



The Essential Guide to Forage Crops



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The Essential Guide to Forage Crops has been published to help farmers and growers plan an effective forage cropping programme. Although grass has to be the first priority to feeding livestock efficiently, forage crops can play an important role, especially when grass growth dips in the summer months. Many of the crops featured in this guide also allow growers to extend the grazing seasons in both spring and autumn, which can enhance profitability.

Conserved fodder crops, such as lucerne and fodder beet, also offer growers the ability to store and feed crops throughout the winter months, providing a fantastic opportunity to reduce costs.

The value of mixed forage diets

Home grown feeds can help to produce an excellent part of a mixed forage diet. Understanding the feed requirements of your animals will ensure maximum returns.

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

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

The opportunity for UK farmers is to exploit the use of home grown forages and reduce their cost of production.

Forage Crops – features and benefits

- Improved profitability
- Reduced reliance on purchased feed
- Full traceability
- Flexible cropping options
- An excellent break crop & entry back to grass
- Extend the grazing season
- Outwintering options
- Low inputs





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Our Expertise



Plant Breeding:

Through our sponsorship of a forage brassica breeding programme at The James Hutton Institute, we have commercially launched some excellent new varieties over a 15 year period. Our own plant breeding activities are currently producing new kales, forage rape and stubble turnips.



Trials:

We produce trials data on all of the major crop species at our trial site at Brant Broughton near Lincoln. The trials results are available in this booklet and enable you to select the best variety to maximise forage production.



Product Development:

We are always keen to trial and develop new products that we feel can offer benefits to livestock producers.



Seed Production & Quality:

We produce our own seed from certified basic seed in many countries. These crops are managed by our own production staff to meet the high standards we demand. Our licensed seed testing laboratory tests out seeds for germination, purity and vigour prior to packing and despatch.



Crop Rotations

Using the chart below, you can easily introduce forage crops into your rotation

Just look at the options in the column marked “What do you want to achieve?”. For instance – Cereal to Grass, and then select the year 1 and 2 crop options. Forage crops provide a fantastic break crop and entry back into grass – they allow you to control any serious weed problems and will add vital animal manures back into your soil.

What do you want to achieve?	Year 1 Crop suggestions		Year 2 Crop suggestions	
	SPRING	AUTUMN/WINTER	SPRING	AUTUMN/WINTER
CEREAL TO GRASS	→ Spring barley	→ Stubble turnips	→ Spring grass reseed	→
HIGH ENERGY	→ Fodder beet	→	→ Forage maize	→ Feed wheat
PROFITABLE SHEEP	→ Swede	→	→ Spring barley	→ Forage rape
PROTEIN BOOSTER	→ Arable silage	→ Lucerne (sow no later than July)	→	→
NEW GRASS	→ Worn out grass ley (after 1st cut silage)	→ Kale	→ Spring sown grass ley	→
MILK YIELDER	→ Maize	→ Forage rye	→ Fodder beet	→
OUTWINTERING	→ Fodder beet	→	→ Kale	→ Kale
GRASS REVIVER	→ Low yielding ley	→ Stitch in grass/clover	→ Revitalised grass	→
TRIPLE CEREAL	→ Spring barley	→ Forage rye	→ Forage maize	→



Choosing the Right Forage Crop

Below you will find a chart which summarises the forage crops featured in this guide; from sowing times and rates, to growing costs, yield and feed quality data.

Use this guide to select the forage crop which best suits your system and objectives.

Species	Sowing Time per hectare	Sowing Rate per hectare*	Growing Costs per hectare	Fresh Yield tonnes per hectare	Dry Matter tonnes per hectare	Crude Protein %	ME kg/DM	ME MJ per hectare
Fodder Beet	March - April	100,000 seeds	£1,460	80-90	13-15	12-13	12.5-13.5	162,500-202,500
Kale	April - Early July	4-5 kg	£496	60-65	8-10	16-17	10-11	80,000-110,000
Stubble Turnip	May - August	5-8 kg	£305	38-45	3.5-5	17-18	11	38,500-44,000
Forage Rape	May - August	6-9 kg	£408	24-35	3.5-4	19-20	10-11	35,000-49,500
Swedes	April - June	3-5 kg Direct 350g-850g Precision	£403	70-90	7-10	10-11	12.8-13.1	89,600-131,000
Lucerne ▲	April - August	30-35 kg	£1,459	35-40	10-12	17-22	10	100,000-120,000
Forage Peas	March - Early June	125-150 kg	£708	37-50	8-10	18-20	10.5	84,000-105,000
Forage Rye	Sept - October	185 kg	£339	20-24	5-6	11-12	10	50,000-60,000

*Growing costs provided by Kingshay Farming Trust ▲ 3 cuts per year



Beta Maize Silage

Fodder beet not only has one of the highest energy levels, but also has the potential to produce more dry matter yield per hectare than any other forage crop. In terms of total energy production per hectare, only forage maize comes close to the performance of fodder beet. Many farmers have already recognised the benefits of feeding fodder beet, but are restricted by traditional storage methods to only using for part of the year. However, this doesn't have to be the case. Co-ensiling fodder beet with maize produces an energy rich feed that can be used all year round. Contamination with soil and stones is to be avoided, so the technique is not suitable for very heavy clay soils, unless the beet can be washed. If you would like more information about Beta Maize, please ask for our comprehensive guide.

Why ensile fodder beet and maize together?

- Possible to feed all year round
- Increased energy concentration in feed
- Significantly increases the dry matter intake of forage
- Reduced dependence on cereals and concentrates

- Stable and uniform feed throughout the year
- Reduced ensiling costs as harvest and silage making are performed in one operation
- Reduced feed delivery costs as no daily chopping or cleaning required



The ensiling process

Harvesting of both crops should take place simultaneously in October when the maize has reached 32% DM. The beet must be crushed or chopped into pieces of 5-10cm in size. The beet tops can also be included if they are weed free and also chopped. Both maize and fodder beet are added to the clamp in thin layers and compressed well. All normal silage making procedures must be adhered to. For best results, use 25% fodder beet to 75% maize, if the Beta Maize forage part of the ration is 60% or less. Where the forage is 100% Beta Maize, then use 10% beet to 90% maize.

Feeding

As cows will preferentially eat the ensiled fodder beet, care must be taken to avoid selective feeding, which may lead to

acidosis. This can be reduced by having several feed deliveries per day and having just one feeding place per cow.





Fodder Beet

Why grow fodder beet?

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

Soil Type/Site Selection:

The crop can thrive on a wide range of soils, but a light to medium, free draining field is ideal. A soil pH of 7 is the target and good accessibility is vital for heavy harvesting machinery.

Seedbed & Sowing Methods:

Aim for firm, fine tilth with pre-Christmas ploughing. Keep moisture loss to a minimum in the spring. Monogerm seed has eliminated the need for labour intensive singling. However, allow for some field losses if seedbed conditions are poor. As a general guide, soil temperatures need to be at least 5°C before sowing. Early April is a typical drilling date in the South. Sowing earlier in cold conditions can lead to bolting. Delayed drilling leads to yield losses. Ensure that the seed is drilled to a depth of 2.5/3cm - use the deeper depth for dry seedbeds. A precision drill is essential.

Fertiliser:

This is a demanding crop in terms of nutrients. All the fertiliser, except the nitrogen, is best applied in the autumn. The nitrogen can be applied immediately after drilling. The use of slurry/farmyard manure will be beneficial, as is the application of sodium on appropriate soil types. Trace elements (especially manganese and boron) are important to fodder beet.

Weeds, Diseases & Pest Control:

Some farmers may be prepared to undertake inter-row cultivations but most now prefer to rely on herbicides to control weeds. It is vitally important to control weeds as their presence can severely reduce yields. Weed beets are very undesirable and every effort must be made to eliminate them.

Our seed is treated with both fungicide and insecticidal products to provide protection during the establishment phase. The crop can be attacked by several pests, including slugs and wireworms whilst aphids transmit virus yellows.

Harvesting:

Although the crop continues to put on yield into the autumn, this has to be balanced against the potential problems associated with late harvest. Some farmers have their own lifting equipment while others will use a contractor. Machines can be divided into 'leaf' or 'root lifters' - whichever is used, the tops must be removed down to the base of the leaf petioles. Keep soil contamination to a minimum.

Root Storage:

A pre-cleaner is recommended to remove soil contamination. Clamps should be checked regularly for signs of any hot spots. The high DM varieties tend to store better on a long-term basis and are less prone to damage.

Feeding:

Fodder beet may be fed chopped or whole. Chopped beet should provide a better liveweight gain in beef animals. Feeding the roots at ground level can reduce the risk of choking. The roots have a high energy but low protein content and make a good substitute for grain in rations for dairy cows, beef animals, sheep, pigs and deer. Crops have also been strip grazed in outwintering systems.

Sowing Information

Sowing period

Late March to late April

Direct drill

100,000 seeds/ha
50,000 seeds/acre

Seed sold in one acre packs
[50,000 seed units]

Yield & Feed Quality

Average dry matter yield

15-17 tonnes/ha

Average fresh yield

80-90 tonnes/ha

Dry matter

15-22%

Crude protein

12-13% [mainly leaves]

Digestibility value

78%

Metabolisable energy

12.5-13.5 MJ/kg DM

Growing Costs

£1460 per hectare

Fresh weight

£16 per tonne

Dry matter

£115 per tonne

EXPERT ADVICE

Never lift too early.
Crops continue to grow until
the end of October

Variety Profiles



Blizzard

Blizzard has the potential to produce very high dry matter yields. Blizzard's characteristics make it ideal for harvesting with sugar beet machinery and its high dry matter content, allows growers extra harvesting flexibility. It will produce a very palatable feed, best fed to dairy or beef animals because of the high DM content.



Ribondo (Rhizomania resistant)

Ribondo is a Rhizomania resistant variety that has very erect leaves, ideal for harvesting with either leaf lifting or sugar beet equipment. Rhizomania is becoming a major problem in some areas of the UK. The disease can cause unacceptable yield losses, but the use of Ribondo will help reduce the build-up and distribution of this disease, especially in sugar beet growing areas.



Blaze

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



Robbos

Robbos is a recent introduction. It had the highest dry matter yields in our recent trials and with a clean yellow root and medium dry matter content, it is an ideal choice for both dairy and beef production.

Trial Results

Variety	Dry Matter Yield %	Fresh Root Yield %	Dry Matter Content %	Skin Colour	Top Size 9=Large	Root in Ground %	Dirt Tare %
100%=Tonnes/Ha	17.3	93.8					
Blizzard	107	87	22.7	White	6.4	70.8	16.6
Robbos	107	99	20.0	Yellow	6.6	59.3	9.3
Magnum	107	96	20.5	White	6.9	64.3	16.7
Blaze	102	102	18.4	Red	5.8	56.6	12.4
Ribondo RR	101	90	20.7	Yellow	6.4	57.4	15.1
Jamon	100	103	17.9	Orange	6.2	56.1	20.5
Kyros (c)	100	100	18.5	Yellow	6.6	57.1	12.7
Tintin	99	94	19.5	Orange	6.8	63.1	*
Starmon	99	93	19.6	Yellow	*	55.5	*
Juana	97	90	19.9	Orange	6.5	61.3	*
Feldherr	95	112	15.6	Orange	6.6	48.7	12.9

Data Source: Limagrain UK Trials 1998-2013
RR = Rhizomania Resistant

*No data available
(c) = Control

Dirt Tare % (2012 only)

Preferred Varieties (red text)

Crop Suitability

Graze in situ ☒

Ensilage ☒

Zero grazing ☒

Lift and store ☒

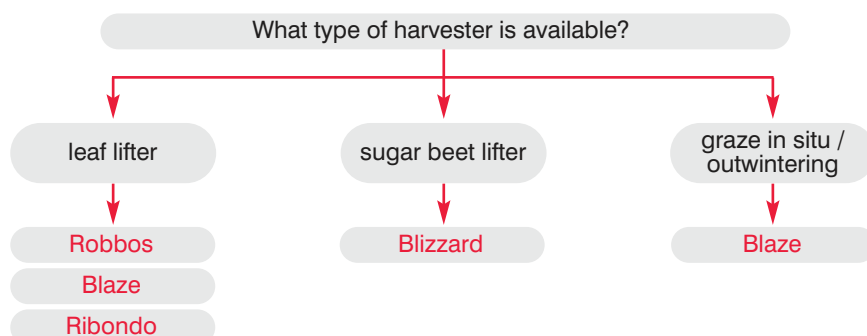
Dairy ☒

Sheep ☒

Beef ☒

Pigs ☒

Fodder Beet Variety Selection Guide





Kale

Why grow kale?

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

Soil Type/Site Selection:

Kale grows best on a medium loam soil with a pH of around 6.5. It needs a well drained soil which is not compacted. If you grow Kale on a very heavy soil remember that you might have problems strip-grazing in a very wet autumn/winter.

Seedbed & Sowing Methods:

A firm, fine and level seedbed is required and this needs to be achieved with minimum moisture loss (especially on dry soils).

Kale seed should be sown between mid-April and mid-July. Early sown crops which establish well are more likely to give the highest yields.

The seed can be broadcast or sown with a precision or root drill. Under normal conditions, a seed rate of 4-5kg/ha should be adequate. If seedbed conditions are very dry, or the crop is broadcast, then the rate can be increased slightly as an insurance. The target population is 70 plants/m² whichever sowing method is used.

Fertiliser:

Kale is a fast growing crop which will thrive well when provided with plenty of organic material like slurry or farmyard manure. For a soil

index of 1, apply 80 units/ha of P and 230 units/ha of K to the seedbed (see page 27).

The amount of nitrogen required will depend on the previous cropping and up to 120kg/ha may be needed after a run of cereals. After intensely grazed grass the rate may fall back to 60kg/ha.

The application may be split for early sown crops – 65% in the seedbed and the balance when the crop has reached a height of 15/16cm. For direct-drilled crops, it is wise to increase the nitrogen by up to 25% to boost the crop in the establishment phase.

Weeds, Diseases & Pest Control:

Several pre-emergence sprays are effective in kale and products are also available for post emergence control of broad-leaved weeds.

In dry years, flea beetles can cause considerable damage to young seedlings. Crops should be monitored regularly, we recommend using only seed treated with Cruiser. Slugs can be a problem in direct-drilled crops – slug pellets should be considered if appropriate. Rabbits and pigeons can also pose a threat and again some specific attempts at control

may be necessary.

Clubroot represents the main disease threat, it is soil borne so control is by the use of good rotations. Try and avoid growing kale on any fields which have a history of clubroot, however the availability of the clubroot resistant variety Caledonian is a major breakthrough. Alternaria and mildew can affect crops but attacks are seldom too serious.

Feeding:

The traditional method is to utilise the crop fresh, either by strip or zero grazing. Strip grazing behind an electric fence which should be moved once or twice a day. Allow a space of 3 metres per cow and an area of grass for the animals to run-back on.

Zero grazing – cutting the crop with a forage harvester – will help secure the maximum use of this excellent green feed with minimal waste. The kale can then be fed from a forage box or from behind a barrier. Experts suggest that kale should provide no more than 30/35% of the daily dry matter intake for dairy cows.

Outwintering – kale has been used very successfully in outwintering systems.

Sowing Information

Sowing period

April – early July

Precision drill

2kg/ha (750g/acre), Grade J

Direct drill

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

Broadcast

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

Yield & Feed Quality

Average dry matter yield

8-10 tonnes/ha

Average fresh yield

60-70 tonnes/ha

Dry matter

14-16%

Crude protein

16-17% fresh

Digestibility value

70-75%

Metabolisable energy

10-11 MJ/kg DM

Growing Costs

£496 per hectare

Fresh weight

£7 per tonne

Dry matter

£67 per tonne

Variety Profiles



Keeper

Keeper is very winter hardy and exhibits good lodging resistance. It is a medium/short type, ideal for fattening lambs and providing high quality winter keep. It has low SMCO levels (anti-nutritional chemical).



Grampian

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

Bred by 



Caledonian

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

Bred by 



Pinfold

Fast growing and ideal for early sowings. Pinfold will provide excellent yields in a short period of time.

Trial Results

Variety	Type	Total Dry Matter Yield %	Total Fresh Yield %	Dry Matter %	Leaf: Stem Ratio ▲	Height cm	Digestibility Value %
100% = Tonnes/Ha		9.8	70.2				
Caledonian	Club root resistant	122	123	13.8	0.6	105	71.2
Grampian	Intermediate	114	113	14.1	0.6	101	73.7
Pinfold	Intermediate	112	100	15.6	1.0	101	71.1
Bittern	Intermediate	112	101	15.5	0.8	94	74.0
Voltage	Intermediate	105	93	15.7	0.9	97	70.6
Keeper	Short Grazer	103	92	15.7	1.2	85	74.2
Maris Kestrel (c)	Short Grazer	100	100	13.9	1.1	74	75.6
Thousand Head	Older Standards	99	83	16.6	1.2	99	70.1

Data Source: Limagrain UK & James Hutton Institute Trials 1991-2013

▲ Highest Score = Most Leaf

(c) = Control

Preferred Varieties (red text)

Crop Suitability

Graze in situ ☒

Ensilage ☐

Zero grazing ☒

Lift and store ☐

Dairy ☒

Sheep ☒

Beef ☒

Pigs ☐

Kale Variety Selection Guide

Summer and autumn use

sheep & cattle

Pinfold

Winter use

sheep

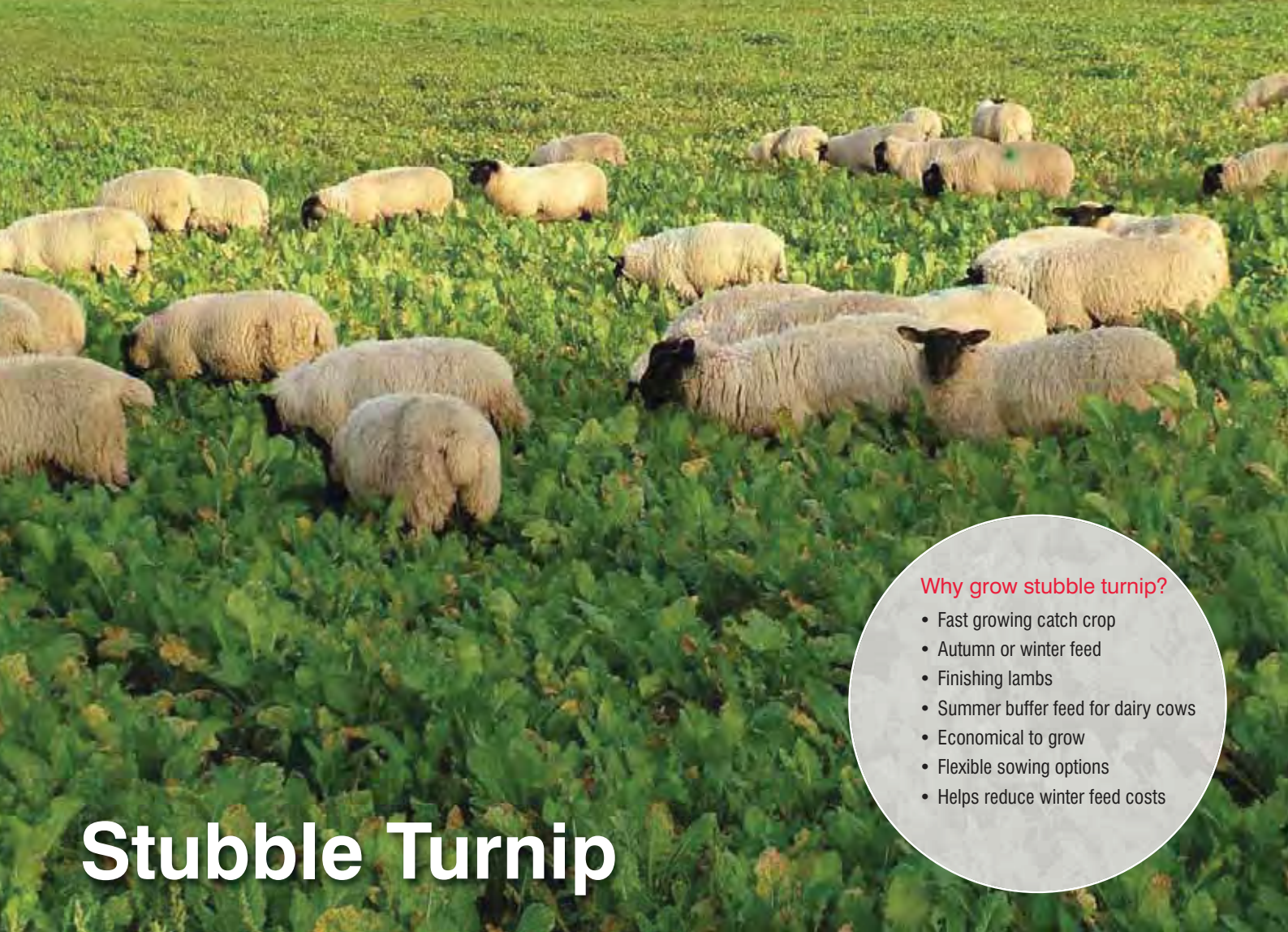
Pinfold

Keeper

beef & dairy

Caledonian

Grampian



Stubble Turnip

Why grow stubble turnip?

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

Soil Type/Site Selection:

As most crops are grazed in situ, a free draining light loam or brash with a pH of 6.5 is ideal.

Seedbed & Sowing Methods:

If stubble turnips are to be sown after grass, a firm, fine seedbed will be required and traditional, plough-based cultivations will be fine. If stubble turnips are drilled following an arable crop, a cereal for example, then tined cultivations, disking or rotovation can often replace the plough. In all cases it is vital that soil moisture is not lost.

Stubble turnips should be sown approximately 12-14 weeks before they are to be utilised. If sown in April, after forage rye, Italian ryegrass or an early spring fallow, turnips are very useful for finishing off spring lambs or feeding other stock.

Stubble turnips also fit in well when sown in mid-June after an early hay/silage cut for autumn feeding, but they are now increasingly being used for autumn sowing on cereal stubbles.

Autumn sowings in the northern half of the country and on all uplands should be completed by the end of July. In the south,

stubble turnips should be sown by mid-August, with early September the latest date to consider.

For crops drilled into broken stubbles, sowing rates will vary from 4.5-6kg/ha depending on soil conditions and time of drilling.

Seed which is broadcast should go in at no less than 7-8kg/ha.

Fertiliser:

An application of 80kg of nitrogen, 25kg of phosphate and 25kgs of potash per ha is usually sufficient for this crop. Certainly, a dressing of between 60-90kg of nitrogen/ha is especially important when the crop is being sown after a cereal. The fertiliser should be worked well into the seedbed. A top dressing of nitrogen (see page 27) 3-4 weeks after sowing can boost crop growth.

Feeding:

The stubble turnip crop is an attractive source of very palatable and easy to digest fodder. Both cattle and sheep should be introduced gradually to the crop and between grazings be able to run-back on grass or have access to grass silage. It is also advisable to have hay or straw on offer prior to each grazing, particularly in the

case of dairy cows. Allow stock about three weeks to fully adjust to stubble turnips, it is a good idea to introduce animals to the crop gradually.

Throughout the grazing period adequate mineral supplements should be fed to all stock.

Although the DM content of both the root and the leaf is low, the quality of this DM is very good.

Livestock Intake:

A dairy cow will eat approximately 22kg in a 2-3 hour grazing period and a lowland ewe about half that amount in a day. So an average autumn crop of 40 tonnes/ha (after allowing for wastage) should provide one day of grazing for 500 cows or 1000 ewes. With beef animals an intake of 25 kg/head/day should give liveweight gains in the order of 0.5 to 0.75 kg/head. As a precaution against taint, dairy cows should be fed stubble turnips immediately after milking – and remove them from the crop at least three hours before the next milking. Cattle should strip graze the crop behind an electric fence to reduce wastage. With sheep, good quality netting can be used to achieve the same aim.

Sowing Information

Sowing period

[1] May to June [2] July to August

Direct drill

5kg/ha [2kg/acre] Natural seed

Broadcast

7.5kg/ha [3kg/acre] Natural seed

Yield & Feed Quality

Average dry matter yield

3.5-5 tonnes/ha

Average fresh yields

38-45 tonnes/ha

Dry matter

8-9%

Crude protein

17-18% [mainly leaves]

Digestibility value

68-70%

Metabolisable energy

11 MJ/kg DM

Growing Costs

£305 per hectare

Fresh weight

£5 per tonne

Dry matter

£66 per tonne

Variety Profiles



Samson (Tetraploid)

Samson can produce huge tankard shaped purple bulbs which are very palatable to both sheep and cattle. In trials, Samson has shown to be **preferentially grazed** which can lead to higher intake and live weight gains.



Rondo

Rondo is a green skinned variety, suitable for sheep or cattle. It has a very leafy growth habit with excellent disease resistance and can be utilised from September to early February. Rondo has excellent root anchorage which helps reduce wastage in the field.



Delilah

This exciting recent introduction has out-performed many existing varieties in our trials for a number of years. Delilah is ideal for fattening lambs and will produce huge, white tankard shaped bulbs. Good resistance to mildew.



Tyfon (hybrid)

Tyfon is ideally sown in the spring and utilised in the summer months when grass growth generally declines. Tyfon should not be sown too early as it is susceptible to bolting. Tyfon's growth habit is very leafy with regrowth potential.

Trial Results

Variety	Type	Total Dry Matter Yield %	Total Fresh Yield %	Root Dry Matter Yield %	Leaf Dry Matter Yield %	Mildew Resistance 9=Best
100%=Tonnes/ha		4.9	46.8			
Delilah	Tankard	103	105	128	79	6.6
Samson (Tet)	Tankard	103	109	123	84	5.6
Barkant (c)	Tankard	100	100	100	100	5.4
Rondo	Round	92	89	95	89	6.2
Dynamo	Round	85	89	98	73	4.7
White Star	Round	82	81	73	89	6.0
Tyfon (Hybrid)	Leafy	79	75	57	101	4.4
Appin	Leafy	74	79	53	93	6.9

Data Source: Limagrain UK Trials 1987-2013

(Tet) = Tetraploid

(c) = Control

Preferred Varieties (red text)

Crop Suitability

Graze in situ ☒

Ensilage ☐

Zero grazing ☐

Lift and store ☐

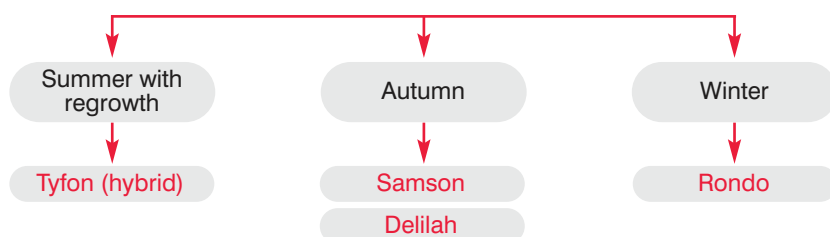
Dairy ☒

Sheep ☒

Beef ☒

Pigs ☒

Stubble Turnip Variety Selection Guide





Why grow forage rape?

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

Forage Rape & Hybrids

Soil Type/Site Selection:

As most crops are grazed in situ, a free draining light loam with a pH of 6-6.5 is ideal. Forage rape has a very vigorous growth habit and is very often used in upland reclamation projects. Where its ability to survive and grow on relatively poor soils and exposed sites is well known.

Seedbed & Sowing Methods:

Forage rape makes an excellent break crop between grass leys; if this rotation is used, a firm, fine seedbed is required. Forage rape can also be sown after cereal harvest where tined cultivations, discing or rotavation will suffice. Whichever method you choose, rolling after sowing will consolidate the seedbed and help reduce moisture loss. Seed should be drilled at 6kg/ha or broadcast at 8-10kg/ha.

Fertiliser:

Forage rape will benefit from applications of FYM or slurry before sowing. If this is unavailable then 60-90kg of nitrogen, 25kg P and 25kg K per hectare into the seedbed should be sufficient for the crop. If the crop looks 'hungry' after 4-5 weeks from sowing then a top dressing of 75kg/ha of nitrogen can be applied. High application of N can be detrimental to stock intakes (see page 27).

Feeding:

Forage rape crops can be ready to utilise between 10-12 weeks from sowing. They are ideally used for finishing lambs or flushing ewes and can be lightly grazed by cattle. As with any brassica crop, feeding should be introduced gradually over a 2-week period. Ideally there should be an area of grassland to allow stock to 'run back' onto, along with access to hay or straw and water.

Forage rape is also the ideal companion to stubble turnips. The two sown together can be fed successfully with the forage rape adding extra crude protein content and winter hardiness.

Many farmers have successfully mixed approximately 250-500g of



forage rape seed into their grass seed mixtures, allowing them to be grazed whilst the young grass seedlings continue to establish underneath.

Forage rape can also be mixed with Italian ryegrass to create a cleaner autumn keep.

Sowing Information

Sowing period

May to end August

Direct drill

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

Broadcast

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

Yield & Feed Quality

Average dry matter yield

3.5-4 tonnes/ha

Average fresh yields

24-35 tonnes/ha

Dry matter

11-12%

Crude protein

19-20%

Digestibility value

65%

Metabolisable energy

10-11 MJ/kg DM

Growing Costs

£408 per hectare

Fresh weight

£12 per tonne

Dry matter

£107 per tonne

EXPERT ADVICE

Only choose varieties that have good disease resistance which will lead to higher intakes

Variety Profiles



Interval (Rape/Kale Hybrid)

When it comes to filling the gap in your winter feed programme, Interval rape/kale hybrid can really boost your profits. Interval's exceptional yield potential, disease resistance and palatability is ideal for finishing lambs or dairy cows. Interval is very fast to establish with some crops ready to utilise within 10-12 weeks of sowing.

Bred by  The James Hutton Institute



Hobson

Hobson is *the* variety for finishing lambs. It has excellent resistance to powdery mildew; a disease which can make some crops unpalatable leading to a high wastage factor. Hobson is very palatable and digestible. Bred by Limagrain and fully proven on livestock farms throughout the UK.



Hungry Gap

For later use, Hungry Gap's exceptional winter hardiness will ensure crops can be used in January and February. It is best sown in June or July and its growth habit is kale-like in appearance.

Trial Results

Variety	Total DM Yield %	Total Fresh Yield %	Dry Matter %	Powdery Mildew Resistance 9 = best
100% = Tonnes/ha	4.1	28.4		
Interval (Hybrid)	110	121	13.0	8
Swift (Hybrid)	107	116	13.2	*
Hobson (c)	100	100	14.3	8
Emerald	93	98	13.5	7
Stego	93	95	13.9	*
Redstart (Hybrid)	91	93	14.0	*
Winifred	87	89	14.0	*
Hungry Gap	83	86	13.9	*

Data Source: Limagrain UK Trials 1990-2012 (2 year data)

*No data available

(c) = Control

Preferred Varieties (red text)

Crop Suitability

Graze in situ ☒

Ensilage ☐

Zero grazing ☐

Lift and store ☐

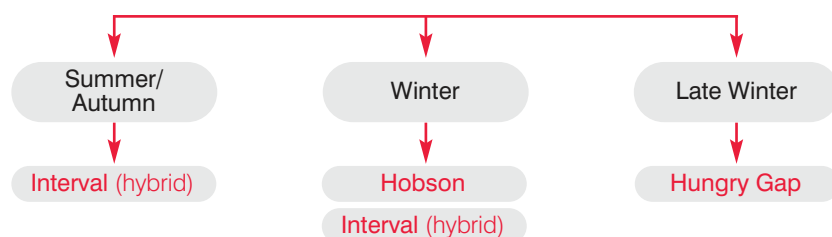
Dairy ☒

Sheep ☒

Beef ☒

Pigs ☐

Forage Rape Variety Selection Guide





Swedes

Why grow swedes?

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

Soil Type/Site Selection:

Swedes can be grown on a wide range of soils including sandy loams, silts, peat or clay loams. The desirable soil properties needed are – ease of working, good aeration, good structure and sound drainage. Avoid soils with pans and ensure a pH of around 6.5.

Seedbed & Growing Methods:

The majority of swede crops are now sown with precision drills which require a level seedbed. Early drilling in April should be made with minimal cultivation passes to reduce compaction. Later drillings in May/June are often made in hot, dry conditions so try to undertake the seedbed cultivations in early spring to reduce soil moisture loss. Weeds should be eliminated between seedbed preparation and sowing.

Seed should be sown at 1-2cm depth and left well firmed on the top.

Precision or space drills are capable of accurate placement of

individual seeds (e.g. Stanhay Webb). Swede seeds are naturally spherical, however, they are graded in size using a nationally agreed code letter system of 'H' (1.75mm-2mm).

Rows should be 38-42cm apart. The ideal spacing within the row is generally assumed to be 15cm. Spacings for varieties may vary to achieve the ideal marketable size of the roots.

Early varieties (low DM) can be sown from early April to late May. The varieties for utilisation in late winter should be sown mid-April to mid-June.

Fertiliser:

Fertiliser should be applied into the seedbed. Swedes are responsive to Boron, which should be applied to soils with a deficiency (see page 27).

Weeds, Diseases & Pest Control:

There are a number of pests which attack the swede crop from sowing through to maturity. In order to maximise crop establishment and minimise crop

damage, it is advisable to sow treated seed. If swedes are sown for culinary use, it is essential that superficial mining or tunnelling from cabbage root fly be controlled, as is the internal damage from turnip root fly.

The major disease to watch for is clubroot, which affects the root system – the misshapen roots can be completely unsaleable in culinary situations.

Attacks of mildew on the leaves will reduce yield and may affect the crops palatability during in situ grazing.

Feeding:

Most fodder swede crops are grazed in situ. However, it is important to remember to select a variety (or varieties) to cover the period you wish to graze. It is advisable to use an electric fence to reduce wastage. Forage swedes can be lifted and the roots stored in a clamp. The roots need to be clean and free from soil and try not to store any damaged roots as this will encourage fungal diseases.

Sowing Information

Sowing period

April-June

Precision drill

350g-850g/ha [150g-350g/acre]
Grade H

Direct drill

3kg/ha [1 kg/acre], Natural seed

Broadcast

5kg/ha [2 kg/acre], Natural seed

Yield & Feed Quality

Average dry matter yield

7-10 tonnes/ha

Average fresh yield

70-90 tonnes/ha

Dry matter

10-13%

Crude protein

10-11%

Digestibility value

82%

Metabolisable energy

12.8-13.1 MJ/kg DM

Growing Costs

£403 per hectare

Fresh weight

£5 per tonne

Dry matter

£62 per tonne

Variety Profiles



Gowrie

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

Bred by 



Lomond

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

Bred by 



Invitation

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

Bred by 



Brora

Brora is a deep, purple-skinned variety, it can be grazed early in the autumn or used for the prepack market as an early harvested crop. Brora has a high marketable yield and is fully tried and tested in the UK. Brora has low resistance to powdery mildew.

Bred by 

Trial Results

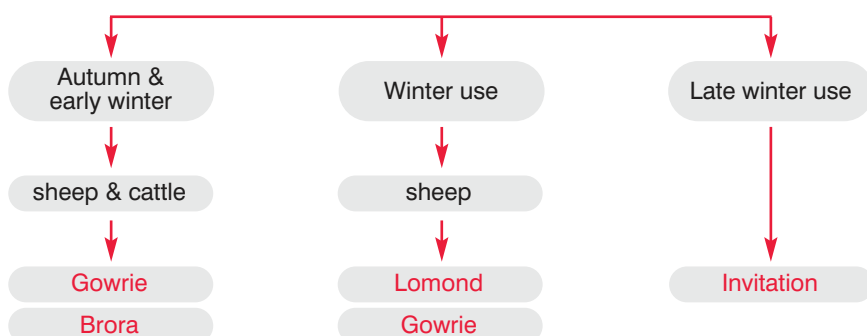
Variety	Type	Total DM Yield %	Total Fresh Yield %	Dry Matter %	Mildew Resistance 9=best	Root Shape 9=best
100%=Tonnes/ha		9.78	89.6			
Gowrie	Dual Purpose	118	119	11.0	9	7
Lomond	Dual Purpose	111	109	11.3	9	7
Ruby	Forage	107	102	11.7	7	5
Invitation	Forage	106	94	12.6	8	6
Brora	Culinary	100	106	10.4	3	7
Ruta Otofte (c)	Forage	100	100	11.6	4	5
Magres	Culinary	100	93	12.2	7	6
Helenor	Culinary	96	93	11.6	3	7
Marian	Dual Purpose	96	97	11	5	5

Data Source: Limagrain UK trials and James Hutton Institute 1990-2010

(c) = Control

Preferred Varieties (red text)

Swede Variety Selection Guide



Crop Suitability

Graze in situ ☒

Ensilage ☐

Zero grazing ☒

Lift and store ☒

Dairy ☒

Sheep ☒

Beef ☒

Pigs ☐

Forage Peas

Why grow forage peas?

- Very high protein content (18-20%)
- Easy to harvest using forage machinery
- Suitable for undersowing new grass leys
- Impressive field performance
- Organic situations
- Some nitrogen fixation to enhance soil and next crop
- Excellent break crop

Soil Type/Site Selection:

Generally speaking, forage peas can be grown on a very wide range of soils – fields need to be very well drained (peas do not like 'wet feet') and have a pH of 6.0 or above.

Seedbed & Sowing Methods:

Sowing date is somewhat flexible as it depends on where the crop is to fit in the rotation. It can be sown as early as March/early April in the south and a little later in the north. The minimum (stable) soil tolerance temperature required is 8°C. Bear in mind that late sowings (after mid summer) are unlikely to yield as well as early crops.

Fertiliser:

Forage peas are leguminous so will fix their own nitrogen. However, a small dressing of nitrogen will often be beneficial at the establishment

phase, depending on the existing nutrient status of the soil.

Weeds, Diseases & Pest Control:

In good conditions forage peas will produce a dense canopy which will smother weeds very efficiently. However, it is good husbandry to ensure that the field is as weed free as possible from the outset.

Bird damage (mainly pigeons and rooks) can be substantial where fields are in a high-risk area.

Damage will be minimised by the speedy establishment of the crop, so sowing into optimum seedbed conditions is vital. The use of bird scaring devices may well be essential on sites prone to bird strikes.

Harvesting:

Forage peas can be cut and clamped, cut and baled or grazed in situ. For crops destined for cutting, the peas should be harvested when they are still flowering and the plants have formed but not filled their first pods. Wilting for 24/48 hours is recommended and precision chopping is essential. The use of an appropriate additive is a very sound move to help ensure a good

fermentation in the clamp or the bale.

Generally speaking, silage made from a mixture of peas and cereals will be less prone to poor preservation – the disadvantage is that such a mixture is more likely to deteriorate faster at the silo face during feeding. This will certainly be the case if the material has not been chopped very short or consolidated efficiently.

A good crop of forage peas will yield between 40-50 tonnes of green matter per ha (at 20% DM) and this is, of course, achieved with a single cut.

If you plan to strip graze your crop, then make sure the whole process is controlled by an electric fence, to reduce wastage and control intake.

Feeding:

Although some experts believe that forage peas are a 'bloat free' crop (due to their content of tannin) it will be sensible to introduce stock to the crop gradually and, for safety, it is important to monitor animals regularly whilst they are grazing. Like all legumes, forage peas are very palatable and their judicious use in the diet should promote a higher voluntary intake.

Sowing Information

Sowing period

March to late June

Direct drill

125kg/ha (50kg/acre)

Broadcast

150kg/acre (60kg/acre)

Yield & Feed Quality

Average dry matter yield

8-10 tonnes/ha

Average fresh yield

37-50 tonnes/ha

Dry matter

20-25%

Crude protein

18-20%

Digestibility value

62-64%

Metabolisable energy

10.5 MJ/kg DM

Growing Costs

£708 per hectare

Fresh weight

£27 per tonne

Dry matter

£102 per tonne

EXPERT ADVICE

Magnus can be undersown with a grass ley; this can greatly reduce the period of time a new ley is out of production.

Variety Profiles



Magnus

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

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

Bred by 



Arable Silage Mixtures

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

The crop can produce excellent yields from a short growing period of approximately 13 –16 weeks. The silage combines high intake potential and can be used as part of a mixed forage diet. The pea content of these mixtures can help increase the protein content. Arable silage mixtures can be undersown with a new grass ley to further maximise the use of your land.

Prosilie

A proven blend of forage peas Magnus and Spring barley which can produce a quality silage, high in protein content.

Contains: 60% Magnus pea 40% Spring barley

Protein Plus

A traditional blend of spring oats, barley and Magnus forage pea. Ideally suited for use in a mixed forage diet.

Contains: 35% spring oats, 40% Spring barley, 25% Magnus forage peas

Sow at:

125-150 kilos per hectare
- undersown with grass

175-200 kilos per hectare
- for best results

Crop Suitability

Graze in situ ☒

Ensilage ☒

Zero grazing ☒

Lift and store ☐

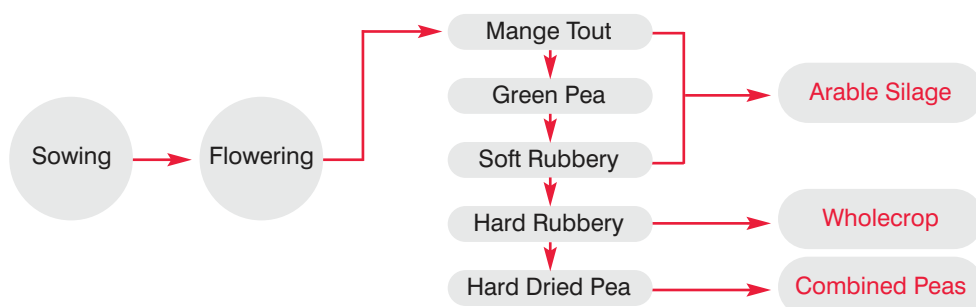
Dairy ☒

Sheep ☐

Beef ☒

Pigs ☐

Harvesting Stages of Forage Peas



Always use the first truss to make your harvest assessment



Forage Rye

Why grow forage rye?

- Early turnout (reducing overwintering costs) for cows
- Winter sheep keep
- Flexible sowing option after maize or cereals
- Zero grazing and big bale options
- Helps mop up residual nitrogen and prevents soil erosion

Soil Type/Site Selection:

As forage rye is primarily grown for its ability to deliver very early grazing in early spring, it is essential to make sure that the right field is selected.

A weed-free, sheltered, well-drained field is ideal and if it has a southerly facing aspect then even better. Although forage rye will grow on a very wide range of soil types it is best to avoid very exposed or badly drained fields.

Seedbed & Sowing Methods:

The seedbed for the forage rye should be reasonably firm and well consolidated. A seed rate of between 160-185kg/ha (65-75 kg/acre) is adequate under most circumstances and the seed should be drilled to a depth of 3.5-5cm.

Cross drilling the forage rye usually helps to promote a thicker stand and direct drilling is an option if required. Direct drilling will

eliminate soil disturbance and will give a much firmer footing for the stock in the spring.

Forage rye is a catch crop so it can slot in between a cereal crop and then be followed by a crop of forage peas, fodder beet or kale.

Drilling date can vary with the locality, but in general aim to get the seed in the ground between mid-August and late September. This ensures that the crop gets well established before the winter sets in.

Some farmers mix Italian ryegrass with their forage rye so that the spring grazing programme can be prolonged. If you adopt this option use a sowing rate of 17kg/125kg/ha respectively. Some farmers have also direct drilled forage rye into a permanent pasture. However, if you use forage rye it will enable you to squeeze extra production out of your land.

Weeds, Diseases & Pest Control:

No herbicides should be needed as the crop suffers from few pests and diseases.

Any leatherjackets, wireworms or slugs which are seen should of course be controlled using the appropriate chemical.

Feeding:

Forage rye should not be allowed to enter the winter in a very proud state. In a mild autumn, crops sown in good time can be lightly grazed in late November or early December. Providing the grazing is not too severe, this operation (carried out when the crop has around 10/12 cm of growth) will encourage tillering, increase winter hardiness and boost the amount of green matter produced in the spring.

If you are grazing dairy cows on forage rye, then the crop length needs to be about 30-35cm. For sheep the crop can be a little shorter.

If you graze early enough then you may well get a second flush of growth before you need to plough out the field for the following crop. Controlled grazing, using an electric fence is very important to avoid excessive wastage.

Another option which some farmers exploit, is to zero graze the crop. This avoids having to take the stock onto the field – which in wet weather can help reduce poaching.

To help you plan your feed requirements you should work on the basis that one hectare has the potential to provide two weeks of grazing for 25 cows or 50 lactating ewes.

Sowing Information

Sowing period

September to October

Direct drill

185kg/ha [75kg/acre] pure sown or
125kg/ha [50kg/acre]
Forage Rye & 17kg/ha [7kg/acre]
Italian Ryegrass

Yield & Feed Quality

Average dry matter yield

5-6 tonnes/ha

Average fresh yields

20-24 tonnes/ha

Dry matter

25%

Crude protein

11-12%

Digestibility value

67%

Metabolisable energy

10M/kg DM

Growing Costs

£339 per hectare

Fresh weight

£12 per tonne

Dry matter

£78 per tonne

EXPERT ADVICE

Some crops can be grazed lightly pre-Christmas to provide extra forage.

Variety Profiles

Humbolt

Humbolt was purpose bred to produce an 'early bite'; in fact its spring growth can be up to three weeks earlier than Italian ryegrass. Humbolt's excellent tillering capacity and early vegetative growth ensures maximum intakes and palatability. Humbolt has excellent winter hardiness and can recover quickly after grazing or cutting.

Humbolt is UK proven and can thrive on a wide range of soil types.



• Cutting a lush crop of Humbolt forage rye which was then conserved as big bale silage

Crop Suitability

Graze in situ



Ensilage



Zero grazing



Lift and store



Dairy



Sheep



Beef



Pigs



Lucerne

Why grow lucerne?

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

Soil Type/Site Selection:

Lucerne can be grown on a wide variety of sites and soil types. The main criteria is to establish it on a site where a fine and firm seedbed can be produced. Lucerne will not, in general, tolerate a waterlogged soil, and this is commonly the cause of die-out over winter. For this reason, heavy sites tend to be avoided. Well draining, heavier soils however can provide very successful sites where good seedbeds can be best established and compaction is avoided.

Sowing Date:

Lucerne can be sown from April right through the spring and summer. Sowings in the late summer will result in heavier crops the following spring. However, the later sowings carry a greater risk of establishment failure due to the onset of cooler growing conditions in the autumn. Failure to enter the

Recommendations Soil index	Phosphate (P ₂ O ₅) kg/ha				Potash (K ₂ O) kg/ha			
	0	1	2	3	0	1	2	3
Establishment	120	80	50	30	120	80	50	0
First cut	100	80	50	30	150	120	90	30
Subsequent cuts	100	80	50	30	120	90	60	30

winter with strong plants is likely to result in excess winterkill. For this reason, crops in the Midlands and further North are better sown in the spring. Crops in the southern half of England however can be established with great benefit in the summer. The latest safe sowing date which should be considered is 1st September. Remember, sufficient soil moisture is essential for generating successful establishment, and this can be a problem with summer sowings.

pH:

Lucerne is one of the few crops which will thrive on a soil with a high pH. Adequate lime levels are essential for a successful crop and liming to pH 7 is advised. Acidity will not be tolerated.

Fertiliser:

In general, Lucerne requires no nitrogen either in the establishment phase or subsequently afterwards. Lucerne is a legume and as such is able, by association with bacteria, to fix nitrogen into the soil for its own use. It will leave residual nitrogen for use by subsequent crops. However, if the Lucerne is following a particularly nitrogen hungry rotation (e.g. cereals) a small quantity of nitrogen may be beneficial in the seedbed (50kg/ha maximum). If slurry is applied before drilling, this usually provides sufficient nitrogen in organic form. Excess nitrogen application will inhibit root nodulation and reduce the Lucerne's ability to fix nitrogen into the soil.

A strongly growing crop of Lucerne

Sowing Information

Sowing period

April to late July

Direct drill

20-30kg/ha (8-12kg/acre)

Broadcast

35 kg/ha (14kg/acre)

Yield & Feed Quality

Average dry matter yield

8-10 tonnes/ha

Average fresh yields

40-50 tonnes/ha

Dry matter

25-30%

Crude protein

18-20%

Digestibility value

62-64%

Metabolisable energy

10.5 MJ/kg DM

Growing Costs

£1460 per hectare

Fresh weight £37 per tonne

Dry matter £140 per tonne

EXPERT ADVICE

Lucerne is best harvested at the set of the flowerbed

will remove approximately 150kg/ha Phosphate and Potash annually. This should be replaced to maintain soil levels by smaller applications after each cut, or a single application after the last cut of summer. Apply fertiliser immediately after cutting to avoid leaf scorch on the new leaf growth.

All fertiliser should be applied according to requirements based upon soil analysis prior to sowing. Trace elements may be deficient on light soils and attention should be paid to the availability of Magnesium, Sulphur, Molybdenum, and Boron. These can be particularly important at the establishment phase.

Inoculation:

Treatment of Lucerne seed with Rhizobium bacteria is essential prior to sowing, in order to ensure successful root nodulation and efficient nitrogen fixing. Inoculation is a simple process involving mixing the seed with a powder and water.

The mixture is allowed to quickly dry before drilling.

Sowing Rate/Depth:

Sowing rates vary from 8-15kg per acre (20-37kg/ha). Lucerne has very tiny seed and is best drilled at no more than 1cm depth. Drill into moisture in 10cm rows. Sowing too deep will result in failed emergence. Fine, firm seedbeds are essential and rolling after drilling is advised. Broadcasting seed is an option and has the advantage of ensuring seed is not placed too deep.

Weed Control:

Lucerne is a very uncompetitive crop in its early growth stages. It will not tolerate weeds and control is essential if infestation is serious.

Summer sowings are likely to have less weed competition than sowings in spring. They also enable cheaper sterile seedbed techniques to be used.

Light infestations are likely to be



removed in the first cut and smothered by the re-growth. This however, is very dependent upon successful initial population establishment.

Approved chemicals for use on Lucerne are limited and advice should be sought upon those with clearance for use.

Perennial weeds should be controlled as far in advance of the crop as possible.

Pests and Diseases:

There are very few chemicals which can be used on Lucerne to control any pests or diseases. The problem is compounded by the inability to enter and travel through the crop once it is actively growing, unless tramlines are used at establishment.

Weevils - may attack at an early stage in establishment biting off young shoots. (Pyrethroids may be used).

Aphids - may infest later but no chemical approval exists for control at present.

Slugs - a potential problem at initial establishment. Slugs should be monitored and slug pellets used where required.

Eelworm - (*Ditylenchus dipsaci*) can cause persistency problems and where infestations in the soil are known to occur, varietal resistance is the only practical solution. Eelworm is more prevalent in heavier soils.

Always use fumigated seed to avoid importing Eelworm into your soil and crop.

Verticillium wilt - There are no chemicals available for the control of this disease. Varietal resistance is the only option.

Rotation:

For crop cleanliness purposes, a rotation of 5 years is advised between Lucerne crops. Crops may be down for 3-5 years, depending upon the durability of the stand.

Harvest:

The first cut will usually be in late April/May, depending upon season and location. The cutting cycle will be approximately 40 days and cuts should be taken at the set of the flower buds. Delaying cutting will result in lower quality, more fibrous material being harvested and a lower feed value. Cutting pre-flowering will yield 20-22% protein. This reduces to 17-18% when cut, once flowers have emerged.

Lucerne has low soluble carbohydrate levels and when

Variety Profiles



Marshall

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

Marshall has thinner stems and is therefore very palatable.



Alicia

Alicia is a high yielding variety. Ideal for silage or haylage production.

Very high protein content (17%) and good ground cover make this variety an ideal choice.

ensiled, this can lead to fermentation problems. A silage additive is therefore recommended to assist conservation preservation. Because of these difficulties, ensiling as big bale often proves easier and more successful. If clamp silage is to be made, then a good wilt is even more essential, raising the soluble carbohydrate concentration in the remaining sap.

Cut at about an 8cm stubble length and the Lucerne should be swathed and wilted. Excess drying will result in loss of leaves and nothing but stalk will remain. Insufficient wilting may lead to effluent problems. A compromise may be reached by wilting until the material on the top of the swath is dry, whilst that in the middle is still green and moist. Bailing at this stage will conserve the valuable leaf material but minimise effluent.

Lucerne is not entirely suitable for grazing, as treading causes excessive wastage and damages the plants too severely. Excess grazed intake can also cause bloat.

Light grazing is less likely to cause damage if practiced once the crop has stopped growing into the autumn.

Care should be exercised to avoid damaging the plant crown growing points, as this can induce Lucerne crown rot. This disease can also be a problem if excess slurry is applied.

Crop Suitability

Graze in situ ☒

Ensilage ☒

Zero grazing ☐

Lift and store ☐

Dairy ☒

Sheep ☒

Beef ☒

Pigs ☐

Chicory

Why grow chicory?

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

Chicory is a perennial forage herb which is capable of producing very high quality feed in early spring to late autumn. The plant needs approximately 14 – 16 weeks of growth before full production is achieved. The plant will produce leafy top growth with a deep tap root that can stand drought and will even tolerate low pH soils of 5.0.

Soil Type/Site Selection:

Chicory prefers well drained soils with moderate to high fertility. pH should ideally be above 5.5, however some crops have been grown successfully below 5.

Seedbed and Sowing Methods:

Chicory is best sown in the spring, into a firm, fine seedbed. The seed can be broadcast or drilled at 5kg/ha (2kg/acre). Sowing depth is approx. 1cm. Chicory can also be added to grass & clover seed

mixtures at 1 kilo per acre. Slug pellets can be used to aid establishment.

Fertiliser:

Like any crop, Chicory will benefit from some fertiliser applied into the seedbed. If you have done a recent soil test, check the indices.

As a guideline, apply phosphate at 20kg/ha potash and nitrogen at 30kg/ha.

Feeding:

Chicory is dormant during the winter months but will grow quickly from April onwards. The crop is ready for grazing when it reaches a height of 8".

The crop is best rotationally grazed every 5-6 weeks to prevent the plants from flowering. Try not to graze after flowering or after wet conditions when the crowns are more susceptible to damage.

EXPERT ADVICE

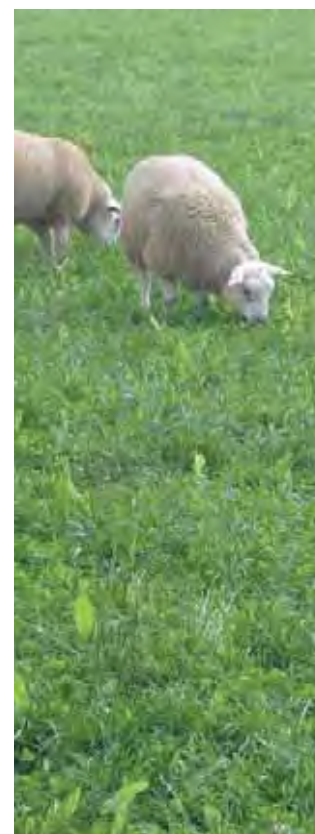
Graze the crop rotationally every 5-6 weeks to prevent the plants from flowering

Variety Profiles



Grasslands Choice

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





Catch Crop Mixtures

Catch crop mixtures are becoming increasingly popular as a way of providing a balanced feed that can be grazed in situ. Most of these concepts involve the blending of catch crop species such as stubble turnips, forage rape and kale.

The high protein contents of both forage rape and kale complement the high energy stubble turnip bulbs and provide an excellent, well balanced autumn or winter feed.

EXPERT ADVICE

Sowing combinations of stubble turnip and forage rape has two benefits; it improves the protein content of the crop and forage rape also improves winter hardiness and extends the utilisation period.

Preferred Mixtures

Lamb Tonic

1kg White Clover
0.5kg Plantain Tonic
2.5kg Chicory
4kg per acre

Lamb Tonic can be sown in strips or added to grass which will provide a nutritious leafy food with high mineral content.

This mixture is perennial and should last 3-4 years.

Autumn Keep

1kg Forage Rape Hobson
0.5kg Stubble Turnip Samson
0.75kg Stubble Turnip Rondo
0.25kg Kale
2.5kg per acre

Very fast establishment for autumn use. Autumn Keep will produce a quality crop with good disease resistance.

Meat Maker

1.3kg Forage Rape Hobson
0.5kg Stubble Turnip Rondo
0.2kg Kale
2kg per acre

An excellent blend designed to produce autumn or winter keep from minimal effort. The higher inclusion of forage rape helps to protect the turnips if crops are to be used later.

Late Lamb

1kg Kale Rape Hybrid Interval
1kg Stubble Turnip Rondo
5kg Italian Ryegrass
7kg per acre

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



Other Useful Forages

Variety Profiles



Massif

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

Bred by  The James Hutton Institute



Imperial Green Globe

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



Mustard

Often grazed in October/ November from sowings made in cereal stubbles in July and August. Low feeding quality but economical to grow and feed.



Vetch

A leguminous crop that can be established in either spring or autumn. Best sown with cereals to help keep the crop upright. Vetches can add a useful amount of protein to a ruminants diet.



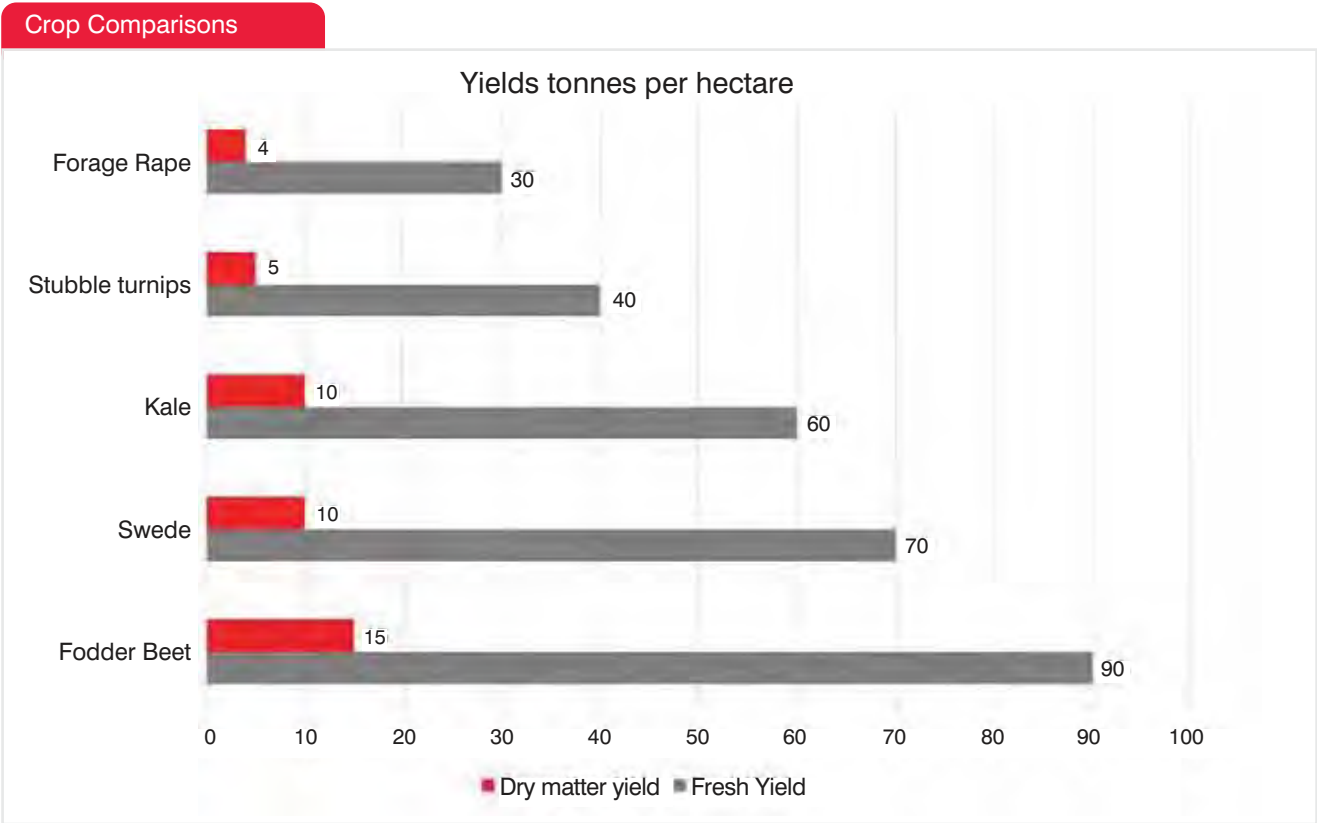
Sainfoin

A drought resistant crop that requires little or no inputs. Not known for bloating, Sainfoin is high in protein.



Crop Comparisons

The chart below shows the fresh dry matter yield you can expect per hectare for each of the forage crop species. Making a comparison is difficult as forage rape and stubble turnips produce a useful yield in 12 weeks, whilst kale and swede yields are higher, but these are achieved over a longer growing period.





Feeding Guidelines

Many of the forages that appear in this booklet are grazed and utilised in the field (grazed in situ). To get the best from your crops, a few simple steps can make all the difference in maximising animal performance and profitability.

The following are some of the key management tools you may consider:

- Recommended inclusion rates should be between 35 - 50% of total dry matter intake
- Access to straw or hay as well as the forage brassica is important
- Ensure a good water supply
- Occasionally over-feeding can cause Goitre and blood anaemia but access to straw and hay can help reduce risk of this problem

Strip Grazing

- Using an electric fence will help reduce wastage in the field
- Long narrow strips are best to allow full animal access
- Introduce the animals to the crop slowly
- Move the electric fence daily if possible
- Providing a dry run back will keep the animals clean

The chart below will allow you to calculate how many grazing days each forage crop will provide:

How much should I grow?

SPECIES	AVERAGE FRESH YIELD	LESS WASTAGE FACTOR	UTILISABLE YIELD	GRAZING DAYS PER HECTARE		
	Tonnes per hectare	Grazing Wastage%		SHEEP RATION		DAIRY OR BEEF RATION
			Tonnes per hectare	7.5kg per day	10kg per day	22kg/2-3 hour grazing period
KALE	60	25	45	6000	4500	2045
STUBBLE TURNIP	40	25	30	4000	3000	1364
FORAGE RAPE	35	25	26.25	3500	2625	1193
SWEDE	80	25	60	8000	6000	2727
FORAGE PEAS	35	20	28	3733	2800	1273
FORAGE RYE	20	15	17	2266	1700	772



Fertiliser Guidelines for Forage Crops

	0	1	2	SNS Index 3	4	5	6
Crop/Species	Kilos per hectare						
Swede							
Nitrogen (N)	100	80	60	40	0-40	0	0
Phosphate (P ₂ O ₅)	105	75	45	0	0	0	0
Potash (K ₂ O)	215	185	155 (2-) 125 (2+)	80	0	0	0
Forage Rape and Stubble Turnips							
Nitrogen (N)	100	90	80	60	40	0-40	0
Phosphate (P ₂ O ₅)	85	55	25	0	0	0	0
Potash (K ₂ O)	110	80	50 (2-) 20 (2+)	0	0	0	0
Fodder Beet							
Nitrogen (N)	130	120	110	90	60	0-40	0
Phosphate (P ₂ O ₅)	110	80	50	0	0	0	0
Potash (K ₂ O)	170	140	110 (2-) 80 (2+)	40	0	0	0
Kale							
Nitrogen (N)	130	120	110	90	60	0-40	0
Phosphate (P ₂ O ₅)	110	80	50	0	0	0	0
Potash (K ₂ O)	260	230	200 (2-) 170 (2+)	130	0	0	0
Forage Rye							
Nitrogen (N)	80	60	40	20	0	0	0
Phosphate (P ₂ O ₅)	95	65	35	0	0	0	0
Potash (K ₂ O)	180	150	120 (2-) 90 (2+)	50	0	0	0

Extract from DEFRA fertiliser manual (RB209) version 8.



Precision Drill Recommendations

Precision Drill Recommendations

SEED GRADING	GRADE	SIZE (mm)	STANHAY BELT SIZE	SPRING BASE	CHOKE	WEBBS SELECTOR WHEEL
Fodder Beet Pelleted Mangel Pelleted	Q-U	3.5 - 4.75	15 or 16	C	A	EP
Mangel Rubbed and Graded	M-T	2.75 - 4.5	14 or 15	B	X	E
Swede	'H'	1.75 - 2.00	8	A	T	B
Turnip	'G'	1.5 - 1.75	7	A	T	A
Kale	'J'	2.0 - 2.25	8.5	A	T	C

Number of Seeds by Pack Size Supplied

SWEDE	KALE	TURNIP	FODDER BEET
Natural seed packed in kilo packs (310,000 seeds approx.)	Natural seed packed in 1 kilo packs (150,000 seeds approx.)	Natural seed packed in 1 kilo packs (430,000 seeds approx.)	Genetic monogerm 1 acre (50,000 seeds)
Graded seed packed in 500 gm packs (150,000 seeds approx.)	Graded seed packed in 500 gm packs (75,000 seeds approx.)	Graded seed packed in 500gm packs (220,000 seeds approx.)	Grade Q-U (3.5 - 4.75mm)
Grade 'H' (1.75 - 2mm) (Approx 300 - 370 seeds per gm)	Grade 'J' (2 - 2.25mm) Approx 150 - 175 seeds per gm)	Grade 'G' (1.50 - 1.75mm) (Approx 420 - 510 seeds per gm)	

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All varieties and products listed in this catalogue are offered strictly subject to safe harvest, final certification and remaining unsold on receipt of orders. All other terms & conditions of sale will be advised by your individual LG Forage Crops distributor or stockist.



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