The feeding of livestock efficiently and economically has never been so important. With production costs increasing, forage crops that you can grow on your own farm can bring many benefits. Although grass must be the priority, forage crops do have a key role to play, especially in drought years, when grass growth decreases significantly.

There are many crop options to consider; from high yielding harvested crops such as fodder beet, or grazed crops like stubble turnips. Whichever option you choose will enable you to help reduce feeding costs, extend the grazing seasons and provide an excellent break crop and entry back to a grass reseed.

Whether you’re a lamb, beef or dairy producer, planning a forage crop programme is important, and identifying your feed demand requirements by month will help you decide which crop species is most suitable for your farming enterprise.

**WHY GROW FORAGE CROPS?**

- Improved profitability
- Reduced reliance on purchased feed
- Full traceability
- Flexible cropping options
- An excellent break crop & entry back to grass
- Extended grazing season
- Outwintering options
- Low inputs
Our plant breeding programme is currently developing new varieties of forage rape, fodder beet, kale and swedes specifically adapted for the UK climate and markets. This is a long term commitment and will ensure that new varieties and the benefits associated with them, are available to farmers in the future.

We believe that testing and producing meaningful UK trial data is vitally important. Variety selection can play an important role in maximising forage production. We can guarantee that products bred and marketed by LG, have been through a vigorous testing regime before commercialisation.

Some of the forage crop seed is produced in the UK and monitored by our own contracts staff. Seed crops are grown to certification standards and seed is cleaned, processed and tested for germination and purity by our licensed seed testing team.

Seed is cleaned, treated, packed and distributed to farms from our warehouse at Witham St Hughs, near Lincoln.
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 Feed Wheat
High Energy     Fodder Beet                 Forage Maize	Forage Rape
Profitable Sheep Swede                        Lucerne (sow no later than July)
Protein Boost   Arable Silage	                     Spring Sown Grass Ley
New Grass       Worn Out Grass Ley (after 1st cut silage) Kale
Milk Yield      Maize                         Forage Rye	Fodder Beet
Outwintering    Fodder Beet                 Kale
Grass Revival   Low Yielding Ley            Stitch In Grass/Clover
Triple Cereal   Spring Barley               Forage Rye	Forage Maize

Using the chart opposite, 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.

If you have any questions, our seed specialists are here to help, see page 28 for details.
The chart below summarises essential information about 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.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>SOWING TIME</th>
<th>SOWING RATE per hectare</th>
<th>GROWING COSTS per hectare*</th>
<th>FRESH YIELD tonnes per hectare</th>
<th>DRY MATTER tonnes per hectare</th>
<th>CRUDE PROTEIN %</th>
<th>ME MJ/KG DM</th>
<th>ME MJ per hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fodder Beet</td>
<td>March - April</td>
<td>100,000 seeds</td>
<td>£1,452</td>
<td>80 - 100</td>
<td>15 - 18</td>
<td>12 - 13</td>
<td>12.5 - 13</td>
<td>162,500 - 202,500</td>
</tr>
<tr>
<td>Kale</td>
<td>April - Early July</td>
<td>4 - 5 kg</td>
<td>£496</td>
<td>60 - 70</td>
<td>8 - 10</td>
<td>16 - 17</td>
<td>10 - 11</td>
<td>80,000 - 110,000</td>
</tr>
<tr>
<td>Stubble Turnip</td>
<td>May - August</td>
<td>4 - 5 kg</td>
<td>£305</td>
<td>40 - 50</td>
<td>4 - 5.5</td>
<td>17 - 18</td>
<td>11</td>
<td>38,500 - 44,000</td>
</tr>
<tr>
<td>Forage Rape</td>
<td>May - August</td>
<td>6 - 7 kg</td>
<td>£408</td>
<td>24 - 35</td>
<td>3.5 - 4</td>
<td>19 - 20</td>
<td>10 - 11</td>
<td>35,000 - 49,500</td>
</tr>
<tr>
<td>Swedes</td>
<td>April - June</td>
<td>3 - 5 kg Direct 350g - 850g Precision</td>
<td>£403</td>
<td>70 - 90</td>
<td>7 - 10</td>
<td>10 - 11</td>
<td>12.8 - 13.1</td>
<td>89,600 - 131,000</td>
</tr>
<tr>
<td>Lucerne▲</td>
<td>April - Mid August</td>
<td>20 - 30 kg</td>
<td>£1,459</td>
<td>35 - 40</td>
<td>10 - 12</td>
<td>17 - 22</td>
<td>10</td>
<td>100,000 - 120,000</td>
</tr>
<tr>
<td>Forage Peas</td>
<td>March - Early June</td>
<td>125 - 150 kg</td>
<td>£708</td>
<td>20 - 30</td>
<td>4 - 6</td>
<td>16 - 20</td>
<td>10.5</td>
<td>42,000 - 63,000</td>
</tr>
<tr>
<td>Forage Rye</td>
<td>Sept - October</td>
<td>185 kg</td>
<td>£339</td>
<td>20 - 24</td>
<td>5 - 6</td>
<td>11 - 12</td>
<td>10</td>
<td>50,000 - 60,000</td>
</tr>
<tr>
<td>Maincrop Turnip</td>
<td>May - July</td>
<td>5 - 7.5 kg</td>
<td>£340</td>
<td>50 - 60</td>
<td>5.5 - 6</td>
<td>17 - 18</td>
<td>10 - 11</td>
<td>55,000 - 60,000</td>
</tr>
</tbody>
</table>

*Kingshay Farming Trust ‘Forage Costings Report’ 2010 ▲ 3 cuts per year
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 risks of this problem

The chart below will allow you to calculate how many grazing days each forage crop will provide.
Always speak to your vet about the risks of using brassicas and how to incorporate risk prevention techniques into the farm health plan.

PHOTO-SENSITISATION
Cause: Compounds within the brassica cause the skin to be sensitive to sunlight, which can result in skin damage. This usually occurs when crops are grazed too early when they are still growing and is more common with rape and kale.

NITRATE POISONING
Cause: Nitrates accumulating in the leaves of brassica crops, usually occurs when fast growing crops are grown in soil with high nitrate levels after rain, which has followed a dry spell. Cool, overcast conditions and high N fertiliser use will also increase the risk.

GOITRE
Cause: Brassicas, especially root crops, contain glucosinolates, which block the uptake of iodine from the diet. Brassicas are also low in iodine, which may increase the risk of iodine deficiency, affecting the thyroid gland and the hormones it produces.

KALE ANAEMIA (REDWATER)
Cause: Excess levels of amino acid compound S-methyl cysteine sulfoxide (SMCO) in the plants, can cause anaemia and appetite loss. The levels of SMCO are worse when soil phosphate levels are low and nitrogen and sulphur levels are high. SMCO levels also increase when crops are flowering.

BLOAT
Consider the risk of bloat, as brassicas can be rapidly degraded in the rumen. It is essential to feed fibre alongside the crops, and introduce non-hungry stock gradually.

FEEDING FLOWERING BRASSICAS
Cause: Some species of brassica are biennials and therefore will flower in the following spring season if they are sown in the summer or autumn period and left ungrazed. Early sown brassica can also vernalise and flower in a short period of time (10-12 weeks).

The plant is most toxic when in flower. It contains sulphur-based heterosides (thiocyanates): gluconapine and progoitrin, which when hydrolysed will yield isothiocyanates (mustard oil) and goitrin. These toxic compounds are irritant, haemolytic, goitrogenic and can cause malnutrition.

Always feed with a fibrous forage like straw or hay
• Ensure a good water supply
• Introduce stock to the crop gradually
• Produce a grass ‘run back’ area
• Strip graze using an electric fence to maximise crop use
**FODDER BEET**

**WHY GROW FODDER BEET?**

- Huge 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:**
A crop of fodder beet 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 good herbicide control is possible 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, as well as symphyllids.

**SOWING INFORMATION**
- **Sowing period**: Late March – 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**: 15-18 tonnes/ha
- **Crude protein**: 12-13% [mainly leaves]
- **Digestibility value**: 78%
- **Metabolisable energy**: 12.5-13 MJ/kg DM

**YIELD COSTS**
- **£1452 per hectare**
- **£16 per tonne**
- **£115 per tonne**

**GROWING COSTS**

**FODDER BEET EXPERT ADVICE**
Avoid lifting too early. Crops continue to grow until the end of October.

**WHY GROW FODDER BEET?**
- Huge 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

**HARVESTING:**
Although the crop continues to put on yield into the autumn, this has to be balanced against the potential problems associated with a 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, beef, sheep, pigs and deer. Crops can also be strip-grazed in outwintering systems.
**VARIETY PROFILES**

**TARINE**
A new variety which has performed outstandingly in our trials. Tarine has unique, clean, pink roots, with a slightly higher DM content % than other varieties, which enables crops to be harvested later. Tarine is one of the new generation of fodder beets, bred for maximum feed potential from every hectare. *Rhizomania* tolerance completes its outstanding package.

**BRICK**
New, high yielding variety, ideal for growers looking to produce a high quality feed with a higher DM content %. Brick is a true fodder beet and therefore exhibits cleaner roots, but will still deliver very high dry matter yields for maximum feed potential. *Rhizomania* tolerant.

**ROBBOS**
Robbos has been a consistent performer in the UK & Ireland. High dry matter yields from a medium DM content means Robbos is ideally suited for first time fodder beet growers and its clean yellow roots are easily harvested and can be fed whole or chopped.

**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.

**TRIAL RESULTS**

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>RELATIVE DM YIELD %</th>
<th>RELATIVE FRESH YIELD %</th>
<th>DM CONTENT %</th>
<th>SKIN COLOUR</th>
<th>% OF ROOT IN GROUND</th>
<th>MEAN BOLTER COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brick RT</td>
<td>117</td>
<td>103</td>
<td>23.6</td>
<td>White</td>
<td>75.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Tarine RT</td>
<td>104</td>
<td>104</td>
<td>20.8</td>
<td>Pink</td>
<td>64.4</td>
<td>0.8</td>
</tr>
<tr>
<td>Enermax</td>
<td>101</td>
<td>93</td>
<td>21.3</td>
<td>Orange</td>
<td>67.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Robbos</td>
<td>101</td>
<td>100</td>
<td>22.4</td>
<td>White</td>
<td>72.3</td>
<td>0.8</td>
</tr>
<tr>
<td>Magnum (c)</td>
<td>100</td>
<td>100</td>
<td>20.8</td>
<td>White</td>
<td>65.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Robbos</td>
<td>99</td>
<td>103</td>
<td>19.9</td>
<td>Yellow</td>
<td>60.0</td>
<td>0.8</td>
</tr>
<tr>
<td>Blaze</td>
<td>95</td>
<td>105</td>
<td>18.8</td>
<td>Red</td>
<td>57.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Kyros</td>
<td>93</td>
<td>104</td>
<td>18.5</td>
<td>Orange</td>
<td>58.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Jamron</td>
<td>93</td>
<td>108</td>
<td>18.0</td>
<td>Orange</td>
<td>57.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Summon</td>
<td>92</td>
<td>97</td>
<td>19.8</td>
<td>Yellow</td>
<td>56.7</td>
<td>0.9</td>
</tr>
<tr>
<td>Jaina</td>
<td>90</td>
<td>94</td>
<td>20.0</td>
<td>Orange</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Feldherr</td>
<td>89</td>
<td>116</td>
<td>15.9</td>
<td>Orange</td>
<td>49.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Brigadier</td>
<td>76</td>
<td>109</td>
<td>14.5</td>
<td>Orange</td>
<td>47.9</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Data Source: Limagrain UK Trials 1998 - 2018  (c) = Control, RT = Rhizomania Tolerant  * No data available  Note: not all varieties are trialled every year, not all scores taken every year.

**CROP SUITABILITY**

- Dairy
- Beef
- Sheep
- Pigs
- Graze in Situ
- Ensile
- Zero Grazing
- Lift and Store
KALE

WHY GROW KALE?
• Higher yields than rape/kale hybrids
• 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 early-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 26).

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. See page 26.

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. 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 tolerant 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 graze behind an electric fence which is best 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.
A new variety with the potential to deliver high dry matter yields ideal for dairy, beef or lamb production. Bombardier will maximise the yield potential per hectare, but this variety has been enhanced to ensure that the feed produced will be of a higher quality. Bombardier is also clubroot tolerant.

Caledonian

Caledonian is the highest yielding kale in our trials. It is clubroot tolerant, 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.

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.

Keeper

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

<table>
<thead>
<tr>
<th>Method</th>
<th>Rate</th>
<th>Seed Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct drill</td>
<td>4-5kg/ha (2kg/acre), Natural seed</td>
<td></td>
</tr>
<tr>
<td>Broadcast</td>
<td>6-7kg/ha (3kg/acre), Natural seed</td>
<td></td>
</tr>
</tbody>
</table>

### YIELD & FEED QUALITY

- **Average dry matter yield**: 4-5.5 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

### 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, discing 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.

### AUTUMN SOWINGS:

- 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 4-5kg/ha depending on soil conditions and time of drilling. Seed which is broadcast should go in at no less than 6-7kg/ha.

### FERTILISER:

An application of 80kg of nitrogen, 25kg of phosphate and 25kg 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 26) 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. It is a good idea to introduce animals to the crop gradually, allow stock about three weeks to fully adjust to stubble turnips.

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 region 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.
**SAMSON**

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 liveweight gains.

**DEILILAH**

This exciting cultivar has outperformed many existing varieties in our trials for a number of years. Delilah is ideal for finishing lambs and will produce huge, white tankard shaped bulbs. Good resistance to mildew.

**SKYFALL (Hybrid Summer Brassica)**

A new variety bred to produce a very fast, leafy and palatable forage. Ideal for strip grazing by dairy or beef cows in the summer months, Skyfall's deep roots also enable the crop to 'bounce-back' after an initial grazing, maximising output per hectare.

**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.

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**TRIAL RESULTS**

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>TYPE</th>
<th>RELATIVE DM YIELD %</th>
<th>RELATIVE FRESH YIELD %</th>
<th>RELATIVE ROOT DM YIELD %</th>
<th>RELATIVE LEAF DM YIELD %</th>
<th>MILDEW RESISTANCE 9 = BEST</th>
<th>ALTERNARIA RESISTANCE 9 = BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% = Tonnes/Ha</td>
<td>5.52</td>
<td>51.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samson Tet</td>
<td>Purple Tankard</td>
<td>103</td>
<td>108</td>
<td>119</td>
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<td>Barkant (c)</td>
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<td>Green Globe</td>
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<tr>
<td>Skyfall NEW</td>
<td>Leafy</td>
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<td>70</td>
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<td>Leafy</td>
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</tbody>
</table>

Data Source: Limagrain UK Trials 1993 - 2018 (c) = Control Tet = Tetraploid * No data available Disease scores taken: December 2017
Note: Not all varieties tested every year, not all scores taken every year

---

**CROP SUITABILITY**

- **Dairy**
  - Sheep
  - Graze in Situ
  - Zero Grazing
- **Beef**
  - Pigs
  - Ensile
  - Lift and Store
FORAGE RAPE & HYBRIDS

WHY GROW FORAGE RAPE?
- Fast growing, leafy catch crop
- High protein content
- Longer lasting than stubble turnips
- Winter hardy hybrids available
- Finishing lambs
- Flexible sowing period
- Sheep, dairy or beef production

SOWING INFORMATION

<table>
<thead>
<tr>
<th>Method</th>
<th>Seed Rate (kg/ha)</th>
<th>Seed Rate (kg/acre)</th>
<th>Seed Type</th>
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</thead>
<tbody>
<tr>
<td>Direct drill</td>
<td>6kg/ha (2.5kg/acre)</td>
<td>Natural seed</td>
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<tr>
<td>Broadcast</td>
<td>8kg/ha (4kg/acre)</td>
<td>Natural seed</td>
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YIELD & FEED QUALITY

<table>
<thead>
<tr>
<th>Yield Type</th>
<th>Yield (t/ha)</th>
<th>Protein (%)</th>
<th>Digestibility (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average dry matter yield</td>
<td>3.5-4</td>
<td>12-13</td>
<td>65</td>
</tr>
<tr>
<td>Average fresh yield</td>
<td>24-35</td>
<td>19-20</td>
<td></td>
</tr>
<tr>
<td>Metabolisable energy</td>
<td>10-11 Mj/kg DM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GROWING COSTS

<table>
<thead>
<tr>
<th>Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>£408 per hectare</td>
<td>Fresh weight £12 per tonne</td>
</tr>
<tr>
<td>£107 per tonne</td>
<td>Dry matter</td>
</tr>
</tbody>
</table>

FERTILISER:
Forage rape will benefit from applications of farmyard manure 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. A high application of N can be detrimental to stock intakes (see page 26).

FEEDING:
Forage rape crops can be ready to utilise between 12-14 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.

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 8kg/ha.

WHY GROW FORAGE RAPE?
- Fast growing, leafy catch crop
- High protein content
- Longer lasting than stubble turnips
- Winter hardy hybrids available

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.

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 12-14 weeks of sowing.

**UNICORN** (Rape/Kale Hybrid)
A brand-new variety which can provide a highly palatable forage for autumn and winter grazing. Unicorn has some re-growth potential providing the stems are not fully grazed, and with this additional growth, dry matter yields per hectare can be boosted.

**RAMPART**
A new generation of forage rape, Rampart has been bred with feed quality enhancements and with its high yield potential and winter hardiness, it will enable growers to find extra flexibility when feeding the crops. Rampart is suitable for both dairy and lamb production and is ready to feed 12-14 weeks after sowing.

**HOBOSON**
Full proven on livestock farms throughout the UK. Ideal for finishing lambs with good winter-hardiness and disease resistance.

---

**VARIETY SELECTION**

**INTERVAL**
- **Forage Rape**
- **Sheep & Lambs**
  - Autumn and winter use

**HOBOSON**
- **Dairy & Beef**
  - Summer and autumn use

**RAMPART**
- **Unicorn**
  - NEW - Rape/kale hybrid bred for feeding quality
  - Bred for feeding quality and grazing flexibility

---

**TRIAL RESULTS**

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>RELATIVE DM YIELD %</th>
<th>RELATIVE FRESH YIELD %</th>
<th>DM CONTENT %</th>
<th>MILDEW RESISTANCE 9 = BEST</th>
<th>ALTERNARIA RESISTANCE 9 = BEST</th>
<th>WINTER HARDINESS 9 = BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% = Tonnes/ha</td>
<td>4.0</td>
<td>30.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interval (Hybrid)</td>
<td>117</td>
<td>125</td>
<td>12.1</td>
<td>9</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Unicorn (Hybrid) NEW</td>
<td>111</td>
<td>116</td>
<td>12.4</td>
<td>8</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Swift (Hybrid)</td>
<td>111</td>
<td>115</td>
<td>12.5</td>
<td>8</td>
<td>8</td>
<td>2</td>
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<tr>
<td>Hobson</td>
<td>107</td>
<td>102</td>
<td>13.7</td>
<td>8</td>
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<td>5</td>
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<tr>
<td>Gorilla</td>
<td>104</td>
<td>96</td>
<td>14.1</td>
<td>6</td>
<td>7</td>
<td>*</td>
</tr>
<tr>
<td>Rampart</td>
<td>102</td>
<td>106</td>
<td>12.5</td>
<td>8</td>
<td>8</td>
<td>*</td>
</tr>
<tr>
<td>Emerald (c)</td>
<td>100</td>
<td>100</td>
<td>13.0</td>
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<td>4</td>
</tr>
<tr>
<td>Siego</td>
<td>99</td>
<td>97</td>
<td>13.2</td>
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<td>*</td>
<td>4</td>
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<tr>
<td>Redstart (hybrid)</td>
<td>93</td>
<td>93</td>
<td>13.0</td>
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<td>4</td>
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<tr>
<td>Winfred</td>
<td>93</td>
<td>91</td>
<td>13.0</td>
<td>*</td>
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<td>5</td>
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<tr>
<td>Avon</td>
<td>92</td>
<td>97</td>
<td>12.4</td>
<td>7</td>
<td>8</td>
<td>*</td>
</tr>
</tbody>
</table>

Data Source: Limagrain UK Trials 1993 - 2018 (c) = Control Winter Hardiness Scored January 2011 * No data available
Note: Not all varieties tested every year, not all scores taken every year

---

**CROP SUITABILITY**

- **Dairy**
- **Sheep**
- **Beef**
- **Pigs**
- **Graze in Situ**
- **Ensilage**
- **Zero Grazing**
- **Lift and Store**
**Sowing period**
April-June

**Precision drill**
350g-850g/ha
(150g-350g/acre)
Grade H

**Direct drill**
3kg/ha (1kg/acre),
Natural seed

**Broadcast**
5kg/ha (2kg/acre),
Natural seed

**SOWING INFORMATION**

- **Average dry matter yield**
  7-10 tonnes/ha

- **Average fresh yield**
  70-90 tonnes/ha

**YIELD & FEED QUALITY**

- **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

**WHY GROW SWEDE?**

- 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 & SOWING 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 in April to 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 26).

**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. Try not to store any damaged roots as this will encourage fungal diseases.

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

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

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**FEEDS, 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 is controlled, as is the internal damage from turnip root fly.

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Attacks of mildew on the leaves will reduce yield and may affect the crops palatability during in situ grazing.
**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 tolerance to both clubroot and powdery mildew.

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

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

**Brora**
Brora is a bright, purple-skinned variety. It can be grazed early in the autumn or used for the pre-pack 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.

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**TRIAL RESULTS**

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>RELATIVE DM YIELD %</th>
<th>RELATIVE FRESH YIELD %</th>
<th>DM CONTENT %</th>
<th>MILDEW RESISTANCE 9 = BEST</th>
<th>ROOT SHAPE 9 = BEST</th>
<th>NECK LENGTH HIGH SCORE = LONGER NECK</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% = Tonnes/Ha</td>
<td>9.78</td>
<td>89.6</td>
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<td>Lomond</td>
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<td>109</td>
<td>11.3</td>
<td>9</td>
<td>7</td>
<td>1.4</td>
</tr>
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<td>Ruby</td>
<td>107</td>
<td>102</td>
<td>11.7</td>
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<td>2.0</td>
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<td>1.6</td>
</tr>
<tr>
<td>Ruta Otoffe (c)</td>
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<td>100</td>
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<td>1.7</td>
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<td>97</td>
<td>11.0</td>
<td>5</td>
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<td>1.5</td>
</tr>
</tbody>
</table>

Data Source: Limagrain and James Hutton Institute Trials 1990 - 2010  
(c) = Control  
Note: Not all varieties tested every year, not all scores taken every year

**CROP SUITABILITY**

- **Dairy**
- **Sheep**
- **Beef**
- **Pigs**
- **Graze in Situ**
- **Ensilage**
- **Zero Grazing**
- **Lift and Store**
FORAGE PEAS & ARABLE SILAGE

WHY GROW FORAGE PEAS?

- Very high protein content (16-20%)
- Easy to harvest using forage machinery
- Suitable for undersowing with new grass leys
- Impressive field performance
- Great for 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 soils should 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, therefore 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 good fermentation in the clamp or the bale.

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 establishment time.

YIELD & FEED QUALITY

| Average dry matter yield 4-6 tonnes/ha | Dry matter 20-25% | Metabolisable energy 10.5 MJ/kg DM |
| Average fresh yield 20-30 tonnes/ha | Crude protein 16-20% | Digestibility value 62-64% |

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.

WHY GROW FORAGE PEAS?

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 20-30 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.

SOWING INFORMATION

Sowing period: March to early-June
Direct drill: 125kg/ha (50kg/acre)
Broadcast: 150kg/ha (60kg/acre)
**VARIETY PROFILE**

**Magnus**

Magnus is a semi-leafless forage pea 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.

**ARABLE SILAGE MIXTURE**

An arable silage mixture contains 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 of the ration. Arable silage mixtures can be undersown with a new grass ley to further maximise the use of your land.

**PROFILE:**

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

Contains: 60% Magnus pea & 40% spring barley

**Sow at:**

125 - 150 kilos per hectare - undersown with grass

175 - 200 kilos per hectare - for best results

### TRIAL RESULTS

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>RELATIVE DM YIELD %</th>
<th>RELATIVE FRESH YIELD %</th>
<th>DM CONTENT %</th>
<th>CRUDE PROTEIN CONTENT %</th>
<th>LEAF TYPE</th>
<th>FLOWER COLOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% = Tonnes/ha</td>
<td>5.12</td>
<td>22.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Magnus</td>
<td>100</td>
<td>100</td>
<td>23.1</td>
<td>15.1</td>
<td>Semi Leafless</td>
<td>Coloured</td>
</tr>
<tr>
<td>Tiberius</td>
<td>92</td>
<td>92</td>
<td>23.0</td>
<td>13.8</td>
<td>Semi Leafless</td>
<td>White</td>
</tr>
<tr>
<td>Mantara</td>
<td>89</td>
<td>88</td>
<td>23.4</td>
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### ARABLE SILAGE MIXTURE

| PROSIDE          | 124                 | 87                      | 32.9         | 12.0                     |                   |               |

Data Source: Limagrain UK Trials 2016    Harvested as Silage

### CROP SUITABILITY

- Dairy
- Beef
- Sheep
- Pigs
- Graze in Situ
- Ensile
- Zero Grazing
- Lift and Store
**FORAGE RYE**

**WHY GROW FORAGE RYE?**
- Early spring turnout (reducing overwintering costs)
- 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

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**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.

**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 be controlled using the appropriate chemical.

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**FORAGE RYE**

**SOWING INFORMATION**
- Sowing period: September to October
- Direct drill: 185kg/ha (75kg/acre) pure sown or 125kg/ha (50kg/acre)
- Forage Rye & Italian Ryegrass: 17kg/ha (7kg/acre)

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**YIELD & FEED QUALITY**
- Average dry matter yield: 5-6 tonnes/ha
- Average fresh yield: 20-24 tonnes/ha
- Dry matter: 25%
- Crude protein: 11-12%
- Digestibility value: 67%
- Metabolisable energy: 10 MJ/kg DM

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**GROWING COSTS**
- £339 per hectare
- Fresh weight: £12 per tonne
- Dry matter: £78 per tonne

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**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 height 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.
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.

**VARIETY PROFILE**

**HUMBOLT**

**USING FORAGE RYE TO IMPROVE YOUR SOIL**

**ROTATION:**
Your soil will start to benefit from growing a cover crop straight away. Many crops such as Humbolt Forage Rye can produce huge amounts of organic matter that will enrich your soil. Humbolt is best sown in September or early-October to ensure that the crop has the time to grow to its maximum potential.

**GREENING – ECOLOGICAL FOCUS AREAS (EFA):**
Farmers wishing to meet their greening obligations can choose to grow a cover crop under EFA rules. You can establish a seeds mixture such as Lift N Fix, which contains Humbolt and Vetch, to meet the requirements and be able to utilise the crop after the EFA period to boost your forage production.

**CROP SUITABILITY**

- Dairy
- Sheep
- Graze in Situ
- Beef
- Pigs
- Ensile
- Zero Grazing
- Lift and Store
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 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. The latest safe sowing date which should be considered is mid-August. 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 lucerne’s ability to fix nitrogen into the soil.

A strongly growing crop of lucerne 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. Some varieties are now supplied pre-inoculated.

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

Crops in the southern half of England however, can be established with great benefit in the summer.

LUCERNE
EXPERT ADVICE
Lucerne is best cut pre-flowering

SOWING INFORMATION
- Sowing period: April to mid-August
- Direct drill: 20-30kg/ha (8-12kg/acre)
- Broadcast: 25-30kg/ha (10-12kg/acre)

YIELD & FEED QUALITY
- Average dry matter yield: 10-12 tonnes/ha
- Dry matter: 25-30%
- Average fresh yield: 35-40 tonnes/ha
- Crude protein: 17-22%
- Digestibility value: 62-64%
- Metabolisable energy: 10 - 10.5 MJ/kg DM

GROWING COSTS
- £1459 per hectare
- Fresh weight: £37 per tonne
- Dry matter: £140 per tonne
SOWING RATE/DEPTH:
Sowing rates vary from 8-12kg per acre (20-30kg/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 cost-effective, 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.

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 five 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 ensiled, this can lead to fermentation problems. A silage additive is therefore recommended to assist conservation preservation. Because of these difficulties, ensiling as a 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, 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 waiting until the material on the top of the swath is dry, whilst the middle is still green and moist.

Baling 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 taken 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

- Dairy
- Sheep
- Pigs
- Graze in Situ
- Zero Grazing
- Lift and Store

VARIETY PROFILES

MEZZO
The top-rated variety in France with a dormancy rating of 3.6 making it worth considering for more northerly areas of the UK & Ireland, previously considered unsuitable for growing Lucerne.

Exceptionally fast growth rate and outstandingly high yields of protein rich forage. High resistance to all the main diseases and nematodes.

MARSHAL
This variety can produce very high dry matter yields. It is well adapted to UK conditions and can be harvested for either silage or hay. Marshal has thinner stems and is therefore very palatable.
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 approximately 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 at 30kg/ha 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 inches.

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.

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.

GRASSLANDS CHOICE

Grasslands 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 to help increase the copper and selenium content.
WHAT IS PLANTAIN? (PLANTAGO)
Plantain is a ribbed, leafy perennial herb with a fibrous root system. It can produce a forage crop that can be fed to both cows and sheep. The forage produced is extremely palatable and provides an excellent source of calcium, sodium, copper and selenium. The growth pattern of Tuatara plantain shows that it can be particularly useful for summer and autumn grazing. Plantain is more persistent than chicory and can remain productive for 2-3 years. It can be grown on its own as a pure stand or mixed with a grass and clover ley. Plant numbers will decline over time depending on weed control, fertiliser applications and grazing management.

ESTABLISHING THE CROP
Plantain can be established on a range of soil types, however it will persist longer if grown on free-draining soils. Avoid fields that are prone to waterlogging. A firm, fine seedbed is required and should be as weed-free as possible. Weed control is best carried out before sowing as post-emergence control is limited. Plantain likes to be sown into warm soils (10-12°C if possible) the seed is small, so sowing depth should be no greater than 10mm in depth. If you are sowing Plantain as a straight stand, a sowing rate of 8-10kg per hectare is recommended. Drilling the seed is best, but broadcasting the seed and then rolling can also be successful. You can also incorporate plantain into grass and clover ley mixtures at a rate of 2-4kg per hectare depending on the content you require. Spring sowing is preferred but the latest sowing date is July. You can treat fertiliser applications as you do with grass and clover leys. 70kg of N per hectare can improve establishment.

GRAZING
Plantain should not be grazed until the plant has six fully grown leaves and the root system is fully developed. Once the plant is at this stage it can be rotationally grazed and will have a faster re-growth potential. In New Zealand, plantain is used to extend grazing periods, improve the supply of trace elements and improve forage quality, especially in the summer months.

WHY GROW PLANTAIN?
- Very palatable
- Excellent source of calcium, sodium, copper & selenium
- Drought tolerant
- Positive impact on animal performance

VARIETY PROFILE
TUATARA
Tuatara has a deep, coarse rooting system, giving it a degree of drought tolerance and is able to be persistent in a wide range of soil types. It is also highly palatable to stock. Tuatara has shown, in our UK trials, to have exceptional late spring growth and faster recovery after grazing.

Plantain can be mixed with grass seed
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 AND SOWING METHODS:
If maincrop turnips are to be sown after grass, a firm, fine seedbed will be required and traditional, plough-based cultivations will be fine. If maincrop turnips are drilled following an arable crop, for example, then tined cultivations, discing or rotovation can often replace the plough. In all cases it is vital that soil moisture is not lost.

Turnips also fit in well when sown in mid-June after an early hay/silage cut for autumn feeding.

Summer sowings in the northern half of the country and on all uplands should be completed by the end of July. In the south, turnips should be sown by early August.

FERTILISER:
An application of 80kg of nitrogen, 25kg of phosphate and 25kg 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 26) 3-4 weeks after sowing can boost crop growth.

FEEDING:
The maincrop 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 turnips.

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.
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.

### PREFERRED MIXTURES

**LAMB TONIC**

- 1kg White Clover
- 2.5kg Chicory

Sow at 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 Rampart
- 0.5kg Stubble Turnip Samson
- 0.75kg Stubble Turnip Rondo
- 0.25kg Kale

Sow at 2.5kg per acre

Very fast establishment for autumn use. Autumn Keep will produce a quality crop with good disease resistance. This mixture is perennial and should last 3-4 years.

**MEAT MAKER**

- 1.3kg Forage Rape Rampart
- 0.5kg Stubble Turnip Rondo
- 0.2kg Kale

Sow at 2kg per acre

An excellent blend designed to produce autumn or winter keep with 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

Sow at 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.
# Fertiliser Guidelines for Forage Crops

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Extract from DEFRA Fertiliser Manual (RB209)
### Precision Drill Recommendations

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<td>C</td>
<td>A</td>
<td>EP</td>
</tr>
<tr>
<td>Swede</td>
<td>H</td>
<td>1.75 - 2.00</td>
<td>8</td>
<td>A</td>
<td>T</td>
<td>B</td>
</tr>
<tr>
<td>Turnip</td>
<td>G</td>
<td>1.50 - 1.75</td>
<td>7</td>
<td>A</td>
<td>T</td>
<td>A</td>
</tr>
<tr>
<td>Kale</td>
<td>J</td>
<td>2.00 - 2.25</td>
<td>8.5</td>
<td>A</td>
<td>T</td>
<td>C</td>
</tr>
</tbody>
</table>

### Approximate Number of Seeds by Pack Size Supplied

<table>
<thead>
<tr>
<th>SWEDE</th>
<th>KALE</th>
<th>TURNIP</th>
<th>FODDER BEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural seed packed in 1 kilo packs (310,000 seeds approx.)</td>
<td>Natural seed packed in 1 kilo packs (150,000 seeds approx.)</td>
<td>Natural seed packed in 1 kilo packs (450,000 seeds approx.)</td>
<td>Genetic monogerm 1 acre (50,000 seeds)</td>
</tr>
<tr>
<td>Graded seed packed in 500g packs (150,000 seeds approx.)</td>
<td>Graded seed packed in 500g packs (75,000 seeds approx.)</td>
<td>Graded seed packed in 500g packs (220,000 seeds approx.)</td>
<td>Grade Q-U (3.5 - 4.75mm)</td>
</tr>
</tbody>
</table>

- **Grade Q-U (1.75 - 2mm)**
  - Approx 300 - 370 seeds per gram
- **Grade H (1.75 - 2mm)**
  - Approx 300 - 370 seeds per gram
- **Grade J (2 - 2.25mm)**
  - Approx 150 - 175 seeds per gram
- **Grade G (1.50 - 1.75mm)**
  - Approx 420 - 510 seeds per gram
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TERMS AND CONDITIONS OF SALE

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 Crop distributor or stockist.
These forage crop options are available from: