The potential of Fodder Beet

The yield potential of Fodder Beet is greater than any other forage crop, but growing and utilising the crop can be a challenge. Fodder Beet is suited to light & medium bodied, free draining soils. Soil nutrition needs to be carefully planned. Weed control can be technically challenging and harvesting costly, but once harvested you have stable, very high energy, transportable forage, which can be fed to most classes of livestock.

In some areas farmers are successfully grazing Fodder Beet in situ. This avoids harvesting and storage costs and simplifies feeding. Costs are greatly reduced, but it limits the classes of stock which may easily utilize the crop.

The Performance of Fodder Beet Compared to Alternative Forages

<table>
<thead>
<tr>
<th></th>
<th>DM Yield / Ha</th>
<th>DM%</th>
<th>'D' Value</th>
<th>ME Mj/Kg DM</th>
<th>Crude Protein %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fodder Beet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roots</td>
<td>14.2</td>
<td>10-20</td>
<td>80%</td>
<td>12.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Tops</td>
<td>3-4²</td>
<td>10-13</td>
<td>65%</td>
<td>10.4</td>
<td>15.0</td>
</tr>
<tr>
<td>Swedes</td>
<td>7.0</td>
<td>8-12</td>
<td>82%</td>
<td>13.1</td>
<td>11.0</td>
</tr>
<tr>
<td>Kale</td>
<td>8.6</td>
<td>15</td>
<td>63-69</td>
<td>10.6</td>
<td>14.0</td>
</tr>
<tr>
<td>Maize</td>
<td>15.1*</td>
<td>28-38</td>
<td>67-73*</td>
<td>10.9*</td>
<td>8.0</td>
</tr>
</tbody>
</table>

Sources: NIAB Fodder Beet List 2001, Marginal Sites Maize list 2007* & Fodder Crops 1993
Note 1: Depending on variety
Note 2: Beet Tops die back in the winter, so this will not be available for late grazing.

Variety Types

There are different types of Fodder Beet. They range from low DM% varieties which tend to grow further out of the ground. The most extreme of this type are like Mangels with less than 50% of the root below the ground. At the other end of the spectrum are the higher yielding, high dry matter varieties, similar to Sugar Beet. These have up to 80% of the root in the ground. The market is dominated by high yielding intermediate types.
Soil Conditions

Seedbed: Fodder Beet is very sensitive to soil compaction, so only plough in good soil conditions. Ploughing and cultivating needs to be deep enough to allow full root development and to provide good soil conditions for lifting machinery. If spring ploughing, make sure moisture is conserved by pressing or rolling the furrows.

If beet is to be lifted, avoid stony or flinty soils which may create problems with conventional beet harvesters. Top lifting harvesters can cope with stonier conditions.

Fodder Beet needs to be sown into a fine, firm, well consolidated seed bed. Precision drills do not work well in loose soil conditions.

Drilling & Seed Rates

The drilling and seed rates detailed below are designed to produce optimum beet yield.

<table>
<thead>
<tr>
<th>Seed Rate:</th>
<th>48-52,000 seeds/acre*¹ (120-130,000 seed/Ha).</th>
<th>Target Plant Population</th>
<th>36-40,000/Acre (90-100,000 plants/Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sowing Depth:</td>
<td>2-3 cm</td>
<td>Ideal Soil T°:</td>
<td>+7° C</td>
</tr>
<tr>
<td>Drill Width:</td>
<td>45-50 cm between rows</td>
<td>Seed spacing</td>
<td>15-20 cm</td>
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</tbody>
</table>

*¹ Seed rates can be further reduced to 40,000, increasing beet size and % of root above the ground, but yield will be reduced.

• Drill width needs to be matched to harvesting equipment. It is less critical for beet destined to be grazed.
• Seed drills must be suitable for use with polymer-coated seed - if in any doubt, refer to the drill manufacturer.

Soil & Fertiliser Requirements

<table>
<thead>
<tr>
<th>Soil Index</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen (N)</td>
<td>120</td>
<td>120</td>
<td>110</td>
<td>90</td>
<td>60</td>
<td>0-40</td>
<td>0</td>
</tr>
<tr>
<td>Phosphate (P₂O₅)</td>
<td>100</td>
<td>75</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Potash (K₂O)</td>
<td>100</td>
<td>100</td>
<td>100 (2−)</td>
<td>100 (2+)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sodium (Na₂O)</td>
<td>200</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

A full spectrum soil analysis to identify nutrient requirements for the fodder beet crop is recommended.
Ideal Soil Type: Medium to light free draining soils with a pH of 6.5 - 7.0

Mineral or Organic Fertilizer: Fodder beet has peak demand for nutrients from June – October when there is a high availability of mineralised nutrient from organic sources in the soil. It is therefore ideally suited to organic manures as a source. Because manures are normally ploughed under it is important to have some soluble fertilizer available for the seedling and early growth stages, no maximise establishment and rooting potential.

Nitrogen: Table 1 summarises the ‘Potential’ nitrogen requirements of Fodder Beet. It is normally recommended that approx 40 Kg/Ha is applied in the seedbed to optimise establishment. Most N can be applied in the form of manures. Any additional mineral Nitrogen which is required should be applied after seedlings have established.

Sodium: Fodder Beet is descended by cultivation from the Sea Beet and thrives on salt (NaCl). Salt is recommended on all soils except fen silt and peat. This can be applied as 400 kg/ha of agricultural salt (200 kg/ha Na2O). This is best applied in the autumn prior to sowing Beet. Other useful sources of sodium are detailed in Table 2. If sodium is recommended but not applied, you can increase the level of potash and get a similar response, however current potash costs make this substitution uneconomic.

Magnesium: Beet is susceptible to magnesium deficiency and may show small yield responses to magnesium fertiliser when soil magnesium is deficient. (See RB209)

Boron: Most soils contain sufficient, but many soils are deficient. If not corrected there is a risk of ‘Heart Rot’. The growing point at the centre of effected beet starts to die in June – July, then turns black. Rot then develops and spreads from the heart to the crown and shoulders. To ensure freedom from deficiency, boron can be incorporated into fertiliser or applied as a post emergence spray when there is enough leaf area to absorb the nutrient. This is normally in combination with herbicide or insecticide.

Manganese deficiency occurs, particularly on soils with a high pH. This can be rectified with a manganese sulphate foliar spray.
Weed Control

Fodder Beet does not compete well with weeds. To grow a successful crop of Fodder Beet the weed control strategy needs to involve avoiding carry over of weeds from previous cropping as well as preventing the establishment of weed seedlings in the growing crop. Unlike Brassicas, there are a number of herbicide options, but some are technically challenging. Weed control can be further enhanced by mechanical weeding.

Control of Perennial Weeds: There are a number of options for the control of weeds growing from seedlings in the growing crop of beet, but limited options for the control of established perennial weeds like creeping bent, couch, creeping thistle & docks. If a field is to be used to grow Beet, these perennial grass weeds need to be controlled by all or a combination of the following methods:

- Applying Glyphosate to the preceding grass or stubble.
- Growing a catch crop to smother weeds & breakdown the turf.
- Plough to completely bury and suppress the weeds.

General Weed Control: The range of herbicides for the control of weeds in Fodder Beet includes both pre and post emergence products. Most programs combine a pre emergence product applied immediately after drilling, followed by a post emergence spray combining both contact and soil acting herbicides, the latter boosting the activity of the original post emergence spray. Most of these products rely on applying products when weeds are at a ‘susceptible’ growth stage. This may be as early as the cotyledon stage. It is important to take professional advice from a BASIS qualified agronomist to get optimum weed control.

Beet is very susceptible to ‘non beet’ herbicides. Clean sprayer thoroughly before spraying beet.

Mechanical Weeding: Modern inter-row cultivators are highly efficient machines which can be used to control weeds in Fodder Beet. Organic farmers have no other option, but these machines can be an effective part of a conventional weed control program. They have the added benefit of aerating the soil, especially useful after periods of heavy rain cause the soil to slump and cap. It must be understood that use of these cultivators will deactivate any soil acting herbicides.
There are a number of pests which can damage Fodder Beet, but problems are less likely to occur if farms have a healthy rotation, good soil nutrition and ideal seedbed conditions. In these conditions the vigour of the crop can tolerate a degree of pest activity. If the crop comes under stress through poor growing conditions, pests can get the upper hand. Some need to be avoided, others controlled.

**Wireworm:** The larvae of the Click Beetle, normally lay their eggs in grass fields or on fallow ground. They are particularly prevalent following long term grass. Wireworms are free living in the soil for 2-3 years grazing on the roots of plants. Their subterranean habitat makes them difficult to control with pesticides. **CONTROL:** Sow Beet only in optimum soil conditions. Use Gaucho seed treatment.

**Flea Beetles:** Adult flea beetles feed on beet plants soon after seedling emergence. Damage can lead to reduced plant growth, and even death, depending on the growth stage of the sugar beet. Damage is easily identified by characteristic “shot-holes”. During late April and early May adults emerge and feed on newly emerged sugar beet plants. The beetles are especially active when air temperatures are high, but will stop feeding and burrow back into the soil if the temperature drops. **CONTROL:** Mesurol or Gaucho seed treatments provide good control. A number of insecticide sprays can also be used. These may be combined with some pre and post emergence herbicides.

**Leatherjackets:** The larvae of the crane fly. Heavy infestations can be devastating. The pest is best avoided by management. Crane-fly tend to lay their eggs in long grass during the September-October period. Grass that is tightly grazed during this period is less likely to be host to high levels of leather jackets in the following spring. **CONTROL:** If the pest is identified, or there is a high level of risk, Leather jackets can be controlled with Chlorpiriphos (Dursban & other trade names)

**Aphids:** These cause problems in Beet in two ways. Firstly they feed on the leaves, but, more importantly they also transmit Virus Yellows. These diseases can have a significant effect on yield. Because the risk is greatest in areas where beet is widely grown, isolated crops are at lower risk. Controlling the aphid is the key to disease control. Insecticide sprays, often combined with herbicides or trace element sprays are often used. Gaucho seed treatment is also very effective.

**Beet Cyst Eelworm:** These can seriously limit yield potential, but are also easily avoided by rotation. Beet should not be grown in the same field more often than one year in four. This breaks the life cycle of the eelworm. Where problems occur, fields may be sown with special varieties of Mustard or Fodder Radish which can ‘mop up’ an infestation, but a good rotation is really the only answer.

The advice offered in this leaflet has been prepared to the best of our ability. We cannot accept any liability as a result of action taken by growers as a consequence of this advice. Detailed recommendations should be sought from BASIS & FACTS qualified agronomists.

Use pesticides carefully. Read the label before you buy.

For further technical advice please telephone Barenbrug UK Ltd on 01359 272000 or email info@baruk.co.uk or visit our website www.barenbrug.co.uk