Fodder beet - growing a high yielding crop (1-77)

Key Points

- Fodder beet is a specialist crop that is more expensive per ha to grow than other crops, but can deliver outstanding results to offset this if grown and managed correctly. Attention to detail and planning of both growing and grazing with contractors in advance are crucial for success.
- Fodder beet can produce high yields of quality feed for periods of winter pasture deficit or to utilize during the shoulder periods of autumn/spring.
- Fodder beet is sensitive to moisture deficit in early stages of establishment.
- For good establishment fodder beet must have a firm fine seedbed with good soil seed contact and a uniform plant population.
- Apply appropriate basal fertiliser pre-plant to reach a realistic yield potential. To reach yield potential, the crop must never be under nutrient deficit during active growth.
- Strategies for weed and pest control are of utmost importance and the programme should be established before planting and then managed carefully right through the life of the crop.
- A planned approach to growing fodder beet increases the success of the crop and the benefits to the farm as a whole.
- By having a realistic estimate of potential yield and desired feeding level you can prepare a feed budget and determine the appropriate land area required.

Introduction

Fodder beet has a long growing season and is usually grazed by dairy stock as a winter feed crop. It is sensitive to drought especially during establishment but is tolerant of dry periods once the root system is well established. Fodder beet is best not sown on land coming out of pasture that has previously shown low productivity. These poor producing paddocks chosen for cropping often have low pH and the crop is not well adapted to these situations. Underlying issues need to be remedied before sowing, in the case of low soil pH this should be 6 months before drilling. Avoid light soils with low water holding capacity (unless irrigated or thoroughly fallowed) or heavy, poorly drained soils. Contractors using precision equipment may refuse areas with surface stones.

Fodder beet is not susceptible to club root or dry rot and therefore can follow brassicas. Fodder beet is highly susceptible to residual sprays and second cropping after other crops will be dependent on whether compatible chemicals have previously been used. Therefore if unsure of paddock chemical history it can be easier to obtain good results following grass than establishing fodder beet after other crops.

Fodder beet must never be grown twice in succession as bulb chips from the first crop may re-grow and produce seed in the second year’s crop and create a bank of hard seed with sporadic germination for up to 20 years. This will preclude the subsequent use of the paddock as volunteer plants could over-populate the paddock resulting in masses of under-sized bulbs. It can also increase the risk from soil born issues such as nematodes.

Fodder beet is usually sown when soil temperatures are adequate to produce large amounts of high quality feed for late autumn and winter. Yields of 18-22 tonnes kg DM/ha are typical of well managed crops although yields of up to 30 tonnes kg DM/ha are possible under good growing conditions.
conditions. However yields will vary depending on attention to detail, soil type, fertility, weed competition and available moisture.

**Planning and paddock selection**

Planning for crops should include a long-term view that considers the re-grassing options, crop sequence, maintenance of soil fertility and structure, the ability to create a suitable seed bed, weed and pest control and the amount of feed required for the animals. Consider Regional Council environmental regulations such as proximity to waterways, potential water run-off, and logistics of feed management issues such as access to stock water.

It is very important to identify paddocks intended for sowing fodder beet at least 12 months before sowing of the crop. Fodder beet is very sensitive to acid soils and the pH needs to be tested (pH of 6 to 6.5 is required) and lime applied at least 6 months before sowing if required. Fine lime can be used closer to planting but this will be more expensive and achieve only a shorter term increase in soil pH. When selecting crop area, it is important to be realistic about the state of the paddock and be willing to do what is required to overcome issues such as soil damage caused by pugging. If following another crop ensure that the paddock history is known before planting as seedlings can be susceptible to residual herbicides applied the previous season. If unsure check paddock DDT levels.

The area required to feed a certain number of animals depends on crop yields and intended animal intake. Actual intakes will be influenced by the utilisation of the crop. This can be up to 95% of the feed on offer, if well managed with strip grazing. The number of cows that can be grazed per hectare at varying yields and different per cow allowance for a 60 day period during winter is shown in Table 1.

**Table 1**  
CROP YIELD, FEED INTAKE AND COWS GRAZED PER HECTARE FOR 60 DAYS

<table>
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<tr>
<th>kg DM of crop offered/cow/day</th>
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If the crop yields are 24 t DM/ha and cows are offered 8 kg DM of crop/cow/day (around 7.2 kg DM eaten/cow/day at 90% utilisation) plus 5 kg DM baleage or hay/cow/day, then 1 ha of crop will supply enough crop for 50 cows to be wintered for 60 days (equivalent 3000 grazing days). The potential to carry such a large number of cows on a small area creates a potential for environmental damage. Therefore care needs to be taken to select paddocks less susceptible to pugging damage and to minimise run-off.

**Soil preparation and sowing**

Fodder beet is a specialist crop and needs to be planned with contractors well in advance. How the crop is to be managed should determine planting layout: for grazing remember to allow for good cow access during transition onto the crop – you need space in the paddock to manage the all-important low allocation of crop per cow. Planting layout should be done considering how to best make the row layout out work for crop allocation.

A 6 metre wide headland parallel to the rows can be made by planting a green feed or by lifting beet for transitioning cows before dry off. If you expect to lift a strip plant a high DM% variety in 50cm rows spacing to make harvesting easier. Think about how and where supplements will be fed. Look to optimize the number of mobs and laneways required, this will save time and improve supplement utilisation in winter. A map of how you want the paddock planted can help the contractor.
Fodder beet needs a fine, firm, moist seed bed with good soil-seed contact to achieve a uniform plant population. A well prepared weed-free seed bed is essential as the young plants do not compete well with weeds.

Select the variety based on desired end use:

- For lifting use a high DM% variety
- Intermediate DM% varieties can be grazed or lifted
- Low DM% varieties are only suitable for grazing

Full cultivation practices and precision sowing are essential for good fodder beet establishment. Optimising moisture retention is critical as young seedlings are vulnerable to dry conditions. This can be achieved using the stale seed bed technique whereby the seedbed is prepared 4-6 weeks in advance and germinating weeds killed immediately before planting. Only use glyphosate for plant knockdown as other chemical can have residual effects on subsequent growth. It is important to bury plant material at least 25cm with a mouldboard plough and ensure that sub-soils are free of pans. Ploughing should be followed by multiple surface workings producing a surface that is as fine and clod free as possible. Apply basal fertiliser prior to the last surface working and roll with a Cambridge roller prior to drilling. Precision drilling is recommended for fodder beet. Generally pelleted seed is used and planted at 80,000 – 90,000 seeds per hectare (8 - 9 seeds sown per m²) – 50 cm row spacing and 25 cm between plants in the rows. The optimum sowing depth is around 2 cm. For harvesting types, increase the sowing rate to suit the variety, the drilling environment, the drill spacing and type of harvester. This will typically be between 100,000 – 120,000 seeds per ha.

Fodder beet should ideally be established when the conditions are adequate and the soil temperature is high enough. Sowing too early can result in vernalisation – where plants will be stimulated to flower and seed prematurely with little bulbing. Soil temperature (at 9 am and 10cm depth) should be at least 10°C and stable or increasing for at least one week before sowing.

Note: It is important when comparing seed prices that you allow for the number of seeds per box. Boxes may contain 50,000, 80,000 or 100,000 seeds, which must be allowed for when ordering seed to ensure the correct quantity for the paddocks to be planted. You should aim to achieve at least 7 plants/m² for grazing and 9 plants/m² for lifting.

Field emergence is driven by: soil moisture, germination %, temperature, soil contact and pests. Where these issues are likely to have a negative impact, a slightly higher seed rate will be required in order to achieve the desired final plant population.

**Lifting vs. Grazing**

Plan for how you intend to use the crop. Sowing in 50 cm rows means there is an option to lift as well as graze the crop. Precision sowing using GPS steering will make lifting easier and decrease wastage.

When planning to lift a crop, be aware of the amount of nutrients removed per tonne of yield, especially potassium and consider the needs of future crops. This can be very useful from an effluent block management point of view.

**Fertiliser guidelines**

High yielding fodder beet crops require high inputs of fertiliser or soil derived nutrients. The fertiliser management for fodder beet differs from brassicas. Whereas brassicas have a high demand for nitrogen (N) and phosphate (P), fodder beet has a higher demand for potassium (K), magnesium (Mg) and Na. All basal fertiliser should be applied pre-plant and not with the seed.
Typically 30 -80 kg P/ha pre-plant will be sufficient. Potassium at 50-100 kg K/ha is normally recommended. Magnesium can vary from 0-50 kg Mg/ha depending on Mg levels in soils. An adequate supply of sodium (Na) is required. Typically, a 20 t DM/ha crop will take up 80 kg Na and as most New Zealand soils have moderate levels of Na, a further dressing of around 100 kg/ha agricultural salt is normally applied per hectare. Sulphur (S) at 20 – 30 kg S/ha is normally applied at sowing also. Boron (B) is normally required at higher rates than when growing brassicas: around 20 - 25 kg/ha boron fertiliser. The amount of nitrogen will depend on levels of available N in soil. A small amount can be applied prior to sowing with the remainder of the 50-100 kg N/ha applied before or near canopy closure. Fertiliser recommendations should be adjusted according to the paddock soil analysis results.

Continue to monitor the crop and discuss extra feeding with your agronomist right through the growing season. Ensure the crop is never under nutrient deficit during times of active growth. The leaves should maintain a healthy green colour throughout the growing season.

**Crop water requirements and irrigation**

Fodder beet generally has a lower water requirement than kale or pasture. Seedbed moisture is critical, as a well-watered soil will ensure a uniform emergence.

In rain fed situations timing of the knockdown spray to create an effective fallow period is critical. In irrigated crops, the key principles are: monitor soil moisture and apply water little and often post planting. Increase both the return interval and the application rate as the plant gets bigger, this will encourage deeper, more efficient root systems. Over watering and consequent high humidity in the crop can encourage disease.

**Weeds**

Fodder beet seedlings are slow to establish and reach canopy closure making them especially susceptible to weeds and pests during early crop development. Ensuring a good start to the crop is essential. Only use certified seed. The use of a stale seed bed where seed bed is prepared 4-6 weeks earlier and germinating weeds killed with a double spray programme of glyphosate (e.g. Roundup) 4 days before ploughing is recommended. Consider using an additional broadleaf spray combined with the glyphosate, however do not combine tribenuron methyl (eg. Granstar) as this will affect seedling emergence. The correct timing of chemicals is crucial for weed control. The first spray is the pre-emergence/post planting spray – this is applied after drilling but before plant emergence. Apply as soon after planting as possible. An insecticide should be included in the spray. This is generally followed by two post emergence sprays. The first post emergence spray timing is dependant on the chemical used. Do not combine the herbicide with insecticides at this stage as it can burn the seedlings. The first post emergence spray is generally followed 7-10 days later with another application of multiple chemicals which can contain active ingredients to control thistle and yarrow. Seek professional advice on what chemicals to use. There are new products available which allow very early [cotyledon stage] spraying options.

**Pest and diseases**

The main pests are springtails, nysius, cutworm and slugs. Farmers are well advised to inspect young crops regularly by walking well into the paddock and apply appropriate insecticide if necessary. Don’t delay application of insecticides to apply with other programmed sprays. Slug control and checks for cut worm and grass grub are recommended, as these pests can cause the death of new seedlings.

Rust and mildew can cause leaf loss in April/May but the leaves will re-grow. Diseases are not usually serious although work is being carried out on these as there is evidence of yield gains from the treatment for powdery mildew.
At the early stages, fodder beet plants are very sensitive to chemicals: take care to avoid spraying during the heat of the day and ensure that tank mixes are compatible and that any threatening spray residues in the spray tank have been properly cleaned out.

Ensure high water rates are used with herbicides, typically 250 – 300 litres /ha. Use a fine spray to ensure good coverage.

**Summary**

Fodder beet requires attention to detail to get good results. Good soil preparation and proper weed/insect control is essential. Proper planning of logistics for growing this crop will help ensure that contractors are available at the correct times as there is often only a small window of opportunity to spray. Do not cut corners and follow the prescribed management plan to ensure success.

The utilisation and feeding of fodder beet is covered in *Farmfact 1-73*.

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