researched by agricultural scientists. Many expert farmers consider that adding these valuable plants to seed mixtures is a logical step.

13 Chicory (Chicorium intybus)
A true 'ground breaking' plant with deep roots that can penetrate plough pans and grow well on the driest soil. This high-yielding perennial is a rich source of minerals and has althelmintic effects. It is therefore excellent for sheep or cattle threatened by intestinal parasites.

14 Ribgrass (Plantago lanceolata)
This reliable perennial herb, also known as ribwort plantain, is relatively low yielding but has deep roots and is grown for its vitamin and mineral content (especially copper, calcium and selenium).

15 Yarrow (Achillea millefolium)
Yarrow is a deep-rooting perennial and a rich source of vitamin A.

16 Burnet (Sanguisorba minor)
On light, alkaline soils this is a long lived perennial forage. All parts of the plant are palatable and it is extremely drought resistant.

17 Sheeps Parsley (Petroselinium crispum)
A short lived but useful herb, suits lighter soil types.

Over-Seeding

Over-seeding is a simple, effective and low cost way to improve worn leys or old pasture without ploughing or reseeding.

Around a quarter of the grass seed sold in the UK is used for over-seeding. This seed is sown to improve worn or damaged leys and for patching up recent sowings which have not taken well.

To many farmers, over-seeding has advantages over the plough. It's cheap, quick and low risk, with existing grass being retained and improved without loss of forage or time.

Not all grasses and clovers are suitable for over-seeding. The best results come from the large seeded and vigorous strains of tetraploid ryegrass.

The best results come from the large seeded and vigorous strains of tetraploid ryegrass.

Of these, the Italian and hybrid forms are the quickest and best for cutting, with perennials being ideal for grazing leys.

White clovers usually give good results when sown into warm, moist soils especially where careful post-sowing grazing management is practiced.

Over-Seeding
Chipping Norton
15th September

Sowing and Growing

Suitable soils and optimum pH
Over-seeding can be beneficial on most soil types. Routine monitoring of pH levels will allow for any necessary corrections to be made.

When to sow
When soil temperatures are above 7°C, usually between March and September. Sufficient soil moisture is vital. Avoid seeding into competitive swards during May and June when excessive grass growth will smother new seedlings.

How to sow
Broadcast or shallow drill into recently grazed or cut leys. Before sowing, create a tilth using a chain or comb harrow. After sowing, roll thoroughly using a ring or flat roller, or tread in with sheep. Grass drills such as the 'Moores' or 'Aitchison' can be used. Cereal drills should be avoided as they can sow the grass seed too deep. Clover should never be sown deeper than 1cm. Spinners such as the 'Stocks' are good for applying small quantities of clover.

Management
Gentle grazing should be resumed around five weeks after sowing. Cattle or sheep may be employed, but sheep should not be left on for long as they will graze too close, damaging new seedlings. Although cattle exert more pressure on the ground, they do not bite so accurately or as close and are the preferred choice provided that dry ground conditions prevail.

Nutrient requirements
N fertiliser applications should be delayed until the new grass or clover seedlings are well established and able to tolerate the competitive growth that fertiliser brings. P and K levels should be maintained at ADAS Index 2.

Grass | Legume | Herb

Mixes: Ryegrass

Ryegrass Over-Seeding
Short Term 2-3 Years

Code: MIXOS

Ideal for the short term improvement of silage leys. The mixture is very competitive and provides good early spring growth. First cut is usually taken between the second and third weeks of May.

- 7.00 kg certified HUNTER tet. Italian ryegrass
- 3.00 kg certified ABEREVE tet. hybrid ryegrass

10.00 kg/acre - £34.25 25.00 kg/ha - £85.63

Ryegrass Over-Seeding
Longer Term 4-5 Years

Code: MIXOSL

A flexible mixture for grazing or cutting fields which require longer term improvement. The grasses will provide growth from spring through the summer.

- 5.00 kg certified ABEREVE tet. hybrid ryegrass
- 5.00 kg certified CALIBRA tet. perennial ryegrass

10.00 kg/acre - £44.10 25.00 kg/ha - £110.25

Ryegrass & Clover Over-Seeding
Longer Term 4-5 Years

Code: MIXOSLC

A combination of ryegrasses and a half-rate of persistent clovers, this mixture can be grazed by sheep or cattle and can also be cut for silage.

- 4.50 kg certified ABEREVE tet. hybrid ryegrass
- 4.50 kg certified CALIBRA tet. perennial ryegrass
- 0.80 kg certified MERWI white clover
- 0.20 kg certified S184 wild white clover

10.00 kg/acre - £55.12 25.00 kg/ha - £137.80

Additions

Bottom grass
The addition of a bottom or grazing-type ryegrass can help to fill in the sward in open leys.

Add 2kg of grazing ryegrass **£11.30 per acre**

Mixes: Clover and herbs

White Clover Over-Seeding
Long Term Grazing

Code: MIXOSC

This persistent mixture combines medium and small leaved clovers which provide grazing for sheep or cattle. It may also be used for silage making.

- 1.10 kg certified MERWI white clover
- 0.50 kg certified ABERPEARL white clover
- 0.40 kg certified S184 wild white clover

2.00 kg/acre - £34.25 5.00 kg/ha - £85.63

White Clover Over-Seeding
Dairy Graze or Silage

Code: MIXOSCD

Using highly productive medium and large leaved white clovers this mixture is ideal for dairy grazing or silage making. It can also be grazed by sheep occasionally if required.

- 1.00 kg certified ABERSWAN white clover
- 1.00 kg certified BARBLANCA white clover

2.00 kg/acre - £34.85 5.00 kg/ha - £87.13

Herbal Over-Seeding
Deep-Rooting Herbal ley

Code: MIXHOS

Deep rooting herbal leys are becoming more and more popular. Grass-only swards lack protein rich clovers and mineral rich herbs. Ideally, herb-rich swards are best established by reseeding but where this is not possible this mixture can be oversown into a grass-only sward.

- 0.60 kg certified DIPLOMAT red clover
- 0.50 kg certified MERWI white clover
- 0.40 kg certified LEO birdsfoot trefoil
- 0.30 kg certified AURORA alsike clover
- 0.20 kg certified S184 wild white clover
- 1.40 kg commercial sainfoin
- 0.55 kg burnet
- 0.40 kg certified PUNA II chicory
- 0.30 kg sheeps parsley
- 0.25 kg certified ENDURANCE ribgrass
- 0.10 kg yarrow

5.00 kg/acre - £61.69 12.50 kg/ha - £154.23

Hay Leys

Grass only hay leys that offer high quality and bulk.

Grass

Sowing and Growing

Suitable soils and optimum pH

The ryegrass based leys are best suited to fertile and moisture retentive soils. Ryegrass can suffer on drought prone soils, so an option on dry land could be to add a deeper rooting, inexpensive festulolium plant to the mixture - please enquire when ordering.

When to sow

The crop should be sown August-September to provide good yields the following spring. Except for the westerwold hay mix, these mixtures won't put on a seedhead when sown in the spring.

How to sow

A non-selective herbicide should be used before seedbed preparation. Drill into a fine firm seedbed and try to avoid drying the soils out with excessive cultivations in dry autumns. Rolling to retain moisture and break down clods before and after sowing with a Cambridge or flat roller is essential. Broadcast seed should be harrowed lightly after sowing and before rolling.

Management

Annual weeds should disappear as the new seeds begin to take over, or they can be grazed out with stock. Cutting usually begins in late June and takes place before and during flowering. Graze excess growth after the required cut has been taken by November to avoid winter kill.

Nutrient requirements

These leys should receive 70kg ha of nitrogen. Excessive applications of nitrogen can cause the plant to become sappy and difficult to dry. As cutting and removing depletes P and K levels, they should be maintained around ADAS index 2.

Mixes

Westerwold Hay Mix

One Year Ley — Code: MIXWWH

This flexible cutting option, produces a short term, clean, high quality hay, due to its rapid growth and high biomass it can be difficult to dry properly. This mix has been designed to include high levels of diploid westerwold which contains less moisture and dries evenly, speeding up the hay making process.

- 9.80 kg certified ESTANZUELA westerwold ryegrass
- 4.20 kg certified POLLANUM westerwold ryegrass

14.00 kg/acre - £45.50 35.00 kg/ha - £113.75

Mixes

Hard Horse Hay

Two Year Ley — Code: MIX9

Devised specifically for the production of hay or haylage. With good disease resistance it produces a consistent sample of hard hay. Although grazable, it's principally a cutting ley. Sow in autumn to provide stemmy hay the following spring.

- 8.00 kg certified HUNTER tet. Italian ryegrass
- 6.00 kg certified SHAKIRA Italian ryegrass

14.00 kg/acre - £46.80 35.00 kg/ha - £117.00

Hay and Graze

Four Year Hay/Haylage Ley — Code: MIXHG

A longer term option for the hay & haylage producer with upright hybrid ryegrass and longer lasting perennial ryegrass. Diploid varieties are included for faster drying. Sow in autumn to provide a crop the following spring, or cut earlier in the year for haylage. Also provides high quality summer & autumn grazing.

- 5.50 kg certified PIROL dip. hybrid ryegrass
- 5.50 kg certified BOYNE perennial ryegrass
- 2.00 kg certified WINNETOU timothy

13.00 kg/acre - £69.95 32.50 kg/ha - £174.88

Traditional Hay Maker

Long Term Hay Ley — Code: MIXHM

Slower to establish than a straight ryegrass ley but will provide good quality, bulky hay crops with low disease levels for many years. Once cut it can be used for aftermath grazing.

- 5.30 kg certified BOYNE perennial ryegrass
- 5.00 kg certified SENU meadow fescue
- 2.70 kg certified WINNETOU timothy

13.00 kg/acre - £92.00 32.50 kg/ha - £230.00

Additions

Sweet vernal grass

To create a softer, sweeter smelling meadow hay.

Add 0.1 kg of sweet vernal grass **£6.85 per acre**

Silage

Good silage comes from a good ley.

Good silage depends on many factors. These include appropriate fertiliser applications, growth stage when cut and how the crop is wilted and stored. But the most important factor is to select the right crop species and varieties to suit the soil type from the start.

Ryegrass leys

Ryegrass in all its forms (see page 4) has been the building block of short term silage leys for the last 60 years. With the various high yielding types such as westerwolds, Italian, hybrid and perennial lasting between one and five years, there is a ryegrass variety to suit every system. Highly responsive to nitrogen, ryegrass-based swards produce palatable silage that increases milk and meat production.

Red clover leys

With its high yields, forage quality and suitability for silage, red clover swards are playing an increasingly important role in sustainable systems of grassland farming, especially now nitrogen prices are so high.

At 19% crude protein, red clover's nutritional value is higher than grass' and its high voluntary intake leads to enhanced animal performance.

Thriving on most soils, its ability to 'fix' atmospheric nitrogen in the root nodules (an average of 200kg N/ha), offers a saving on manufactured nitrogen fertiliser.

Red clover is tolerant to winter cold and, due to its deep rooting characteristic, is drought resistant. Used as a break crop it will improve soil structure and fertility while also giving excellent forage yields.

Lucerne

At 20% protein lucerne is an attractive feed. It is a good complement to maize and is leafy and low in fibre, breaking down rapidly in the rumen and passing out quickly, allowing a greater intake of forage than many other species. Lucerne has significant benefits but few people grow it believing, incorrectly, that it is a difficult crop to maintain.

Sainfoin

Sainfoin performs better than any other crop on thin, dry, calcareous and brashy soils. This remarkable plant is extremely drought resistant with its deep-penetrating roots. In addition, it needs no nitrogen fertiliser and very little phosphate. It offers a protein-rich forage with medicinal qualities that will appeal to all types of livestock farmer.

Great Silage, Great Soil

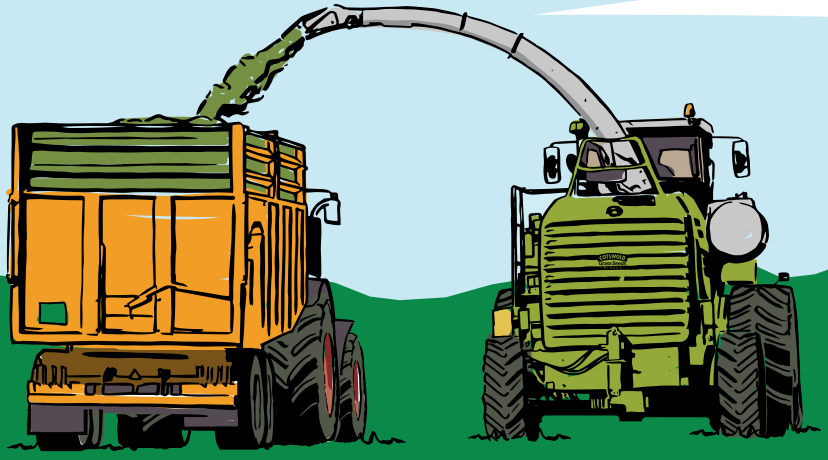
Short term leys are beneficial in arable rotations and are a solution on the many farms with deteriorating soil structure.

Ryegrass leys produce a large amount of root mass in a short time which improves soil structure when it decays at the end of the ley's term. Deep-rooting legume-based leys are also excellent at improving soil, and have the additional benefit of fixing nitrogen, invaluable at a time of rising fertiliser prices.

These leys are also effective in the battle against blackgrass as a one, two or three year ley breaks the lifecycle of this weed, so benefiting subsequent crops.

Vetch

This is a short term annual with a high protein and mineral content. Vetch is fast to grow and can be sown alone for silage or grazing and is also suitable for mixing with cereals such as oats for whole-crop silage. Quick to establish, it can also be sown with grass and clover mixes to produce extra yield.



Intensive Silage

Short and medium term leys that provide the highest yields for silage.

In these leys the various types of ryegrass (see page 4) have been combined to produce high-yielding quality silage crops lasting between one and five years. The characteristics of individual varieties have an impact on the timing of the first cut and the potential number of cuts per year. There is also the potential to graze the aftermath with many of these mixtures.

One year bulk

There has been a sharp increase in the use of Westerwolds. Rapid in establishment and quick to produce bulk, these leys are very useful for producing early grazing and silage from autumn sowings. They can also be sown in the spring on moisture-retentive soils to provide heavy summer silage crops.

Unlike other ryegrasses, westerwolds will produce a stem and seed head from a spring sowing. This is useful, especially for the production of high quality horse hay.

High yield, high quality

Our two to five year seed mixtures are formulated for the focused and intensive farmer who requires silage and grazing leys to have a direct impact on milk or meat production.

In these economic times, the need to maximise milk and meat from efficient forage production is clear. Our mixes are therefore designed to combine exceptionally good yields with the highest nutritive value.

Emphasis is placed on achieving optimum D-value at the time of utilisation, as well as high soluble carbohydrate content. Grass varieties in these mixtures give ultimate performance and are highly rated for overall disease resistance which will improve both yield of grass and palatability of forage.

What is festulolium?

Festulolium is a natural hybridisation of ryegrass and fescue species, combining the stress resistant genes of fescue with the bulky yield of ryegrass. It provides a more resilient species, with a better tolerance of drought or water logged soils, while still providing high yielding, very palatable forage. Festulolium is generally an upright grass, suitable for cutting.

Sowing and Growing

Suitable soils and optimum pH
Ryegrass is best suited to fertile and moisture-retentive soils and will tolerate slightly acidic pHs (6.2-6.5).

When to sow
Highest yields come from autumn sowings (August-September). Spring sown crops (March – May) are dependent on sufficient moisture and should be avoided in drought-prone areas.

How to sow
Drill in two directions into a fine, firm seedbed at 10-20mm. Rolling with either a Cambridge or flat roller before and after sowing is recommended. Broadcast seed should be harrowed lightly after sowing and before rolling.

Management
When spring sown these leys can be ready for cutting after only 12 weeks. A further two cuts can follow on soils that have adequate moisture and N. Early cuts just prior to heading will give high D-values and good regrowth. Cut frequently to encourage high D-value leafy growth. Graze excess growth by November to avoid winter kill.

Nutrient requirements
100kg N/ha for the first cut with 60-80 kg of N applied per subsequent cut. As cutting depletes P and K levels, these should be maintained at ADAS Index 2.

Yield potential

Westerwolds:	18t DM/ha
Italian ryegrass:	18t DM/ha
Hybrid ryegrass:	14t DM/ha
Perennial ryegrass:	13t DM/ha

Typical silage analysis has a dry matter of 30%, a crude protein of 16%, a D-value of 70 and an ME of 11MJ.

Grass | Legume

Mixes

Quick Bulk Westerwolds

Intensive One Year Ley

Code: MIXQB

A very fast growing ley which can be sown in the spring or autumn and is primarily grown to produce silage. However, it can be grazed and the crop can provide 'early bite' when sown in the autumn. It is therefore a cheap alternative to cereal rye which was formally grown for this purpose.

- 7.00 kg certified JIVET westerwolds ryegrass
- 7.00 kg certified POLLANUM westerwolds ryegrass

14.00 kg/acre - £45.50 35.00 kg/ha - £113.75

Festulolium Silage Ley

Two Year Dry Land Ley

Code: MIXAF

This mix contains one of the festulolium varieties on the UK recommended list. It is a hybridisation of Italian ryegrass and meadow fescue, combining the bulky yield of Italian ryegrass with the stress resistant genes of fescue. An improved mixture for dryland, showing better resilience during the dry summers. Both species will head in the third week of May and can be relied on for 2 years.

- 10.00 kg certified ABERNICHE festulolium
- 4.00 kg certified HUNTER tet. Italian ryegrass

14.00 kg/acre - £59.80 35.00 kg/ha - £149.50

Westerwold and Vetch

Six Month Ley

Code: MIXWWV

A good balance between a vigorous grass and a fast growing short term legume, this mixture can be used to provide a very large cut or early spring grazing. As westerwolds will regrow after cutting this ley can be left for a further cut or grazed if required. To minimise the risk of ryegrass seed being shed, it is advisable to cut before the seed heads are visible.

- 8.00 kg certified POLLANUM westerwolds ryegrass
- 17.00 kg certified CANDY vetch

25.00 kg/acre - £73.75 62.50 kg/ha - £184.38

Mixes

Maximum-Yield

Two Year Silage Ley

Code: MIXA

Optimum balance between the highest quality and yield for silage, Maximum-Yield produces the all-important first cut between the second and third week of May. At this time the grasses will have high D-values and soluble carbohydrate content which ensures good silage fermentation.

- 10.50 kg certified HUNTER tet. Italian ryegrass
- 3.50 kg certified SHAKIRA Italian ryegrass

14.00 kg/acre - £46.80 35.00 kg/ha - £117.00

Hybrid Silage Ley

Three - Four Year Ley

Code: MIXB

Early growth, high yields and good persistence make hybrid ryegrasses worth considering when the ley is expected to remain down for more than two years. Utilising excellent hybrid varieties, this ley is comparable, in terms of output, with Italian ryegrass. It should also be noted that the grazing potential of this ley is superior.

- 6.00 kg certified ABERECHO tet. hybrid ryegrass
- 6.00 kg certified ABEREVE tet. hybrid ryegrass
- 2.00 kg certified TODDINGTON perennial ryegrass

14.00 kg/acre - £61.00 35.00 kg/ha - £152.50

Maximum D-Value

Four - Five Year Silage Ley

Code: MIXC

Maximum feed value can only be obtained from well made high D value silage. This ley will provide optimum digestibility and yield during the third week of May. Yields are boosted by utilising hybrid ryegrass with high quality Aberwolf perennial ryegrass, noted for it's very good D-value on the recommended list and providing good summer and late season grazing.

- 6.00 kg certified ABERCLYDE tet. perennial ryegrass
- 4.00 kg certified ABERWOLF perennial ryegrass
- 2.00 kg certified ABEREVE tet. hybrid ryegrass
- 2.00 kg certified ABERECHO tet. hybrid ryegrass

14.00 kg/acre - £71.35 35.00 kg/ha - £178.38

Additions

White Clover

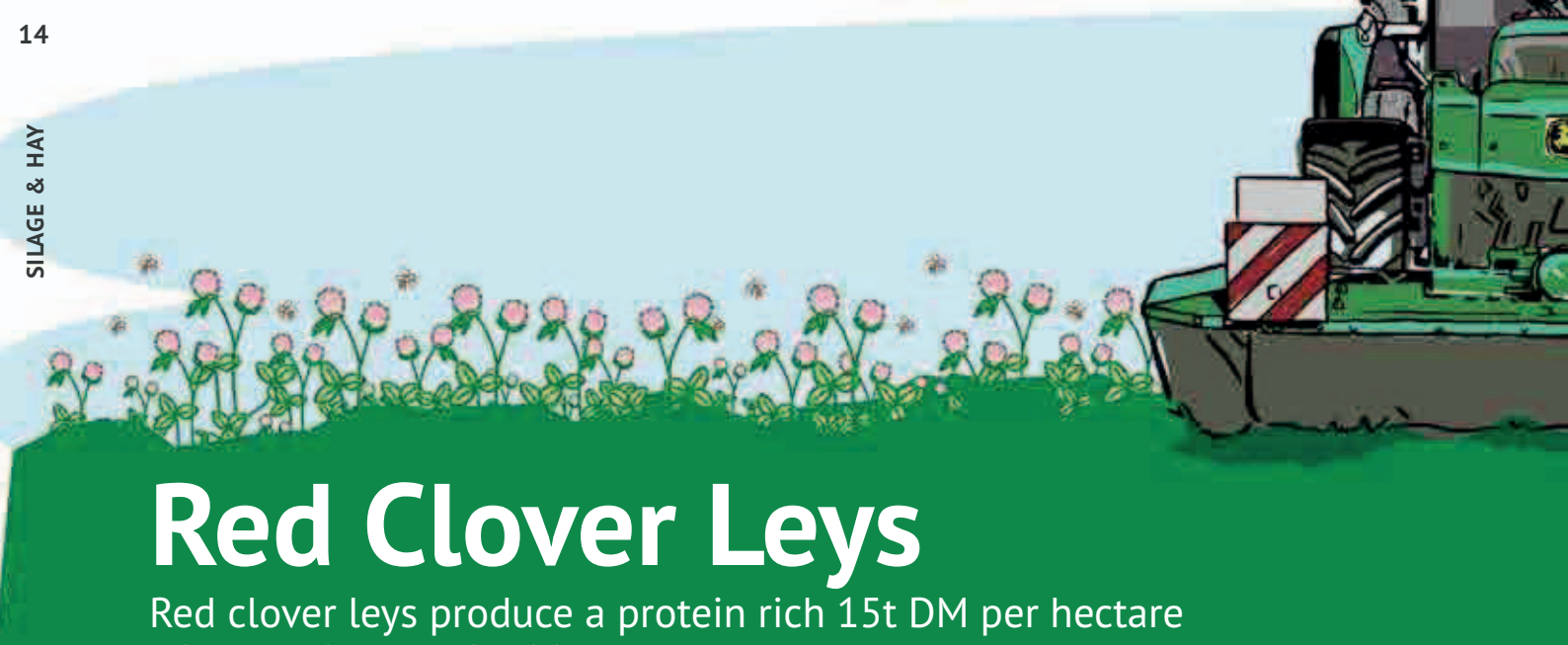
White clover can be added to improve nutritional value.

Add 1kg of white clover **£16.95 per acre**

Festulolium

Swap ryegrass for festulolium for improved drought tolerance.

Please call for advice



Red Clover Leys

Red clover leys produce a protein rich 15t DM per hectare without nitrogen fertiliser.

Red clover produces silage with a 2-3% higher protein content than a grass-only equivalent. This, combined with its high intake characteristics, leads to improved milk and meat production.

Red clover is drought tolerant and like many fast-growing legumes it's able to 'fix' up to 250 kg N/ha. To provide enough free nitrogen for a successful crop, legumes need to be included at high proportions in a mixed sward.

Legumes do not fix nitrogen all year round. For this natural chemistry to occur, the soil needs to be warm and, in the UK, this usually means that nitrogen fixation occurs between April and September.

With or without grass?

Red clover can be sown as a monoculture at 5-6 kg/acre for silage, but a mixture with grasses is preferable since this gives higher total forage yield and makes better silage. Mixtures of 9 kg/acre grasses and 3 kg/acre red clover are commonly sown to provide the correct balance. A pure stand of red clover generally yields lower than the grass and clover mixture at about 5-6t DM/ha.

For a one or two year ley Italian ryegrass is an excellent component, but for a duration of three years or more a mixture of hybrid and perennial ryegrass is a better option.

To allow full expression of the red clover, it is best to use tetraploid varieties of ryegrass since they tiller less densely than diploids. Their early-season growth also coincides with the flowering pattern of the red clover. They are then at the same maturity stage and digestibility is similar.

Red Clover Ley
Gloucestershire
30th May

What you need to know about oestrogen

When it comes to sheep grazing red clover leys there is one question that keeps coming up. Will the oestrogen in red clover affect ewe fertility? Red clovers contain varying amounts of this compound and some sheep farmers are concerned that it may lower conception rates. This is possible, but with the right management it is unlikely that red clover will be of much concern to breeders. To be clear, oestrogen in red clover has no known detrimental effects on fattening lambs. It is when it is fed to breeding ewes caution should be exercised.

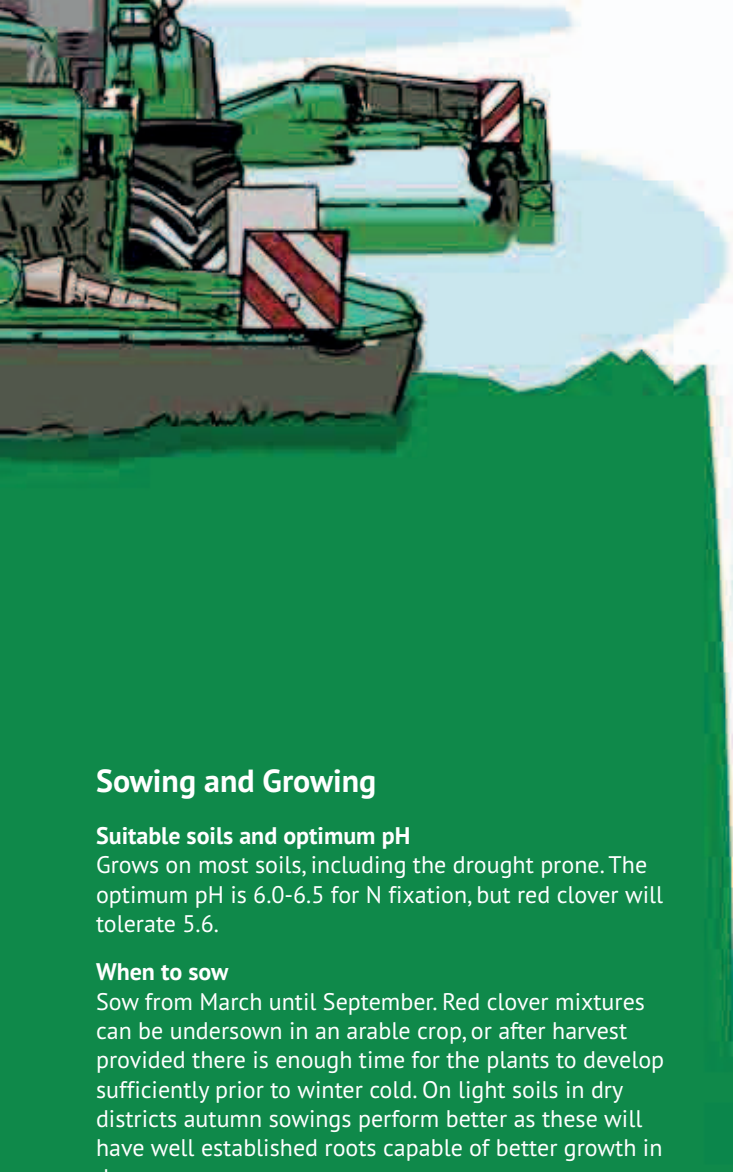
If leys contained only red clover then it is possible that ewe fertility could be reduced. But there are relatively few confirmed cases and it is common practice to avoid flushing ewes on leys that contain low levels or no red clover. This is safe.

Oestrogen from red clover leys is very mobile and does not remain long or accumulate in the blood. Also once ewes are in lamb it may be considered safe to graze or feed red clover silage. It is worth noting that red clover in silage also contains oestrogen.

Plant breeders are possibly able to offer a solution. Back to the variation in plants. Just as there is variation in yield and persistence there is also variation in oestrogen content. Some varieties have been identified as containing low levels of oestrogen. Now this might sound like a great solution to a potential problem but whilst some do contains less, they can be significantly lower yielding than top rated varieties.

This presents a problem when choosing a variety. However there will be instances where yield is less important. For example low input and organic farmers often have more acreage under red clover. They rely on them more than conventional farmers and there may be a case to use low oestrogen red clovers so that ewes can be tupped on red clover leys on these farms. Plant breeders including those at Aberystwyth are currently working in this area and so it is possible that given time, seed of higher yielding, low oestrogen red clover varieties may become more widely used.

The considerable benefits of high protein, drought tolerance and free nitrogen fixation should more than make up for any concerns about oestrogen.



Sowing and Growing

Suitable soils and optimum pH
Grows on most soils, including the drought prone. The optimum pH is 6.0-6.5 for N fixation, but red clover will tolerate 5.6.

When to sow
Sow from March until September. Red clover mixtures can be undersown in an arable crop, or after harvest provided there is enough time for the plants to develop sufficiently prior to winter cold. On light soils in dry districts autumn sowings perform better as these will have well established roots capable of better growth in dry seasons.

How to sow
For sound establishment, a well cultivated, firm, level seedbed is needed to ensure that the small clover seeds are drilled uniformly at a shallow depth of 10-15 mm. The use of a roller prior to and after sowing is essential.

Management
The competitiveness of red clover against weeds is low at the early establishment phase particularly if sown alone.

Topping is of value and 'clover-safe' herbicides are available, though they can check red clover development to some degree. To avoid clover sickness (a combination of soil-borne sclerotinia and stem eelworm) a five year gap should be allowed between leys containing red clover.

Nutrient requirements
Red clover will fix its own N, but P and K levels must be maintained at an ADAS Index 2. A small quantity of N can be applied in the autumn or early spring to enhance initial growth. This should not exceed 25kg N/ha.

Yield potential
Forage yield in the establishment year of a spring-sown sward is circa 60% of that possible in the first harvest year which should be around 15t DM/ha.

The yield is spread over 2-3 cuts per year. Typical silage analysis has a dry matter of 30%, a crude protein of 19%, a D-value of 72 and an ME of 12MJ.

Mixes

Grass | Legume

Fast and Vast

One - Two Year Mixture

Code: MIXFV

This short term ley is for those wishing to produce a large amount of forage with little or no nitrogen fertiliser. Yields are high, especially on rich, moist soils and the majority of crops are made into silage. In addition to red clover, the mixture also contains crimson clover and vetch which increase yield over a short period of time. It can be relied upon for one full year of production or left down for a second.

- 10.00 kg certified CANDY vetch
- 2.00 kg certified GLOBAL red clover
- 1.00 kg certified HEUSERS OSTSAAT crimson clover
- 4.50 kg certified HUNTER tet. Italian ryegrass
- 4.50 kg certified SHAKIRA Italian ryegrass

22.00 kg/acre - £85.50 55.00 kg/ha - £213.75

Short Term Red Clover Ley

One - Two Year Mixture

Code: MIXCG03

An intensive silage ley lasting for up to two years which requires little or no nitrogen fertiliser. First cut is to be expected during the third week of May.

- 3.00 kg certified GLOBAL red clover
- 6.00 kg certified HUNTER tet. Italian ryegrass
- 3.00 kg certified SHAKIRA Italian ryegrass

12.00 kg/acre - £61.20 30.00 kg/ha - £153.00

Longer Term Red Clover Ley

Three Year Mixture

Code: MIXCG06

Persistent and high yielding, this ley is tried, tested and highly successful. It is usually cut in the third or fourth week of May and incorporates the best red clover with hybrid and perennial ryegrasses, giving yields nearly as high as our two year red clover ley.

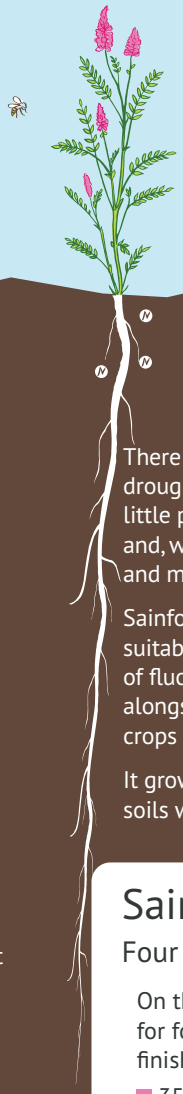
- 3.00 kg certified DIPLOMAT red clover
- 3.50 kg certified ABEREVE tet. hybrid ryegrass
- 3.50 kg certified ABERECHO tet. hybrid ryegrass
- 2.00 kg certified CALIBRA tet. perennial ryegrass

12.00 kg/acre - £69.15 30.00 kg/ha - £172.88

Additions

Vetch
Vetch may be added to red clover and ryegrass mixes to increase yield in the first growing season.

Add 10kg of vetch **£29.50 per acre**



Sainfoin

High yielding silage or hay crop with occasional grazing for dry, alkaline soils. Bloat free and a natural anthelmintic.

There are few crops quite like sainfoin. It is a high-yielding, drought-resistant plant which needs no nitrogen fertiliser and little phosphate. It won't cause bloat, is a natural anthelmintic and, with rumen-protected protein, produces top quality meat and milk.

Sainfoin has deep-penetrating roots making it highly suitable for the dry, alkaline soils of England. In these times of fluctuating fertiliser, feed and veterinary drug prices, alongside increased demands for sustainability, there are few crops that tick as many boxes.

It grows best on stony brash or chalks, but does not like wet soils where red clover should be chosen in preference.

Sowing and Growing

Suitable soils and optimum pH
Performs best on free-draining alkaline soils. Do not sow on land below 6.2pH.

When to sow
Always sow sainfoin into warm soils in the spring.

How to sow
Sainfoin seed can be undersown to spring cereals or direct drilled in April or May at around 30mm. If undersown, the cereal sowing rate should be reduced to 40 kg/acre.

Management
A sainfoin ley should be managed carefully to maximise performance. Sainfoin produces a cut of silage in early June or hay may be taken if preferred. Sainfoin should be cut during early flowering but this may be delayed without much loss of feed value if needed. Regrowth is less after the first cut and may be cut again or grazed. Grazing should be light and quick to avoid damage to the plant. Never set stock it or it will become thin.

Nutrient requirements
Sainfoin requires no N or P but K levels must be maintained at ADAS Index 2 to safeguard yields.

Yield potential
14t DM/ha annually. Typical silage analysis has a dry matter of 14%, a crude protein of 18%, a D-value of 62 and an ME of 9.5 MJ. However, sainfoin produces better results than this analysis indicates as its high tannin content protects the protein in the rumen so increasing absorption and producing higher liveweight gains.

Sainfoin

Four Year Cutting or Grazing

Code: SAI

On the right ground this is a superb crop. Lasting for four years or more, it is extremely valuable for finishing lambs.

- 35.00 kg commercial sainfoin

35.00 kg/acre - £124.25 87.50 kg/ha - £310.63

Companion Grass Option

Four Year Mixture

Code: MIXLUC

We recommend the use of a non-competitive grass mixture to be sown with sainfoin. The grass fills the base of the crop, increasing yield and soluble sugars to improve silage fermentation. The grass seed element should be surface sown and rolled in.

- 2.00 kg certified SENU meadow fescue
- 1.00 kg certified WINNETOU timothy

3.00 kg/acre - £24.40 7.50 kg/ha - £61.00

Sainfoin & Lucerne Field Day

A practical workshop

FarmED

- For farmers wanting protein from dry land
- Understand more about these N fixing legumes
- How to choose between sainfoin and lucerne
- Seeds, sowing, establishment and management

For dates & to book online **www.farm-ed.co.uk**

From £60 per person **Groups welcome**

For more information on sainfoin, please download our growers guide - **Sainfoin - Surprising science behind a forgotten forage.**

Visit cotswoldseeds.com to download your copy.

Grass | Legume

Lucerne

Reliable yields for silage on dry gravels.

Lucerne is highly productive and reliably provides three to four cuts of protein-rich silage annually, even through drought, and lasts for around five years. Lucerne must be grown on naturally alkaline and free draining soils or gravel. It is slower to establish than ryegrass and does require careful management but, if agronomic guidelines are followed, there is nothing complicated about it.

Hay time
Oxfordshire
10th June

Lucerne

Four Year Cutting Crop

Code: MARSH

Lucerne should be sown as a four or five year temporary ley. For specialist use it may be made into hay for the equine market where it is known as alfalfa.

- 8.00 kg certified TIMBALE lucerne

8.00 kg/acre - £79.20 20.00 kg/ha - £198.00

Companion Grass Option

Four Year Mixture

Code: MIXLUC

We recommend the use of a non-competitive grass mixture to be sown with lucerne. The grass fills the base of the crop, increasing yield and soluble sugars to improve silage fermentation. The grass seed element should be surface sown and rolled in.

- 2.00 kg certified SENU meadow fescue
- 1.00 kg certified WINNETOU timothy

3.00 kg/acre - £24.40 7.50 kg/ha - £61.00

Sowing and Growing

Suitable soils and optimum pH
Gravels and free-draining soils with a pH 6.5-8.

When to sow
Lucerne must be sown into warm soils and is often undersown to a spring cereal crop as it is slow to establish. Reducing the cereal seed rate by a third and cutting it as arable or wholecrop silage will give lucerne the best start. Alternatively, sow in the summer following an early-harvested cereal such as winter barley. The middle of August is the latest date for sowing.

How to sow
The seed of lucerne is small and needs to be sown to a maximum depth of 15mm otherwise a patchy, thin crop will result. Roll before and after sowing to help achieve fast germination and weed competitiveness. Sowing with a companion grass mix helps out-compete weeds enabling lucerne leys to be left down for longer. Herbicides exist but are limited and you should obtain a clean seedbed prior to sowing.

Management
Following a direct spring sowing a light cut may be taken in mid August. From a summer sowing or an undersowing there will be little to cut in the first year. Leave until the following spring when it should be cut for the first time in early June at almost full flowering. Thereafter cut at the bud stage as this provides the ideal balance between yield and quality. Two or three further cuts follow at six week intervals. After cutting, the crop needs wilting so that it contains less than 70% moisture when made into baled silage. Hard or frequent grazing should be avoided especially during its first year as the crop will not tolerate it. Lucerne can also cause bloat when grazed.

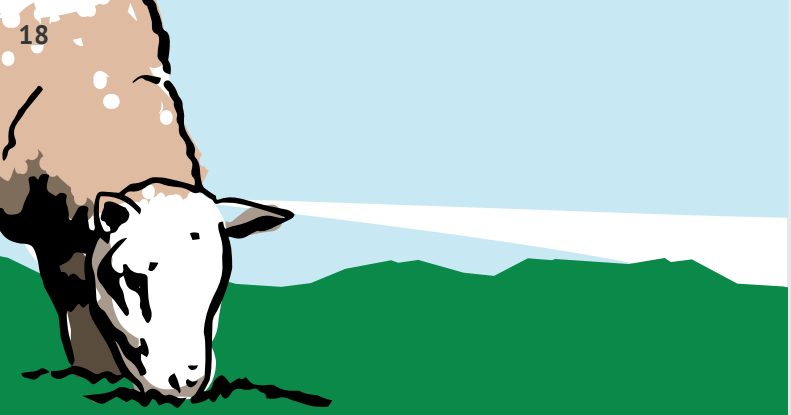
Nutrient requirements
Although lucerne requires no N once established it can be beneficial to apply 25kg N/ha to an autumn sowing to promote rapid plant development. P and K requirements are higher than for grass and should be maintained at ADAS Index 2 to maintain yields.

Yield and nutrient data
14t DM/ha annually. A well fermented lucerne/grass silage has a dry matter of 30%, a crude protein of 20%, a D-value of 60 and an ME of 9.7MJ.

Culture

To Fix N
The use of culture to provide the correct type of bacteria to initiate nodulation is considered essential. Mix with seed on the day of sowing.

Sachet for 25 kg of seed **£10.00 plus VAT**



Grazing

The cheapest forage

Whether you want grass to grow in the uplands or the lowlands, on dry or wet soil, on acidic, neutral or alkaline soils, we can provide a seed mix to suit.

The number of species in our grazing mixtures varies from one to eighteen, providing a huge range of choices to meet the requirements of the diverse grazing systems on farms across the country.

Pioneers of grassland management such as Andre Pochon, Robert H Elliot and William Lamin developed complex mixtures of grasses and legumes for grazing and cutting. In recent times however, intensively bred strains of ryegrass in temporary leys have been very popular as they respond well to nitrogen fertiliser and give the high yields required by intensive farmers.

Clover versus N fertiliser

Nitrogen fertiliser is one of the largest costs to livestock farmers. In light of volatile fertiliser prices, many farmers are sowing high-clover leys to lower the cost of forage production as white clover and other nitrogen fixing legumes can reduce or replace the need for artificial nitrogen.

Single species versus diversity

While some have good reason to grow single species swards, sowing mixtures of grasses and clovers offers real benefits. A single grass alone will often be lower yielding and more vulnerable to failure or poor performance due to pests, disease or the effects of unusual weather. A diverse mixture is therefore more reliable and preferable to sowing a single species. This is especially important for leys which are expected to last for more than one year. Higher yields from mixtures of grasses and clovers are due to better seasonal distribution of growth: grasses give high yields during May and June, clovers produce theirs in July and August. Critically, it's the contribution of both grass and clover that provides the optimum balance between bulk yield and feed value. Grasses tend to have higher annual yields, but are lower in protein than clovers. Animals grow faster and do better on a mix of clover & grass.

Drought resistant swards

In recent summers extended dry periods have put a real strain on livestock farmers battling to ensure they have sufficient forage year round. Grass species such as cocksfoot and clover continue to produce even when there has been no rain for weeks, and many of our mixes are designed with these conditions in mind.

First Hand

George Hosier

Farm Type	**Mixed Beef & Arable**
Location	**North Wessex Downs**
Size	**625 Hectares**
Soil Type	**Predominately calcareous, green sand, clay and chalks, to flinty**
Mixes Used	**Herbal Leys and cover crops**

Five years ago George Hosier began introducing herbal leys into his arable rotation to widen his rotation and make his farm more resilient. The results have been impressive.

'I felt the herbal ley with its species diversity and architecture of deep rooting plants like chicory, cocksfoot, clover and sainfoin would give us more resilience for different weather conditions and also improve soil structure and fertility. The more diversity you have above ground, the more below the ground and the more nutrient cycling goes on, improving the fertility of the soil.'

George's great-grandfather bought Wexcombe Farm in 1920. The youngest son of a family of 12 who were tenant dairy farmers in Bradford-upon-Avon, he could see the potential for a dairy farm. But there were no buildings on the top of the downs, so rather than walking the cows miles back down to the farm he invented the mobile milking bale, a system that was very successful through the 1920s to 1950s. George's father took the decision to leave dairying in 1990 and the partnership (George, his wife and his parents) have run an arable operation and beef suckler herd of Hereford crosses since then. Outbreaks of TB in the '90s resulted in a decision to reduce numbers to around 40 breeding cows, grazing the permanent pasture and finishing everything on the farm using the housing available.

It was the decision to go no till for the arable operation in 2014 and introduce leys into the rotation to improve soil organic matter that changed things.

George began with 10 hectares of temporary leys but the farm now has 80 hectares. 'The herbal leys add so much in terms of increasing soil organic matter and soil life and they also give us a really good break and chance to clean the fields and reduce the burden of black grass and other pernicious weeds in our arable system.'

'The herbal leys add so much in terms of increasing soil organic matter and soil life and they also give us a really good break and chance to clean the fields and reduce the burden of black grass and other pernicious weeds in our arable system.'

The cattle do really well too. 'We've steadily been increasing the size of the suckler herd and are now up to 218 head of cattle and there will be 90 cows going to bull this year. They are all mob-grazed together and calved in April. The aim is to finish everything between 26-30 months. We can finish animals just on herbal leys, winter cover crops and permanent pasture. Everything is 100 percent pasture fed and the average carcass weight is 345kg.'

So how are the herbal leys and cover crops established and managed in the arable rotation?

'There are challenges with seeding a herbal ley in the no till system and we've tried a few different methods. Initially we had a cross slot drill but now we have a John Deere 750a. The benefit of the JD over the cross slot is the rows are slightly closer together giving a more even sward. We double drill at 90 degrees to improve ground cover and we have found autumn drilling behind winter barley is the best - we try to get the ley in during early August. We have established some by undersowing into spring barley in May time. It established well but the grass did better than the herbs and it was a bit more open, so my preferred route is to put it in in the autumn.'

The herbal leys are in the ground for four years and then sprayed off and direct drilled with a summer cover crop to break down the grass sward. 'We grow winter cover crops in front of all our spring cropping. Occasionally we also grow a cover crop in summer time to boost forage grazing for the cattle. The cover crop is also a way of reducing the allelopathic effect of grasses on the following wheat crop.

The herd is mob-grazed and moved every day. 'It creates work but when you take into account the lack of work in the winter compared to housing cattle, it balances out. It's a low cost, one man job and it suits our farm really well. We are well organised and it takes about 45 minutes to move the single strand of electric poly wire, water trough and move a mob of just over 200 head of cattle. We have not used a wormer on the farm for 5 years now, since we've been using herbal leys. The combination of regular moves and anthelmintic plants means the worm burden is low and they are grazing fresh pasture very regularly. We don't tend to suffer summer fly problems either, so we seldom see the vet.'

So how do the herbal leys fit into the arable rotation? After several years of tweaking the system, we now tend to graze the grass quite hard in the winter time, have another grazing early spring and then we desiccate it with glyphosate in May and then put a summer cover crop into it. This helps to break down the sward and reduce any potential allelopathic effect of the dying grasses on the following wheat crop and it also gets us a cover crop to graze in autumn and cycle all those nutrients which have been captured by the cover crop. We then go in with winter wheat drilled in late September/early October into the grazed cover crop. We are working with the Wild Farmed team to try planting wheat into herbal leys to keep the herbal leys going a bit longer and produce some wheat at the same time. Watch this space; if it works it's an exciting new avenue.'

'We are in a new countryside stewardship agreement, having put all of our herbal leys into the SW17 nil fertiliser regime. We haven't needed any fertilisers on our herbal leys since we've been mob-grazing them. They do so well without.' Since George has been growing herbal leys for 5 years, the first ones are just coming out and the fields are going back into arable rotation. 'The soil is much more friable than when the leys went in,' says George. 'It was in a field that had a real black grass problem and it's a lot cleaner than it was prior to having the herbal ley. We have seen worm numbers increasing and dung beetles. It's just a healthier environment. There's an increase in farmland birds and a huge increase in numbers of small mammals, like voles which has led to an increase in kestrels and barn owls on the farm. It's not just about improving soil health, it's about improving everything. The whole life on the farm is better as a result of having more diversity in the rotation. We have been using Cotswold Seeds ever since we decided to grow herbal leys,' says George. 'They are always friendly and efficient. I am really pleased with the vigour of the seeds and establishment. They're a great asset to have at the end of the phone.

'The farming industry is facing huge challenges,' says George. 'We are at a crossroads. In my mind the best thing we can do here is make ourselves as resilient to change - economic, climate, International trade as possible - by improving soil health and finding a route to market for our cattle by shortening the supply chain. That's the direction I see this farm going in.'

Dual Purpose Swards

Self-sufficient leys that provide high protein grazing with little or no nitrogen fertiliser.

Sowing and Growing

Suitable soils and optimum pH
These ryegrass-based leys grow on all but the most waterlogged soils. They are best suited to pH6 or above but will grow to pH5.6.

When to sow
Seed can be sown between March and mid September when soils are warm and sufficient moisture is available.

How to sow
A very firm seed bed is required as white clover and timothy seeds are small and benefit from shallow sowing at around 10mm. Rolling at least once after sowing is strongly recommended. If under-sowing, do not choose a thick crop as this will result in failure; a thinly sown spring cereal is ideal. A clover seed mix is best sown by broadcasting with a spinner but can also be sown with a proper grass seed drill.

Management
As the main period of grass growth is during May and June, it makes sense to take a cut of silage or hay during this time. Additionally, where grass growth exceeds grazing demand more can be cut and round-baled as silage. Ideally, these leys should be rotationally grazed with an interval of 3-5 weeks for recovery.

Nutrient requirements
These leys should receive no more than 100kg N/ha with the biggest demand (60kg N/ha) in March and April if a silage cut is to be obtained. Pochon Dairy requires very little or no N as the high clover content (30-50%) will fix N in the soil.

Yield potential
12t DM/ha should be achieved.

These mixtures are ideal for those looking to graze and/or cut a medium to long term ley. With white clover included in all three, they are largely self-sufficient in nitrogen. Of course the benefits derived from clover are proportional to the amount in the sward, both in terms of animal nutrition and nitrogen fixing.

If using the mix for silage or hay, the ley should be shut up at least six weeks before cutting, with the best combination of yield and quality coming from grasses that are just beginning to produce a seed head and clovers in bud or early flower. A first cut of silage is ready during late May. These leys will provide a second cut but are usually grazed.

These three mixes are among our most popular. The 'Milk-Meat' combination has been in use since the Second World War and sown on, we estimate, over a quarter of a million acres.

The case for clover

Red clovers can be broken down into two distinct types: early and late flowering with a difference between flowering periods of 10 - 14 days.

Early or double cut red clover – These are most popular and are commonly used for silage as they re-grow well to provide a second cut later in the year.

The late varieties such as Altaswede can be used on late, wet ground to provide one large single cut later in June.

White clover

White clover is classified according to leaf size, which break down to small, medium and large, the size of the leaf dictates what type of use it is most suited to.

Small Leaf Clover - The very small, low yielding but extremely persistent type is known as 'wild white'. Little clovers like S184 are extremely persistent, filling the base of the sward and can be grazed hard especially with sheep.

Medium Leaf - Medium leaved varieties such as AberSwan and Merwi offer yields well in excess of the wild whites. They are also more competitive, persistent and offer good early spring growth.

Large Leaf - The large leaf types such as Barblanca are the highest yielding. However, large leaved varieties do not survive well when grazed hard with sheep. Therefore these are best sown in silage or cattle grazing leys. For most situations it is best to sow a mixture of types to allow for grazing or silage.

Grass | Legume

Mixes

Early Bite

Sheep and Hay Ley

Code: MIX1

Ideal for producing early grass on light land, this ley will provide good growth throughout the year and is especially good for lamb production. It is also suitable for hay or silage and can be expected to last for at least three years. Contains white clovers, making grazing more palatable and increasing live weight gains.

- 4.00 kg certified ABEREVE tet. hybrid ryegrass
- 4.40 kg certified ABERWOLF perennial ryegrass
- 2.00 kg certified TODDINGTON perennial ryegrass
- 1.00 kg certified WINNETOU timothy
- 0.20 kg certified ABERSWAN white clover
- 0.20 kg certified MERWI white clover
- 0.20 kg certified S184 wild white clover

12.00 kg/acre - £71.19 30.00 kg/ha - £177.98

Milk-Meat Cut or Graze

Five Year Plus Ley

Code: MIXMM

Our best selling dual purpose ley, equally suitable for cattle or sheep. This mixture combines the benefits of high yielding intermediate ryegrass Aberwolf, with Twymax, which consistently holds its quality late into the season, along with highly palatable timothy and white clover. It can be sown for silage and hay or intensively grazed. This versatile high D-value ley will yield well on all soil types.

- 2.40 kg certified ABERWOLF perennial ryegrass
- 2.30 kg certified TWYMAX tet. perennial ryegrass
- 4.30 kg certified CALIBRA tet. perennial ryegrass
- 2.00 kg certified TODDINGTON perennial ryegrass
- 1.50 kg certified WINNETOU timothy
- 0.20 kg certified ABERSWAN white clover
- 0.20 kg certified MERWI white clover
- 0.10 kg certified BARBLANCA white clover

13.00 kg/acre - £74.40 32.50 kg/ha - £186.00

Pochon Dairy

Two-Four Year Silage/Grazing Ley

Code: MIXCG02

Designed specifically for the dairy farmer wishing to produce silage and high quality grazing. This ley has an open growth habit allowing the white clover plenty of space to exploit. Including Aberystwyth ryegrass and white clovers, this mixture is principally intended to be grazed by the dairy cow. For sheep grazing use 'Pochon' Persistent (see page 29).

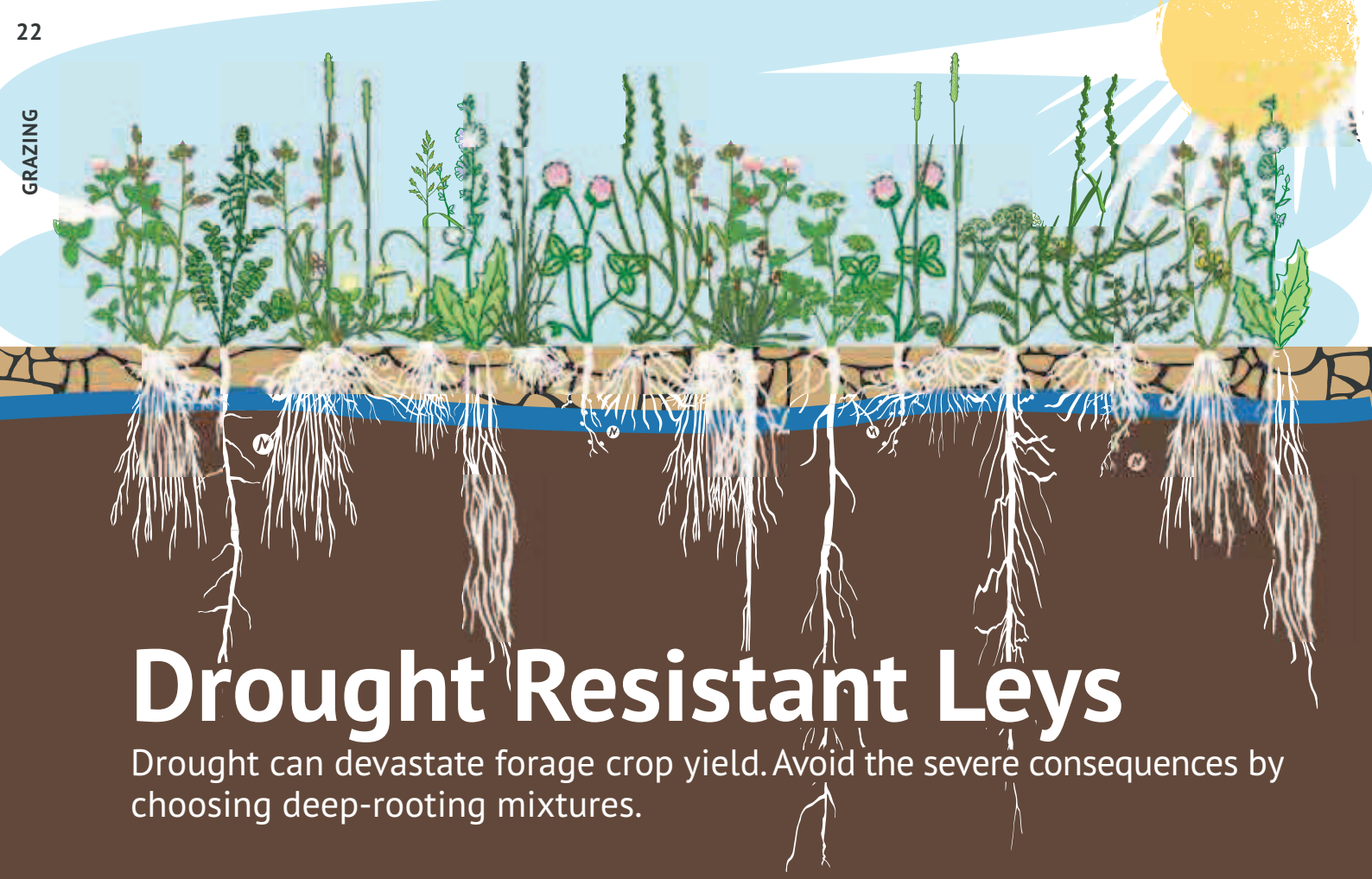
- 3.00 kg certified ABEREVE tet. hybrid ryegrass
- 2.00 kg certified ABERECHO tet. hybrid ryegrass
- 2.50 kg certified ABERWOLF perennial ryegrass
- 3.00 kg certified TWYMAX tet. perennial ryegrass
- 0.60 kg certified ABERSWAN white clover
- 0.60 kg certified MERWI white clover
- 0.30 kg certified BARBLANCA white clover

12.00 kg/acre - £68.90 30.00 kg/ha - £172.25

Additions

Red Clover: 1 kg red clover	**£10.80 per acre**
Cover Crop: 3 kg westerwold	**£8.85 per acre**
Heavy Land: 2 kg timothy	**£19.20 per acre**
Light Land: 2 kg cocksfoot	**£12.60 per acre**
Anti Bloat: 5 kg sainfoin	**£17.75 per acre**

Silage Making
Gloucestershire
17th May



Drought Resistant Leys

Drought can devastate forage crop yield. Avoid the severe consequences by choosing deep-rooting mixtures.

Sowing and Growing

Suitable soils and optimum pH
These mixes are designed for light, free-draining land with a pH of 5.6-7.

When to sow
Sow between March and early September. Avoid late autumn sowing when mixtures contain clovers.

How to sow
Sow into a fine, firm seedbed at around 10mm. Seed can be broadcast on a windless day, harrowed lightly and rolled. Alternatively, seed may be drilled in two directions into a well consolidated (rolled) seedbed.

Management
These leys depend upon developing a large number of deep roots. To achieve this these leys should be allowed to accumulate a lot of leaf and should then be heavily grazed (rotationally) before being allowed to repeat the cycle. Set stocking is less effective. Leys containing cocksfoot should be grazed frequently and cut young to ensure that growth remains leafy.

Nutrient requirements
N fertiliser (40kg N/ha) can increase early spring growth but high applications will impede clover growth and content which needs to be high for summer grazing production. P and K levels should be maintained at ADAS Index 2.

Yield potential
Cocksfoot-based leys: 12t DM/ha
Ryegrass-based leys on dry, light land: 7t DM/ha
Ryegrass-based leys with rainfall: 12t DM/ha

The dry conditions suffered by many in recent years demonstrates the need for grass mixtures which continue to yield even during prolonged spells of drought. By combining deep-rooting grasses and clovers with differing growth habits, it is possible to provide summer grazing from dry soils.

Recent weather has shown that ryegrass does not thrive in dry conditions. However there are other grasses, such as meadow fescue, timothy and cocksfoot, which can be relied upon. These species can offer great benefits over ryegrass to those in challenging conditions. If you farm on dry land then these leys are well worth considering.

Growing grass on droughty land

Pioneers of grassland farming, Robert H Elliot and William Lamin, developed complex ley mixtures comprising deep-rooting species such as cocksfoot, chicory and red clover.

Then, as now, some farmers were reluctant to use too much cocksfoot (see page 4), as it was inclined to grow coarse and clumpy. However, this is only a problem when seed is sown too thinly, allowing the cocksfoot too much freedom, or when it is allowed to become too mature when making hay.

Elliot observed first hand at Clifton Park that his deep-rooting four year ley provided good quality forage and improved soil so much that he was able to grow subsequent cash crops for four years with little fertiliser input. Lamin, who used a simplified version of Elliot's mix, observed "... it's like throwing money away to put ryegrass on dry land."

It's worth noting that although ryegrass is vulnerable to drought and is one of the first grasses to stop growing, it does recover very quickly when rain comes and can make a valuable contribution after prolonged dry periods.

Mixes

Light Land Beef/Sheep

Long Term Ley

Code: MIX5

A long term ley that combines perennial ryegrass with drought-resistant cocksfoot. Good year-round production can be achieved which can be used for grazing or silage. Cocksfoot needs frequent grazing but recovers quickly after defoliation. The blend of persistent white clovers and timothy makes the sward extremely palatable. It is also very productive late into the summer.

- 3.00 kg certified DONATA cocksfoot
- 3.00 kg certified CALIBRA tet. perennial ryegrass
- 3.00 kg certified ABERWOLF perennial ryegrass
- 2.30 kg certified TODDINGTON perennial ryegrass
- 1.00 kg certified WINNETOU timothy
- 0.25 kg certified ABERSWAN white clover
- 0.25 kg certified MERWI white clover
- 0.20 kg certified S184 wild white clover

13.00 kg/acre - £83.69 32.50 kg/ha - £209.23

'Lamins' Drought Resistant

Four Year Grazing for Dry Land

Code: MIXCG04

This is a traditional humus building, drought resistant ley which is ideal for continuous grazing. This 'Clifton Park' type mixture will provide good quality forage which is high in protein. It starts early in the spring and will grow well through the summer and into the autumn. Birdsfoot trefoil has been added to this mixture after witnessing it's ability to stay green throughout the dry summer of 2018.

- 5.50 kg certified DONATA cocksfoot
- 2.50 kg certified SENU meadow fescue
- 1.00 kg certified WINNETOU timothy
- 0.70 kg certified LOFA festulolium
- 1.00 kg certified ALTASWEDE late red clover
- 0.60 kg certified MERWI white clover
- 0.15 kg certified LEO birdsfoot trefoil
- 0.50 kg certified PUNA II chicory
- 0.15 kg certified ENDURANCE ribgrass
- 0.25 kg burnet
- 0.05 kg yarrow
- 0.10 kg sheeps parsley

12.50 kg/acre - £107.59 31.25 kg/ha - £268.98

Additions

Cover crop: 3 kg westerwolds	**£8.85 per acre**
Cover crop: 3 kg Italian ryegrass	**£9.60 per acre**
Cover crop: 10 kg vetches	**£29.50 per acre**
Anti bloat: 5 kg sainfoin	**£17.75 per acre**

Cholderton

Four Year Plus Grazing/Cutting Ley

Code: MIXCM

A ley developed on the thin, chalk soils of Wiltshire which provides good growth for early grazing or cutting. It regrows powerfully through the spring and into the summer, giving an outstanding second cut yield. The ley tolerates dry conditions due to the deep roots of cocksfoot and red clover.

- 1.50 kg certified ABEREVE tet. hybrid ryegrass
- 4.00 kg certified CALIBRA tet. perennial ryegrass
- 2.20 kg certified ABERWOLF perennial ryegrass
- 1.00 kg certified WINNETOU timothy
- 2.00 kg certified DONATA cocksfoot
- 1.00 kg certified LOFA festulolium
- 0.50 kg certified DIPLOMAT red clover
- 0.40 kg certified ABERSWAN white clover
- 0.30 kg certified MERWI white clover
- 0.10 kg certified S184 wild white clover

13.00 kg/acre - £82.47 32.50 kg/ha - £206.18

Chicory Grazing Ley

Three - Four Years

Code: MIXCL

This high-protein, mineral-rich, drought resistant mixture combines one of the most well-known varieties of chicory with clover and a small quantity of ryegrass. It will last for three to four years.

- 2.50 kg certified PUNA II chicory
- 0.20 kg certified ENDURANCE ribgrass
- 1.50 kg certified DIPLOMAT red clover
- 0.60 kg certified MERWI white clover
- 1.70 kg certified TWYMAX tet. perennial ryegrass

6.50 kg/acre - £82.00 16.25 kg/ha - £205.00

Grazing Chicory
FarmED
12th August

First Hand

Bradwell & Macaroni

Farm Type	**Arable & Dairy**
Location	**Cotswolds**
Size	**4500 Acres**
Soil Type	**Cotswold Brash**
Mixes Used	**Bespoke Herbal Leys**

Two neighbouring Cotswold farmers have gone into partnership in an innovative, joint venture with a Cornish dairy farmer and herbal leys are driving the business.

The Bradwell Grove Estate, near Burford, totals 3000 acres. Macaroni Farm, tenanted by Sam Phillips and his father, comprises just over 1950 acres. Charles Hunter-Smart manages the Bradwell Grove Estate for the Heyworth family, and explains how the joint venture came about.

'We've farmed organically since 2005, utilising the single farm payment, but in 2016-2017 the reduction of BPS was going to have a big impact. One member of staff was retiring and I was getting older too. We had a simple rotation of three cereal crops and two fertility-building crops. We had a hundred Limousin-Angus cross suckler cows and were running a joint venture sheep business with about a thousand ewes. At that point all our grass crops were multispecies herbal leys which we'd been growing for 6-7 years.

'Sam Phillips, a young, fourth generation farmer and our immediate neighbour, was exploring the idea behind the new System Cameleon inter-row drill & hoe which looked to suit organic cropping. We got chatting and did some exploratory visits together to look at the drill on a farm in Suffolk. We realised neither of us could afford the drill on our own. Out of that conversation, I thought there might be an opportunity to share a little more than just the machine. Sam is full of enthusiasm, passionate about organic farming and food. I saw it as a way of providing economies of scale, pooling ideas and provide a seamless transition for the Heyworth family to enable me to step back and do a bit less.'

That was the start. Two years into the arable joint venture, Sam and Charles started talking about livestock, as Sam explains:

'The herbal ley element within our rotation is the fertility building stage but we could only afford to keep the leys in the ground for two years because we needed to get back to a cash crop. So we wanted to make sure that when the land was in a herbal ley we were still making money. We were adamant we wanted to be profitable without subsidy. The traditional suckler beef herd wasn't making much profit. We were set-stocking and housing for 6-7 months, bedding on organic straw at £90 a ton and feeding baled silage with the need for lots of day to day labour. So we decided to look at an alternative dairy enterprise that would tick all the boxes in terms of soil, biodiversity and profitability. Because the margin on the dairy is much better than beef or sheep we could afford to stretch the rotation to four years of herbal ley.'

The next major hurdle was securing a contract for the milk. The solution was to create a three way venture - The Cotswold Mobile Dairy. Dave Sanders, based near Bodmin in Cornwall providing the milk contract and cows. Bradwell Grove and Macaroni Farm between them providing the land and infrastructure.

'The cows are drawn through the parlour because they know on the other side is fresh grass. Every time they get moved they know they are going on to something new, palatable and good. In a conventional fixed milking system they are drawn through with feed concentrates but we don't have to do that.'

Dairyman, Rob Richmond, now manages 350 cows for the Bradwell Grove and Macaroni Farm partnership, along with 100 heifers and 100 heifer calves. Rob explains the choice of a mobile dairy. 'Because of the size of the land in the Bradwell Grove/Macaroni joint venture we didn't want a fixed dairy - we wanted to spread as much fertility over the 4,500 acres as we could. So we looked at a mobile milking system. We have a 24:48, Herringbone Waikato Milking system on a tri-axle flatbed trailer which follows the cows around the grazing platform.'

The cows are milked in the morning, then go on to fresh pasture. They graze for the main part of the day and in the late part of the afternoon they move to a night paddock, then back round to the parlour. After milking the next morning the parlour moves to the next block.

'The cows are drawn through the parlour because they know on the other side is fresh grass,' says Charles. 'Every time they get moved they know they are going on to something new, palatable and good. In a conventional fixed milking system they are drawn through with feed concentrates but we don't have to do that.'

'The herbal ley has a crucial role in our rotation. The dairy is so reliant on the leys,' Sam explains. 'Legumes fix nitrogen, improving soil fertility and the deep roots make the soil structure ideal for subsequent cereal cropping. I think its better with livestock. Their manure fertilises the soil and is broken down by worms, bugs and beetles. It creates a soil fertility cycle that enables our farming system to work'.

The four year herbal ley system is a big advantage to help control black grass. 'Two years of grazing the crop and then putting it back into arable cropping was not enough to kill the black grass seeds, but if we can bury them for four years a lot of that seed will become unviable. So having the cows and being able to run the herbal leys for four years is a great bonus.'

Sam explains how the leys are managed. 'I go to Cotswold Seeds in late autumn and discuss our seed mix and what seed rate to use etc. Typically, we use the previous mix as a template. We look at what worked and what didn't. Sam Lane, the Technical Manager at Cotswold, then formulates a mix with a high percentage of sainfoin, as well as clovers and trefoils for maximum nitrogen fixation. Our mix includes a diverse range of grasses to hold the sward together, such as Timothy, red fescue, a little ryegrass and plenty of deep rooting cocksfoot. The thin brashy soil is prone to drying up in the summer, so the mix needs to include drought tolerant herbs like the mineral rich chicory and plantain. We try to mimic the plant diversity of nature, with all the benefits to the soil. Every farm is different and every farmer has ways they want to work - Cotswold Seeds are brilliant at accommodating that.'

The Cameleon Drill, which kicked off the JV journey, offers consistent establishment of herbal leys. 'We undersow into a spring cereal, typically barley or oats. We don't reduce the seed rate for the cereal nurse crop. We like to roll it to make sure there is good seed to soil consolidation. Weather and dry spells are not good for spring sowing and that's a risk we take. But we feel this is the best way to establish a herbal ley. There's big excitement when it appears. It's so rewarding.'

Leys established with Cameleon Drill

The herbal leys remain for four years, then the land is cultivated for cereals for four years.

'We have a blueprint of an eight year rotation,' says Sam. The dairy has 4 blocks and the arable has 4 blocks. Every year a new block rotates into dairy. We are building the soil, then using that, but instead of just being sustainable - building and using, building and using - we are building, using a little bit, building more.'

Sam says that setting up the business during the Covid pandemic was stressful but they are now reaping the rewards.

"When we were set-stocking and grazing tighter we felt we were taking more out of the ground than we were putting back. Now we are seeing the benefits of mob grazing and out wintering all stock. It's amazing how the land has transformed in just a year. By grazing a third, trampling a third, leaving a third, the land is recovering and regenerating.

'The herbal ley mix will change again next year,' says Sam. 'Conservation or regen-ag is about observation and trying different things. If you are learning from mistakes you are progressing. Every day is a school day.'

Herbal Grazing Leys

Deep rooting, species rich, nutritionally balanced grazing leys.

What is a herbal ley?

A herbal ley is a complex seed mixture of grasses, legumes and herbs, which bring a range of benefits to forage, livestock health and soil fertility. Herbal leys can often include a mixture of up to 18 species, depending on the aims of the ley, location and soil type.

They have traditionally been used to build soil fertility and structure in an arable rotation, acting as a minimal input, four year break crop, but they bring significant benefits not only to the soil health, but also to the health and diet of livestock and the wider environment.

The deep rooting species in the mixture add drought tolerance when grown on thin soils or during dry summers, remaining green and palatable for much longer than other forage mixtures. They work especially well on dry, light land where ryegrass leys prone to burning up in mid summer.

The mixture of species also ensures a longer growing season and certain species included in the mixtures such as sainfoin, chicory and birdsfoot trefoil, have anthelmintic properties, which helps to reduce the worm burden in livestock, creating less reliance on artificial wormers and your vet.

The deep rooting herbs, notably chicory, mine the soil for important nutrients and minerals, making them available to the grazing livestock and lowering the need for bought in concentrates. The high legume content of these leys reduces the need for expensive artificial nitrogen, since they fix their own N, feeding the other grasses and herbs in the mixture, and again helping to reduce costs.

Sowing and Growing

Suitable soils and optimum pH
Ideally suited to medium and light soil types with a pH of 6.0-8.0.

When to sow
Sow from March until early September.

How to sow
Sow into a fine, firm seedbed after an application of FYM. These leys contain many small-seeded species and are best broadcast as this leads to more even plant distribution. Roll twice after sowing for maximum seed to soil contact and consolidation.

Management
Graze lightly while the crop is establishing. Once growing well, rotationally graze allowing at least 28 days or more for recovery and regrowth. Using electric fencing, ration an area per day (e.g. about one acre for 100 cattle) but adjust this area to match growth and stock requirements. Over-grazing will damage chicory crowns. Surplus production from Herbal Leys can be made into silage.

Nutrient requirements
No N is required, P and K should be maintained at ADAS Index 2.

Yield potential
Yields of up to 13t DM/ha for the Herbal Ley can be achieved.

Grass | Legume | Herb

Simple Herbal Ley

Four Year Grazing/Cutting/AD Ley

Code: MIX23

Our Simple Herbal Ley is designed for farmers who may be considering experimenting with a diverse seed mixture that's more complex than ryegrass and clover mixes. Our Simple Herbal Ley contains ryegrass, cocksfoot, timothy, meadow fescue and legumes, red clover, white clover, and mineral rich forage herbs including chicory and ribgrass.

- 2.50 kg certified LOFA festulolium
- 2.65 kg certified CALIBRA tet. perennial ryegrass
- 2.20 kg certified ABERWOLF perennial ryegrass
- 1.50 kg certified DONATA cocksfoot
- 1.00 kg certified WINNETOU timothy
- 0.70 kg certified SENU meadow fescue
- 0.30 kg certified MERWI white clover
- 0.20 kg certified BARBLANCA white clover
- 0.15 kg certified DIPLOMAT red clover
- 0.25 kg certified ALTASWEDE late red clover
- 0.15 kg certified AURORA alsike clover
- 0.30 kg certified PUNA II chicory
- 0.15 kg certified ENDURANCE ribgrass

12.00 kg/acre - £81.90 30.00 kg/ha - £204.75

Herbal Over-Seeding

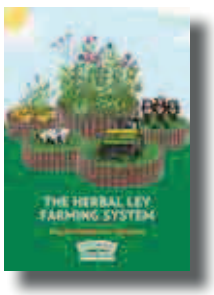
Deep-Rooting Herbal ley

Code: MIXHOS

Deep rooting herbal leys are becoming more and more popular. Grass-only swards lack protein rich clovers and mineral rich herbs. Ideally, herb-rich swards are best established by reseeding but where this is not possible this mixture can be oversown into a grass-only sward.

- 0.60 kg certified DIPLOMAT red clover
- 0.50 kg certified MERWI white clover
- 0.40 kg certified LEO birdsfoot trefoil
- 0.30 kg certified AURORA alsike clover
- 0.20 kg certified S184 wild white clover
- 1.40 kg commercial sainfoin
- 0.55 kg burnet
- 0.40 kg certified PUNA II chicory
- 0.30 kg sheeps parsley
- 0.25 kg certified ENDURANCE ribgrass
- 0.10 kg yarrow

5.00 kg/acre - £61.69 12.50 kg/ha - £154.23



Interested in herbal leys? Learn more about their benefits and how they've stood the test of time in our 32 page farmers guide - **The Herbal Ley Farming System**

Visit cotswoldseeds.com to download your copy.

Herbal Grazing Ley

Four Year Drought Resistant Ley

Code: MIX20

Based on Newman Turner's original recommendations, this all round mixture provides wholesome and substantial forage for grazing and occasional cutting. This 18 way mixture provides grazing for early turnout and continues to produce forage right through the summer and autumn. Containing deep-rooting ingredients, this ley not only improves soil structure but also draws up essential vitamins and minerals for the ruminant animal.

- 1.60 kg certified DONATA cocksfoot
- 1.60 kg certified LOFA festulolium
- 1.00 kg certified TODDINGTON perennial ryegrass
- 1.00 kg certified CALIBRA tet. perennial ryegrass
- 0.50 kg certified WINNETOU timothy
- 0.50 kg certified SWAJ tall fescue
- 0.40 kg certified SENU meadow fescue
- 2.50 kg commercial sainfoin
- 0.65 kg certified DIPLOMAT red clover
- 0.55 kg certified MERWI white clover
- 0.35 kg certified MILKY-MAX pre inoculated lucerne
- 0.20 kg commercial sweet clover
- 0.20 kg certified AURORA alsike clover
- 0.20 kg certified LEO birdsfoot trefoil
- 0.75 kg burnet
- 0.60 kg certified PUNA II chicory
- 0.20 kg certified ENDURANCE ribgrass
- 0.15 kg sheeps parsley
- 0.05 kg yarrow

13.00 kg/acre - £103.89 32.50 kg/ha - £259.73

Herbal Heavy Land Ley

For Medium and Clay Soils

Code: MIX22

Still deep rooting but without cocksfoot this grazing mix suits heavier soils and lasts up to five years.

- 2.00 kg certified LOFA festulolium
- 1.70 kg certified ABEREVE tet. hybrid ryegrass
- 2.00 kg certified CALIBRA tet. perennial ryegrass
- 1.60 kg certified SENU meadow fescue
- 1.80 kg certified WINNETOU timothy
- 0.80 kg certified SWAJ tall fescue
- 0.60 kg certified ALTASWEDE late red clover
- 0.40 kg certified DIPLOMAT red clover
- 0.30 kg certified MILKY-MAX pre inoculated lucerne
- 0.25 kg commercial sweet clover
- 0.50 kg certified MERWI white clover
- 0.40 kg certified AURORA alsike clover
- 0.45 kg certified PUNA II chicory
- 0.50 kg burnet
- 0.20 kg certified ENDURANCE ribgrass

13.50 kg/acre - £105.98 33.75 kg/ha - £264.95

First Hand

Andy Dawson

Farm Type	**Livestock**
Location	**Oxfordshire**
Size	**180 Acres**
Soil Type	**Heavy Clay**
Mixes Used	**Traditional Haymaker**

Andy Dawson is Farm Manager at New House Farm which produces high quality beef and lamb which is sold direct to local customers. The aim is to produce the livestock on nothing but grazed grass and hay produced on the farm. Cotswold Seeds' Traditional Haymaker mix, a long term cut and graze ley combining ryegrass, meadow fescue and Timothy is integral to the business. This mix works really well on the heavy clay soils. More recently Andy has managed to overseed clover and herbs into these fields to further boost self sufficiency and protein.

The Briarland herd, based at New House Farm, is another evolution of the farm which has been in the same family for the past 100 years. The original property and land were purchased by the current owner's grandparents, Sir George and Lady Schuster, in 1919. Joanna Clarke became involved with the farm in 1984 and now runs it with her son Nicholas. The farm started as a dairy and then focused on arable cropping for a number of years, but in a drive to become more self sufficient, the focus shifted back to livestock. Andy considered various traditional cattle breeds, settling on Shorthorn cattle and 30 Llanwenog ewes. In 2015 the arable fields were sown with grass and hay mixtures.

The fields include long term grazing pasture and 40 acres of the specialist Haymaker Mix.

Almost all the cows are now home-bred, with more coming into the herd each year. The home-bred bull, Ludo, produced his first crop of calves in 2019. The flock of Llanwenogs increases each year by the addition of home-bred ewe lambs. Lambing takes place in April. Some are added to the flock, some sold as live lambs and the rest are available to buy in the farm's lamb boxes later in the year.

'We now have 70 Beef Shorthorn cows and rare breed Llanwenog sheep,' explains Andy. 'This year we were thrilled that our ewe lambs won 1st prize and the flock won 3rd prize in the Llanwenog Society competition.

The cows and sheep are 100% pasture fed. 'We don't use any concentrates or fertilisers, except for muck,' says Andy. 'The cattle spend around 8 months grazing outside, only coming inside when the land becomes too wet. The sheep are outside all year except for lambing time. We make hay in July and the cows graze the aftermath. Then we put the sheep on it with rams until early December. After that it's left until we make hay again. The livestock are inside feeding on the hay until we let them out when the weather improves in April. The cows and sheep do really well on it. They don't lose any weight over winter and the weight gain is good and steady'.

"Timothy and meadow fescue grass species really suit this heavy clay soil,"

The local abattoir is only 11 miles from the farm, after which the carcasses are transferred to a local butcher at Wykham Park Farm. 'Most of our meat is sold direct to an increasing number of customers, ready-packed in boxes,' Andy explains. 'The farm also supplies local restaurants and pubs.

'The hay crop has just got better and better as time goes on,' Andy says. 'It's so palatable and rich in clover. The Timothy and meadow fescue grass species really suit this heavy clay soil and the Timothy is great for providing that high fibre 'scratch factor' which is essential for the cattle'.

For this farm it's all about growing and rearing as much as possible on the farm, being as self sufficient as possible and keeping inputs to a minimum which is a very smart approach in the current economic climate.

Intensive Dairy

The latest ryegrass swards to maximise milk from grazed grass.

Grazed grass is by far the most important and economical feed and can provide around two thirds of forage on dairy farms.

Ryegrass mixtures provide very high annual yields when managed intensively in a high-input system. Ryegrasses allow for higher stocking rates than alternative grasses, such as meadow fescue or cocksfoot, because they are significantly more responsive to nitrogen fertiliser.

These mixtures include the latest varieties and grow very well on moisture-retentive 'ryegrass soils', providing grass from spring through summer and well into the autumn.

Sowing and Growing

Suitable soils
Ryegrass is a shallow-rooted grass and should be grown on moisture-retentive soils that do not dry out. The target soil pH for ryegrass grass leys is slightly acidic at around 6.

When to sow
Ryegrass will germinate quickly from seed and sowings can be made from late February until early October in southern areas. However, most seed is sown in March and April and from late July until mid September when soil temperatures are above 7°C.

How to sow
Drill in two directions into a fine, firm seedbed at 10-20mm. Rolling with either a Cambridge or flat roller before and after sowing is recommended. Broadcast seed should be harrowed lightly after sowing and before rolling.

Management
Optimum sward height for grazing is 7-10cm. Early bite can be obtained on light, sheltered land from Intensive Dairy Graze - Early. Around 20 acres (8 ha) is advisable to provide early bite for 100 cows. Mid summer grazing is increased by grazing ryegrass hard early in the season as this stimulates tiller production and results in more leaves and less stem. Under-grazing should be avoided as this leads to stem production and loss of forage quality. To avoid winter damage, ryegrass should be grazed down to 4cm at the end of the season.

Nutrient requirements
N fertiliser (70kg N/ha) will be required in mid February in mild areas to mid April for northern or upland districts. Provided soil moisture is available, a mid season N fertiliser application (60kg N/ha) will produce more grass. On land where late season grass can be utilised a further dressing of N (40kg N/ha) can be applied in late August. P and K should be maintained at ADAS index 2

Yield potential
Yields of around 13t DM/ha are achievable if N levels are maintained and grazing is actively managed.

Mixes

Intensive Dairy Graze - Early

Four - Five Year Ley — Code: MIX3

To provide quality grazing throughout the season this mixture includes tetraploid ryegrasses which will increase palatability and voluntary intake. Containing early, mid and late season grasses, this ley is suited to light land, requires early grazing and can help to extend the grazing season. The inclusion of the 'Aber' strains ensures D-values remain high.

- 3.00 kg certified ABEREVE tet. hybrid ryegrass
- 2.00 kg certified ABERWOLF perennial ryegrass
- 5.00 kg certified ABERCLYDE tet. perennial ryegrass
- 2.00 kg certified TWYMAX tet. perennial ryegrass
- 2.00 kg certified TODDINGTON perennial ryegrass

14.00 kg/acre - £69.25 35.00 kg/ha - £173.13

Intensive Dairy Graze - Late

Five Year Plus Ley — Code: MIX4

A proper late, thick-bottomed sward for summer grazing or late silage making on heavier soils. A high sowing rate of palatable grasses including high sugar 'Aber' varieties with consistent D values and late diploid DLF varieties with very good crown rust and drechslera scores, to ensure grazing remains palatable late into the autumn. This mix costs more than other ryegrass mixes but provides an ideal grazing sward for at least five years.

- 4.00 kg certified ABERWOLF perennial ryegrass
- 4.00 kg certified ABERCLYDE tet. perennial ryegrass
- 4.00 kg certified TWYMAX tet. perennial ryegrass
- 3.00 kg certified TODDINGTON perennial ryegrass

15.00 kg/acre - £78.55 37.50 kg/ha - £196.38

Long Term Leys

Good traditional leys that will produce grass for years to come.

Long term leys are ideal for self-sufficient beef and sheep farmers wanting to produce profitable stock with the emphasis on seasonal production, live weight gain and finishing healthy animals.

The long term ley mixtures contain perennial ryegrass or meadow fescue along with timothy and clover for good year-round production. Clover is an excellent protein source which increases production, reduces inputs and maintains profit margins.

All grasses have a lifespan. Some such as timothy and meadow fescue are very long lived and so can be considered permanent. Most ryegrasses are suited to short or medium term leys, but some varieties of late perennial ryegrass are persistent and suited to long term leys.

Under Sowing a Spring Cereal

Since the advent of the *Norfolk Four Course* rotation, by Coke of Holkham, leys have often been sown underneath a spring sown cereal. This when done correctly protects the vulnerable new ley from hot weather and leaves a new ley well established after the cereal has been harvested. Any cereal can be under sown but barley and oats are most popular.

The competition factor should be reduced to a minimum by sowing the cereal, at two thirds the normal rate, and the ley seeds mix at the same time. The cereal should be drilled in and the grass seed mix broadcast on the surface, then harrowed and rolled. Some farmers wait until the cereal is up with 3 or 4 leaves before sowing as there is less risk of having a lot of green material going through the combine at harvest. This is really only advisable in high rainfall areas and not usually necessary in drier districts.

Sometimes, if the weather is bad, it is not possible to sow before the cereal has germinated. In this case sowing of the ley mix should be delayed until the cereal is through and well established with 3 or 4 leaves.

Sowing and Growing

Suitable soils and optimum pH
These leys are suitable for all soils apart from light ones. Ideally pH6-7.

When to sow
These long-lasting leys take time to germinate and become established. It is therefore essential to sow when growing conditions are good and not too early in the spring before the soil is warm. They are often sown in spring but autumn sowings can be contemplated provided the seed is in by early September. These leys contain many small-seeded species and are best broadcast as this leads to more even plant distribution. Once sown, roll immediately to ensure good soil-to-seed contact.

How to sow
With long term leys it is extremely important to control perennial weeds prior to sowing. As these mixes contain small seeded species such as timothy or clover it is best to sow at no more than 10mm into a fine seed bed. A cover crop of westerwolds ryegrass can provide additional bulk in the year of sowing but is not advisable on heavy ground as they may out-compete the other species in the mix. These mixes can alternatively be undersown to a spring cereal which has been drilled at a reduced rate.

Management
Light grazing with sheep or young cattle will consolidate new plants, encourage grass to tiller and control annual weeds (known as the 'golden hoof'). Cutting for silage or hay is best left until the ley is well established in its second season.

Nutrient requirements
These leys should receive no more than 100kg N/ha with the biggest demand (60kg N/ha) in March and April if a silage cut is to be obtained. Pochon Persistent requires very little or no N as the high clover content (30-50%) will fix N in the soil.

Yield potential
Yields of 12t DM/ha should be achieved.

Grass | Legume

Mixes

Pochon Persistent

High Clover Long Term Grazing Ley Code: MIXCG01

For over thirty years Pochon has proven very successful on a wide range of conventional and organic farms. This mix is suitable for taking a cut of silage, but is mainly for rotational grazing. Including the best strains of high yielding white clovers from Aberystwyth, it gives excellent mid-summer production without artificial N.

- 3.00 kg certified TODDINGTON perennial ryegrass
- 2.00 kg certified KENDAL perennial ryegrass
- 2.50 kg certified TWYMAX tet. perennial ryegrass
- 3.00 kg certified CALIBRA tet. perennial ryegrass
- 0.60 kg certified ABERSWAN white clover
- 0.60 kg certified MERWI white clover
- 0.30 kg certified S184 wild white clover

12.00 kg/acre - £74.80 30.00 kg/ha - £187.00

Grazing Pochon Persistent
Wiltshire
30th June

Permanent Grass

Long Term Grazing or Cutting Code: MIX6

This versatile mixture contains persistent varieties ensuring good yields for cutting and grazing over many years. Timothy is extremely resistant to cold temperatures and provides good late-season growth. The thick-bottomed sward structure is obtained by using late perennial ryegrasses and highly nutritious white clover. This mixture is very hardy and can be grown in upland or lowland areas.

- 3.00 kg certified TODDINGTON perennial ryegrass
- 2.00 kg certified KENDAL perennial ryegrass
- 2.80 kg certified TWYMAX tet. perennial ryegrass
- 2.70 kg certified ABERWOLF perennial ryegrass
- 1.50 kg certified WINNETOU timothy
- 0.40 kg certified ABERSWAN white clover
- 0.40 kg certified MERWI white clover
- 0.20 kg certified S184 wild white clover

13.00 kg/acre - £83.60 32.50 kg/ha - £209.00

Long Lasting Upland

Dual Purpose Mix Code: MIXCG05

This ryegrass-free mix is very long lasting and will tolerate harsh upland conditions. It is very palatable and is best when rotationally grazed to allow a period of recovery and regrowth. It can also be cut for silage or hay with the best quality forage coming from swards which are cut before heading.

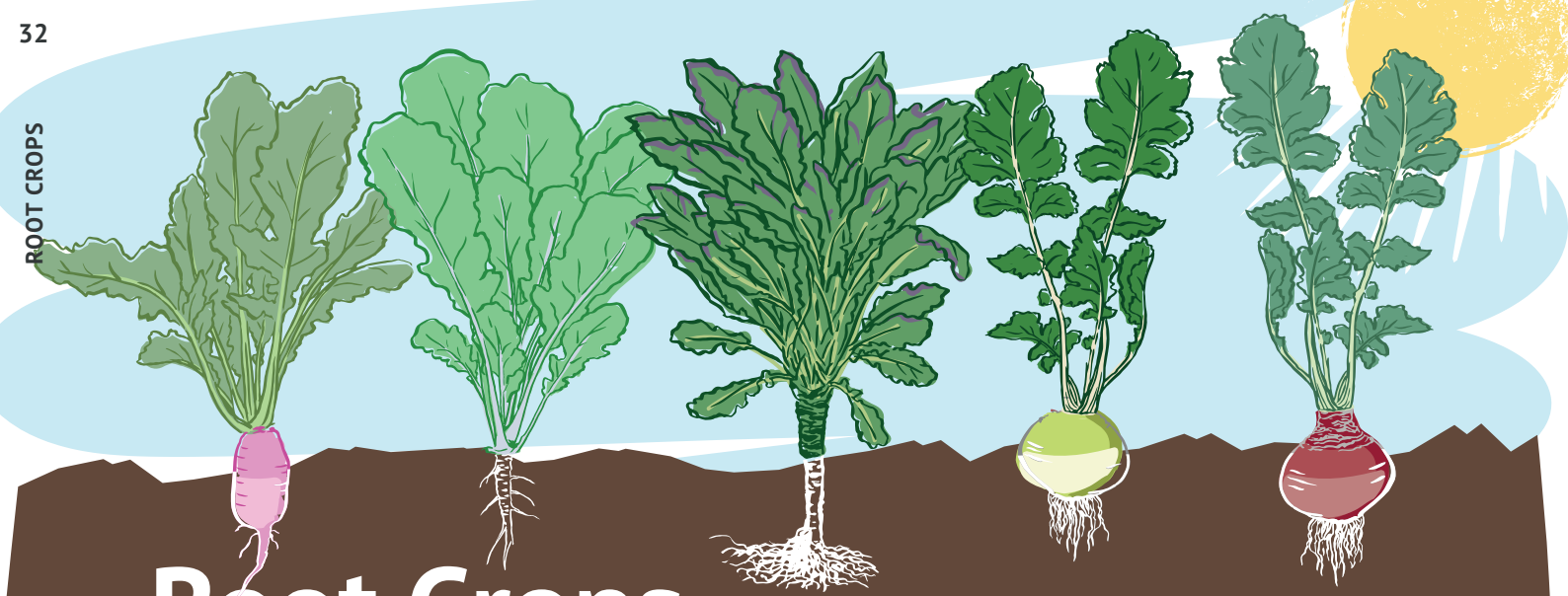
- 7.50 kg certified SENU meadow fescue
- 3.00 kg certified COMER timothy
- 1.00 kg certified ALTASWEDE late red clover
- 0.80 kg certified MERWI white clover
- 0.20 kg certified S184 wild white clover

12.50 kg/acre - £110.96 31.25 kg/ha - £277.40

Additions

Westerwolds can provide cover during establishment and increase yields in the first year. A small amount of forage rape can be added to offer early grazing and cover.

Add 3 kg of westerwolds	**£8.85 per acre**
Add 0.25 kg forage rape	**£1.22 per acre**



Root Crops

Fodder crops provide essential forage when grass is restricted. They are also a vital break crop.

Once sown, brassicas quickly produce a fodder crop. Adding muck or fertiliser to the crop makes it as productive as possible. This then feeds a larger number of livestock, so returning more dung to the soil, making the most of a very beneficial cycle. Once the decision has been made to break up a ley or pasture, many farmers sow a brassica fodder crop. These are not troubled by grass pests or diseases and thrive on the nitrates released by the decaying sward.

Reduce feed costs

These short-term catch crops are sown in late spring or summer to provide valuable home-grown fodder for buffer feeding dairy cows or finishing lambs in autumn or winter, when other sources of forage are limited. Turnips and rape grow quickly, needing just 10 weeks. Kale, swede and hardy turnip take a bit longer but are much more winter hardy and excellent for late-winter grazing. All are highly beneficial break crops which reduce grassland weeds and pest attacks.

Summer feed for dairy cows

Stubble turnips are palatable, energy-rich and offer dairy farmers the opportunity to prevent a feed shortage over the summer. To allow the rumen to adjust, cows should be introduced gradually to the crop for the first few days.

Lamb finishing

Lambs can be successfully fattened on fodder brassicas, gaining around 100-150 grams per day. The addition of a small quantity of hay, barley or concentrates is beneficial. Root crops, especially when grown on free-draining soils, are excellent for late autumn and winter use.

Hybrid Rape/Kale
Herefordshire
30th November

Sowing and Growing

Suitable soils and optimum pH
These crops will grow on most soil types provided they are well-textured and can give a fine tilth when cultivated. However, it's important to sow on well-drained ground for winter grazing. Optimum pH6.2.

When to sow
Fast growing root crops can be sown anytime from spring through till early autumn providing soil moisture is sufficient.

The slower growing crops such as the Hardy Root Mix, maincrop turnip, swede, fodder beet and kale should be sown in late spring (April – June).

How to sow
Root crops (except fodder beet) can be direct drilled with a Moore Uni-Drill (or similar). If a root crop is to follow a grass ley, glyphosate can be applied to the grass prior to mowing. Once the grass is removed, seed can be direct drilled into its stubble and can establish quickly unhindered by weeds. A good dose of slurry or FYM should be applied before sowing if possible.

Management
Electric fencing allows the crop to be fed at a controlled rate and should be long enough to give all stock access to the crop face. By doing this there is also less wastage through trampling. Ideally, a grass 'runback' should be provided for animals to lie on.

Nutrient requirements
These crops need 70kg N, 50kg P and 50kg K per hectare.

Yield potential

	DM/Ha	CP (%)	D-Value
Stubble Turnips	4.5t	17	69
Maincrop Turnips	6.0t	9	80
Swede	8.5t	11	82
Fodder Beet	14.0t	12	78
Kale	9.0t	17	68
Forage Rape	4.5t	19	68
Hybrid Rape/Kale	6.0t	19	68

Mixes

Early Fold Root Mix

Fast Growing and Cheap Seed — Code: MIXEF

This is a fast growing mixture capable of producing up to 45 tonnes per hectare with a dry matter content of 10% in approximately 10-12 weeks. Three acres feeds 100 sheep (complete diet) or 50 cows (quarter of diet) for a month.

- 1.50 kg certified SAMSON stubble turnip
- 0.50 kg certified HOBSON forage rape

2.00 kg/acre - £10.70 5.00 kg/ha - £26.75

Summer Early Graze

Fast Growing and Cheap Seed — Code: MIXSEG

An alternative to the Early Fold Root Mix above. Good for sowing in May & June and grazing during autumn.

- 1.00 kg certified TYFON leafy turnip
- 1.00 kg certified HOBSON forage rape

2.00 kg/acre - £16.90 5.00 kg/ha - £42.25

Hardy Root Mix

Longer Term — Code: MIXHR

Combining different brassicas together in a mixture is often beneficial as the crop is more reliable and higher yielding. This longer term mixture needs 20 weeks or more to produce its full yield, but will provide winter hardy keep until February or March. Three acres feeds 150 sheep (complete diet) or 75 cows (quarter of diet) for a month.

- 0.65 kg certified PINFOLD kale
- 0.65 kg certified GREEN GLOBE hardy turnip
- 0.20 kg certified GOWRIE swede

1.50 kg/acre - £30.96 3.75 kg/ha - £77.40

Straights

Fodder Beet

This root crop provides a huge yield which is highly digestible and has a high energy content. It should be sown in April and, because the seed is pelleted, can only be sown with a precision drill. **Seed is only available in one acre packs (50,000 seed units).** Robbos variety is suitable for leaf lifting harvester and Feldherr for hand harvesting or grazing in situ.

Robbos	**£105.00 per acre**
Feldherr	**£105.00 per acre**

Straights

Brassica

Forage Rape

This protein rich green forage can be ready to graze in as little as 12 weeks and is ideal for fattening lambs. The Hobson variety is mildew resistant and frost tolerant. Sowing rate 4.00 kg/acre.

Hobson (4.00 kg/acre)	**£4.90 per kg**

Stubble Turnip

Turnips are grown in most areas of the UK as a highly digestible catch crop, ready within 10-12 weeks from sowing. Sowing rate 2.00 kg/acre.

Samson (Sheep grazing)	**£5.50 per kg**

Kale

Kale is high yielding, protein rich and winter hardy. Usually grazed between September and March, depending on sowing time. Full crop ready in 20 weeks. Sowing rate 2.00 kg/acre.

Pinfold (2.00 kg/acre)	**£17.15 per kg**
Maris Kestrel (2.00 kg/acre)	**£19.60 per kg**

Hybrid Rape/Kale

Introduced to capitalise on the benefits of both rape and kale, this fodder crop is ready in 12 weeks from drilling. Many farmers favour this crop as it can offer good regrowth. Choose Redstart for winter hardiness and strong regrowth or Interval for good yields and high palatability. Sowing rate 3.00 kg/acre.

Redstart (3.00 kg/acre)	**£8.73 per kg**
Interval (3.00 kg/acre)	**£5.70 per kg**

Maincrop Turnip

This is the hardier type of turnip which requires 20 weeks growth and is suitable for grazing late into the winter. Hardy turnips yield around a third more than stubble turnips. Sowing rate 2.00 kg/acre.

Green Globe (2.00 kg/acre)	**£11.40 per kg**

Swede

This crop is ideally suited to cooler, wetter parts of the north and west of Britain. For stock or pot. Sowing rate 1.50 kg/acre.

Gowrie (1.50 kg/acre)	**£62.00 per kg**

Equine

Horses' requirements are sometimes different to that of sheep and cattle. These mixes have been created specifically with equine needs in mind.

Sowing and Growing

Suitable soils and optimum pH
These mixes are suitable for most soil types, mixes containing forage herbs prefer lighter soils which are less grass dominant.

When to sow
Sow from April to September when soil temperature is above 7˚C. Ryegrass based mixes or surface mixes with high sowing rates can be sown later than non ryegrass grazing mixes.

How to sow
Mixes can be broadcast or drilled but sown no deeper than 1cm. Always roll after sowing, if using a Cambridge roller, roll the field twice for maximum consolidation and soil contact.

Surface mix sowing rates vary. High rates are used on areas that receive lots of use and need fast establishment, low use areas or areas that are being patched up have scope to reduce the sowing rate.

Management
New swards can be lightly grazed around five or six weeks after establishment. Overgrazing should be avoided, swards should be given regular rest periods of a few weeks throughout the growing season to recover.

Surface mixes can be topped 4-5 weeks after sowing and again 4 weeks later to encourage the sward to thicken and plants to tiller, creating a denser surface.

Annual weeds will disappear when grazed. Perennial weeds should be controlled prior to seeding. Selective herbicides can be used on docks, thistles & nettles.

Nutrient requirements
Soil nutrient levels should be checked every 2 years and deficiencies corrected. If fertilising, take horses off for 2 weeks after application to allow the nutrients to be absorbed properly.

Slow release N fertiliser products are available to reduce a strong flush of grass directly after application e.g. 'Paddock Royale' (approx 2x 25kg bags per acre, Yara Guidelines).

Why is it so important to get your pasture right?

It is generally believed that wild horses had the ability to self-medicate, roaming freely to forage for different plant species that would naturally provide them with the macro and micro nutrients, minerals and vitamins that they need. Due to a number of factors such as herbicide use and popularity of aggressive species such as ryegrasses the diversity of species and consequently the nutritive value in swards has declined. It has become increasingly popular to address the shortfalls in the pasture by feeding concentrates and supplements, but this is not the healthiest option for the horse or for the environment.

There are a number of health issues that can be directly related to pasture management, nutritional content of the pasture and time spent eating grass or conserved grass (hay or haylage). These include laminitis, developmental orthopaedic disease, gastric ulcers, colic, respiratory diseases, mud fever, and wormer resistance. By getting the right mix of grass, legume and herb species for your land and your horse's needs the aim is for your horse to gain the majority, if not all, of its nutritional requirements from forage, relying less on concentrates and spending more time out in the field whatever the weather.

Surface & Repair Mixtures

Good grass surfaces are key for exercising horses safely and effectively. High sowing rates create dense turfs which withstand heavy equine usage. The species chosen ensure a uniform surface and maximum cushioning for the horses without affecting performance, if managed correctly.

Over-seeding can be a useful, low cost way of regenerating existing pasture which has become thin and tired with age or damaged through over-grazing or use. The existing grass sward is a very competitive environment for any new seeds to establish so ryegrass is usually used for over-seeding because it is the quickest to germinate and suitably aggressive.

Equine Grazing Mixes

Standard Horse Pasture

Long-Term Grazing and Hay

Code: MIX7

This is our standard mix which provides a fast establishing dense turf for grazing or the occasional cut of hay. It does contain ryegrass so would not be suitable for horses or ponies that are prone to laminitis or Equine Metabolic Syndrome.

- 3.10 kg certified ABERWOLF perennial ryegrass
- 2.80 kg certified TODDINGTON perennial ryegrass
- 2.20 kg certified MAXIMA creeping red fescue
- 1.20 kg certified SENU meadow fescue
- 1.20 kg certified CARACTER red fescue
- 1.50 kg certified WINNETOU timothy
- 1.00 kg certified EVORA smooth stalked meadowgrass

13.00 kg/acre - £84.10 32.50 kg/ha - £210.25

Natural Pony Paddock

Long Term with Herbs & No Ryegrass

Code: MIXPP

This non-ryegrass mix contains a very wide selection of grasses & herbs, improving drought tolerance, forage value and fibre content, providing a healthy, balanced diet. The absence of ryegrass species lowers the risk of laminitis due to a lower sugar and higher fibre content. This mix is slower to establish than those with ryegrass.

- 3.00 kg certified SENU meadow fescue
- 2.50 kg certified MAXIMA creeping red fescue
- 2.00 kg certified EVORA smooth stalked meadowgrass
- 1.70 kg certified SPARTA cocksfoot
- 1.50 kg certified SWAJ tall fescue
- 1.20 kg certified WINNETOU timothy
- 1.20 kg certified CARACTER red fescue
- 0.25 kg certified HIGHLAND common bentgrass
- 0.10 kg certified ZUBERSKA meadow foxtail
- 0.05 kg commercial sweet vernal grass
- 0.10 kg certified ENDURANCE ribgrass
- 0.25 kg burnet
- 0.05 kg yarrow
- 0.10 kg sheeps parsley

14.00 kg/acre - £112.90 35.00 kg/ha - £282.25

Equine Pasture Mix

Long Term and No Ryegrass

Code: MIX13

This is a persistent, non-ryegrass mix providing good quality forage with a low sugar content. Although this mix will take a little longer to establish than a ryegrass based mix, it will provide a dense, resilient turf with balanced forage for grazing and hay.

- 3.60 kg certified SENU meadow fescue
- 2.75 kg certified EVORA smooth stalked meadowgrass
- 2.50 kg certified MAXIMA creeping red fescue
- 2.35 kg certified CARACTER red fescue
- 1.80 kg certified WINNETOU timothy
- 1.00 kg certified SWAJ tall fescue

14.00 kg/acre - £101.69 35.00 kg/ha - £254.23

Repair & Over-seeding Mixes

Pasture Over-Seeding

Longer Term Four to Five Years

Code: MIXOSH

A long duration ryegrass mixture for over-seeding grazing pastures where more forage is required.

- 8.00 kg certified TODDINGTON perennial ryegrass
- 2.00 kg certified KENDAL perennial ryegrass

10.00 kg/acre - £56.50 25.00 kg/ha - £141.25

Equine Over-Seeding

Longer Term Four to Five Years

Code: MIXEQOS

A long duration non-ryegrass mixture for over-seeding grazing pastures where more forage is required.

- 2.75 kg certified SENU meadow fescue
- 1.40 kg certified WINNETOU timothy
- 1.50 kg certified EVORA smooth stalked meadowgrass
- 1.00 kg certified MAXIMA creeping red fescue
- 0.75 kg certified SPARTA cocksfoot
- 0.60 kg certified CARACTER red fescue

8.00 kg/acre - £60.38 20.00 kg/ha - £150.95

Paddock and Gateway Repair

Over-Seeding

Code: MIXPAD

A high sowing rate of fast-establishing mixture which provides a thick grass cover for use on poached areas or to improve pasture quality.

- 4.00 kg certified POLLANUM westerwold ryegrass
- 4.40 kg certified TODDINGTON perennial ryegrass
- 4.30 kg certified ESQUIRE dwarf perennial ryegrass
- 4.30 kg certified MAXIMA creeping red fescue
- 3.00 kg certified EVORA smooth stalked meadowgrass

20.00 kg/acre - £112.75 50.00 kg/ha - £281.88

Surface Mix

Racecourse, Gallop and Cross Country

Permanent

Code: MIX8

This mixture is very dense and resilient and contains spreading grasses with the ability to fill bare patches.

- 50% certified MAXIMA creeping red fescue
- 25% certified ESQUIRE dwarf perennial ryegrass
- 25% certified EVORA smooth stalked meadowgrass

50-160 kg/acre 125-400 kg/ha **£6.49 per kg**

First Hand

George Young

Farm Type	**Agroecological Mixed**
Location	**Essex**
Size	**1200 acres arable, 150 acres conservation grazing**
Soil Type	**London Clay**
Mixes Used	**Herbal Leys & Legume & Herb Rich Swards**

'I describe myself as an agroecological mixed farmer,' says George Young. 'Farming with nature is one of the key things I want to do here on the farm, utilising nature's toolkit rather than machines and chemicals.'

Nine years ago, Fobbing Farm was growing wheat, OSR and peas in a standard six course rotation but George wanted to change the cropping system,revitalise the soil, build resilience, improve the ecology to encourage beneficial insects and get rid of problematic weeds. He began introducing large scale herbal leys into his arable rotation.

George has sown 250 acres of herbal leys over the past 4 years and felt it was important to incorporate ruminant livestock. He chose cows and now values them immensely. 'We've had to get the infrastructure right but we've worked hard with semi-permanent fencing and I feel confident about rolling out herbal leys across the rest of the farm. After four years of a diverse mix of herbs, legumes and grasses grazed by the cows I can mine the nutrition in the soil for three years. The leys really are the base for me being able to farm in a sustainable and regenerative way and they look and smell stunning too.'

They are established with a direct drill - a New Zealand style cross slot. 'We don't sow deep and we roll twice for maximum seed to soil contact. We've had great success even with hit and miss rainfall.' The combination of leys and livestock enables different types of farming with different income streams, explains George. 'I can produce meat, grow fruit and nuts, or heritage grains, even high value market garden vegetables!'. The eleven varieties of ancient grains have deep roots to tap into the rich nutrition of the soil. Fobbing Farm now has a mill room, featuring Vermont granite and sells direct to bakers.

George has also introduced agroforestry, planting a plethora of tree species - quince, plums, cherries, pears, walnuts and cobnuts. He's trialling apricots, nectarines and almonds on frost-free fields. Belts of timber run up the middle of the farm, with birch on the outside. Willow is great medicinally for livestock and can be coppiced for wood chip and compost. Belts of trees reduce erosion during the early stages of any arable crops.

'From a livestock management perspective it's exciting. I wanted to make sure my livestock can graze on all the interesting parts of the farm. Trees provided them with shade and protection from rain.'

'We are seeing really exciting changes after just 4 years and I can't wait to see what this farm will be like in twenty years time. It's a generational project.'

So what next? The farm is currently in organic conversion and George says he has 'fallen in love with ecology.'

'Ecologically, it's tremendous. I saw my first dung beetle on the farm 18 months ago and now there are at least 10 species. They are key ecological builders, eating slugs eggs, feeding birds and mammals. You simply don't get them without a diverse ley because you'd be using synthetic wormers which kill dung beetles. The herbal leys are doing a vital job for pollinators too. They contain around 10 flowering plants, are building life into the soil, encouraging small mammals, larger mammals and birds of prey to live on the farm.

Chewing it Over

Sam Lane, our Technical Man reminds us that we need a resilient farming system that can withstand the vagaries of economic and climate change.

It's with some relief that we wave goodbye to 2022. It's certainly been a year of challenges! In terms of growing conditions the spring season gave way to prolonged dry weather, hose pipe bans and a serious summer drought, causing major issues for spring planted seed mixtures.

These extreme summer temperatures were certainly a shock. During my time spent travelling in Australia 10 years ago, I vividly remember driving just outside the Blue Mountains and noticed the temperature gauge on the car reading 41.5 degrees, never for one minute considering that in the future we may have summer days reaching 40 degrees in the UK!

However, we must try to remain positive. The rains did eventually come as we got to the autumn season, just in time to get most autumn sown leys, winter cereals and forage crops in the ground in some form or other. Despite some late sowings the mild autumn has helped many of these plantings establish reasonably well and we hope for more balanced weather in 2023.

As we look ahead to next year, the economic outlook both at home and on the international stage looks equally challenging. We seem to be in a period of alarmist news stories, with the next catastrophe just over the hill, and through all this we are reminded time and time again how fragile our food system can be. However, with all the challenges we currently face, comes the opportunity to adapt our farming practices where possible and endeavour to keep moving forward.

In my role as advisor I'm lucky to speak to a range of farmers, landowners and growers throughout the year, all of whom are producing food under a range of banners - from conventional systems to organic, Biodynamics to Regen Ag. It's becoming clearer and clearer to me that while these labels are useful, truly open-minded and progressive farmers can consider, discuss and learn from all of these strands to create a really sustainable system.

The challenge of high fertiliser prices is a great case in point. The older agricultural books describe in detail the use of various legume species to boost soil fertility, helping to reduce our reliance on bought in inputs.

Red clover can be used to power short term grass leys, while also fixing up to 200 kgs per ha N for the next crop. A silage mix containing a robust level of red clover can provide 3 cuts of high protein forage each year without the need for expensive artificial N.

Similarly large perennial forage legumes like lucerne can provide 4 cuts of high quality silage every year, without the need for any nitrogen. On the right soils lucerne can last for 5 years and has the added benefit of great drought tolerance.

"travelling in Australia 10 years ago, I vividly remember the temperature gauge on the car reading 41.5 degrees, never for one minute considering summer days reaching 40 degrees in the UK!"

Shorter term legumes like vetch and crimson clover can be included in forage mixtures or used as a standalone crop to add a short, sharp fertility boost to tired soils.

We have also seen some arable growers pushing the boundaries by introducing white clover into cereal rotations by growing a 'Living Mulch'. The idea being to grow a legume alongside a cash crop to help feed it with natural nitrogen as the crop progresses.

While this method has shown many positive results such as reduced inputs and a lower weed burden, it has also highlighted plenty of challenges. However, with volatile fertiliser prices this and other legume based farming systems are certainly worth watching closely.

SFI Grassland Soils Standard

The Sustainable Farming Incentive (SFI) pays English farmers to produce public goods such as water quality, biodiversity, animal health and welfare and climate change mitigation, alongside food production. This page contains information on Herbal Ley mixtures that will meet the requirements of this new scheme. The Grassland Soils Standard pays up to £58 per hectare.

Grassland Soils Standard specifics

This year farmers can enter individual fields into an SFI Standard. Here we deal with the Grassland Soils Standard. It is available at either introductory (£28/hectare per year) or intermediate (£58/hectare per year).

For both levels, farmers will need to test the land they enter for its soil organic matter. They will also need to develop a soil management plan. For both levels too, there must be at least 95% green cover of the land in the standard over the winter.

For the higher payment of £58 per hectare the intermediate level requires that herbal leys are established and maintained on 15% of the area entered into that standard. For grassland farmers this offers the opportunity to take advantage of growing Herbal Leys.

It is very important to choose the right mixture as these include a very wide range of grasses, legumes, herbs and wild flowers. The rules are relatively simple and we can offer further advice on how to formulate and select mixtures that will suit individual fields, soil types and uses.

Intermediate Level Herbal Mixes

SFI 'Light Land' Herbal Ley

Three-Five Year for Grazing — Code: MIXSFILIGHT

A dual purpose soil improving Herbal ley that can be both cut and grazed throughout the year, tailored to suit particularly light soils prone to drought, it stays green throughout the summer months.

10.00 kg/acre - £74.50 25.00 kg/ha - £186.25

SFI 'Heavy Land' Herbal Ley

Three-Five Year for Grazing — Code: MIXSFIHEAVY

A Herbal ley containing species carefully selected to suit heavier, wetter sites, these deep rooting plants, especially the herb species will improve infiltration and drainage, reducing surface runoff and erosion. The mix can be both cut and grazed.

10.00 kg/acre - £74.45 25.00 kg/ha - £186.13

SFI 'Cutting/Silage' Herbal Ley

Three-Five Year Cutting/AD — Code: MIXSFICUT

An increasing amount of arable farmers require the Herbal option to produce high quality silage or AD feedstock where livestock grazing is not an option. This mix includes highly palatable, protein rich legumes, as well as nutritious grasses and herbs which suit a cutting regime.

10.00 kg/acre - £70.00 25.00 kg/ha - £175.00

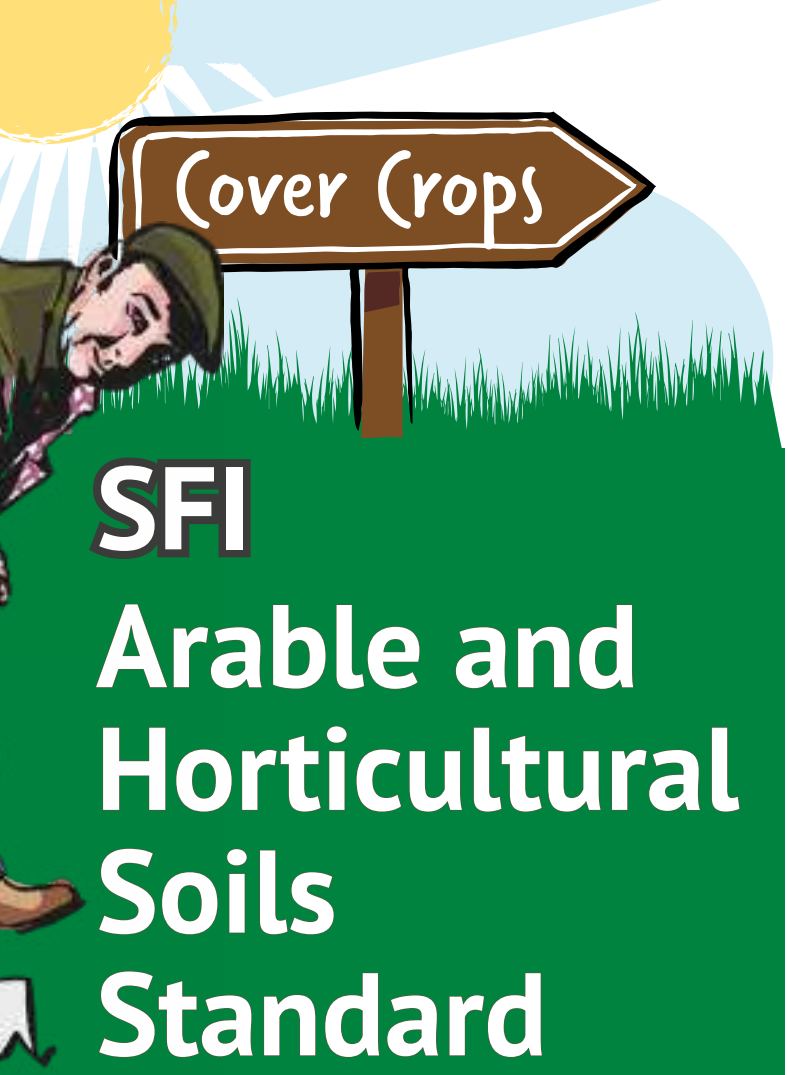
SFI 'Stockless Arable' Herbal Ley

Three-Five Year Fertility Boost — Code: MIXSFISTOCK

This long lasting green manure is designed for soil fertility boosting with a high legume content for free N and multiple topping to add lots of organic matter.

9.00 kg/acre - £69.41 22.50 kg/ha - £173.53

N.B. Mixtures subject to change. Up to date online



SFI Arable and Horticultural Soils Standard

DEFRA expects the initial SFI offer to enhance the natural health and fertility of our soils and to contribute to the nations efforts to reach Net Zero by locking more carbon into soils. For arable farmers keeping green cover on soils over the winter with crops, cover crops or Herbal leys there is up to £40 per hectare available.

Arable and Horticultural Soils Standard specifics

This will be available at either an introductory (£22/hectare per year) or intermediate (£40/hectare per year) level.

For both levels, farmers will need to test for soil organic matter, develop a soil plan and ensure winter cover is in place for at least 70% of the land in the standard.

Both levels will need organic matter applied each year to one-third of the area of land entered into the standard. Organic matter can be added to soils and can include introducing grass or herbal leys into an arable rotation or by including legume species or legume rich mixes in rotations

At the intermediate level, a sown green cover crop must be in place for winter months. This must include land with multi-species green cover (covering at least 20% of total land in the intermediate level of the standard). The green cover must be well established by the start of December until the end of February each year.

Introductory Level Cover Crop Mix

Quick Growth Cover Crop

Flexible, Fast Establishment Code: MIXQCC

A brassica based mixture designed to establish rapidly, providing a flexible option to sow between an early harvested crop but before autumn planting, or as an autumn cover crop for rapid green winter cover.

5.00 kg/acre - £19.40 12.50 kg/ha - £48.50

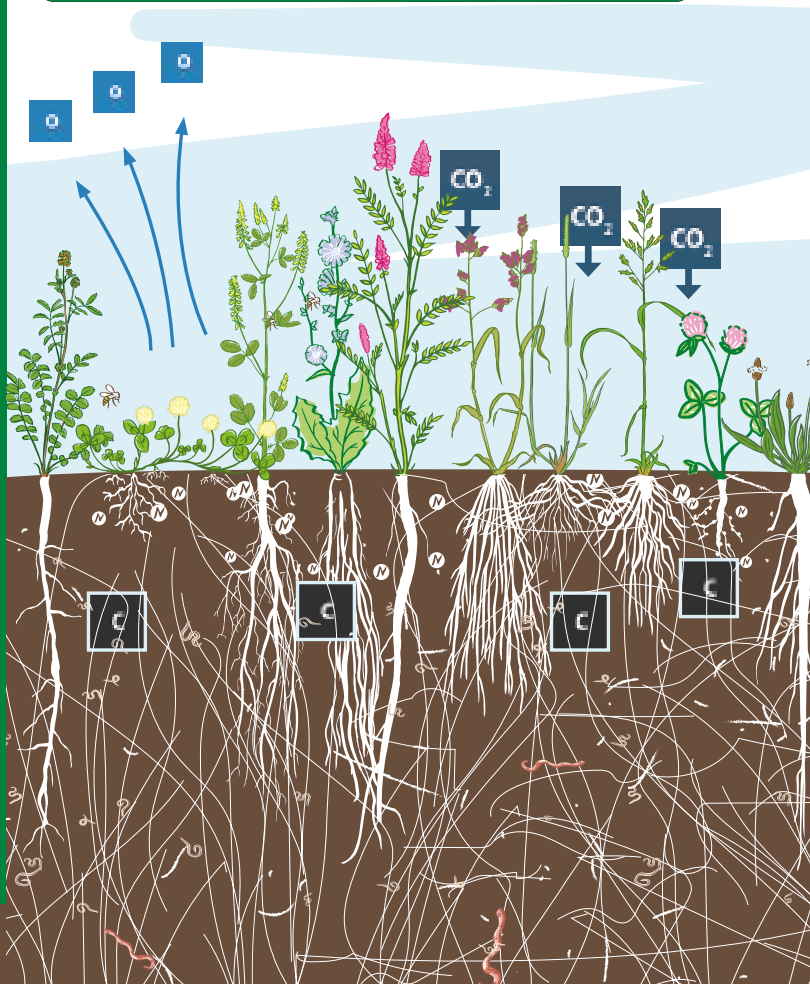
Intermediate Level Cover Crop Mix

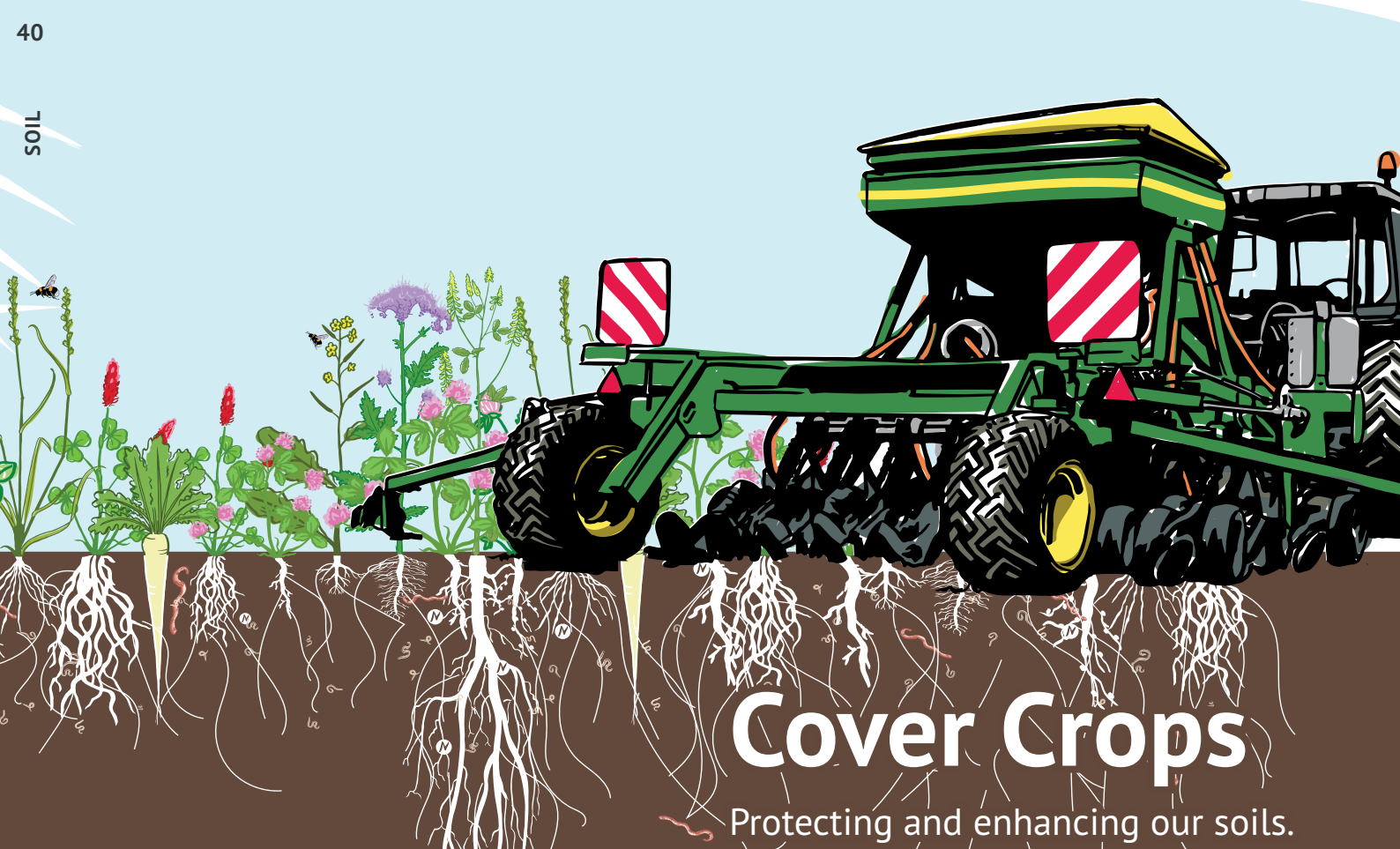
Multi Species 8 Way Cover Crop

Ground Cover&Livestock Forage Code: MIXSFIMULTICC

Multi species mixture to reliably produce more biomass than a monoculture. This is a low cost mixture with highly diverse 8 way multi species content to maximise the benefits. Use to improve soil structure, nutrient availability, water holding capacity and to enhance and improve soil micro biology.

9.00kg/acre - £23.45 22.50 kg/ha - £58.63





Cover Crops

Protecting and enhancing our soils.

Rising cost of fertilisers and other inputs combined with an increasingly uncertain climate means that it's becoming ever more beneficial and indeed crucial to have good soils which are fertile, well structured and tolerant to drought.

The dilemma for many arable farmers is affording the time and money to invest in soil health and improvement, but simply put, if we don't, soils will rapidly become so poor they will adversely affect yield, crop quality and ultimately profitability.

It is the small remains of plant life that ultimately produce vital fertility and structure in the soil. Though this organic matter makes up only a small percentage of the soil content it is vital, since nothing will grow on clay, silt or sand alone. Doing nothing to replace it is therefore not an option.

The best and cheapest way of adding organic matter to the soil is to grow cover crops between cash crops. The cost of the seed and having no income from a field given over to cover crops can appear prohibitive but should be seen as an investment that will produce higher and better yields in subsequent years.

Sowing and Growing

Suitable soils and optimum pH
These will grow on most soil types with a pH above 5.6.

How to sow
Mixes can be broadcast or drilled at a maximum of 10mm. Ideally, into warm soils when rain is imminent. If possible, roll after sowing for maximum seed to soil contact.

If sowing multi species mixes with large and small seeds drill according to the smallest seed size, sowing these too deeply will reduce establishment reliability.

Management
Catch crops must be established by 20th August and maintained for a minimum of 8 weeks and retained until at least the 14th October. Cover crops must be established by 1st October to 15th January or longer.

These mixtures can be grazed, topped or sprayed off after the above dates to terminate and either incorporated or left to break down on the surface depending on the farming system.

Cover crops grown after high yielding cereals may benefit from 25-50kgs per ha of N, especially if sowing for winter grazing.

Legume | Herb | Brassica | Cereal | Other

Special Quick Growth Cover Crop
Wiltshire
1st October

Short term mixes

Quick Growth Cover Crop

Flexible, Fast Establishment — Code: MIXQCC

A mixture designed to establish rapidly, providing a flexible option to sow between an early harvested crop but before autumn planting, or as an autumn cover crop for rapid green winter cover.

- 2.50 kg certified CABRI mustard
- 2.20 kg certified IRIS fodder radish
- 0.30 kg certified LILLA phacelia

5.00 kg/acre - £19.40 12.50 kg/ha - £48.50

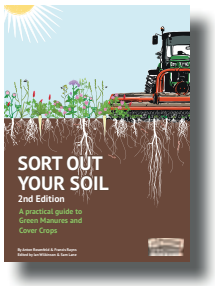
Diverse Grazable Cover Crop

Ground Cover & Livestock Forage — Code: MIXGCC

A great mix for a joint arable & livestock venture, the mix contains soil conditioning phacelia, fodder & tillage radish, combined with high protein vetch, forage rape & turnips improving palatability and liveweight gain for stock. N.B. Rye will be replaced with winter cereal if unavailable early in the season.

- 6.50 kg certified HUMBOLT rye
- 3.30 kg certified CANDY common vetch
- 0.05 kg certified HEUSERS OSTSAAT crimson clover
- 0.50 kg certified IRIS fodder radish
- 0.40 kg certified HOBSON forage rape
- 0.20 kg certified SAMSON stubble turnip
- 0.05 kg certified LILLA phacelia

11.00 kg/acre - £23.50 27.50 kg/ha - £58.75



Discover a whole lot more on cover crops and green manures in our updated practical guide - **Sort Out Your Soil 2nd Edition**

Call us on 01608 652552 or visit cotswoldseeds.com to get your copy.

The Golden Hoof
Berkshire
13th November

Green Manures

Protecting and enhancing our soils.

Summer Sown Mixes

Summer green manures are planted from late spring onwards on bare ground and are incorporated before the sowing of a winter cash crop. A good summer green manure will be ready for turning-in after only 8-10 weeks. These crops give good leaf canopy cover to block out light, suppressing weed growth.

These green manures can be sown on their own or as an understory to a main crop and last between 2 and 6 months. As legumes will only fix nitrogen when the soil is above 8˚C they are effective between April and August.

Overwinter Mixes

Winter green manures such as rye or westerwolds scavenge excess nitrogen from previous crops which prevents it leaching over the winter. The nitrogen held within the green manure crop is then released when it is incorporated.

Legumes like vetch can be used for winter cover and, provided that these are sown by September, can fix up to 200kg N/ha for use by the following cash crop. The canopies of these plants also protect against soil erosion.

Longer Term Leys

Slower growing perennial legumes such as red and white clover are used to add nitrogen to the soil over a long period.

Red clover fixes upwards of 200kg N/ha which is released rapidly after incorporation. To delay the release of nitrogen, clover is mixed with grass which is higher in carbon and acts like a sponge, holding the nitrogen for longer. This is especially important for subsequent autumn-sown crops where the nitrogen demand is highest 6 or 7 months after the green manure crop.

Sowing and Growing

Suitable soils and optimum pH
These will grow on most soil types with a pH above 5.6.

When to sow
Sow summer mixes in warm soil between May and July. If undersowing, seed should be broadcast from mid March in damp conditions before the host crop canopy closes in. Cover for the winter should be sown by late September although rye and vetch can be sown into October.

How to sow
Rye and vetch seeds can be drilled at up to 25mm. All other mixes should be drilled or broadcast at no more than 10mm.

Management
Summer green manures will be ready for incorporation after 8-10 weeks normally at the onset of flowering. Winter green manures can be incorporated in April or May. Westerwolds ryegrass will regrow after cutting so can be left through the summer for further cutting or mulching. To minimise the risk of ryegrass seed being shed, cut before the seed heads are visible.

Yield potential
The amount of N fixed by legumes depends on the success of the green manure. Generally, a reasonable crop can fix over of 100kg N/ha from a spring or summer sowing. Rye can scavenge and hold 90% of soil N, westerwolds about 70% and vetch and red clover can fix upwards of 200kg N/ha if left to grow.

Brassica | Legume | Herb | Cereal | Grass

Short term mixes

Summer Quick Fix
Nitrogen Boost

Code: MIXSQF

The purpose of this mixture is to build soil N in a short time. It is a fast-growing, annual mixture that is at its best when sown into warm soils.

- 1.55 kg certified CABRI mustard
- 0.25 kg certified IRIS fodder radish
- 1.50 kg certified HEUSERS OSTSAAT crimson clover
- 1.20 kg certified AXI berseem clover
- 0.65 kg commercial sweet clover
- 0.60 kg certified MARAL persian clover
- 0.25 kg certified GLOBAL red clover

6.00 kg/acre - £37.32 15.00 kg/ha - £93.30

Summer Green Manure
Early Sown N-Fixer

Code: MIXCCE

In warm soils, this mix can provide 150kg of N per hectare from a summer sowing. Very rapid growth with the potential to leave in over winter.

- 1.35 kg certified SHAKIRA Italian ryegrass
- 0.90 kg certified CABRI mustard
- 0.65 kg certified IRIS fodder radish
- 0.15 kg certified STRUCTURATOR tillage radish
- 0.85 kg HEUSERS OSTSAAT crimson clover
- 0.55 kg commercial sweet clover
- 0.45 kg certified certified AXI berseem clover
- 0.10 kg certified ALTASWEDE late red clover

5.00 kg/acre - £25.50 12.50 kg/ha - £63.75

Yellow Trefoil/White Clover
Intercrop Mixture

Code: MIXINT

This mixture will fill the base of a main crop brassica or cereal without affecting its yield. It reduces weed competition, adds organic matter and fixes nitrogen. Trefoil rarely interferes with harvest as it is low growing. This strong growth suppresses weeds, especially if left in for a second year.

- 1.95 kg certified MERWI white clover
- 1.05 kg certified VIRGO PAJBERG yellow trefoil

3.00 kg/acre - £49.22 7.50 kg/ha - £123.05

Over winter mixes

Rye/Vetch
Overwinter Mix

Code: MIXRYEV

Growing a N lifter and fixer together is a reliable way of improving soils over the winter. An excellent weed suppressor. Available from September.

- 60.00 kg certified HUMBOLT rye
- 15.00 kg certified JOSE vetch

75.00 kg/acre - £114.90 187.50 kg/ha - £287.25

Ryegrass/Vetch
Overwinter Mix

Code: MIXWWV

An economical, effective option for overwinter soil management. Adds large amounts of N and organic matter.

- 8.00 kg certified POLLANUM westerwolds ryegrass
- 17.00 kg certified CANDY vetch

25.00 kg/acre - £73.75 62.50 kg/ha - £184.38

Longer term mixes

Fertility Builder
One-Two Year Mixture

Code: MIXFB

A grass and clover mix is the most effective green manure of all for improving soil fertility and structure. To realise its full potential it should be grown for at least one full year before incorporation.

- 5.85 kg certified CALIBRA tet. perennial ryegrass
- 2.65 kg certified GLOBAL red clover
- 0.50 kg certified MERWI white clover

9.00 kg/acre - £63.72 22.50 kg/ha - £159.30

Humus Builder
2-4 Year Soil Structure Improver

Code: MIXHB

This mix utilises species with very strong tap roots for huge improvements to soil structure and organic matter levels, ideal on light or dry land.

- 4.00 kg certified GLOBAL red clover
- 3.00 kg certified SPARTA cocksfoot
- 0.35 kg certified LACERTA chicory
- 0.15 kg certified PUNA II chicory

7.50 kg/acre - £70.77 18.75 kg/ha - £176.93

First Hand

Bob King

Farm Type	**Mainly Arable**
Location	**Wiltshire**
Size	**650 acres**
Soil Type	**Heavy Clay**
Mixes Used	**Cover Crops and GS4 Leys**

Bob King has discovered that using cover crops and GS4 herbal leys grazed with livestock is benefiting his arable business, allowing him to cut back on inputs and save money. Near the Salisbury Plain, the farm has been in Bob's family since WWII and he now manages it with his father and uncle. It comprises 450 acres of arable, 100 acres of GS4 Herbal Ley and 100 acres of permanent pasture, some over clay and some chalk downland. "We have land in the Higher Level Countryside Stewardship scheme, making use of various options including non grazable AB16 Bumblebird mix, GS4 ley and AB9 wild bird cover. 'The GS4 mixes have been sown on a rolling basis since 2020 and provide a two year break in the arable cropping rotation. It enables us to reduce our reliance on bought-in fertilisers, by naturally boosting soil fertility", explains Bob.

So how are the leys managed and terminated?

'We take a cut of silage in the first year, around late May, and in their second year the leys are primarily grazed. We were conscious of needing to get some livestock into the arable rotation and we run about 300 head of cattle through the year, over a 18 month cycle. We have been grazing the livestock on the herbal leys for 2 years now. Prior to that they were on the permanent pasture. Since we moved onto the herbal leys we've seen a lift in growth rates from 0.5kgs to about 0.8-9kgs a day which has enabled us to increase our livestock throughput. I am really pleased with how the cattle perform on the herbal leys and the silage that we make with it.'

The GS4 leys are terminated with glyphosate then direct drilled with an arable crop, in fact all the cropping on the farm is now done under a direct drill system. Bob started using winter cover crops on the farm about 15 years ago as he was concerned about leaving ground bare over winter before going into a maize silage crop. It was when he adopted the direct drilling system that it began to really take off.

'It's been five years since there's been any major soil movement and the benefits to the soil are clear.'

'We grew winter cover crops that we then direct drilled 'on the green' into the cover crop residue and that worked particularly well. Cover crops also give us an opportunity to graze lambs over some arable ground, helping to boost soil fertility further. The more we do this, the more we become convinced it's what we should be doing. We are now growing more diverse 6-7 species mixes and always looking to include plants that root at different depths to improve soil health.' Bob is discovering that a conservation agriculture approach is enabling him to cut back on inputs and save money.

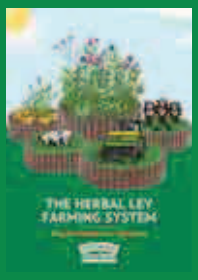
'After a GS4 we have been able to cut out insecticides in the following winter wheat crop because we have beneficial insects in the soil. The legumes in the GS4 are fixing nitrogen so we are also reducing artificial nitrogen inputs too. With the challenges facing farming, including loss of single farm payments and subsidies and rocketing fertiliser prices, this is all very helpful. The Countryside Stewardship scheme is definitely enabling us to make up some of what we are losing from the single farm payments.'

Bob started using Cotswold Grass Seeds fifteen years ago when he first became interested in plant diversity. `There is always someone there at the end of the phone with help, advice and suggestions on seed mixtures.'

Environmental

Countryside Stewardship, Entry Level & Higher Level Seed Mixtures.

Environmental seed mixtures are one way of protecting and enhancing wildlife across farmland. Many existing entry level & higher level stewardship schemes are still providing important resources and habitats. The more recent Countryside Stewardship scheme offers a further range of options, some based on the ELS/HLS prescriptions as well as newer options like the Bumblebird mixture and Two Year Legume Fallow. The mixtures on the following pages are common environmental stewardship prescriptions for ELS, HLS and Countryside Stewardship. All options can be tailored to better suit the location, soil type and aim of the scheme.



Interested in herbal leys? Learn more about their benefits and how they've stood the test of time in our 32 page farmers guide - **The Herbal Ley Farming System**

Call us on 01608 652552 or visit cotswoldseeds.com to get your copy.

Herbal Ley Field Day

Establishment & Management

FarmED

- An educational day covering GS4/SFI options
- Will equip you to choose and grow herbal leys
- From seed choice to sowing and establishment
- Includes visit to mob grazed herbal ley demo

For dates & to book online **www.farm-ed.co.uk**

From £50 per person **Groups welcome**

Mixes

GS4 Legume & Herb Rich Sward

ELS/HLS/CSS Codes: GS4, EK21

Whole Field Herbal Ley Code: MIXGS4

This all round mixture promotes biodiversity, creates habitats, produces pollen and nectar and is also a superb soil conditioner and top quality forage. It contains deep rooting species which are drought resistant and also draws up micronutrients from deep within the soil.

- 10% certified cocksfoot
- 10% certified festulolium
- 15.6% certified tet. perennial ryegrass
- 5% certified perennial ryegrass
- 7% certified timothy
- 5% certified meadow fescue
- 20% commercial sainfoin
- 3% certified birdsfoot trefoil
- 2.5% certified red clover
- 2.5% certified alsike clover
- 2.5% certified late flowering red clover
- 1.5% commercial sweet clover
- 6% burnet
- 4.5% chicory
- 2.8% sheeps parsley
- 1.5% ribgrass
- 0.5% yarrow
- 0.1% lesser knapweed

10.00 kg/acre 25.00 kg/ha **£7.98 per kg**

Farmers Mob Grazing GS4 on Herbal Ley Field Day
FarmED, Oxfordshire

Pollen & Nectar

Legume and flower margins.

Margin mixes

Nectar Stewardship Mix AB8

ELS/HLS/CSS Codes: EC24, EE1, EE2, EE3, EE9, EF1, HE10, AB8

Long Term Pollen & Nectar — Code: MIXECOAB8

An economical pollen & nectar source satisfying the AB8 stewardship criteria of 90% grasses and 10% flowering species. These mixes are relatively slow to establish, after the first year there are flowers for insects, seeds for birds and cover for mammals.

- 5% certified common bentgrass
- 10% certified creeping red fescue
- 15% certified smooth stalked meadowgrass
- 30% certified red fescue
- 30% certified sheeps fescue
- 3% native sainfoin
- 2% certified birdsfoot trefoil
- 1% native red clover
- 0.65% lesser knapweed
- 0.65% wild carrot
- 0.6% salad burnet
- 0.5% ox-eye daisy
- 0.5% certified late flowering red clover
- 0.2% cornflower
- 0.2% corn marigold
- 0.2% yarrow forage herb
- 0.15% self heal
- 0.15% red campion
- 0.15% ribwort plantain
- 0.05% lady's bedstraw

8.00 kg/acre 20.00 kg/ha **£12.33 per kg**

Floristically Enhanced AB8 Field Margin

ELS/HLS/CSS Codes: EF1, EE12, AB8

Long Term Pollen & Nectar — Code: MIXAB820

Containing 7 grass species and over 10 true wildflower species. This mix will provide a long-term, diverse pollen and nectar source, with the inclusion of the suggested 2kgs per hectare wildflower component.

- 5% certified common bentgrass
- 5% certified smaller catstail
- 10% certified crested dogstail
- 10% certified slender creeping red fescue
- 15% certified smooth stalked meadowgrass
- 20% certified sheeps fescue
- 25% certified red fescue
- 1.5% sainfoin
- 1.05% wild carrot
- 1.05% salad burnet
- 1% ox-eye daisy
- 1% lesser knapweed
- 1% native red clover
- 1% self heal
- 0.5% red campion
- 0.5% musk mallow
- 0.5% ribwort plantain
- 0.3% white campion
- 0.2% yarrow
- 0.2% meadow buttercup
- 0.2% lady's bedstraw

8.00 kg/acre 20.00 kg/ha **£23.57 per kg**

The Operation Pollinator

ELS/HLS/CSS Codes: EF4, AB1

Just Legumes — Code: MIXOP

Operation Pollinator is a mixture of legumes without grasses to provide a flower-rich area. This mix works well on heavy soil types where sown grasses can become dominant.

- 24% certified late flowering red clover
- 18.8% certified red clover
- 20% certified alsike clover
- 20% commercial sainfoin
- 7% certified birdsfoot trefoil
- 5% certified sweet clover
- 4% certified crimson clover
- 0.5% wild carrot
- 0.4% ox-eye daisy
- 0.3% lesser knapweed

5.00 kg/acre 12.50 kg/ha **£10.72 per kg**

Pollinators & Predators

How to attract beneficial insects

FarmED

- Find out how to attract beneficial insects
- Understand pollinators and predators and their roles
- Managing and maintaining habitats for insects
- Farm walk to see arable and horticultural habitats

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From £60 per person **Groups welcome**

FarmED Field Day
Oxfordshire

Grass | Legume | Herb | Cereal | Wildflower | Others | Brassica

Farmland Birds

Reducing the hungry gap.

Farmland bird mixes

AB15 Autumn Sown Two Year Legume Fallow

ELS/HLS/CSS Codes: AB15

Two Year Mixture — Code: MIXAB15

Flowering crops on fallow land. Substitute perennial ryegrass for cocksfoot on dry soils.

- 66% tet. perennial ryegrass
- 13% common vetch
- 8% late flowering red clover
- 6% red clover
- 3% birdsfoot trefoil
- 3% alsike clover
- 1% yellow trefoil

12.00 kg/acre 30.00 kg/ha **£5.76 per kg**

AB9 *One Year* Winter Bird Food

ELS/HLS/CSS Codes: AB9, EF2

Survival Mixture — Code: MIXSM

This mixture should be sited on field margins or next to hedges or woodland. It contains a range of species which provides food for birds, including finches and sparrows, over one winter while also feeding small mammals.

- 15% fodder radish
- 15% linseed
- 17% red millet
- 17% white millet
- 10% mustard
- 10% spring triticale
- 8% gold of pleasure
- 8% brown mustard

5.00 kg/acre 12.50 kg/ha **£4.28 per kg**

AB9 *Two Year* Wild Bird Seed

ELS/HLS Codes: AB9, EF2, CSS

Farmland Bird Feeder — Code: MIXWBSS

This mix includes annuals for the first winter, while the biennial kale provides late seed in the second winter. It is a good food source for wild birds and is reliable if managed properly, as well as being more economical.

- 70% spring triticale (supplied separately)
- 14.25% kale
- 10% white millet
- 2% fodder radish
- 2% mustard
- 1.75% fennel

20.00 kg/acre 50.00 kg/ha **£4.04 per kg**

AB15 Autumn Sown Fallow Legume Only Mix

ELS/HLS/CSS Codes: AB15

Two Year Mixture — Code: MIXAB15LEG

Legumes only on fallow land. Use this if grass weeds are an issue.

- 50% common vetch
- 15% certified pre inoculated lucerne
- 12.5% red clover
- 10% alsike clover
- 4% birdsfoot trefoil
- 3.5% late flowering red clover
- 2.5% yellow trefoil
- 2.5% crimson clover

8.00 kg/acre 20.00 kg/ha **£6.83 per kg**

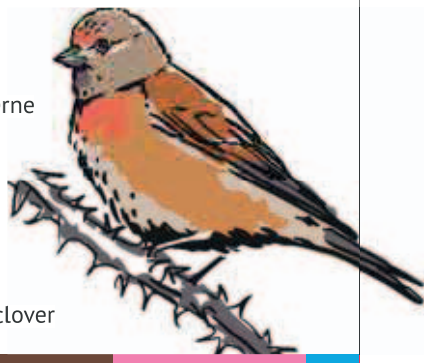
AB16 Enhanced Autumn Sown Bumblebird

ELS/HLS/CSS Codes: AB16

Two Year Mixture — Code: MIXAB162021

Food source for birds, pollinators and insects.

- 42.5% winter rye
- 23% winter oats
- 8.2% common vetch
- 6.7% winter linseed
- 5.5% game kale
- 2.7% crimson clover
- 2.2% pre inoculated lucerne
- 1.8% fodder radish
- 1.2% fennel
- 1.2% birdsfoot trefoil
- 1.2% gold of pleasure
- 0.5% alsike clover
- 1.7% phacelia
- 0.8% red clover
- 0.8% late flowering red clover



18.00 kg/acre 45.00 kg/ha **£3.68 per kg**

Retrieve Mix

ELS/HLS Codes: EC24, EE1, EE2, EE3, EE9, EF1, HE10, CSS

Fast and Economical — Code: MIXRET

For a summer sowing after a failed spring crop nothing beats these fast growing brassica species. It's quick, reliable and it works.

- 37.6% mustard
- 31.2% forage rape
- 18% fodder radish
- 13.2% hybrid rape/kale

5.00 kg/acre 12.50 kg/ha **£4.49 per kg**

Resource Protection

Grass areas to shield water courses and provide wildlife habitats.

Sowing & Growing Environmental Mixes

When to sow

For grass only or pollen & nectar mixes sow between late March and early May, or August and early September. Legume based mixtures should be sown into warm soils. Generally mixes containing wild flowers are sown in the autumn, especially if they contain Yellow Rattle. Sow Wild Bird seed mixtures when the risk of frost has passed in the spring.

How to sow

Species included in pollen and nectar or grass mixtures are small in size and should be shallow sown into a fine but firm seedbed. They can be broadcast and harrowed or shallow drilled at 10mm. Both options should be well rolled after sowing for maximum seed to soil contact.

Wild Bird seed mixtures containing a range of annual species can be shallow drilled or broadcast and well rolled in to a fine but firm seedbed. Two year Wild Bird mixtures containing high levels of cereals can be supplied separately, the cereals can be drilled in rows to a depth of 25mm, and the smaller seeds broadcast in a second pass.

Management

Pollen & nectar and grass only mixtures can be lightly topped several times during establishment, normally 6-8 weeks after sowing, to control annual weeds and encourage tillering. They are also cut back as growth slows in the autumn.

Weed control in Wild Bird mixtures is difficult, its important to create a clean, weed free seedbed before sowing.

Mixes

Species Rich Parkland Grassland

ELS/HLS Codes: HK7, GS7

Low Maintenance Long Term — Code: MIXPGLM

A slow growing and manageable seed mix for those with low requirements from permanent grassland. This mixture can be grazed periodically or topped to keep a tidy appearance.

- 1% commercial sweet vernal grass
- 3% commercial meadow foxtail
- 5% certified common bentgrass
- 6% certified crested dogstail
- 10% certified rough stalked meadowgrass
- 25% certified smooth stalked meadowgrass
- 25% certified red fescue
- 25% certified sheeps fescue

16.00 kg/acre 40.00 kg/ha **£9.86 per kg**

Recreating Grassland

ELS/HLS Codes: HK7, ED2

Long Term — Code: MIXRG

The mixture below is suitable for sowing on most soil types ranging from clays to calcareous. Provides grass for grazing or hay production (if no forage is required use the mix above).

- 5% certified common bentgrass
- 10% certified sheeps fescue
- 15% certified red fescue
- 20% certified timothy
- 20% certified smooth stalked meadowgrass
- 30% certified meadow fescue

10.00 kg/acre 25.00 kg/ha **£8.12 per kg**

Buffer Strip Grass Margin

ELS/HLS/CSS Codes: EJ5, EJ9, EE7, EE8, EC24, EE1, EE2, EE3, EE9, AB3, SW4, SW1

Two, Four or Six Plus Metre — Code: MIXGM

An ideal mixture for buffer strips on cultivated land. This mixture is suitable for ELS and can also be used in HLS.

- 5% certified common bentgrass
- 10% certified cocksfoot
- 20% certified timothy
- 20% certified meadow fescue
- 20% certified smooth stalked meadowgrass
- 25% certified red fescue

10.00 kg/acre 25.00 kg/ha **£7.95 per kg**

First Hand

Dr Sarah Beynon

Farm Type	**Wildlife & Conservation**
Location	**West Wales**
Size	**200 acres**
Soil Type	**Varied neutral and acidic soils from peat to clay with some free draining and stony**
Mixes Used	**Herbal Ley, Bespoke Wildflower Legume Pollinator Mixtures**

'Although I'm a farmer's daughter I always had a passion for wildlife and over the years, studying to become an entomologist, I realised just how important insects and other invertebrates are', says Dr Sarah Beynon, who bought what is now The Bug Farm from her cousins.

'The soils here are varied neutral and acidic soils from peat to clay with some free-draining stony fields', Sarah explains. Traditionally this is assigned a low economic value by farmers but we look at it in a different way. It's our most rich and valuable land because it's not been possible to grow intensive crops reliably over the years, meaning habitats have not been destroyed.' Building on this, Sarah turned it into a nature reserve where she manages her own herd of pedigree Welsh Black Cattle for conservation grazing. 'Their dung fertilises the land and provides a home for dung beetles and other insects, which in turn provide food for birds and mammals.'

The Bug Farm grows wheat and barley alongside other arable crops such as linseed, buckwheat and wild bird seed mixes, all from Cotswold Seeds, but these are not currently harvested for human consumption, leaving it for overwintering birds to feed on instead. It's an integrated system with clover inter-cropping, herbal leys and a lot of perennial wildflower meadows.

'We want to get the balance right,' Sarah says. 'We are farming food and habitats for wildlife and also producing food for humans at the same time.'

Over the years Sarah has worked with Cotswold Seeds using a mixture of simple and complex herbal leys and tailoring wild flower mixes to suit the local conditions, converting rotational arable fields to these diverse leys to give them a break from arable production. Sarah also uses the grass and wild flower mix, Cotswold Wildflora on some areas of the farm. 'It's a real wow factor', she says. 'There's a flash of colour in year 1 from the annuals like Cornflower and Poppy and then the perennials come through to provide a longer-term meadow. We don't have any issue with annuals competing with perennials. The corn marigolds do really well and the knapweed has been fantastic - goldfinches and linnets have been returning to the farm in huge flocks.'

'We want to get the balance right, we're growing food for human consumption but at the same time preserving habitats.'

Sarah is working on a Nature Networks Fund project, monitoring results with a team of ecologists. Cotswold Seeds has also produced a special wildflower mixture and The Bug Farm has given a packet of it to every resident in St Davids - the smallest city in the UK - to grow mini meadows in their garden.

Sarah is now doing a trial with Cotswold Seeds clover mixtures. 'We are planting a woodland across the farm and are keen to reduce the use of herbicides in tree establishment. By sowing clover rich mixtures to out-compete the grass, hopefully we won't need to spray around the trees for the first couple of years.

'It's really exciting', says Sarah. 'We're farming for wildlife in a sustainable way for the long term. We need to reverse the mass extinction we're facing and change our food systems - and show how it all works financially and ecologically.'

The Bug Farm includes a museum, art gallery and tropical bug zoo. There are farm trails and wildlife walks plus the UK's first restaurant with insect-based dishes on the menu full-time.

Mixes

Wild Flowers

During the last decade, we've seen an increasing demand for wild flower seeds which are being sown to recreate traditional meadows which have been in decline.

Wild flower meadows are either managed under an agri-environmental agreement, where a list of species and management prescription will be provided by Natural England, or often for aesthetic purposes alone. They take many years to evolve naturally and can't be instantly created just by sowing seeds.

Nevertheless, with proper preparation and management, excellent results can be achieved in a relatively short time. **Visit our website for case studies and management advice.**

FarmED Courtyard
22nd July

Meadow Over-Seeding

Just Wild Flowers

Code: MIXWFOS

This wild flower-only mixture can be sown into open swards that are free of aggressive grasses and weeds. *Due to some shortages of wild flower seeds the contents of this mixture may vary depending on stock availability. Please call or check our website for the latest information.*

2.00 kg/acre 5.00 kg/ha **£193.20 per kg +VAT**

Cornfield Annuals

For One Summer

Code: MIXANN

This is a one year mix to provide a colourful display between June and August. Must be planted by April.

- 40% corn cockle
- 14% field poppy
- 13% cornflower
- 13% corn marigold
- 7% birdsfoot trefoil
- 6.5% crimson clover
- 6.5% persian clover

6.00 kg/acre 15.00 kg/ha **£65.65 per kg +VAT**

Cotswold Wild Flora

Long Term

Code: MIXFLO

Our most popular mix combines annuals, for an exceptional display in the first year, with perennials which get better and better from year two onwards.

- 5% certified common bentgrass
- 5% commercial yellow oatgrass
- 10% certified crested dogstail
- 10% certified smaller catstail
- 15% certified sheeps fescue
- 15% certified smooth stalked meadowgrass
- 20% certified red fescue
- 2% salad burnet
- 1.5% sainfoin
- 1.2% lesser knapweed
- 1% self heal
- 1% ox-eye daisy
- 1% ribwort plantain
- 1% red campion
- 1% lady's bedstraw
- 1% wild carrot
- 1% field scabious
- 0.75% musk mallow
- 0.5% meadow buttercup
- 0.5% yarrow
- 0.5% betony
- 0.5% white campion
- 0.05% cowslip
- 1.5% corn cockle
- 1% corn marigold
- 1% cornflower
- 1% field poppy
- 1% yellow rattle

10.00 kg/acre 25.00 kg/ha **£53.54 per kg**

Woodland Edge and Shady Area

Long Term

Code: MIXWOOD

In open and semi-shaded areas a number of grasses and wild flowers will thrive many of which are in this mix.

- 2% commercial tufted hairgrass
- 10% certified common bentgrass
- 10% certified crested dogstail
- 15% certified wood meadowgrass
- 24% certified slender creeping red fescue
- 24% certified red fescue
- 2% red campion
- 2% white campion
- 2% self heal
- 1.3% meadow vetchling
- 1.25% hedge bedstraw
- 1% garlic mustard
- 1% tufted vetch
- 1% betony
- 1% wood avens
- 0.8% perforate st john's wort
- 0.5% yarrow
- 0.5% teasel
- 0.3% upright hedge parsley
- 0.25% bluebell
- 0.1% autumn hawkbit

10.00 kg/acre 25.00 kg/ha **£79.39 per kg**

Acid & Clay Soil

Long Term

Code: MIXACID

A suitable mixture for both acidic and heavy clay soil types. Prepare a well worked, weed-free seedbed and spread seeds at no more than 10mm deep.

- 5% wavy hairgrass
- 5% commercial meadow foxtail
- 5% certified rough stalked meadowgrass
- 10% certified crested dogstail
- 20% certified common bentgrass
- 20% certified red fescue
- 20% certified sheeps fescue
- 2.3% lesser knapweed
- 2% self heal
- 1.5% lady's bedstraw
- 1.5% ox-eye daisy
- 1% betony
- 1% ribwort plantain
- 1% meadow buttercup
- 1% sheeps sorrel
- 1% yarrow
- 1% yellow rattle
- 0.7% meadowsweet
- 0.5% native red clover
- 0.5% meadow vetchling

10.00 kg/acre 25.00 kg/ha **£73.61 per kg**

Chalk & Limestone Soil

Long Term

Code: MIXCHA

This mixture is designed for chalk and limestone soil. Known to support a large selection of wild flower species which is why we have been able to create such a diverse mix.

- 2% quaking grass
- 2% crested hair-grass
- 4.5% commercial sweet vernal grass
- 10% crested dogstail
- 10% certified smaller catstail
- 18% certified smooth stalked meadowgrass
- 18% certified sheeps fescue
- 20% certified red fescue
- 3.1% sainfoin
- 2% field scabious
- 1.5% salad burnet
- 1.2% kidney vetch
- 1% meadow buttercup
- 1% wild carrot
- 1% ladys bedstraw
- 1% ox-eye daisy
- 1% self heal
- 1% agrimony
- 1% vipers bugloss
- 0.5% yarrow
- 0.1% small scabious
- 0.05% birdsfoot trefoil
- 0.05% hoary plantain

10.00 kg/acre 25.00 kg/ha **£71.18 per kg**

Damp Meadow

Long Term

Code: MIXDAM

Wetter soils require a slightly different seed mixture. This one should give reliable results on most damp soils and may also be used around water courses or ponds.

- 2% commercial meadow foxtail
- 5% certified common bentgrass
- 10% certified crested dogstail
- 10% certified rough stalked meadowgrass
- 18% certified smooth stalked meadowgrass
- 20% certified red fescue
- 20% certified sheeps fescue
- 2% great burnet
- 2% yellow rattle
- 1.8% self heal
- 1.5% lesser knapweed
- 1.25% ox-eye daisy
- 1.25% common sorrel
- 1% meadowsweet
- 1% ribwort plantain
- 1% lady's bedstraw
- 1% betony
- 0.5% ragged robin
- 0.5% meadow vetchling
- 0.1% devil's-bit scabious
- 0.1% native red clover

10.00 kg/acre 25.00 kg/ha **£66.60 per kg**

Wild Flower Directory

Perennials

Agrimony
Late

Agrimonia

Upright plant found in hedges and field edges. Late seeding.

Betony
Stachys officinalis

Found in shady areas, woodland fringes & hedge rows. Likes damp sites.

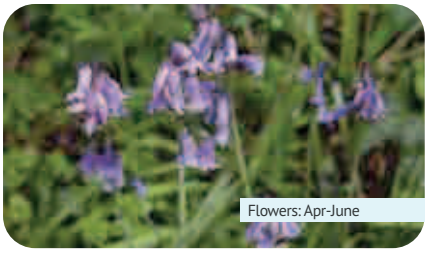
Birdsfoot Trefoil
Lotus corniculatus

Found in downlands and old pasture, esp. on calcareous soils, drought resistant.

Bluebell
Early

Hyacinthoides non-scripta

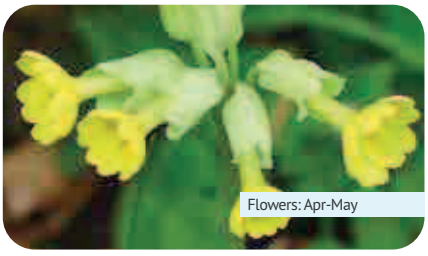
Found in hedge-banks and woodland where they can form a distinctive blue carpet.



Cowslip
Early

Primula veris

Found on chalky grassland and open calcareous woodland.



Devil's Bit Scabious
Late

Succisa pratensis

Found in damp meadows and wetter (but not waterlogged) areas.

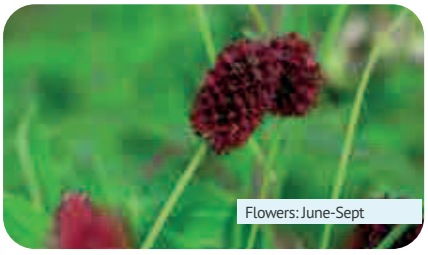
Field Scabious
Late

Knautia arvensis

Frequent in cornfields, grassland and roadsides on calcareous dry soils.

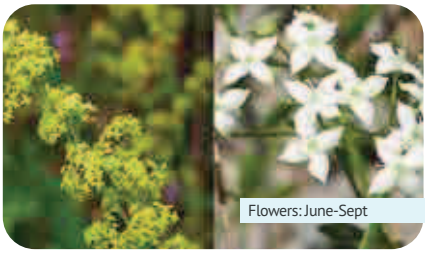
Great Burnet
Sanguisorba officinalis

Oblong burgundy flower heads, found on wetter meadow ground.



Ladys/Hedge Bedstraw
Galium verum/Galium mollugo

Ladys bedstraw suits most soils. Hedge bedstraw prefers free-draining.



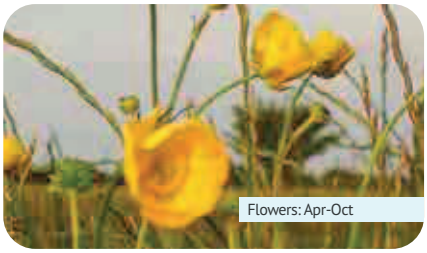
Lesser Knapweed
Centaurea nigra

Also known as common or black knapweed. Good nectar source

Meadow Buttercup
Early

Ranunculus acris

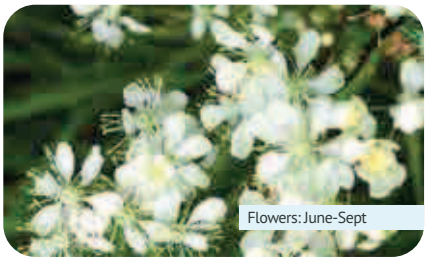
Found in older grasslands and damp grassy places with a long flowering period.



Meadowsweet
Late

Filipendula ulmaria

Found in and alongside meadows. Prefers wet ground. Strongly scented flowers.

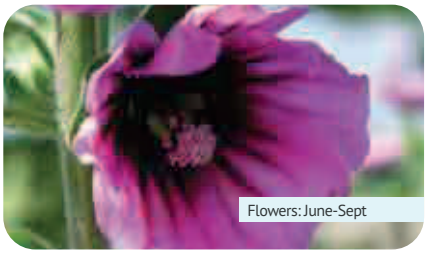


Meadow Vetchling
Lathyrus pratensis

Yellow pea-like flower, grows in grassy fields and hedgerows.

Musk Mallow
Malva moschata

Prolific on soils rich in nitrogen. Grows in hedgerows and grassland.



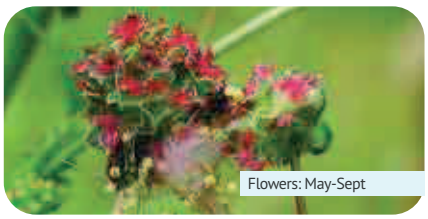
Ox-Eye Daisy
Leucanthemum vulgare

Robust, reliable plant for alkaline soils. Found in meadows, pastures and banks.

Perennials continued

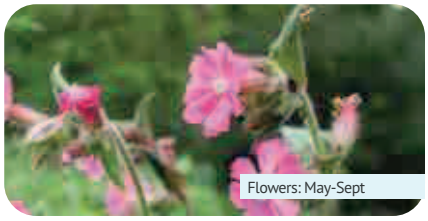
Ragged Robin
Early
Lychnis flos-cuculi
Delicate ragged flowers usually found in damp meadows.

Salad Burnet
Sanguisorba minor
Found on dry, lime rich, calcareous soils. Liked by grazing animals.



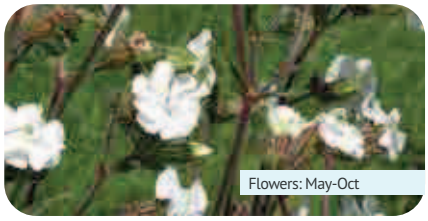
Tufted Vetch
Vicia cracca
Creeping, sprawling growth habit. Found in hedgerows and climbing up vegetation.

Red Campion
Early
Silene dioica
Often found in woodland and shady areas. Likes damp soils.



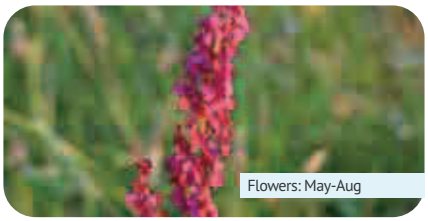
Self Heal
Prunella vulgaris
A low growing, creeping plant which is common in most grassland.

White Campion
Silene latifolia
Frequent in roadside verges, hedgerows and waste ground.



Ribwort Plantain
Plantago lanceolata
Established in most older grassland. Source of vitamins and minerals for grazing animals.

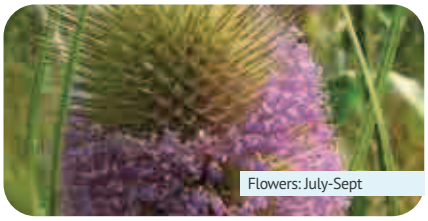
Sorrel
Rumex acetosa
Grows well in loamy soils rich in nutrients.



Wild Carrot
Daucus carota
Found in grassy places, field margins and roadsides. Prefers calcareous soils.

St Johns Wort
Hypercium perforatum
Likes free-draining calcareous soils with a sunny aspect. Has medicinal properties.

Teasel
Dipsacus fullonum
A tall plant found in field margins, particularly in the south of Britain.



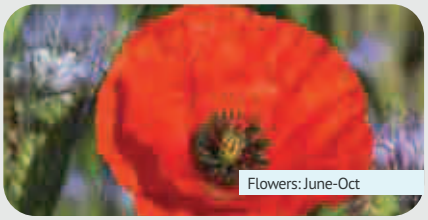
Yarrow
Late
Achillea millefolium
Found in grassland and grass margins, hedgerows and open spaces.

Annuals

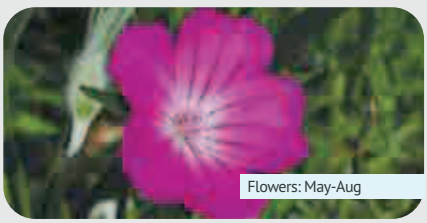
Corn Chamomile
Anthemis arvensis
Corn field annual which thrives in loamy soils rich in nutrients.

Cornflower
Centaurea cyanus
A pretty bright blue solitary flower. Was used as a dye in champagne wine.

Field Poppy
Papaver rhoeas
Found in arable fields and disturbed ground. Silky, deep scarlet flowers.



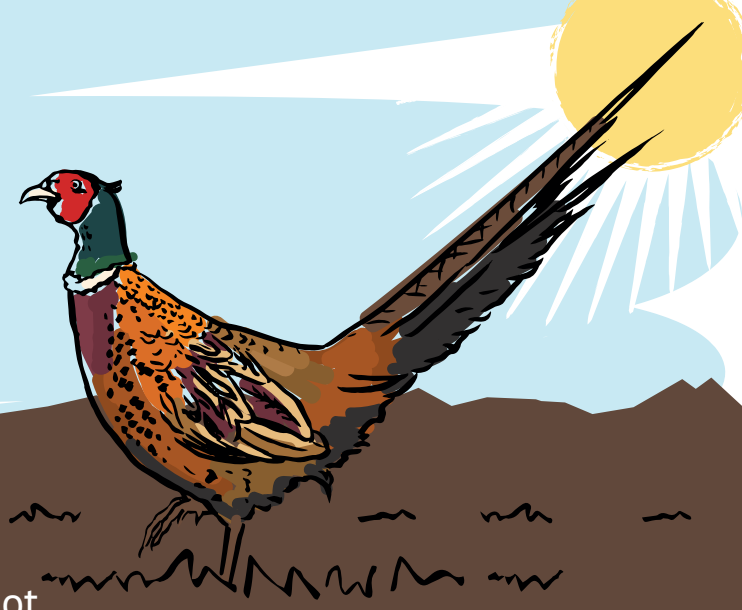
Corn Cockle
Agrostemma githago
A tall annual with an attractive vivid purple flower.



Corn Marigold
Crysanthemum segetum
A former weed in spring-sown corn. Now rare on farmed land. Bold yellow flowers.

Yellow Rattle
Rhinathus minor
Parasitic plant which restricts grass growth allowing delicate wildflowers to establish.

**Please note wild flower seed sold as straights attracts VAT at the current rate of 20%*



Game

Reliable game cover and food for any shoot.

The game cover section has been recently updated, it provides a wider choice of mixtures that have been in development for the last 3 years. The FlexiCover mixtures provide both 1 and 2 year options and can be used for both flushing and holding cover. The combination of grain sorghum and brassica species provides reliable cover all the way through the winter.

The new Cotswold Partridge mix combines species attractive to partridge and a broken canopy to protect against predators from above.

While our range is more comprehensive than ever before, no one mixture will fit all shoots and sites, so we are more than happy to talk through different species and options and tailor bespoke mixtures to fit.

Game and Bird Food Crop Overview

Species	Duration	Sowing Time	Sowing Depth	Full Growth Height (cm)	Comments	Sowing Rate (kg/ac)	Feed	Cover
Maize	1 Yr	Late April-May	7.5 - 10	180 - 200	Cobless varieties available	11 - 14	✓	✓
R. Millet	1 Yr	April-June	2.5	100 - 120	Later seeding than W.Millet	5 - 10	✓	
W. Millet	1 Yr	April-June	2.5	100 - 120	Produces more seed than R. Millet	5 - 10	✓	
Reed Millet	1 Yr	April-June	2.5	100 - 120	Strong standing ability	5 - 10		✓
D. Sorghum	1 Yr	May-June	3 -5	100	Sow in wide rows	8		✓
Giant Sorghum	1 Yr	May-June	3 - 5	180	Prone to brackling	12		✓
Grain Sorghum	1 Yr	May-June	3 - 5	100 - 120	Produces seed	8	✓	✓
Sunflower	1 Yr	Mid April onwards	5	90 - 175	Dwarf varieties reach 3ft	10	✓	
Buckwheat	1 Yr	May-June	3.5	90	Not frost hardy	20 - 30	✓	✓
Linseed	1 Yr	March-June	2	50 - 60	Good for Partridge	20	✓	✓
S. Cereals	1 Yr	March-May	2 - 3	70 - 80	Sow in spring for winter grain	50 - 75	✓	✓
W. Cereals	1 Yr	March-Sept	2 - 4	70 - 90	Sow in autumn for grain in Yr 2	50 - 75	✓	✓
Quinoa	1 Yr	May-June	0.5 - 1	90 - 140	Produces high protein seed	5	✓	
F. Rape/OSR	1 Yr	May-August	1	80 - 90	Flea beetle risk	4		✓
Mustard	1 Yr	May-August	1	80 - 120	Sow in august for late cover	6 - 10	✓	✓
Brown Mustard	1 Yr	May-August	1	80 - 100	More winter hardy than Mustard	2	✓	✓
Fodder Radish	1 Yr	May-August	1	80 - 120	Holds seeds late in season	6	✓	✓
Hybrid Brassica	1 Yr	April-August	1	90 - 120	Sow by mid Aug	3		✓
Gold of Pleasure	1 Yr	April-May	1	50 - 70	High seed shed	5	✓	✓
Kale	2+ Yr	April-June	1	70 - 110	2 year cover	3		✓
Sweet Clover	2+ Yr	April-June	0.5 - 1	120	Significant growth in Yr 2	6		✓
Chicory	2+ Yr	April-Sept	0.5 - 1	90 - 150	Lasts 3-4 Years	6	✓	✓
Canary Grass	2+ Yr	May-June	1	180	Main growth in Yr 2 onwards	3	✓	
Reed C. Grass	2+ Yr	May-June	1	200	More winter hardy than Canary Grass	3	✓	

Grass | Legume | Cereal | Others | Brassica

Mixes

FlexiCover One Year Game Mix

Cover and Feed

Code: MIXFLEXI

This flexible mixture combines brassicas, sorghums and cereals. Sowing in wide rows allows game birds easier movement if pushing them into a flushing point or sow in narrow rows to create a denser holding cover, or windbreak alongside maize.

- 4.00 kg spring triticale
- 3.60 kg spring barley
- 3.85 kg grain sorghum
- 1.10 kg red millet
- 1.10 kg white millet
- 0.40 kg reed millet (Japanese)
- 0.50 kg forage rape
- 0.50 kg hybrid rape/kale
- 0.50 kg fodder radish
- 0.25 kg gold of pleasure
- 0.20 kg mustard

16.00 kg/acre - £51.42 40.00 kg/ha - £128.55

FlexiCover Two Year Game Mix

Cover and Feed

Code: MIXFLEX2

The inclusion of kale can ensure this mixture lasts for two full years. During establishment protect against flea beetle and consider fertiliser to push the brassicas past the most susceptible stage of pest damage.

- 7.00 kg spring triticale
- 2.75 kg grain sorghum
- 1.10 kg red millet
- 1.10 kg white millet
- 0.30 kg reed millet (Japanese)
- 2.15 kg game kale
- 0.40 kg fodder radish
- 0.20 kg hybrid rape/kale
- 0.10 kg gold of pleasure
- 0.40 kg fennel

15.50 kg/acre - £79.55 38.75 kg/ha - £198.88

Retrieve Mix

Fast and Economical

Code: MIXRET

For a summer sowing after a failed spring crop nothing beats these fast growing brassica species. It's quick, reliable and it works.

- 1.88 kg mustard
- 1.56 kg forage rape
- 0.90 kg fodder radish
- 0.66 kg hybrid rape/kale

5.00 kg/acre - £22.45 12.50 kg/ha - £56.13

Mixes

General Purpose Game Mix

Cover and Feed

Code: MIXGAME

This is our most popular game cover mix, combining a wide range of species providing feed and cover for pheasants, partridge and farmland birds.

- 2.38 kg buckwheat
- 2.04 kg dwarf sunflower
- 1.57 kg white millet
- 1.40 kg red millet
- 0.51 kg reed millet (Japanese)
- 0.51 kg forage rape
- 0.51 kg mustard
- 0.51 kg fodder radish
- 0.26 kg hybrid rape/kale
- 0.31 kg game kale

10.00 kg/acre - £49.94 25.00 kg/ha - £124.85

Cotswold Partridge Mix

Cover and Feed

Code: MIXPART

The mix is designed to include species which attract partridge, as well as creating a broken canopy with room for birds to move through the cover.

- 6.10 kg spring triticale
- 5.57 kg spring barley
- 1.46 kg white millet
- 1.46 kg red millet
- 1.46 kg linseed
- 0.45 kg forage rape
- 0.45 kg gold of pleasure
- 0.20 kg hybrid rape/kale
- 0.20 kg leafy turnips
- 0.20 kg crimson clover
- 0.45 kg fennel

18.00 kg/acre - £47.83 45.00 kg/ha - £119.58

FlexiCover
Leicester
19th November

Game Mixes

Quinoa/Kale Mix

Cover and Feed

Code: MIXQUI

This simple combination supplies the two key requirements of birds: cover and feed. The kale provides excellent winter cover and supports the quinoa plants. Quinoa can provide 1-2t per acre of high protein feed from late autumn.

- 1.40 kg quinoa
- 1.45 kg game kale
- 0.15 kg hybrid rape/kale

3.00 kg/acre - £49.10 7.50 kg/ha - £122.75

Short & Sturdy Game Cover Mix

Cover and Feed

Code: MIXSHORT

This mix is ideal for growing with maize to act as a windbreak on exposed sites or to create a flushing point in front of the gun line. The seed bearing grain sorghum, sunflower and millet also provide for farmland birds.

- 4.70 kg grain sorghum
- 0.50 kg white millet
- 0.30 kg reed millet (Japanese)
- 2.50 kg dwarf sunflower

8.00 kg/acre - £46.95 20.00 kg/ha - £117.38

Seed & Shelter Millet Mix

Cover and Feed

Code: MIXMIL

Combining Red and White Millet for a wider window of seed production and reed millet to provide cover. Broadcast or shallow drill in maize strips for a denser cover.

- 3.00 kg white millet
- 3.00 kg red millet
- 2.00 kg reed millet (Japanese)

8.00 kg/acre - £31.80 20.00 kg/ha - £79.50

Sowing and Growing

Whether you run a small local syndicate or a large estate shoot it is important to produce good, reliable crops that provide plenty of shelter, cover and seed.

When to sow

Most game crops are spring sown after frost risk has passed to provide cover and feed from late summer. Start planting the mixes of brassicas, millet, maize, sunflowers and canary grass in mid April, with dwarf sorghum better if drilled in May or June. The only exception is the quick-growing Retrieve Mixture which can be drilled anytime from April to early September if there is sufficient soil moisture.

How to sow

A well worked weed-free seedbed is required, try to achieve a stale seedbed with several cultivation passes to stimulate weed germination before sowing. Seeds such as maize, sunflower and sorghum are usually drilled but small seeded species such as kale and mustard may be broadcast and well rolled after sowing.

If sowing a mix with a range of seed sizes, prioritise the smaller seeds, try to ensure the smaller seeds are not sown too deeply, as this can reduce the reliability of establishment, most larger seeds will cope with being sown slightly shallower.

Bespoke Autumn sown mixtures are available for cover in the following year.

Management

For sites with a known weed burden of later germinating annuals like fat hen consider herbicide tolerant mixtures (Speak to an adviser). Grass weeds can also be controlled by sowing broadleaf only mixtures tolerant to graminicides.

Nutrient requirements

Game crops require P & K levels to be ADAS Index 2 and can benefit from 50kg N/ha in the seed bed. Farmyard manure is a very beneficial source of fertility, with its effects showing for several years.

Grass | Others | Brassica

Straights

Dwarf Sunflower

Large amounts of food supplied through the winter. Dwarf (1-2 metres)

10.00 kg/acre - £69.50 25.00 kg/ha - £173.75

Straights

Canary Grass

This perennial grass is drilled in wide rows (60-90cm) and takes a year or so to become established. From the second year the seed heads will reach two metres and the crop can usually be relied upon for 10 years. Good for pheasants and partridges as well as linnets and wrens.

3.00 kg/acre - £85.50 7.50 kg/ha - £213.75

Reed Canary Grass

Grows taller than Canary grass and is more suitable to northern climates because it tolerates extreme cold weather. Reed canary grass can be slow to establish, sometimes taking up to two years but it will tolerate a wide range of soil types.

3.00 kg/acre - £88.05 7.50 kg/ha - £220.13

Cotswold Game Kale Blend

The kale mix combines tall, sturdy and leafy varieties for good access and cover.

3.00 kg/acre - £50.89 7.50 kg/ha - £127.23

Dwarf Sorghum

An excellent windbreak around other crops, it is an annual crop with similar properties to maize.
Only available in one acre packs.

Certified Dwarf Sorghum £44.50 per acre

Game Maize

Specifically chosen for it's early establishment vigour and impressive standing ability, providing robust cover late in the season. This variety will reach 2 metres and has medium to late maturity. If the priority is early cob production over holding cover please contact us for further options.
Only available in one acre packs (treated seed).

Supplies very limited - call for availability

Lawn & Landscape

Seed mixtures that establish quickly to provide attractive, tough and low maintenance turf.

Great lawns are a distinctive feature of British gardens. Our mixtures contain the best modern varieties that require minimal maintenance so you can enjoy more time looking and less time mowing.

The right mix is just as important for other key grassy areas such as sports pitches and roadside verges. Creating the right species mix for these uses is vital to ensure the surface is correct for purpose and can be effectively managed.

How much seed do I need?

- Measure the area of your lawn in square metres (multiplying the width by the length will give the area).
- Multiply the area by the sowing rate given for each mix (in grams per square metre), always using the highest sowing rate if you are creating a lawn on bare earth
- Divide the results by 1000 to give the number of kilograms required

Example:
Length of lawn = 10m, width = 4m, area of lawn = 40m^2
40 x 70g (sowing rate) = 2800 = 2.8kg of seed required

Please note: One acre = 4000m^2

	70 grams/m^2 High rate	50 grams/m^2 Medium rate	35 grams/m^2 Low rate
15 m^2	1 kg	0.75 kg	0.5 kg
30 m^2	2 kg	1.5 kg	1 kg
100 m^2	7 kg	5 kg	3.5 kg
250 m^2	17.5kg	12.5 kg	8.75 kg
500 m^2	35 kg	25 kg	17.5 kg

Mixes: Lawn

Hard Wearing Lawn
With Ryegrass

Code: MIXHAR

Designed to produce a tough and durable lawn which is easy to grow and live with. The grasses used produce a knitted turf and offer unbeatable toughness. We have supplied this mixture for 30 years and frequently hear positive reports from our customers. As well as being used as a lawn, this mixture will produce a suitable turf for caravan parks and airfields. Turf growers also like the blend as it establishes quickly.

- 50% certified dwarf/turf ryegrass
- 40% certified slender creeping red fescue
- 10% certified common bentgrass

50 - 70 g/m^2 **£7.21 per kg**

Ornamental Lawn
Without Ryegrass

Code: MIXORN

A superb fine-leaved mixture with a superior finish. It is suitable for sites where a 'bowling green' finish is required. The mixture is slow growing and tolerates light shade but will require regular feeding and mowing, ideally with a cylinder mower, to keep its appearance.

- 80% certified slender creeping red fescue
- 20% certified common bentgrass

50 - 70 g/m^2 **£8.32 per kg**

Shady Lawn
Without Ryegrass

Code: MIXSHA

A slow-growing mixture for low-light areas. A good turf can be produced from this mix, especially when the mowing height is increased to 2-3 inches.

- 30% certified slender creeping red fescue
- 30% certified red fescue
- 30% certified smooth stalked meadowgrass
- 10% certified common bentgrass

50 - 70 g/m^2 **£7.79 per kg**

Mixes: Landscape

Economy Landscape

With Ryegrass

Code: MIXECO

A low cost, fast establishing mixture, designed to cover large areas quickly. Suitable for banks and other non-prestigious areas.

- 50% certified dwarf/turf ryegrass
- 50% certified creeping red fescue

35 g/m² **£5.90 per kg**

Verge Mixture

With Ryegrass

Code: MIXRV

An all-round mixture which is used for verges, pipelines and other reinstatement projects.

- 35% certified dwarf/turf ryegrass
- 30% certified creeping red fescue
- 20% certified chewings/red fescue
- 10% certified smooth stalked meadowgrass
- 5% certified common bentgrass

35 - 70 g/m² **£6.64 per kg**

Low Maintenance

Without Ryegrass

Code: MIXLM

A seed mixture which requires very little mowing or maintenance. It will tolerate shade and grows on all soils including infertile types.

- 70% certified sheeps fescue
- 20% certified chewings/red fescue
- 10% certified common bentgrass

35 - 70 g/m² **£7.17 per kg**

Additions

White Clover
Nitrogen fixing clover.

White clover can be included on request.
Please call for advice.

Mixes: Sport

Rugby & Football

Re-Seed and Renovate

Code: MIXSPO

This is a fast establishing mixture which can be used for all winter sports. It is also suitable for school playing fields and for over-seeding pitches at the end of the season.

- 80% certified dwarf/turf ryegrass
- 20% certified creeping red fescue

35 - 50 g/m² **£6.02 per kg**

Tennis Court & Cricket Wicket

With Ryegrass

Code: MIXTEN

Ball bounce and speed are improved on dense and compact turf. Formulated to provide a firm and fast surface and give a true, sufficiently high bounce. Frequent mowing and rolling recommended for best results.

- 45% certified dwarf/turf ryegrass
- 30% certified chewings/red fescue
- 15% certified slender creeping red fescue
- 10% certified common bentgrass

50 g/m² **£7.02 per kg**

COTSWOLD SEEDS

Cotswold Seeds was founded in 1974 and deals with over 18,000 farmers throughout the UK. The company has a specialist interest in grass and legumes, offering advice on growing and managing these crops to farmers and growers in the livestock, arable and horticultural sectors. The company, in conjunction with FarmED at Honeydale Farm, is also involved in a wide range of research projects.

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