

Maximising the Potential of Fodder Beet for Livestock

Grazing - *where to start?*

Fodder beet has recently grown in interest for grazing *in situ* to livestock. The crop offers many benefits including its high yield potential, which gives it the ability to be the cheapest forage per kg of dry matter, while the excellent nutrition gives it the capability to be the cheapest forage per mega joule of energy. Other benefits include its excellent digestibility, greater weed control options being available than forage crops in the brassica family and an ability to grow fodder beet in rotation with brassica crops such as swedes in a livestock situation.

The crop has a long growing season, with approximately 240 growing days. Utilisation typically occurs from October, when grass growth becomes limited. The bulb of the plant is the major energy source, this bulb will continue bulking until grazing.

The best choice of cultivars for grazing beet systems is not automatically the highest yields. For beef finishing and sheep systems, rather than dairy, the key driver for system success is palatability, as the more they eat the greater the production. Dairy cows are less sensitive to cultivar, and will eat all without much difference. As a general rule, the lower DM% cultivars are more palatable and therefore suited to beef finishing and sheep grazing systems.



The leaf is more of a protein and mineral source, and retention of the leaf into the winter is necessary to provide a good balance of nutrition within the crop. When the leaf is lost through the autumn and winter then the protein and phosphorus is imbalanced for stock grazing. Once the leaf is lost then the protein and phosphorus need to be replaced with other forage, which will have greater fibre content and therefore decrease the daily live weight gains achieved from feeding the fodder beet crop only. To aid retention of the leaf throughout the winter, varietal choice should include good disease resistance and a high leaf percentage of the total plant. Late season nitrogen applications have shown to benefit leaf retention in New Zealand trials. After frost, leaves can go brown and stringy, this leaf still holds its nutrition (protein and minerals) and is often more palatable to the livestock, where they choose to eat this over green leaf. Early leaf losses are more of an issue, where the tissue senesces and disintegrates, obviously here the nutrition disappears.

Main driver for the crop to maximise yield

- Production of dry matter
- Leaf retention throughout the winter

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Yield Assessment

Prior to grazing assess the yield of the beet crop. This will aid with calculating the daily requirement from livestock. It is very simple to do, using the below method.

Tools required to measure fodder beet

- Tape measure
- Knife
- Luggage scales
- Bag or Bucket
- Paper, pen and calculator

How this is calculated will depend on if your row width. For example, if it is 45cm, measure 5.5 metres along a drill, if it is 50cm, measure 5 metres along the drill.

1. Measure along the row (as above) in a random sampling area, avoiding end riggs.
2. Lift the whole plant (bulb and leaf) from both sides of the 5m, lifting 2 rows of beet at either 5m or 5.5 metres length (depending on row width)
3. Use a knife to separate the leaf and bulb
4. Weigh the leaf and bulb separately; ensuring all brown, slimy leaves are included in the measurement for the leaves.
5. Repeat over the field (5 sampling areas of 5m x 1m = 25sqm)

		Bulb	Leaf
A	Sample 1	50 kg	29 kg
	Sample 2	54 kg	32 kg
	Sample 3	52 kg	33 kg
	Sample 4	55 kg	34 kg
	Sample 5	<u>51 kg</u>	<u>30 kg</u>
	Total Fresh Weight (FW)	262 kg	158 kg
B	Tonnes Fresh Weight / ha (A) x 400 / 1000	104.80	63.2
C	Dry Matter (%) *	15%	10%
D	Tonnes Dry Matter/ ha (B x C)	15.72	6.32
E	Tonnes Dry Matter Yield (D bulb + D leaf)	22.04 t DM	

Dry matter analysis is available through forage analysis labs, this is valuable.*

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Fodder beet should be allocated on a daily basis to the livestock; this should be grazed behind an electric wire. An average Scottish crop of fodder beet yields 20 tonnes DM/ha. Meaning that in every square metre there is 2kg of dry matter. In a crop with 50cm row width, every metre would allow for 1kg DM.

Cattle

Fodder beet is a sugar rich energy feed that requires careful management of grazing stock. Cattle must be structurally transitioned, on to the crop to prevent rumen acidosis.

Ensure cattle are vaccinated for clostridial infections prior to grazing the crop. Beet can increase the chance of such infections due to the high sugar load in the intestines. Remember to administer any booster vaccinations that are required.

Cattle transition onto the crop

- Over a 21 day period (3 weeks)
- Starting with 1kg DM per animal per day, and not increasing until all cattle are eating the bulbs readily – then moving up 1kg DM every two days until they start to leave it.
- Allow 1 metre of linear fence per animal (access is as important as allocation)
- A 6-10 metre headland of grass or green stubble should surround the crop.
- Must be rigid with this process, take your time and stick to the plan.
- This process teaches the animals to eat the beet and allows the rumen to

Allocation

A dry cow will eat 11-12kg DM/day, the transition period could look like the below:

Day 01 – 02	1kg DM fodder beet 9kg DM forage
Day 02 – 13	Increase beet by 1kg every second day Decrease forage by 1kg every second day E.g. day 14 - 7kg DM fodder beet, 3kg DM forage
Day 14-21	Hold allocation at 8kg DM fodder beet, 2 kg DM forage
Day 21	Animals will be successfully transitioned on to the beet crop.

After transition, forage can be as low as 2kg DM for adult cattle and 1kg DM for weaned calves. Following this plan will ensure there is no over allocation of fodder beet in the transition period, and no bulb left behind, which could cause over allocation.

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Daily allocation should be given to cattle, meaning the fence should be moved daily.

Ensuring the space requirements are being met is essential to ensure all cattle can access the beet at the same time and choose their plant and eat it.

The intake of growing cattle can be maximised after transition, resulting in increased growth rates. This can be achieved by leaving residues of the crop three days behind. An example of this would be allocating 100% on day 1, but leaving behind 25% of the previous days beet, 10% of the day before that and 5% of the day before that. After the cattle have eaten the fresh allocation, they will move from the fence and eat up the residual beet left, increasing their intake and improving the utilisation of the crop.



Grass or Green Stubble

A 6-10 metre headland of grass or green stubble should surround the crop, this will allow the cattle to transition in their own time. This prevents having to rely on a ring feeder for additional forage which can result in not all of the animals getting the forage they want.

The two pictures below show one (left) with a green arable stubble, where the cattle can get away from the crop and forage on the grass. The other photo (right) shows the fodder beet planted all of the way up to the fence. This creates a problem in that there is no space for foraging and transitioning the cattle would be very difficult. In this situation 6 metres from the fence line would need to be cleared into a tractor bucket, to allow each head of cattle to access the beet with a 1 metre space along a linear fence. This situation can be prevented by the use of a headland.



The above guide of transitioning must be followed on an annual basis, even if cattle have eaten fodder beet in the past, to prevent rumen acidosis and cattle deaths.

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Sheep

The main benefit of a fodder beet system for sheep is to raise the stocking density on the farm, removing sheep from grass in the autumn and ensuring grass is ready for the spring.

As with cattle, ensure sheep are vaccinated for clostridial infections prior to grazing the crop. Beet can increase the chance of such infections due to the high sugar load in the intestines. Remember to administer any booster vaccinations that are required.

Sheep transition onto the crop

- Over several days
- Sheep self-regulate their intake well.
- Allow 0.3 metre of linear fence per animal (access is as important as allocation)
- A two day shift is ideal for sheep, to allow for a balance of bulb and leaf.
- A 6-10 metre headland of grass or green stubble should surround the crop.

Sheep can be introduced to the crop more rapidly than cattle or deer. Sheep will self-regulate themselves as intake increases, and a common procedure is regular switches made between a few hours on and then off the beet on to forage over a few days. The time on the crop should steadily be increased until the animals have constant access. This will take approximately 7 days.



Sheep are more selective on palatability than cattle, if they find it unpalatable they will leave the bulb and just eat the leaf. They also eat differently from cattle in that they eat the bulbs standing in the ground, rather than knocking over as cattle do. They eat the beet down to the ground and then cone out the bulb below the ground, meaning some wastage is found.

When a good level of leaf is retained in the crop, there is no need for additional forage or supplementation in the diet. But when there is low leaf availability, protein may be limiting. The best supplement for sheep is grazed grass (if available), this will supply protein and minerals, with minimal fibre to maintain intake levels.

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The sheep should have a clean run-back area. The run-back area is essential to enhance animal welfare while offering the animals an area to forage on grass as well as a clean, dry surface for loafing. If supplementary forage is used, such as pasture, hay, or silage, it should ideally be placed in the field while ground conditions are favourable to prevent soil damage from machinery such as tractor wheels. In addition, the mineral and trace element nutrition requirements of sheep grazing fodder beet for the region should be supplied. In some cases, this will require selenium, copper, cobalt and iodine, and macro-elements phosphorus.

Contingency Planning – Plan B

When out wintering livestock, it is imperative to have a contingency plan, for any adverse weather conditions. This should include managing rations and the conditions of the soil. These may include:

- Putting straw into the field to give the animals a dry area to lie and ruminate.
- If shelter is limiting, create shelter to protect the animals from the weather e.g. straw bales, potato boxes, etc. These should be sited in an area that dries out quickly.
- Back fence or fence off damaged areas to avoid further compaction.
- If condition require animals to be removed from the crop, remember to transition them off, in the same way they were transitioned on to the crop. This may include housing the animals and lifting beet and feeding indoors. A gradual change to the diet will minimise risk to the rumen.

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