

MEASURING KALE, SWEDES, FODDER BEET

Simple guidelines for farmers to use to measure their own crops

The first rule is, don't take any short cuts. The second is still don't take any short cuts.



Choosing the sample

1. Walk (or drive) the whole paddock to assess variability before you start sampling. Soils are likely to be extremely variable over a short distance (especially Canterbury) and the far corner can be quite different to the gateway. On rolling downs and hills topography will make a big difference to yield (stock camps, slope and aspect).
2. Be careful to pick areas that are representative. Throwing the square (quadrat) will often pick a bare area or the tallest plant. The solution is to spend time standing, looking at the crop and assessing what area or % of the paddock is good/bad. You will be surprised how close you will get.
3. The general rule is one sample per hectare. You need to make sure you sample all the representative areas. Where there is a lot of yield variability take more samples.

Dry Matter

Dry matter tests can be done on a representative sample of the crop and will provide the best yield estimate.

Dry matter (DM%) guidelines from: "A Guide to Feed Planning for Sheep Farmers" are:

Swede tops	15%	bulbs	10%
Turnip tops	13%	bulbs	9%
Chou	15%		
Rape	20%		

Fodder beet bulb DM% range - 10-20% (cultivar variation)

However there is great variation in crops eg. 10-18% for rape crops; difference in leaf to bulb ratio; DM in the leaf increases as crops mature. All can result in a large variation in the kgDM/ha estimated. See over the page for further detail.

Sampling the crop

4. Kale and Rape - Cut the plants 7cm above ground for a light crop (5-7t), 20-30cm for a heavy crop (10-15t). This will provide a good estimate of

utilisable yield. Experience shows this to be reasonably accurate.

5. For kale, rape and swedes use a 0.5m² square (70.7cm x 70.7cm quadrat); for grass ¼ m² (50cm x 50cm) is OK.
6. For crops that are ridged or precision drilled measure a calculated row length to give a square metre of crop.

Calculating the row length for sampling

To calculate this you have to know the width between rows so will need a tape measure. Measure across 11 rows, crest to crest, divide distance by number of rows minus one (ie 11 - 1=10) eg.

$$11 \text{ rows} = 4.58\text{m}$$

$$4.58\text{m}/(11-1) = 0.458\text{m or } 45.8\text{cm wide.}$$

To get a square metre divide into 1. i.e.

$$1/0.458 = 2.18\text{m.}$$

So you weigh **2.18m of one row** to get a square metre.

7. Fodder beet and swede rows are often extremely variable so it is important to take 2m² for a sample. In the example in step 6 this is 4.36m of row and might be 20-30kg of beets.
8. If the rows are obvious and you are using a quadrat, put the square diagonally across the rows, otherwise it is possible to cut an extra row and increase the measured weight by up to 20%.
9. Do not pull extra plants into the square, cut only those growing within it. With swedes, fodder beet or turnips it is often necessary to cut bulbs in half.

Example calculations for kale:

Weigh each ½ m²; For a paddock of 4ha, 4 samples = 2m²

$$\begin{aligned} \text{e.g. } & 3.02\text{kg} + 3.55\text{kg} + 2.78\text{kg} + 3.66\text{kg} \\ & = 13.01\text{kg}/2\text{m}^2 \\ & = 6.05\text{kg}/\text{m}^2 \end{aligned}$$

To get tDM/ha

$$6.05 \times 10 \times \text{DM}\%(14\%) = 8.47\text{t}/\text{DM}/\text{ha}$$



For best results weigh bulb and leaf separately.

Fodder beet is difficult to measure and has been over estimated for years – it is unusual to get a crop above 25tDM/ha and average is about 20tDM/ha.

Drying and weighing

All estimates are on a dry matter basis, so samples must be dried before working out yields and relative contributions.

1. How much sample to take - 200g
2. Remember to weigh the dry matter sample before drying to determine dry matter percentage.
3. Samples for dry matter percentage and pasture composition should be dried at 80°C for a minimum of 12 hours.
4. Samples dried before NIR analysis should only be dried at 60°C for 24 hours.
5. On removal from the oven, dried samples will absorb moisture so immediate weighing is required.
6. Dry matter samples are weighed to 1g accuracy.
7. Accurate digital scales are needed. Some digital kitchen scales are suitable.
8. Drying bulbs takes a long time and may be best sent to the lab

Microwave drying

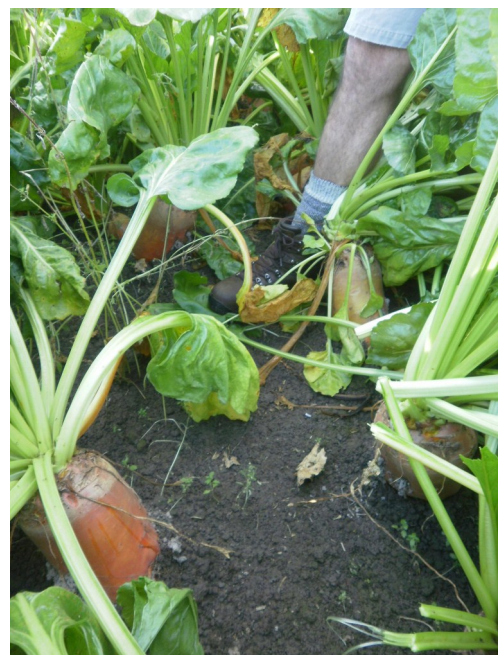
Microwave drying is a good technique to use in most farm situations for pasture samples. Brassicas will be more difficult.

1. A fresh sample of 100g is weighed and spread evenly across the microwave plate.
2. A glass of water is placed in the back of the microwave and must have water in it at all times to prevent a fire when the sample is close to dry.
3. Microwave on high for five minutes (for a 700 W

oven).

4. Check the dry weight and dry for another one minute.
5. Weigh again and if no further weight change is recorded, the sample is dry.
6. If some weight change was recorded, dry a further one minute and repeat the procedure until no weight change is recorded.

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Fodder beet crop ready to sample