

1-15 Using the Rising Plate Meter (RPM)

The Rising Plate Meter (RPM) is a farm management tool that is used through out New Zealand Pastoral farming to measure perennial ryegrass/white clover swards.

Caution

The RPM is a farm management tool that approximates pasture mass. It should not be used as the only method to allocate pasture to stock. Allocation of pasture should be made with the following considerations:

- Observation of stock that they are grazing for sufficient time
- That post grazing residuals are hitting the desired targets

The benefits of the RPM are:

- Able to quantify pasture on farm (Average Pasture Cover)
- Correctly and consistently target a consistent pasture height
- A tool that almost anybody can use

When used in conjunction with regular farm walks the RPM can be a vital cog in pasture management decisions. The data collected can also generate valuable information for future farm management decisions. The data collated can provide:

- Annual farm growth rates
- Individual paddock growth rates
- Seasonal average pasture targets
- More accurate information for feed budgets
- Information to build a feed wedge

Key points when using the RPM

- The RPM measures height not kilograms of dry matter (kg DM)
- The equation that converts height to kg DM should be seen as a guide
- Maintenance is critical to ensure accuracy and reliability of reading
- Operators technique needs to be consistent
- Adverse environmental conditions will impact on accuracy

What does the Rising Plate Meter measure?

The RPM measures the compressed height of pasture. Each of the 'clicks' represents 0.5cm of compressed height i.e. a reading of 7 "clicks" represents a compressed pasture height of 3.5 cm.

The RPM equation

"Average compressed pasture height" $\times 140$ $+ 500$ = kg DM/ha

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Readings from RPM \times the multiplier $+$ the adder = kg DM/ha

Understanding the equation

The equation changes the compressed height (i.e. "clicks") to a kg DM/ha. This equation is a 'guide' and not an absolute measure of quantity as the DM composition will change due to seasonal variations.

The platemeter equation is a regression equation. The "adder" as it is called, is where the regression line bisects the vertical axis (i.e. it is the DM yield when the RPM has a reading of 0). The "multiplier" is the slope of the regression line. The multiplier accounts for the increase in DM yield for each increase in RPM reading.

For the winter formula above ("clicks" \times 140 + 500) the DM yield when the plate reads 0 = 500 kg DM/ha and for every 0.5 cm or "click" of compressed height measured by the plate meter there is another 140 kg DM/ha.

Range of the multiplier:

- 115 when grass is growing the fastest (e.g. low DM)
- 140 this is about the average (so best fit for the whole season)
- 185 used in very dry conditions of slow growth e.g. drought, frost (higher DM)

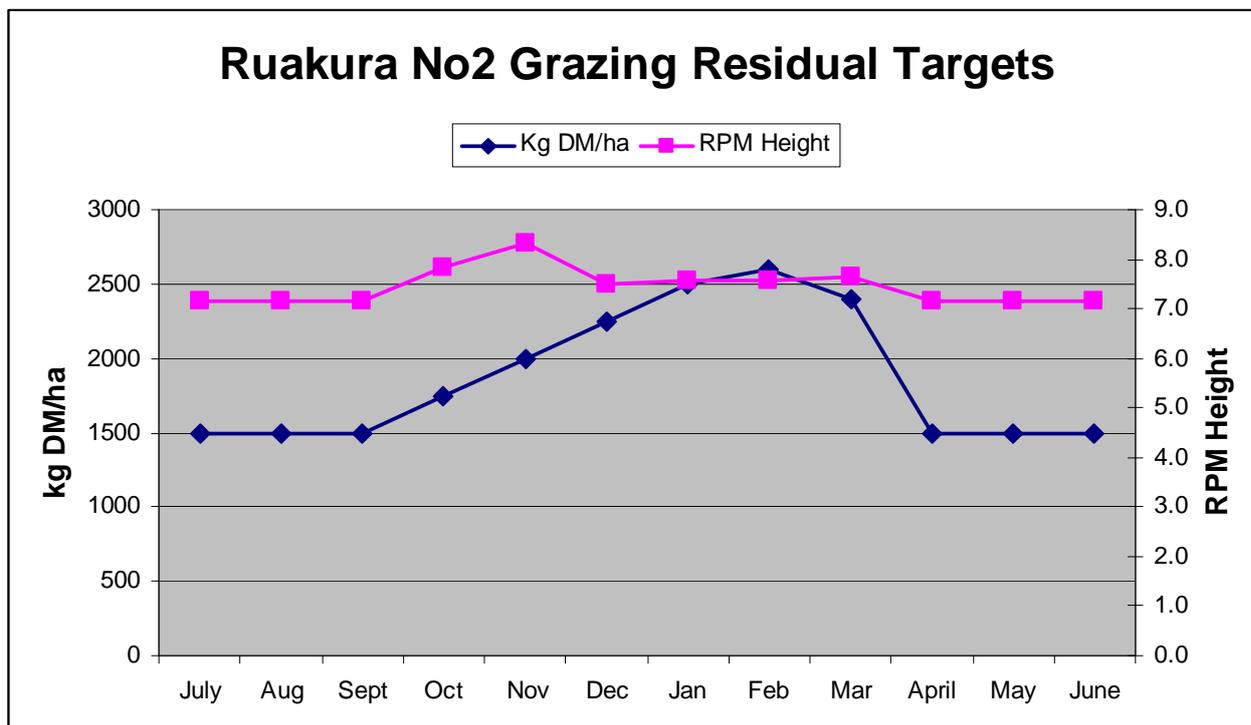
Use one equation for simplicity and convenience

The equation of "average compressed height \times 140 + 500" is the best fit for most situations and makes the data produced the easiest to understand.

Achieving consistent grazing height is the key to offering cows high quality pasture at every grazing. One of the main benefits of the RPM is that it accurately assesses post grazing heights. In the past, target grazing residuals have been communicated to farmers in kgs DM/ha with different targets throughout the year, but as the line representing RPM height in *Figure 1* below shows, the actual grazing height changed little. This led to a lot of confusion with farmers lifting post grazing height and losing quality when the post grazing height should actually be consistent through out the year at 7 - 8 clicks on the RPM for ryegrass/clover pastures.

Therefore height is the preferred method to express grazing residual targets as it eliminates the confusion created from having different targets for different months of the year and changing the plate meter equations.

Figure 1: Ruakura No2 Grazing Residual Targets Expressed as kg DM/ha and Height (RPM clicks)



Maintenance of the Plate Meter

To ensure the RPM gives consistent readings, routine maintenance needs to be carried out. Refer to the manufactures guidelines. The main problems associated with the RPM are:

- Corrosion on the shaft
- Grass and mud build up on the plate and shaft
- Poor wheel alignment in the shafts grooves
- A bent shaft
- Flat batteries (Electronic RPM)

Check the operation of the rising plate meter prior to commencing the walk for:

- Charged battery (if using electronic meter)
- Freely moving shaft and correctly aligned cog
- A clean plate free of grass and mud

Once the farm walk has been completed ensure the RPM is clean and dry and stored correctly.

Operator technique and procedures

Incorrect operator technique will cause inaccurate readings of the RPM. The main operator problem is extra pressure applied to the RPM when taking a measurement. The RPM has been calibrated with the plate falling under its own weight. By creating extra force (slamming the plate down or using the RPM as walking stick) the plate falls faster and the shaft can be pushed below the soil surface.

Rolling the RPM when taking a measurement generally does not affect the measurement unless it is very pronounced.

When taking readings during the farm walk the following will need to be considered to ensure consistent measurement:

- Avoid gateways, troughs and fence lines
- Ensure the walk gives a fair representation of the paddock. To do this either walk diagonally across the paddock or walk a “w” within the paddock
- The readings should be random and not biased by the operator looking where to place the RPM. A guide is to take a reading every 2-3 steps.

Adverse Weather Conditions

Weather conditions can impact on the accuracy of the RPM. In extreme conditions postpone the walk until conditions improve. Factors to consider under different conditions:

Ground frost

- Do not plate the farm when the pasture is still frosted, wait until it has lifted
- If the soil is frosted apply pressure to the shaft to break the standing ice crystals so that the bottom of the shaft reaches the soil surface

Windy conditions

- Strong wind conditions will compress long pasture resulting in lower readings

Heavy Rain and wet conditions

- In wet conditions water can accumulate on the plate. This accumulation of water increases the weight of the plate and results in lower readings. Regularly shake the plate to remove any surface water.
- After heavy rain pasture can also be ‘compressed’ resulting in a lower height reading
- Avoid areas of surface water as the RPM will give inconsistent readings

Snow

- A snow fall on pasture will “compress” the pasture resulting in lower height readings

Avoid other pasture or weed species

The RPM has been calibrated for perennial ryegrass/white clover swards. Different pasture species (e.g. Fescue, Kikuyu) will give different readings, as the physical composition of the plants is significantly different.

Weed species such as thistles, buttercup and wire weed need to be avoided as they cause the RPM to read “high” as they hold the plate above the ground. If paddocks have been topped in previous rounds beware of topped areas that contain weed stems. Often the weed stems are very hard and woody and create an ‘artificial’ residual for the RPM.

Pugged paddocks

The RPM will not give an accurate assessment of pasture cover in badly pugged paddocks. Visual assessment should be used after calibrating the “eye” using the RPM on paddocks that have not been pugged.