
Handbook Manual Platemeter



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Introduction

Congratulations on the purchase of your Manual Platemeter. This platemeter is a highly engineered precision device for measuring the average height of pasture relative to density of the pasture.

This is directly relative to the quantity of dry matter present (kilograms of dry matter – kg DM/ha).

Your platemeter will become an invaluable tool in your farming operation for day-to-day feeding decisions and long term feed budgeting.

Important safety note

Read and understand all the instructions before using the platemeter. A copy of this user guide can be downloaded from www.jenquip.co.nz or www.nzagriworks.co.nz

Your platemeter is designed only for measuring pastures. Use it for no other purpose (e.g. it is not a walking stick.) This platemeter has been manufactured using quality materials and techniques, however, if faults do occur, have them corrected before you use the platemeter.



Be careful around electric fences. Parts of the platemeter will conduct electricity!

Store the plate correctly. Be careful that the wind does not blow the plate away. It is not to be thrown.



Water blasting or submerging the unit will void the warranty.

Assembly Instructions

The platemeter is supplied in three parts:

The plate

The plate sits on top of the pasture to establish average height and density. The area-to-weight ratio of the plate has been carefully calibrated.

The rod with meter

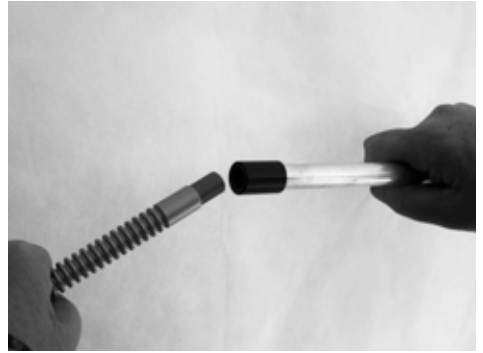
The grooved rod allows pasture to be measured in 0.5 cm intervals (clicks). The rod includes the manual meter.

The handle

Attach top handle to the rod. Ensure that the rod does not fall through the counter as this will damage the gear and void warranty.

Top Handle assembly instructions

Screw top handle onto the top of the grooved rod where it comes out of the counter.



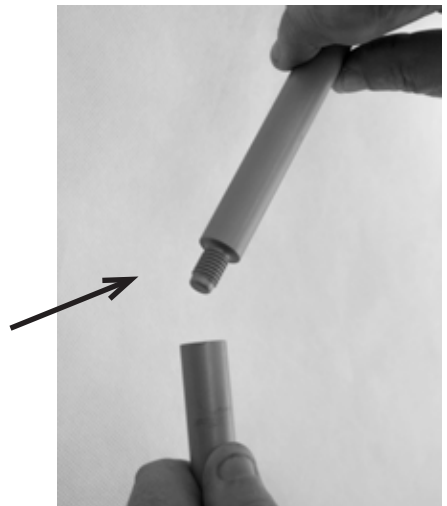
Grooved Rod Extension (for the 400mm model)

Turn upside down and slip off the O ring.



Put 4 drops of thread locker into the female end.

Screw threaded rod extension into grooved rod and do up firmly by hand, wiping off any excess thread locker that may have leaked out with a dry cloth. Do not use tools as this will damage the grooved rod.



Using Your Platemeter

Principal of Use: place the meter squarely on the ground. The plate will “rise” as it rests on the grass, giving a reading of grass height ($\frac{1}{2}$ cm increments) on the bottom counter. At each measurement, click the top (sample) counter to record the total number of samples taken.

Technique: practice the technique of an uninterrupted slow walking pace, taking care not to “roll” the meter. (This is where the plate is not square to the ground and it will provide a false HIGH reading.) Try “rolling” and compare the results with placing the meter squarely on the ground. The meter should also be lowered consistently—not gently but not forced into the ground either.

Farm Walk: the more regularly you take readings the better. Astute farmers will take readings weekly, sometimes more often during critical times of the year and less frequently during times of static conditions. The more samples taken per paddock the less margin of error. We recommend 20 to 40 samples per paddock but if you have bad conditions i.e. pugged paddocks, more samples should be taken.

Most paddocks will have areas of good growth and areas of poor growth. If recently grazed, the pasture may be clumpy. Ensure that your walk includes representative samples of both areas. Avoid tracks, stock camp sites and other uncharacteristic areas.

Take samples every 3 paces or so, rather than choosing by eye the spot to sample. This removes operator preference for long or short patches.

Be consistent. Plan the same walk every time although it can be done in reverse. This allows each walk to be compared with another.

Recording

On starting each paddock, record the bottom counter opening (initial) reading onto your platemeter record sheets. Zero your top sample counter and commence your walk. Click the sample counter each time a sample is taken.

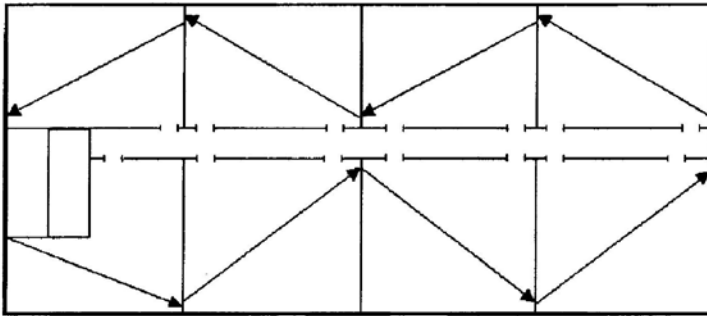
On the last sample for the paddock, leave the meter squarely on the ground and record the bottom counter reading and number of samples taken; zero the sample counter.

Hint: Lift the meter up and grasp it by the grooved shaft, with your thumb placed

on the sliding tube assembly to stop it moving.

When you start your recording in the next paddock there will be no need to record the opening reading as it will be the same as the closing reading in the previous paddock (only 2 recordings per paddock!)

Before starting the next paddock ensure the sample counter is zeroed and your bottom counter recording and reading are the same.



Analysing recordings from the farm walk

A calculator can be used, however if you have a computer the optional Pasture Management Software programme simplifies the procedure. (The software programme fully explains the procedure to be used.)

Procedure for using a calculator: on your recording sheet fill in

- The date of the farm walk
- For each paddock the initial and final readings and the number of samples taken.
- Write down the area of each paddock

Select an equation (formula) to use. The equation will vary depending on pasture type (clover, rye grass etc), pasture condition, time of year (leafy growth/stem growth/seed head stage,) local conditions etc.

However the important factor for achieving meaningful results is to be

CONSISTENT with an equation throughout a feed budgeting programme. If you need to change your equations, try to change at the same time each year so your results can be compared.

Before selecting an equation talk with your local discussion group or farm adviser to see what they are using. You may wish to do a full calibration. This requires cutting of quadrats. See addendum.

You are feed budgeting your property for your benefit. (Problems can arise when comparing results with other properties due to different pasture types, techniques used etc.)

Results from your feed budgeting will assist in making important management decisions such as:-

- Stocking rates
- Quantity of feed supplements to feed
- When to apply nitrogen fertiliser
- Predicting future shortages or surpluses of pasture
- Planning silage and hay making
- Drying off times
- Stock sale decisions
- Highlighting poor performing pastures or paddocks

Various equations are shown on the following pages: Follow the instructions below, and then using the appropriate equation calculate the Kilograms of Dry Matter per Hectare (Kg DM /Ha); multiply this by the paddock areas to get total Kg DM per paddock. Various equations are shown on the following pages. Follow the example:

Example: $\frac{\text{Initial Reading} = (X) - \text{Final Reading} = (Y)}{\text{Number of samples taken in paddock} = (Z)}$

$$\frac{(Y) \quad (X)}{(00720 - 00420)} = 10 \times 158 + 200 = 1780 \text{ Kg DM/Ha}$$

30
(Z)

$$1780 \text{ Kg Dm/Ha} \times 3 \text{ (paddock area)} = 5340 \text{ KGDM}$$

(Total Dry Matter in paddock)

Standard equations

Dairy pasture

Moderate rainfall periods

$$\frac{(Y-X)}{(Z)} \times 158 + 200 = \text{Kg Dry Matter per Hectare}$$

Dairy pasture

Reasonably consistent rainfall

$$\frac{(Y-X)}{(Z)} \times 158 + 1000 = \text{Kg Dry Matter per Hectare}$$

Sheep pasture

$$\frac{(Y-X)}{(Z)} \times 200 = \text{Kg Dry Matter per Hectare}$$

Total dry matter = Kg Dry Matter per Hectare x paddock area

Growth rate of pasture = Final Kg DM / ha - Initial Kg DM / ha

(Kg DM / Ha / day) Number of days between sample

Seasonal variations of formulas

Depending on the time of the year the following equations can be used instead of the standard equation (x 158 + 200)

- | | |
|--|-------------|
| 1 Winter & early spring- before stem growth | x125 + 640 |
| 2 Late spring & early summer- during stem growth | x130 + 990 |
| 3 Mid summer | x165 + 1480 |
| 4 Early autumn- before autumn rain | x159 + 1180 |
| 5 Late autumn- after rain | x 157 + 970 |

Dexcel standardised equations

These equations were derived to overcome regional differences throughout New Zealand. They should be used when comparing results with others.

Ready Reckoner:

Take 50 measurements per paddock and determine total difference between end and start readings. Read off RPM height and KgDM/ha for that period. (Source: DEXCEL 1999.)

The above formulas are industry published. Jenquip does not provide agronomy advice.

50 RPM readin gs Total	Ave RPM height (half cm)	Winter = X 140 + 500	Oct = X 115 + 850	Nov = X 120 + 1000	Dec = X 140 + 1200	Jan = X 165 + 1250	Feb = X 185 + 1200	March = X 170 + 1100
900	18	3020	2920	3160	3720	4220	4530	4160
850	17	2880	2805	3040	3580	4055	4345	3990
800	16	2740	2690	2920	3440	3890	4160	3820
750	15	2600	2575	2800	3300	3725	3975	3650
700	14	2460	2460	2680	3160	3560	3790	3480
650	13	2320	2345	2560	3020	3395	3605	3310
600	12	2180	2230	2440	2880	3230	3420	3140
550	11	2040	2115	2320	2740	3065	3235	2970
500	10	1900	2000	2200	2600	2900	3050	2800
450	9	1760	1885	2080	2460	2735	2865	2630
400	8	1620	1770	1960	2320	2570	2680	2460
350	7	1480	1655	1840	2180	2405	2495	2290
300	6	1340	1540	1720	2040	2240	2310	2120
250	5	1200	1425	1600	1900	2075	2125	1950
200	4	1060	1310	1480	1760	1910	1940	1780
150	3	920	1195	1360	1620	1745	1755	1610

Which equation should you use?

We say if you are comparing notes with a neighbour, a discussion group or an adviser then you are probably best to use a similar equation to the one they are using. A lot of farmers don't compare with others and only use the dry matter values for their own use. In this case select an equation relevant to the pasture growth stage.

Still unsure as to which equation to use, suspicious of your findings or having a disagreement with others? The answer is to cut, dry and weigh a pasture sample. We have heard of disagreements with grazing contracts based around meter readings where each party thinks a different equation should be used.

The answer is unbiased- for the most accurate equation, cut, dry and weigh a sample (see "Cutting Quadrats" in the Addendum.) This weight is then compared with a meter reading for the same sample using the various equations, to see which one most closely matches the weight of the sample. Be consistent with your farm walk and equations and you will end up with records which are meaningful, comparable and very useable.

Hints: It is possible to get a read out of KgDM/Ha in the paddock without using a calculator.

Step 1- Using a felt tip pen, copy the relevant parts of the following table onto the plate.

Step 2. Move the plate up and down until an easily remembered figure is on the bottom counter i.e. 11,300

Step 3. Take 30 samples in the paddock. Note final reading and subtract it from initial reading. Round reading difference to the nearest on the chart and read off KgDM/Ha.

30 Plate		KgDM/ha			Before	After
Readings	x 158 + 200	Winter	Spring	Summer	Autumn rain	Autumn rain
50	465	850	1205	1755	1445	1230
100	730	1060	1425	2030	1710	1490
150	990	1265	1640	2305	1975	1755
200	1255	1475	1860	2580	2240	2015
250	1520	1680	2075	2855	2505	2280
300	1780	1890	2290	3130	2770	2540
350	2045	2100	2505	3405	3035	2800
400	2310	2310	2720	3680	3300	3060
450	2570	2515	2940	3955	3565	3325
500	2835	2725	3155	4230	3830	3590
550	3095	2930	3370	4505	4095	3848
600	3360	3140	3590	4780	4360	4110
650	3625	3350	3810	5055	4625	4370
700	3887	3560	4020	5330	4890	4630

Maintenance

Your meter has been developed over a number of years to be simple, effective yet reliable. However a little maintenance will ensure many years of trouble-free use.

Before use

After assembling the plate onto the grooved rod move the plate up and down a few times to ensure no binding occurs. If its movement is restricted the reason must be found and rectified before the meter is used.

After use

Remove the plate and wash it clean. DO NOT WATER BLAST. Wash and dry the area around the bottom of the meter. Move the sliding tube assembly so that all dirt and accumulated grass can be washed away.

Fault Finding

Abnormally high or inconsistent results:-

Activate the top sample counter a few times to ensure it counts only once each time it is pushed. Over a period of time the top counter can dry out and record several counts at each activation. If this is the case some CRC light penetrating oil should be applied to the counter, either through the hole in the casing or preferably by stripping the counter apart. Or return to your service agent for servicing.

After several activations the counter should again count correctly.

High results: Check your technique to ensure you are not “rolling” the meter.

Low results: Ensure the bottom slide tube assembly is not binding during its travel up and down the grooved shaft.

Addendum

A. Cutting Quadrats

To calibrate the meter, you must first know exactly how much pasture is in the paddock. Cutting quadrats is the traditional scientific method of measuring dry matter, used almost universally for decades. Once the amount of Kilograms of Dry Matter (KgDM) are known this can be compared with the readings obtained from the Jenquip platometer. A formula converting the meter readings to actual KgDM/hectare can then be arrived at.

Cutting Quadrats: This involves sampling a number of quadrats (small areas) per paddock. There are variations of this method but a common version is described here:

1. Make a template out of ½” steel rod, plywood sheet or similarly stiff material. For longer pastures a “box” with no bottom works well. This can be any shape but the area of the hole in the template must be known. We recommend a template with a hole measuring 20cm x 50cm (i.e. 0.1 m²).
2. Using the platometer measure where the pasture is typical of the rest of the paddock.
3. Now place the template in the sample area. Using shears or clippers, cut and collect all the pasture within the template right down to the soil level.
4. Wash the sample to remove any soil or dung contamination. (Place the sample in a 20 litre bucket, turn a high pressure hose on it until the bucket is full. Pick any floating dung out of the bucket by hand and pour the water through a sieve or colander, catching the grass in the process but taking care to leave any lumps of soil in the bottom of the bucket. Repeat with a second rinse if necessary, and leave the colander to drain for a few minutes.

Drying the sample:

This can be done in a standard oven provided it is set on the lowest setting, (60 to 80°C) and the oven door left open to let the moisture escape. Drying time is overnight. Over drying is a possibility so be consistent with your procedure. Alternatively, a microwave oven can be used. They have limited capacity so only small samples can be dried at a time. Leave a glass of water inside the oven to prevent arcing which could occur as the sample dries out. Drying time depends on the size of the sample but is usually less than 15 minutes. Once the sample is dry it is then weighed. If your sample area was 0.1 m² then
Weight (gms) x100 = Kg DM / ha

The more quadrats you cut in a paddock the better will be your result. Typically, three to five samples per paddock are taken.

Deriving the Formula

Although a long hand mathematical calculation can be used to derive the formula, the easiest method is to use a programmable calculator capable of regression analysis. The “average” pasture height reading is graphed against actual dry matter measured.

B. Conversion Factors

— Hectares x 2.471 = Acres

— Acres 2.471 = Hectares

— 1 Hectare = 10,000 square meters

— Kilograms x 2.205 = Pounds

— Kg DM 1 Ha x 0.892 = lbs DM / Acre

(lbs DM/Acre/day) = Final lbs DM/Acre - Initial lbs DM/Acre
Number of days between samples

C. Supplementary Feed Values

1 cubic meter of silage averages 800 kg (0.8 tonne). To estimate DM content of silage, twist the silage in your hand to see how easily the juice is expressed.

— If juice is easily expressed by hand, DM below 18%

— If juice is expressed with difficulty, 18-22%

— If little or no juice is expressed but hands moist, 22-27%

Silage- Hay conversions

