

Estimating dry matter yield

In Mitchell grass country

Jenny Milson and David Phelps Agri-Science Queensland

Purpose of this fact sheet

This fact sheet outlines steps to estimate pasture yield in Mitchell grass country by cutting samples. Knowing your pasture yield is useful in estimating the number of stock that can be safely carried in a paddock using a feed budget. Pasture yield can also be estimated using photographs of sites with a known yield as a guide.

Equipment

You will need a set of shears, a 0.5m x 0.5m sized square quadrat (metal frame), 20 equal sized paper bags, a set of battery operated scales, a calculator and pen and paper.

Cutting the samples

1. Find a representative area of pasture. You may need to do more than one site across your paddock if there is variation in the pasture yields from one area to another. Also keep in mind that you will need to do yield assessments for each land type.
2. In open downs, take ten steps while looking towards a fixed point on the horizon. You can choose any number of steps between samples—the important thing is to be consistent to avoid being biased towards high or low yielding patches. Looking at the horizon stops you from veering towards the patches that look the best!
3. Place the quadrat down with the bottom left hand corner at your toe and allow the quadrat to fall to the right.
4. Cut any forage to 2 cm above ground level and place in a paper bag. You may want to write the date, paddock and sample number on the bag.
5. Cut 20 quadrats at each site. If that is not feasible, cut at least 10. The more quadrats you cut the more variation you will cover in the site and the more accurate your yield estimates will become.



Weighing the samples

1. Tare (re-set) the scales with an empty paper bag.
2. Weigh each sample in grams, writing the weight on the bags or list on a sheet of paper (including the bag number).

We want to estimate a value in kg/ha, so there is now some maths needed to convert our sample weights.

Calculating pasture yield

1. Calculate the average (mean) weight of your 20 samples in grams e.g. 36.8 g.
2. Multiply the average weight by 40 to convert your average to kg/ha*.
e.g. $36.8 \text{ g} \times 40 = 1472 \text{ kg/ha}$ (of 'wet' pasture).
3. Calculate the percentage of dry matter by either drying the sample in a microwave oven—see 'Silage Note No. 7'—or by estimating the amount of water in the feed e.g. 15% moisture (85% dry proportion).
4. Multiply the wet weight (that's what we have weighed) by the dry percentage to calculate the dry matter yield.
e.g. $1472 \text{ kg/ha} \times 85\% = 1251 \text{ kg DM/ha}$.
All livestock rations—including pastures—are based on dry matter (DM) weight.
5. Record this estimate of standing dry matter (kg DM/ha).

Using the yield estimate

Use this estimate of standing dry matter in your feed budget calculations and/or in estimating how much area is required for one adult equivalent (AE).

For example, if you have a 450 kg steer (one AE) eating an average of 2% of his bodyweight per day—on *average* over the year—he will eat 9 kg/day *on average*. He'll eat a higher percentage of body weight when pasture nutrition is of high quality and less when pasture quality is low.

This 450 kg steer would need 72 m² area of a pasture yielding 1251 kg DM/ha each day—if we allow him to graze the pasture down to the ground. The calculation is:

- Steer intake = $2\% \times 450 \text{ kg} = 9 \text{ kg/day}$ or 9,000 g/day
- Pasture yield = 1251 kg DM/ha or 125 g/m²
- Area needed = $9,000 \text{ g/day} \div 125 \text{ g/m}^2 = 72 \text{ m}^2$.

* This figure is derived by multiplying the average weight for our ¼ m² quadrat (0.5 m by 0.5 m = 0.25 m²) by four to give us the weight per square metre. Multiply this value by 10,000 to give grams per hectare and then divide by 1000 to give kg per hectare.

If the steer was allowed to graze at a more sustainable level of 30% forage use, we need to adjust the calculation of the available feed i.e. $30\% \times 1251 \text{ kg DM/ha} = 376 \text{ kg DM/ha}$ or 37.6 g/m^2

The area needed for the steer to graze sustainably is 240 m².

Another way to calculate this is based on hectares. At 30% pasture use you could stock 42 head on one hectare for a day—assuming none of the feed is trampled into the ground.

More information

For more information contact your local DEEDI office, go to the DEEDI website or contact David Phelps on 07 46501200 or Email david.phelps@deedi.qld.gov.au