
# THE HERBAL LEY FARMING SYSTEM

## Why it's lasted over 100 years

COTSWOLD Grass Seeds DIRECT

# THE HERBAL LEY FARMING SYSTEM

COTSWOLD Grass Seeds DIRECT

For advice call 01608 652552
or visit cotswoldseeds.com

Written by Ian Wilkinson, Sam Lane & Paul Totterdell
Edited by Fiona Mountain & Matt Johnson

## Foreword by R. Newman Turner

When my father, Frank Newman Turner, took on the management of Goosegreen Farm, in Somerset, in 1941, disease was prevalent on the farm. The cattle, grazed on the same pastures for generations, were prone to spontaneous abortion and mastitis. The hay produced by mowing those pastures could, as he put it, better have served the purpose of wire, for all its nutritional value.

He soon noticed, however, that ailing cattle would graze from the hedgerows in preference to the grass. They were seeking something more than the depleted pastures could provide. When he was able to rent and later purchase the farm (and encouraged by his mentor, Sir Albert Howard, the great advocate of soil health) he was able to convert to sustainable farming principles, an important element of which is ley farming.

The value of the ley or temporary pasture in cropping rotation became obvious to him as a boy growing up on his family's farm in Yorkshire. He came to regard the ley as the sole provider of food and fertility for both soil and livestock. But he realised that, whereas the main purpose of man-made pastures - leys - was to provide livestock with their summer and part of winter feeding, they should have the more important role of improving soil fertility. His hedgerow-grazing cattle had taught him that.

As he wrote in his book Fertility Pastures; 'When we make a pasture of nature's model of complex ingredients (herbal ley) for the primary purpose of building soil fertility, we can also achieve for the grazing animal food of a quality which will enable the animal to maintain its own health and fertility and produce abundantly of milk and progeny'.

In addition to the standard grasses such as timothy, meadow fescue, and perennial ryegrass, he added to his seed mixes deep-rooting herbs such as chicory, yarrow, plantain, and sheep's parsley which could improve the mineral content of the pasture. Cotswold Seeds have incorporated F.Newman Turner's principles into the make up of many of their seed mixes.

The fertility of the fields at Goosegreen Farm improved as did the milk yields of the prize-winning pedigree Jersey herd that F. Newman Turner built up. He went on to describe his methods in his books Fertility Farming, Herdsmanship, Fertility Pastures, and Cure Your Own Cattle, which have been re-published in new editions as classics of organic farming literature by AcresUSA*.

As Newman Turner wrote in Fertility Pastures: ' The herbal ley is my manure merchant, my food manufacturer, and my vet, all in one'

R. Newman Turner, January 2018

** The new editions of F. Newman Turner's books are published by AcresUSA and are available through Amazon and other booksellers*

## INDEX


| | | | |
|---|---|---|---|
| 4 | NITROGEN FIXATION | 18 | SOWING & GROWING |
| 6 | MINERAL MINING | 20 | SPECIES IDENTIFICATION |
| 8 | DROUGHT RESISTANCE | 22 | OVER-SEEDING |
| 10 | ANTHELMINTICS | 24 | GRAZING |
| 12 | THE DARWIN EFFECTS | 26 | HERBAL CUTTING |
| 14 | CARBON CAPTURE | 28 | ARABLE MEETS HERBAL |
| 16 | ROTATION | 30 | ENVIRONMENTAL |

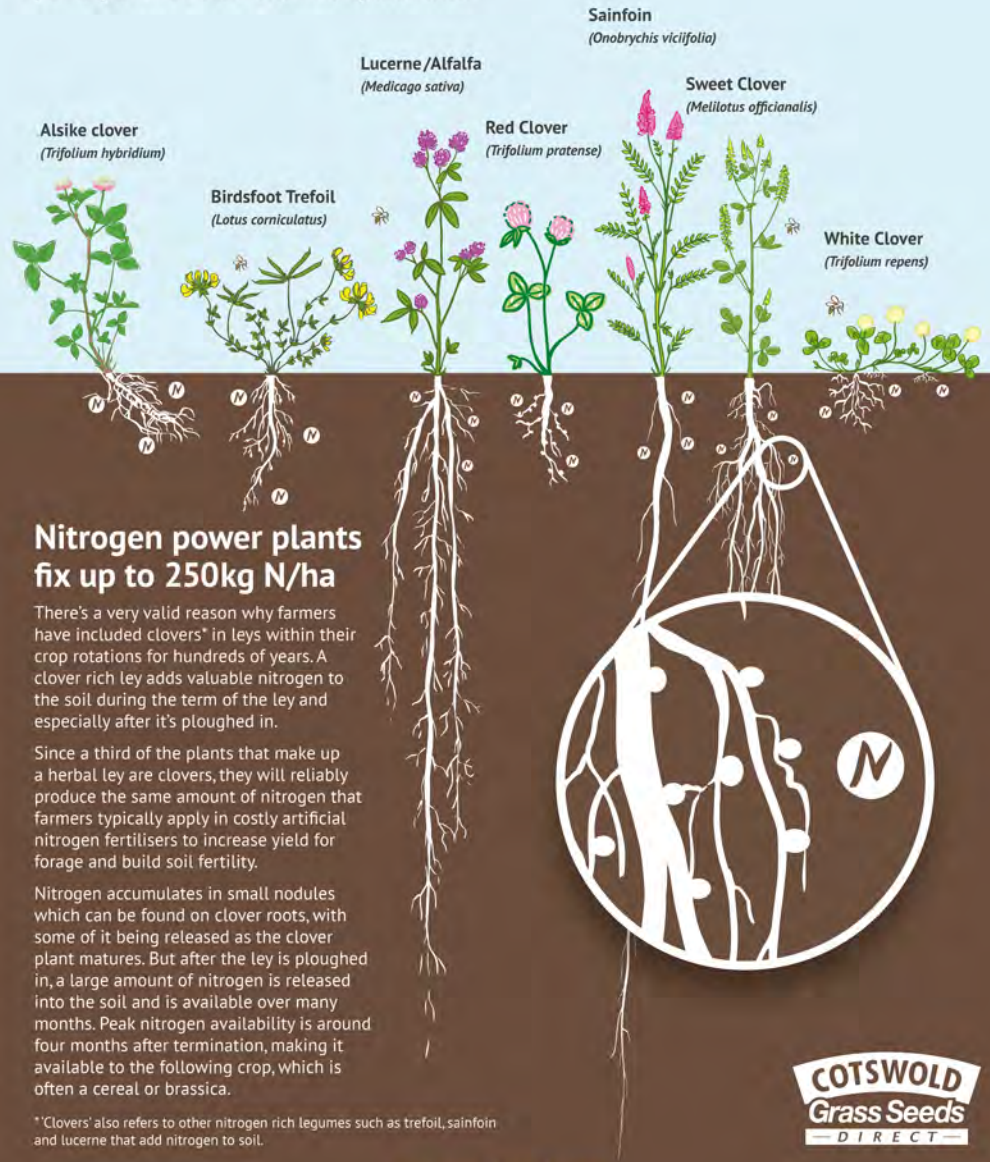
## Artificial nitrogen fertiliser* price per tonne

*34.5% Ammonium nitrate


# FREE FERTILISER

## Replace costly artificial nitrogen fertiliser

Legumes are the engine of the herbal ley. These are the plants that provide free N that makes plants grow. Here are the commonly used ones.




## Nitrogen power plants fix up to 250kg N/ha

There's a very valid reason why farmers have included clovers* in leys within their crop rotations for hundreds of years. A clover rich ley adds valuable nitrogen to the soil during the term of the ley and especially after it's ploughed in.

Since a third of the plants that make up a herbal ley are clovers, they will reliably produce the same amount of nitrogen that farmers typically apply in costly artificial nitrogen fertilisers to increase yield for forage and build soil fertility.

Nitrogen accumulates in small nodules which can be found on clover roots, with some of it being released as the clover plant matures. But after the ley is ploughed in, a large amount of nitrogen is released into the soil and is available over many months. Peak nitrogen availability is around four months after termination, making it available to the following crop, which is often a cereal or brassica.

* 'Clovers' also refers to other nitrogen rich legumes such as trefoil, sainfoin and lucerne that add nitrogen to soil.

## FIRST HAND
## ROBERT ELLIOT

It's 1907, and Robert Elliot has been farming for thirty years at Clifton Park, Kelso on the Scottish borders, after two decades spent in the tea plantations in India.

The 1250 acre farm had been arable, but faced with Kelso's very light and infertile soils together with cheap cereal imports, this was no longer viable and Robert has been forced to look for an alternative method of farming.

Rather than focus predominantly on arable crops, he has introduced livestock and developed a low risk system, which he has called the Clifton Park Farming System, which is centered around a four year ley, designed to improve the quality of all the crops.

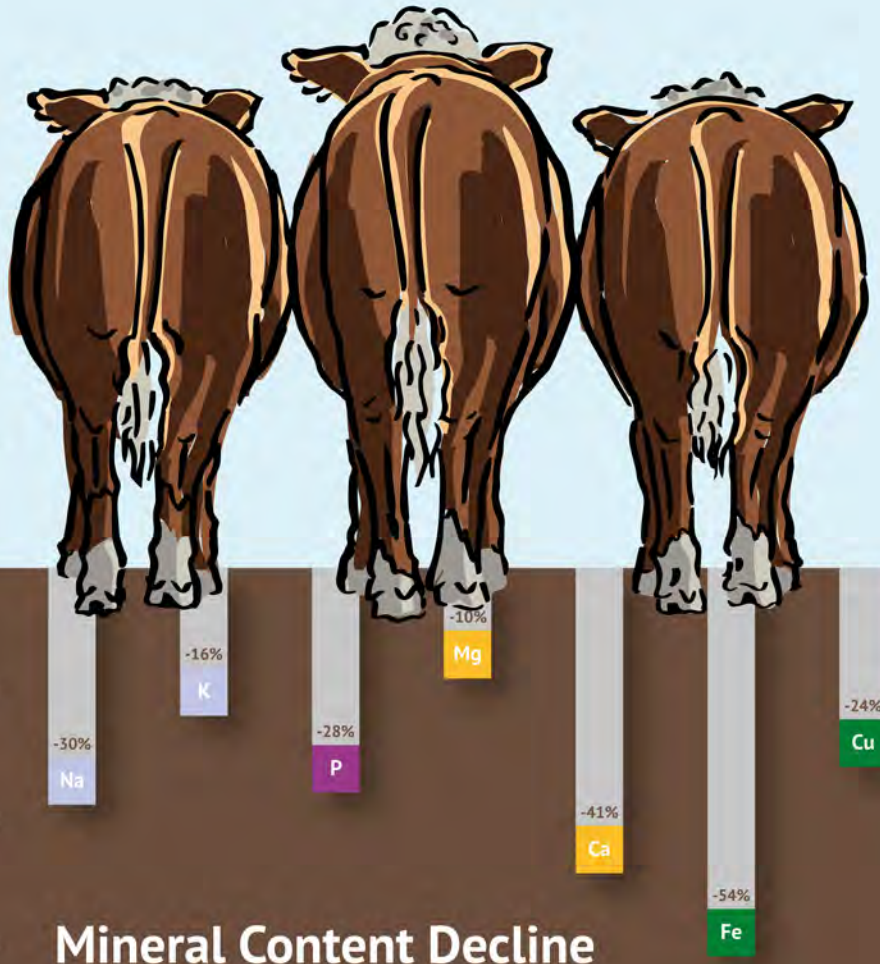
'I look for an economy of production with the smallest possible cost of fertilisers,' Robert explains. 'These leys contain deep rooting plants which increase the capital of the soil and produce a large head of breeding stock which we sell off the farm with practically no feeding stuff used.'

Robert has examined soils on adjoining grassland at a neighbouring farm and noted that the old turf has accumulated a large amount of vegetable matter and nitrogen roots on the top of the soil. In contrast, observations of the Clifton Park Herbal Ley Fields revealed decidedly more root growth. By the fourth year of the ley, the soil had considerably altered and was more friable.

'I reduced my artificial fertiliser bill to a low ebb and as of this year I have abolished it all together,' Elliot says.

Looking forward, he is certain this is the direction in which farming should move.

'It seems obvious to me that the present plan of employing agricultural chemists must be abandoned. What we require are practical farmers who have moderate amounts of chemical knowledge. Any intelligent farmer who has been farming on his own account for say ten years and is about thirty-five years of age, could learn the necessary amount of chemistry within six months. The farms would then have an agricultural chemist with a thorough practical knowledge of agriculture, instead of chemists who have either none or the merest smattering of it.'




## Mineral Content Decline in Meat Over 50 Years

In the second half of the 20th century, mineral content fell as a result of intensification and simplification of farming systems which were largely dependant upon monocultures. The above chart shows the percentage loss of mineral content in meat over a 50 year period from 1941. Work was also carried out at the same time comparing minerals in milk, vegetables and fruit in the UK and the trends were the same. This work was originally started by R.A. McCance and E.M. Widdowson and was continued and funded by MAFF.

Similar work was carried out by the US Department of Agriculture as well as the Australian Department of Agriculture over the same time period. Their results mirrored patterns in the UK study.

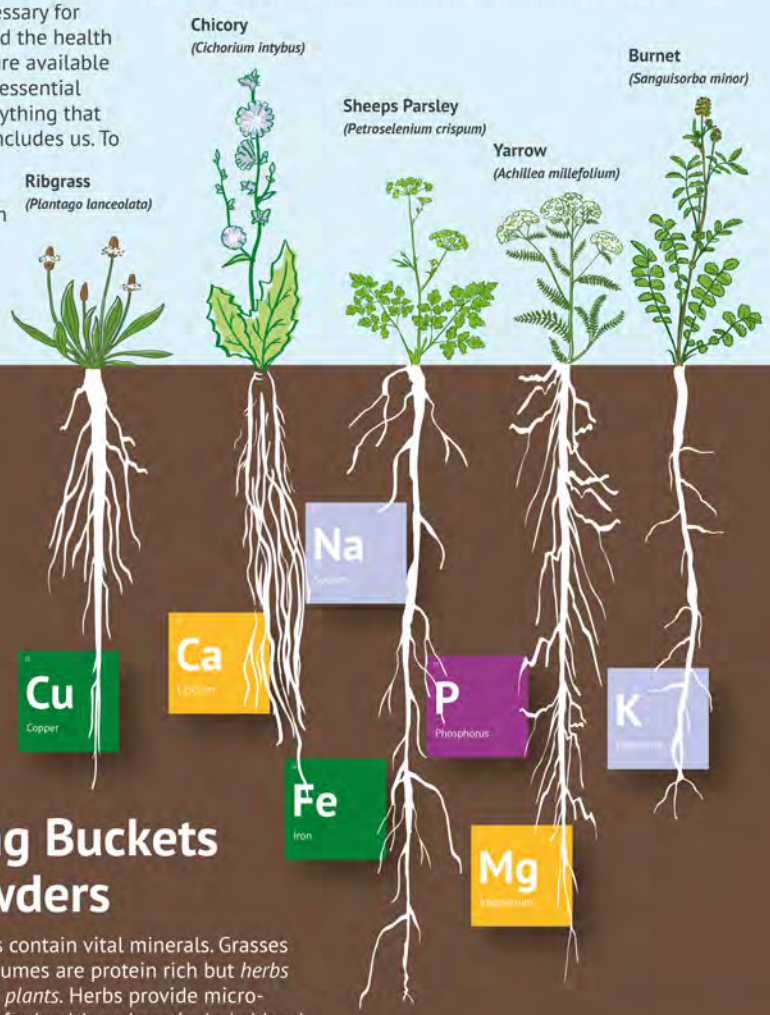




# NATURAL MINERAL RICH FEED

## Free minerals for animal and human health

Vital minerals necessary for livestock health and the health of the food-chain are available in the soil and are essential for plants and everything that eats them, which includes us. To transfer minerals into our livestock, herbs can be grown in Herbal Leys to mine them.




## Reducing Buckets and Powders

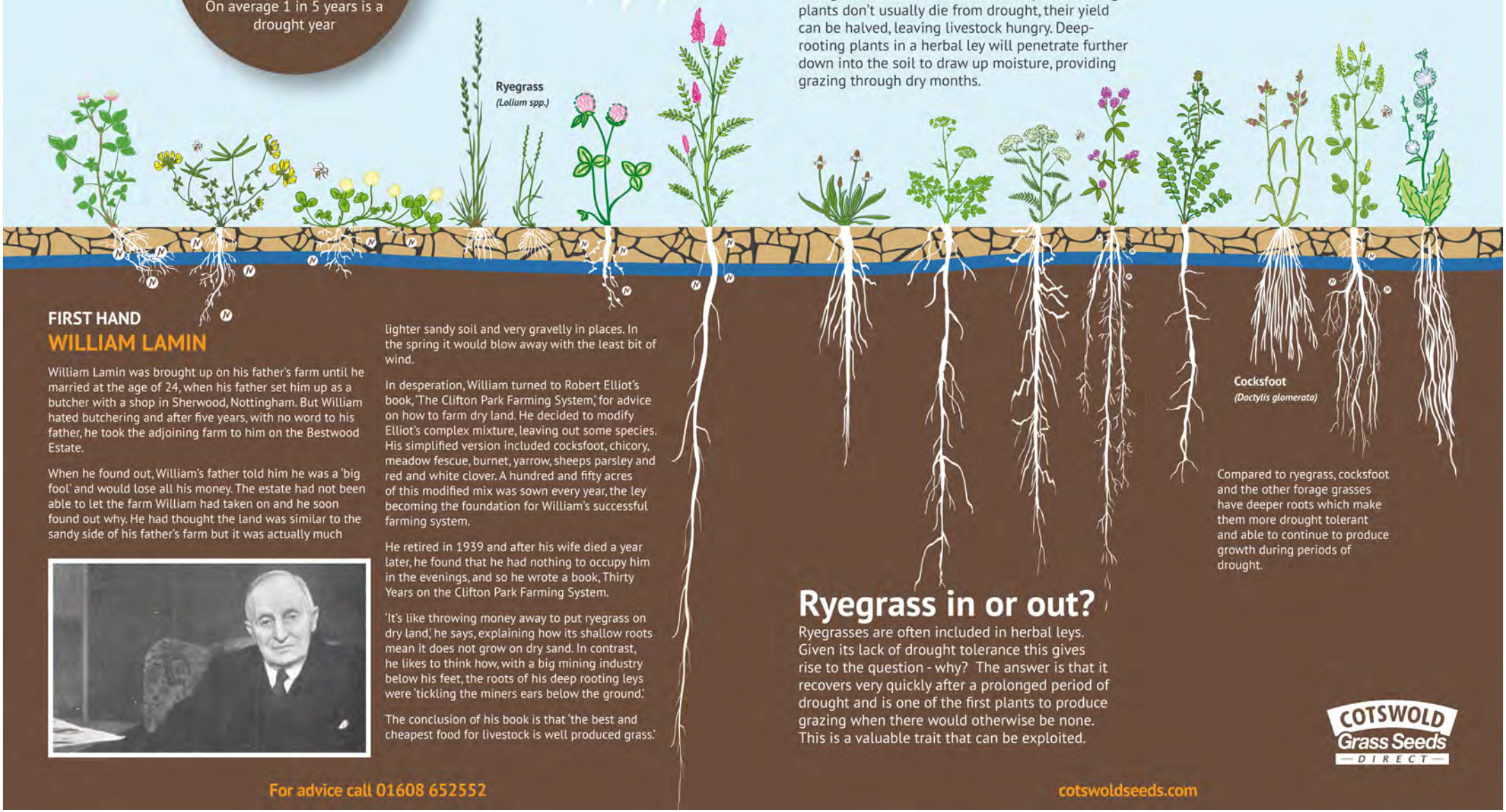
Deep rooting herbs contain vital minerals. Grasses are energy rich, legumes are protein rich but *herbs are the mineral rich plants*. Herbs provide micro-nutrients essential for health and particularly blood and bone formation. When grazed, herbs provide a year round mineral source and replace the need for purchased buckets and powders.

COTSWOLD Grass Seeds DIRECT


# NATURAL DROUGHT RESISTANCE

## Reliable grazing on dry soils

Drought resistance varies between species. Though plants don't usually die from drought, their yield can be halved, leaving livestock hungry. Deep-rooting plants in a herbal ley will penetrate further down into the soil to draw up moisture, providing grazing through dry months.




Compared to ryegrass, cocksfoot and the other forage grasses have deeper roots which make them more drought tolerant and able to continue to produce growth during periods of drought.

### FIRST HAND
### WILLIAM LAMIN

William Lamin was brought up on his father's farm until he married at the age of 24, when his father set him up as a butcher with a shop in Sherwood, Nottingham. But William hated butchering and after five years, with no word to his father, he took the adjoining farm to him on the Bestwood Estate.

When he found out, William's father told him he was a 'big fool' and would lose all his money. The estate had not been able to let the farm William had taken on and he soon found out why. He had thought the land was similar to the sandy side of his father's farm but it was actually much lighter sandy soil and very gravelly in places. In the spring it would blow away with the least bit of wind.



In desperation, William turned to Robert Elliot's book, 'The Clifton Park Farming System,' for advice on how to farm dry land. He decided to modify Elliot's complex mixture, leaving out some species. His simplified version included cocksfoot, chicory, meadow fescue, burnet, yarrow, sheeps parsley and red and white clover. A hundred and fifty acres of this modified mix was sown every year, the ley becoming the foundation for William's successful farming system.

He retired in 1939 and after his wife died a year later, he found that he had nothing to occupy him in the evenings, and so he wrote a book, Thirty Years on the Clifton Park Farming System.

'It's like throwing money away to put ryegrass on dry land,' he says, explaining how its shallow roots mean it does not grow on dry sand. In contrast, he likes to think how, with a big mining industry below his feet, the roots of his deep rooting leys were 'tickling the miners ears below the ground.'

The conclusion of his book is that 'the best and cheapest food for livestock is well produced grass.'

## Ryegrass in or out?

Ryegrasses are often included in herbal leys. Given its lack of drought tolerance this gives rise to the question - why? The answer is that it recovers very quickly after a prolonged period of drought and is one of the first plants to produce grazing when there would otherwise be none. This is a valuable trait that can be exploited.

COTSWOLD Grass Seeds DIRECT

FIRST HAND

## CHARLES HUNTER-SMART

Charles Hunter-Smart has held the position of Farm and Estate Manager at Bradwell Grove for 31 years, running a business which includes arable cropping, a beef suckler unit and a sheep enterprise. A joint venture, Cotswold Organic Growers Ltd, aims to further improve the management of soil. The common thread linking these diverse operations is enhancing the soil, which provides the building blocks for the cereal and forage crops.

Over the years there has been a commitment to adapting the rotation to fully incorporate herbal leys, which are left in place for 2-4 years to really build root mass and organic matter in the soil. The grasses in the bespoke herbal ley include cocksfoot, tall fescue and meadow fescue which have a very good root system to create pore spaces and a large amount of root mass in the soil that breaks down over a long time. The plants in the mix that have anthelmintic properties benefit livestock health.

The legumes in the mix - clover, trefoil, lucerne and sainfoin - are used to fix atmospheric nitrogen into the soil, thereby reducing the reliance on inputs. Forage herbs with deep roots like chicory, burnet, yarrow and ribgrass mine trace elements from further down in the soil profile.

This system of soil improvement has made the land easier to work, with less cultivation as fewer passes are needed to achieve a seed bed. It has also increased the soil's resilience to extremes of weather, causing it to act as a sponge after heavy rainfall but hold moisture in dry summers.

The leys are undersown into a cereal to provide a cash crop whilst the ley develops, which reduces the amount of time land is left out of production. Charles has also undersown winter rye as the cereal crop because he feels it has a more open growth habit than spring barley, giving the ley more space and light to develop. The ley is left down for between 2 and 4 years - left longer when required to control weeds, improve soil structure and drainage, before returning to three years of cereal cash crops.

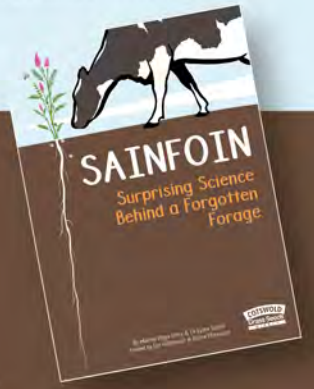


# NATURAL WORM CONTROL

## Prevent drug resistant nematodes


Farmers spend around £80 million on synthetic anthelmintics or drenches, but the main concern is that their application is widespread in intensive farming and this has resulted in drug resistant worms in sheep, and to a lesser extent, in cattle.

Anthelmintic plants - chicory, sainfoin & birdsfoot trefoil - in a herbal ley provide alternative solutions to control parasites in livestock.




THE SCIENCE

## HOW DOES IT WORK?

Some plants such as sainfoin and birdsfoot trefoil contain condensed tannins in their leaves and stems. These can reduce worm burdens. In the last decade there has been considerable scientific progress in understanding the effect these tannins have on livestock.

Sainfoin, for example, has been proven to effect the most prevalent and problematic worms in the abomasum and small intestine of sheep and cattle.

The work of research projects Healthy Hay & LegumePlus showed that by consuming sainfoin, there was an positive effect on the control of *Haemonchus & Trichostrongylus* in sheep, and *Ostertagia & Cooperia* in cattle.

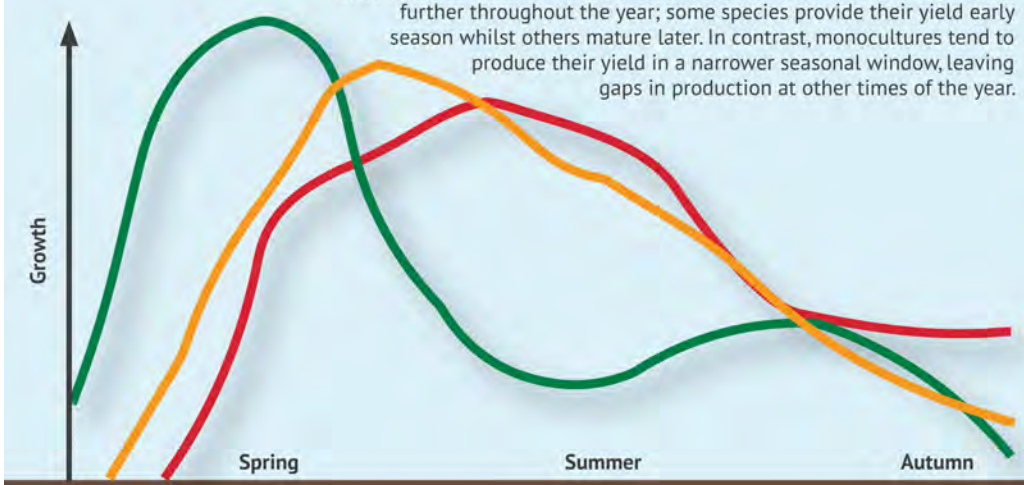
The consumption of sainfoin disturbs the biology of 3 main stages of the parasite lifecycle: the eggs, the larvae and the adult worms.

There is much more research at legumeplus.eu, and at cotswoldseeds.com where you can also request a hard copy of 'Sainfoin - Surprising Science Behind a Forgotten Forage'

COTSWOLD Grass Seeds DIRECT

## Seasonal Growth

The over-yielding effect is complemented by the differences in growth habits of the various species in the mixture. Characteristics such as speed of growth and heading dates overlap to extend the grazing season further throughout the year; some species provide their yield early season whilst others mature later. In contrast, monocultures tend to produce their yield in a narrower seasonal window, leaving gaps in production at other times of the year.

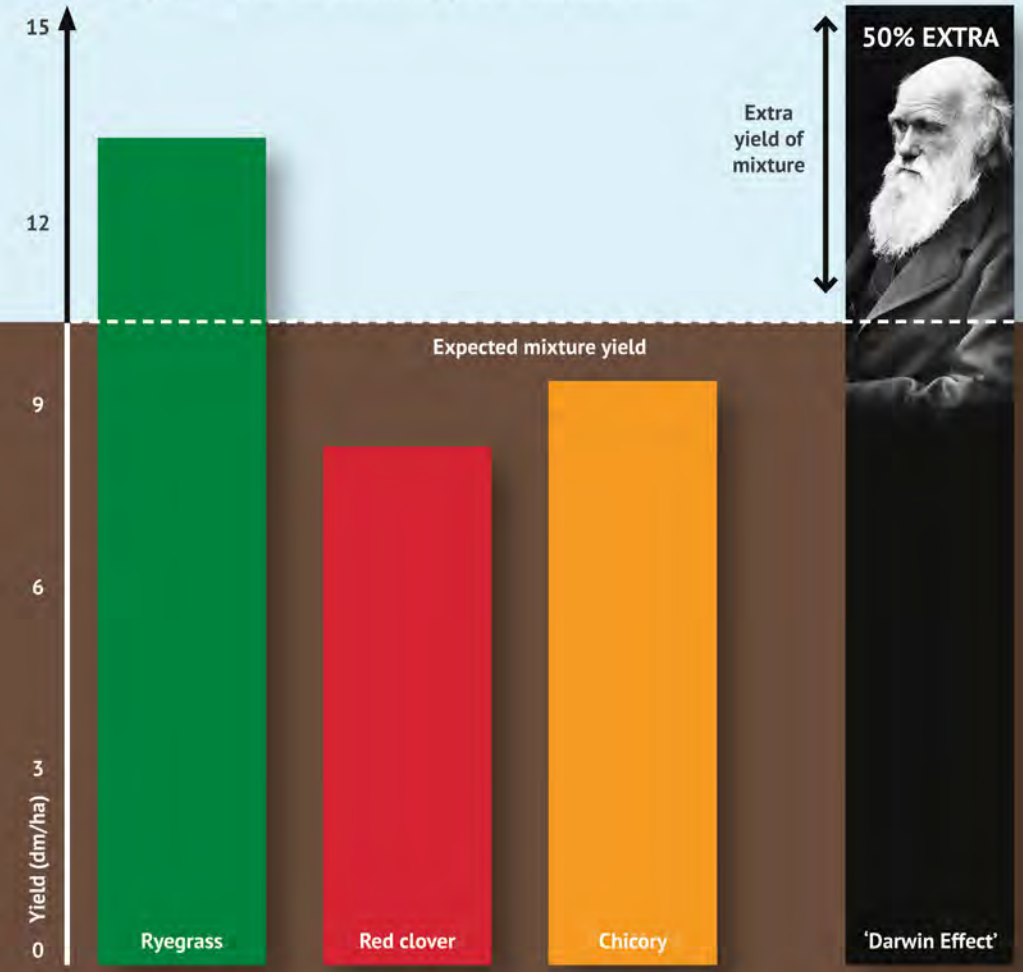



# THE DARWIN EFFECTS

## The Over-Yielding Effect

### Different plants grown together yield 50% more than their average

For example, if ryegrass, red clover & chicory are grown together, you might expect the yield to be an average of the individual plants. But, as noted by Darwin, when plants are grown in a mixture the yield is much greater due to their overlapping growth habits and patterns.




## The Natural Selection

### Let your land make the decision for you

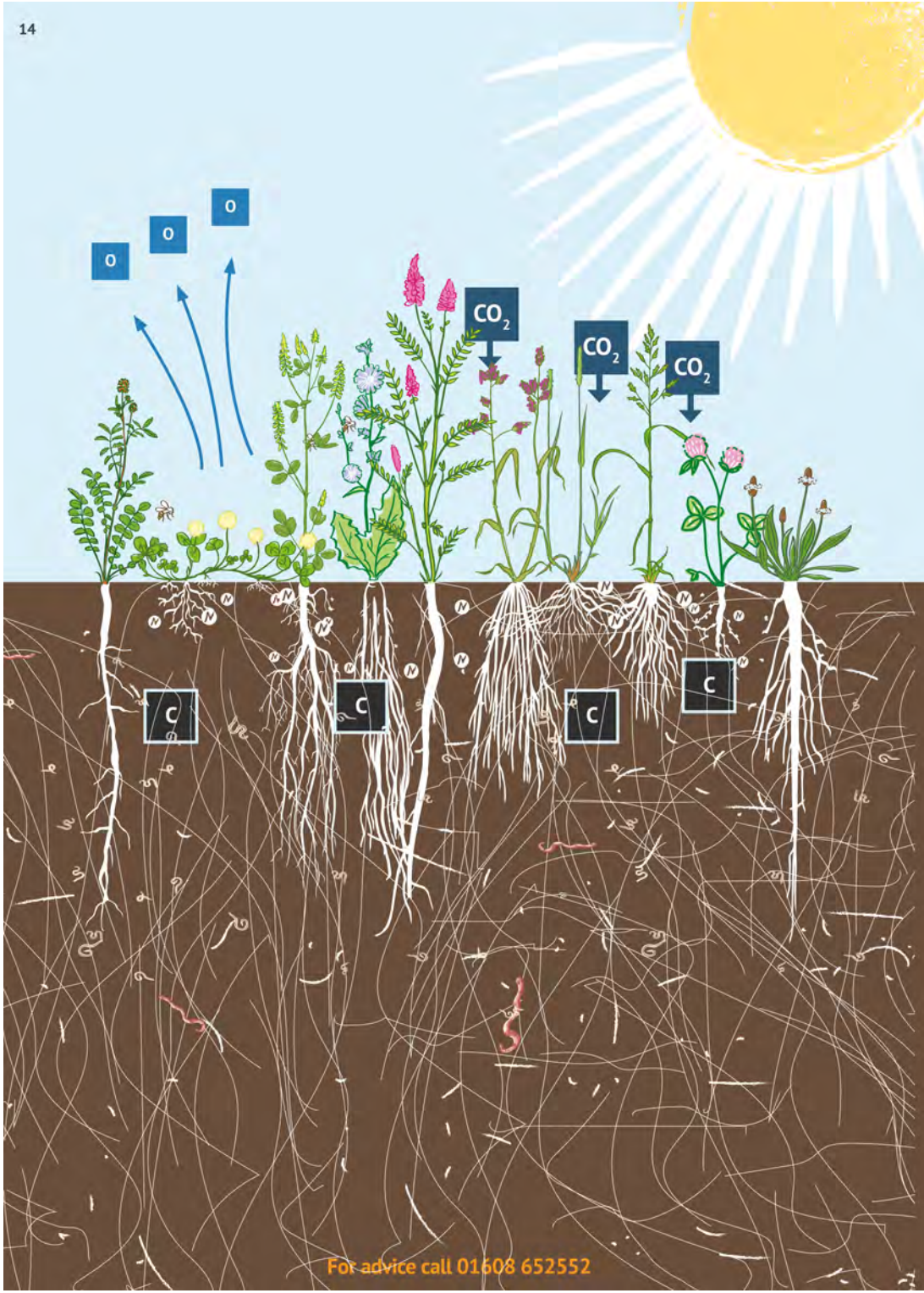
It is important to choose the right combination of species for the right situation. The diversity of ingredients in a herbal ley means that mixtures can be tailored to suit individual soil types & circumstances and can be matched to a farmer's particular needs or preferences.

For instance, Simple Herbal is an entry level herbal ley which can be used as a stepping stone to more complex mixtures, while the Heavy Land Herbal is tailored to wetter and heavier soils.


***"In the struggle for survival, the fittest win out at the expense of their rivals because they succeed in adapting themselves best to their environment"***

*- On the Origin of Species, Charles Darwin, 1859*

COTSWOLD Grass Seeds DIRECT




# CARBON CAPTURE

## More deep-rooting leys, more carbon sequestration, better farming

With farm payments and subsidies increasingly dependent on 'good environmental practice,' growing a diverse ley which encourages carbon sequestration is a win win.

Plants capture carbon from the atmosphere and transfer it to the soil, where it's utilised by the soil biology to help unlock precious nutrients which would otherwise be unavailable to the growing plants. The greater diversity of plants in a ley, the greater the diversity of soil biology, which in turn produces greater yield and therefore more carbon captured. Carbon is also very important for soil structure and just a small increase in soil carbon content can have a huge impact on it's ability to hold moisture. This of course is very important in times of drought.

Healthy soil biology also reduces the need for artificial fertiliser derived from oil and gas, saving money and using up less of the earth's natural resources.

### FIRST HAND

### ROB RICHMOND

Rob Richmond, a dairy and arable farmer in Gloucestershire, turned to Herbal Leys because ryegrass does not yield well on some soils, particularly drought prone ones like Cotswold Brash.

The Herbal Ley is what stands between this dairy farmer and 'a very big feed bill'. His 280 spring calving Friesian and Shorthorn cattle graze from mid February to mid December on the leys. They're fed silage in the dry period.

The mix of grasses and legumes in the ley also 'feed the soil', adding substantial amounts of N and organic matter.

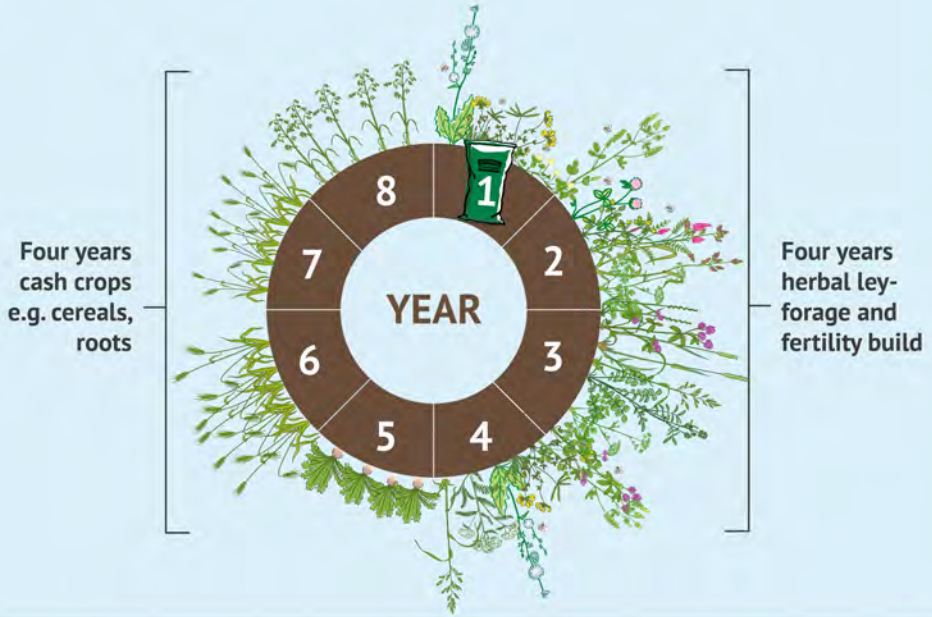
Herbal leys are left in for up to nine years and Rob has found that the dominance of red clover in the first couple of years means he has had no real weed problems.

Voluntary intakes are very high as the species contained are so palatable and this, combined with the high fibre content, contributes noticeably to herd health, as do the micronutrients brought up by the deep-rooting elements such a chicory.

After grazing the herbal leys once in early spring, fields are shut up and one or two silage cuts then taken before the leys are grazed a further three or four times before winter. Even in a difficult growing season the leys have yielded about 10t per hectare of dry matter with no costly inputs. Again, this helps keep the feed bill down with cows being fed just 800kg of cake each annually with over 70% of milk yield achieved from forage alone, even in dry years. Rob started with 200 cows but by 2016 grass growth supported 260 cows and is still rising today - all with zero artificial inputs.

'You have to get over it looking untidy,' in comparison to simpler swards' says Rob. But that adjustment is nothing compared to reliable year-round forage on dry soil.

COTSWOLD Grass Seeds DIRECT




# ROTATION, ROTATION, ROTATION

## 4 years gives optimum forage yield, root growth, nitrogen fixation and species diversity

The ley is the fertility building part of a crop rotation. For the best results, herbal leys should ideally be left in the ground for 4 years. Any shorter, leys won't have enough time to build up roots. Any longer and some species will disappear.

Farmers who use herbal leys in rotation spend less on inputs thanks to the improvements they make to the soil. This in turn makes the farm more profitable.


**FIRST HAND**

### IAN WILKINSON

For many years Honeydale was an arable farm, growing spring barley, and like many, the farm had become dependent on monoculture and contractors. Two decades ago it had been a mixed farm with arable crops and dairy, and Ian Wilkinson and Cotswold Seeds have been working towards changing it to a diverse system of farming.

Honeydale is to develop as a Centre for Diverse Farming Systems, explains Ian. 'We're experimenting and trialling different methods of diverse farming and techniques to improve soil fertility, trying to find new ways of making smaller farms viable by growing diverse crops and having more livestock on the farm so it's self sufficient, and the need for fertilisers and pesticides is reduced. We want to show how value can be added to farm produce by enterprising individuals.'

Ian was inspired by Robert Elliot and William Lamin, but if there is one man who has influenced him, guided product development at Cotswold Seeds and the development of Honeydale Farm, it's Frank Newman Turner, a pioneering Yorkshire-born farmer and author who believed in 'health from the soil up'. His writings give guidance from his own experience of the role that herbs play in preventing disease, providing year round grazing and the avoiding the need for artificial fertilisers.

He believed that all these aspects can be brought together by using a complex mix of pasture grasses, herbs and legumes in a herbal ley. On his farm in Somerset, deep rooting herbal leys with no chemical inputs formed the

basis of his grassland pastures for his pedigree Jersey cattle. In his trilogy of farming books, written from 1952 to 1957, Turner described the Herbal Ley as his 'fertiliser, merchant, food manufacturer and vet all in one'.

At the heart of Honeydale Farm is an eight year crop rotation which begins with a 4 year deep rooting herbal ley. 'This is the engine of our rotation, which will power the rest of it, improving sustainability and animal health, boosting soil fertility and ultimately driving the profitability of the farm,' explains Ian.

The mixture of plants contained in the ley brings multiple benefits. Red clover, for instance, has a deep root structure and can fix nitrogen into the soil. A herb like chicory provides an even deeper root, mining the soil for minerals, improving the life and health of the soil. Mixes containing sainfoin, birdsfoot trefoil and chicory also have natural anthelmintic properties and the growing times of the different plants also have the great advantage of providing year round forage.

After four years the ley will be ploughed and followed by turnip and rape. Wheat is then planted and undersown with yellow trefoil and white clover as an intercrop which acts as a soil improver, to be grazed with sheep after the wheat has been harvested. Oats are then sown, followed by a stewardship wild birdseed mix, followed by a final cereal crop. This is undersown and then it's back to the four year deep rooting ley.

Ian is mob-grazing with sheep to manage the ley and says it works brilliantly. 'We made a small investment in moveable fencing and a water bowser, and we literally rent-a-mob, grazing a flock of sheep belonging to our neighbour, in what we like to call a perfect 'partnersheep!'. The sheep also have access to other forage crops at other times of the year and some of the permanent grass is also cut for hay.

In keeping with the plans for a Centre for Diverse Farming Systems, a ten acre heritage orchard has been planted and a natural flood management scheme has been created along. The farm is also participating in a diverse forages project with Reading University, Rothamstead and Duchy Colleges, and Paul Totterdell has established 14 beehives for honey production.

'It's all part of the story we want to tell consumers,' says Ian Wilkinson. 'As farmers we are custodians of the land and we can't keep taking from it without putting something back, but the beauty of diverse farming is that it's a win win system. For instance planting trees and hedges provides shelter, making it easier to bring livestock back onto arable land. This in turn enhances the soil, adding value to food products and at the same time creating a habitat for farmland birds and beneficial insects, like bees.'

COTSWOLD Grass Seeds DIRECT

# SOWING & MANAGING HERBAL LEYS

## The key to success is shallow sowing and plenty of rolling

## Sowing

A clean seedbed with a fine tilth is required for small seeds. Depth of sowing is critical and small seeds should go no deeper than 1cm, otherwise they'll struggle to germinate successfully.

Seed can be broadcast or shallow drilled. Once sown, roll, roll and roll again! Well consolidated seedbeds give better results than loose ones.

April — September

## Early Management

Once the mix has been sown, herbicide options are non-existent, because herbal leys include broad leaved and grass species. Most weed-killers will affect one or the other. It is standard practice to lightly graze a herbal ley in the year of sowing, to control annual weeds and thicken the sward.

Be careful not to over-graze too early and leave plenty of leaf on the sward to cover ground.


## Leave in for 4 years

Herbal leys are usually rotationally grazed and are best left in the ground for four years. This gives the optimum amount of root growth, soil fertility building and high species diversity.

The best way to manage herbal leys is to rotationally graze. Set-stocking or allowing stock to graze for long periods of time can significantly lower sward diversity

## Termination

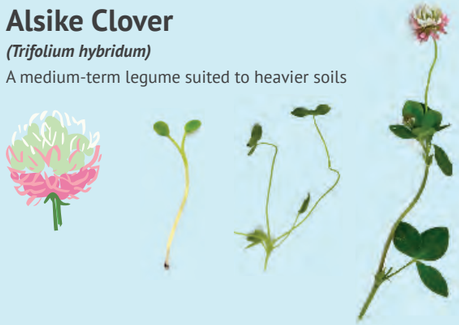
Opinions are divided as to the best method of sward destruction. Most farmers with experience of herbal leys use a plough, without herbicide, to invert the ley. Typically, this is followed with a short fallow and then disced or power harrowed before sowing the next crop, which is usually either fodder brassica or cereal.

COTSWOLD Grass Seeds DIRECT

# PLANT IDENTIFICATION

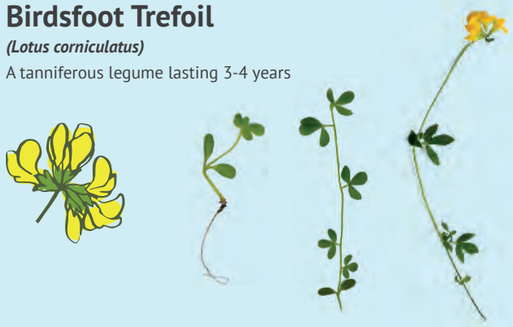
## Get to know the herbal ley plants throughout their growth stages

### Alsike Clover
***(Trifolium hybridum)***
A medium-term legume suited to heavier soils



### Sweet Clover
***(Melilotus spp.)***
A short-term, deep-rooting legume

### Birdsfoot Trefoil
***(Lotus corniculatus)***
A tanniferous legume lasting 3-4 years



### White Clover
***(Trifolium repens)***
A high-protein, long-term legume

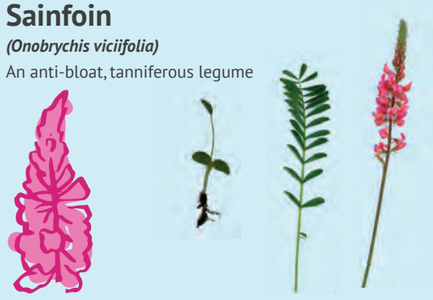
### Lucerne
***(Medicago sativa)***
A dry land, deep-rooting perennial legume

### Cocksfoot
***(Dactylis glomerata)***
An early growing, light land grass

### Red Clover
***(Trifolium pratense)***
A high-yielding 3 year legume

### Festulolium
***(Festulolium spp.)***
A palatable species combining ryegrass and fescue

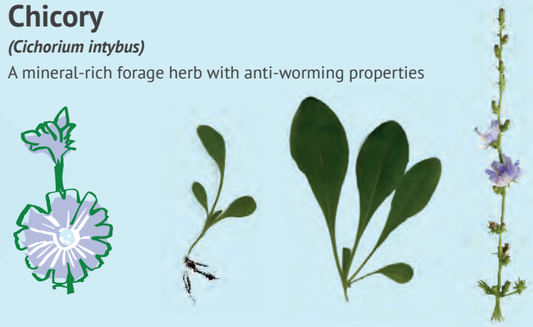
### Sainfoin
***(Onobrychis viciifolia)***
An anti-bloat, tanniferous legume



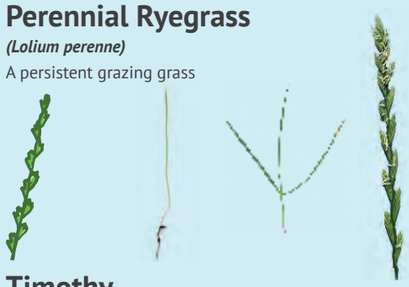
### Italian Ryegrass
***(Lolium multiflorum)***
A fast-growing grass providing bulk in years 1-2

### Meadow Fescue
***(Festuca pratensis)***
An adaptable grass growing well on less fertile soils

### Chicory
***(Cichorium intybus)***
A mineral-rich forage herb with anti-worming properties

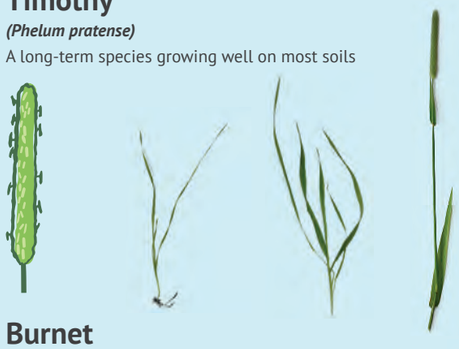


### Perennial Ryegrass
***(Lolium perenne)***
A persistent grazing grass

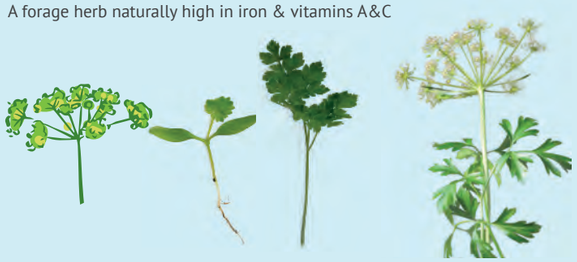


### Ribgrass
***(Plantago lanceolata)***
A forage herb naturally high in minerals & nutrients

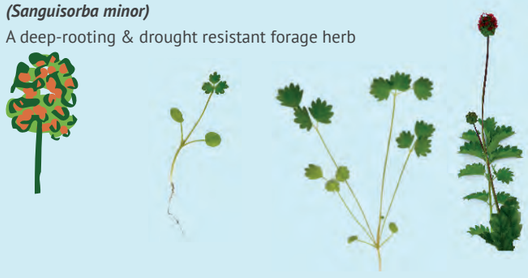
### Timothy
***(Phelum pratense)***
A long-term species growing well on most soils



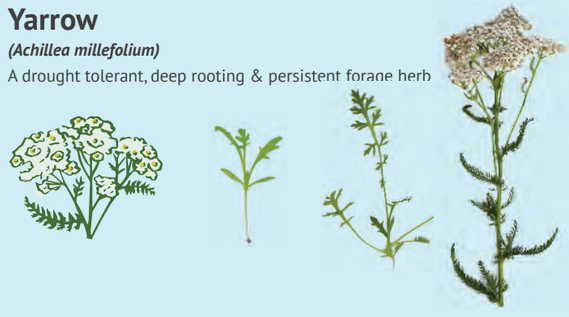
### Sheeps Parsley
***(Petroselenium Crispum)***
A forage herb naturally high in iron & vitamins A&C



### Burnet
***(Sanguisorba minor)***
A deep-rooting & drought resistant forage herb



### Yarrow
***(Achillea millefolium)***
A drought tolerant, deep rooting & persistent forage herb



## How to do it

1: Graze or mow to remove competition
2: Broadcast or drill seed
3: Leave 6 weeks to establish
4: Finally, lightly graze or cut again


# OVER-SEEDING

## Can old grass be improved by stitching in seeds from a herbal ley?

Reseeding is preferable to overseeding as the results are more predictable. However, there are big advantages to be gained from overseeding. It's less expensive, uses less machinery, and you retain and add to what you currently have rather than losing it for six months while the new ley is established.

Critically, the old sward should be grazed or cut as tightly as possible before sowing, so it's not competitive against new seedlings. Aggressive harrowing will remove dead material and loosen bare soil. Seed can be shallow drilled or broadcast, from April. Once the seed is sown it needs to be trodden in by livestock or harrowed and rolled to consolidate and lock in moisture. Livestock can graze the old sward, but must be removed after 4-5 days to prevent damage to the new seedlings. They can be re-introduced for a light graze or cut after 6-8 weeks to knock back the existing sward, again taking care not to damage seedlings.

### FIRST HAND
### CLYDE JONES

Clyde Jones is Dairy Farm Manager on the Bistern Estate in Ringwood, Hampshire.

The 4000 acre (1600 hectare) farm, stretching between the River Avon and the New Forest, has four enterprises - forestry, arable, environmental and dairy, which includes 300 hectares for young stock with 177 hectares grazing and 200 hectares of water meadow in HLS.

Clyde was brought in nine years ago as a grazing specialist with particular expertise of grazing practices in New Zealand. At the time, the calving was split between autumn and spring, with 550 cows. A system of rotational paddock grazing was in operation, with cattle grazing on perennial ryegrass and white clover, and fed in the shed on nine different feeds.

However, they were not producing the required 9000 litres and there were fertility issues. The farm is dry, with sand over gravel, and the organic matter was low, at 2.5%.

The first change Clyde made was to switch entirely to spring calving, but the farm struggled in a particularly dry year. The fifty day rotation was not working as the grass was not regrowing and the ground was burning up.

When 16 hectares came available from arable stubble, it was decided to direct drill this with a herbal ley.

'We had three grazings from the field in a year,' Clyde says. 'I was very impressed.'

The next move was to make 'a leap of faith' as Clyde terms it, and herbal leys were stitched into perennial ryegrass across 45 hectares. It was grazed right down with milking cows and 'we've not looked back since,' says Clyde.

Any field that now comes up is converted to herbal ley, with two thirds of the grazing land now given over to this crop. A fixed rotation of 30-60 days operates throughout the seasons. No fertilizers are being used and the results are impressive.

'The organic matter has doubled in six years taking it to 5%, and we're getting ten tonnes of dry matter per hectare.'

# GRAZING

## Herbal leys are traditionally grazed

The ley is the fertility building part of a crop rotation. For the best results, herbal leys should ideally be left in the ground for 4 years. Any shorter, leys won't have enough time to build up roots. Any longer and some species will disappear.

Farmers who use herbal leys in rotation spend less on inputs thanks to the improved soil that they create. This makes the farm more profitable.

FIRST HAND

### YEO VALLEY FAMILY FARMS

Jon Wilson is Farms Manager at Holt Farms, the Yeo Valley Family Farm, which provides milk to Yeo Valley to produce their well-known range of dairy products.

'Our aim is to feed the cows on grazing leys or silage to produce the best quality milk and this is being achieved by giving over increasing acreages of land to herbal leys,' says Jon.

The farm stretches from Blagdon Lake to the top of the Mendips and is home to two milking herds, comprising 420 British Friesian Dairy cows, with 240 cows at Holt Farm and 180 cows at Yoxter Farm, plus arable/rotational silage and sheep. Youngstock and bulls are bred on the farm. The soil ranges from loamy clay to thin limestone brash soils on top of the Mendips.

The arable rotation of two cereals and three years of red clover cutting leys was quite tight so the decision was made to reduce to first cereals only and include white clover and herbal leys across most of the land. A large acreage was established with more being sown the following year, early enough to get them well established before winter.

The drivers for change were the benefits of herbal leys in terms of soil improvement and nutrition for cows, anthelmintic properties and the benefits of herbs for mining minerals.

The herbal grazing ley is a complex mixture and Yeo Valley Family Farms, in consultation with Cotswold Seeds, took the view that it was worth including the widest variety of species and experimenting with management to see what worked best on the particular soil.

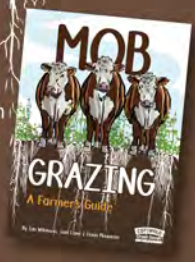
Herd Manager at Holt Farm, Richard Searle has seen very positive results: 'The cows like the ley as a grazing platform, and we are finding benefits to fertility. The diversity of the ley means it is more balanced than the white clover grazing leys, is higher in sugars and not too high in protein, so we expect an improvement in milk constituent values.'

## Grazing Management

After sowing, a light graze will effectively tidy up the new sward, but over-grazing diverse swards too early can damage or destroy them.

Once the sward is established, careful management is needed to maintain diversity of species. Limiting the set-stocking approach will prevent livestock from cherry-picking the more palatable species and causing them to die away. This preferential grazing effect can be reduced by back fencing the stock every time they are moved.

Mob-stocking, with a high number of livestock grazing an area for a short space of time, is an ideal way to manage herbal leys. The contained livestock will graze and trample all of the species at once, reducing the likelihood of more dominant species out-competing the less aggressive species. If the sward gets away, a silage cut can be taken to make use of excess growth.




Request a copy of 'Mob Grazing - A Farmers Guide' at cotswoldseeds.com

COTSWOLD Grass Seeds DIRECT

## Silage & Hay

Quality of conserved forage is, of course, as important as the quality of grazed forage in the field. Herbal cutting leys make fantastic silage & hay and provide impressive yields for feeding during the winter months. If a significant amount of chicory is present in the sward, an extra layer of wrap might be necessary for bailed silage to prevent mature chicory stems puncturing the bails. Animals will leave very mature chicory stems in hay.

## Anaerobic Digestion

Herbal leys have attracted a great deal of interest as a feed-stock for AD plants in recent years. This is due to the high quality & yield of the cut material, the lifespan of the ley, the soil improvement benefits and the mitigation of environmental impact which can be associated with AD. Previously favoured monocultures are not able to offer the broad spectrum of benefits achievable by using a diverse mixture of deep rooting species.




# HERBAL CUTTING LEYS

## Herbal leys can also be tailored for cutting

Herbal leys for grazing and cutting differ because a grazing rotation allows the more fragile species of legumes and herbs in the ley to flourish. Herbal cutting leys however are grown to a more mature stage during which the more dominant species can smother the less competitive ones. For this reason herbal cutting leys tend to contain only the species that reach maturity simultaneously, and are competitive enough to survive a cutting regime.

### Typical Silage Analysis


FIRST HAND

### JAMES FOOTE

Cornish dairy farmer, James Foote, ordered a special cutting herbal ley for an 18 acre field which had been down to maize. But the depletion of the soil due to the maize together with soil erosion over the winter, had left the field in a poor state.

The herbal cutting ley was shallow drilled and harrowed into a fine seed bed on 20th May and came up nicely despite a cool, wet and windy June. The first cut was taken just a few weeks later on 25th July.

'It was cut ten days earlier than I would have liked and ideally we'd have left it to wilt for at least another twelve hours but we were racing the weather,' says James. However the yield was better than expected.

Six to seven tonnes an acre of farmyard manure were applied during cultivations with no fertiliser applied and there was great regrowth thirty days after cutting. The clamp was opened to put lucerne on top and on inspection the herbal ley was ensiling well at this point.

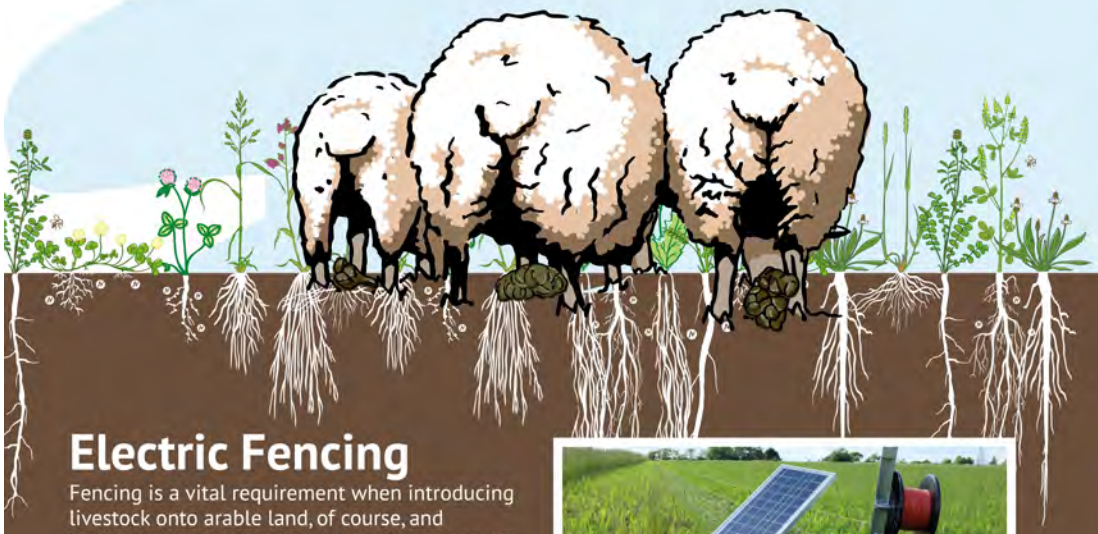
The results have been impressive: 6 tonnes per acre of fresh weight and a fresh cut analysis of 25% dry matter, crude protein 16.7%, D-value 78.7 and ME of 10.8.

'Our main aims were to find a perennial forage mix that is deep rooting to improve soil holding and structure, add diversity to both the soil and forage feed and increase our nutrient cycling so that we can eliminate purchased fertiliser,' says James. 'And we have.'

COTSWOLD Grass Seeds DIRECT

## What if I don't have any livestock?

Reintroduction of livestock can be a daunting prospect but buying and managing the stock yourself is not the only option. Land is at a premium and many livestock farmers often require grazing that cannot be provided on their own farms. By sowing herbal leys for soil improvement, you can offer grazing to local livestock farmers who will manage the stock for you while you gain the benefits of their presence in the rotation. Everyone wins.



## Electric Fencing

Fencing is a vital requirement when introducing livestock onto arable land, of course, and temporary electric fencing is therefore a popular solution for arable farmers.

According to Mark Grant Goodey of Rappa Fencing, it's difficult to summarize advice to arable farmers looking at fencing options prior to introducing livestock onto their farm, because every farm is different. But the principles are the same, as is the simplicity and ease of installing electric fencing.

'The first consideration is the size of the paddocks you need to create and the distance of fencing required,' says Mark. 'A suitable layout can then be devised, so the fencing is easy to pick up and put down.'

This layout will dictate which material is used for the wiring - either polywire or steel - and the size of the energizer to power it. It will also dictate how many systems are needed. These are a complete pack of wire and posts, supplied in

straight lengths of between 200 - 600 metres. This modular approach makes it easy to budget the overall fencing cost and also makes storage simpler. You can start small, with a trial plot, and then add on as many systems as you want, over time.

The main concern of arable farmers introducing livestock and fencing is will the animals get out? With three strands of wire for sheep and two for cattle they soon become trained and quickly learn how to stay within the fencing.



# ARABLE MEETS HERBAL

## Bringing livestock back into the arable rotation

We have already referred to the importance of reducing inputs to maintain profits and how herbal leys can help cut costs. It could be said that the arable sector suffers most of all at the mercy of fluctuating input costs and unrelenting soil degradation. By re-establishing the rotation to include herbal leys for soil improvement alongside cash crops we can reinvest in the farm's natural capital - the soil - to improve the yield and quality of arable produce.

By far the best way to manage and utilise herbal leys is by reintroducing livestock into this rotation. Using methods such as mob grazing, livestock can be very easily managed and will naturally recycle and deposit nutrients and organic matter back into your soil.

Grazing herbal leys helps to maintain the diversity of sown species, allowing us to maximise the benefit of the herbal ley whereas cutting regimes, as discussed on page 27, can have the effect of simplifying the mixtures due to high levels of competition.

Grazing instead of cutting also reduces the impact of using heavy machinery such as compaction particularly during wet periods of the year.

### FIRST HAND

### IAN BOYD

Gloucestershire arable farmer Ian Boyd, with 280 hectares, began using a herbal ley when his farm went organic, and his main motivations were to tackle blackgrass and improve the health of the soil. But Ian firmly believes that in order to gain the full benefit of a herbal ley and make it commercially viable, livestock must be introduced into the arable rotation.

Ian began by trialing a herbal ley undersown with spring barley. The soil is thin Cotswold brash so is not productive land and Ian was looking for sustainable cereal yields. He quickly increased to 40 hectares, a ten year project, with 4-5 years of herbal ley followed by 2-3 years of cropping - either barley or winter wheat. It's crucial to secure an income from the fertility building crop and this comes from the cattle. 'To do it properly you need a holistic approach,' Ian says. 'Breeding your own livestock means you are 100% in control and avoid many problems. Our Hereford cattle are born on the farm, and we direct sell the meat as the end produce. They are the vital piece of the jigsaw.

After just three years Ian has seen great results. The soil health tests over 4 fields have shown 3% increase in organic matter as well as increased earthworm counts, the visual assessment of soil structure and the glue that holds the soil to the roots have all shown 'such vast improvement it's almost

a shame to plough,' says Ian. Blackgrass was taking over the heavier field and since the herbal ley was planted 'we've yet to see any blackgrass at all.'

The other bonus is that as a keen wildlife photographer the herbal ley has increased the biodiversity of the farm above ground as well as below, and given Ian lots more photo opportunities.

# ENVIRONMENTAL CREDIT WHERE ITS DUE

## Diverse herbal leys create habitats for wildlife and help manage water

Jenny Phelps is senior farm conservation advisor for FWAGSW, which offers farmers practical solutions for making their farms more wildlife-friendly, while also making their businesses more profitable.

One of FWAGSW's roles is to help farmers to make the most of Countryside Stewardships, which can include legume and herb rich leys as an option (GS4, OK/EK21). Farmers are encouraged to put together options that will help to produce food for farmland birds and pollinators and Jenny is very enthusiastic to promote herbal leys. They create habitats for mammals and increased soil quality that not only improves carbon sequestration but also increases soil life, particularly earthworms. With greater root structures, herbal leys enable rainwater to infiltrate the soil more easily. This has the benefit of less runoff increasing flood resilience. Farmers often tell Jenny how introducing herbal leys into the arable rotation has been an invaluable tool for soil fertility building as well as blackgrass control, and it has improved farm biodiversity.

**FIRST HAND**

### JENNY PHELPS MBE

One of the farms on which Jenny has learned from and which demonstrates the principles advocated by FWAGSW, is Conygree Farm, which is the foreground of historic Lodge Park on the National Trusts' Sherborne Park Estate near Northleach in the Cotswolds, and has featured on BBC 'Springwatch.'

Mel Brunyee, who previously helped manage some of Norfolk's finest nature reserves, now runs the farm with Jonathan and their young family and their vision is for land rich in heritage, flora and fauna, and grazed by naturally maturing native breeds, including rare Cotswold Lion sheep which make for tasty lamb and mutton, and tradition Hereford cattle, fattened gently on rich grasslands.

Herbal leys play a key role at Conygree and are left to flower in summer. Together with flower rich margins, the provide rich sources of nectar, insects and nesting habitat. Lapwings often walk their chicks into the sward to feed. Sheep graze the ley and areas left ungrazed can result in chicory growing to 6 foot high, which is made into silage or strip grazed with cattle. Meanwhile 45ha of ex arable land was drilled with a herbal mixture developed specifically for calcareous soils and is being reverted to species rich limestone grassland. A late hay cut, allowing the plants to flower and set seed, is taken every other year.

The herbal ley is also used to give the plants a nitrogen boost and is grown in rotation and so helps to control flea beetle within the wild bird cover which is grown for winter bird feed. Winter flocks of over a thousand birds visit the farm with species including Yellowhammer, Linnet, Chaffinch, Greenfinch and Corn Bunting.


**Cotswold Seeds makes bespoke seed mixtures tailored for individual farms. Whether it's simple or diverse, we advise on mixture formulation and deliver within 24 hours.**

**For orders & advice call 01608 652552.**

**A Herbal Grazing Ley Seed Mixture can consist of any or all of these species**

**Grasses**
Cocksfoot
Festulolium
Hybrid Ryegrass
Italian Ryegrass
Meadow Fescue
Perennial Ryegrass
Timothy

**Legumes**
Alsike Clover
Birdsfoot Trefoil
Lucerne
Red Clover
Sainfoin
Sweet Clover
White Clover

**Herbs**
Burnet
Chicory
Ribgrass
Sheeps Parsley
Yarrow

**01608 652552**
**cotswoldseeds.com/herbal-leys**

COTSWOLD
Grass Seeds
DIRECT