



Perennial ryegrass grazing management in spring

Paddock guide

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We thank the farmers and our DairyNZ colleagues whose contributions have enhanced this booklet.

How to use this booklet

This booklet provides information to enable you to answer key grazing management questions:

Is this
perennial
ryegrass?

At what leaf
stage am
I grazing
pastures?

Is my pre-grazing
yield on target?

Am I achieving
target post-
grazing residuals?

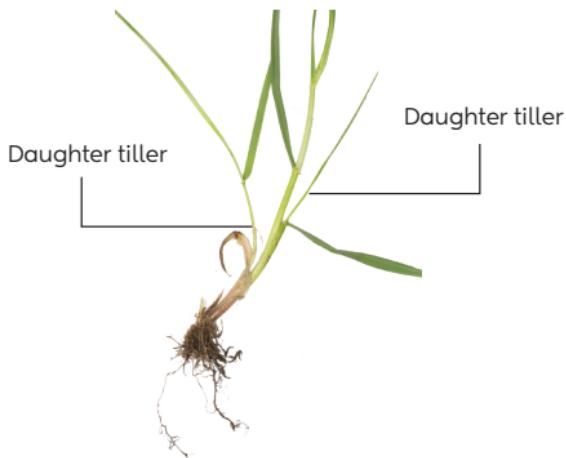
Am I using a
combination
of animal and
pasture indicators
to make
profitable feeding
decisions?

Perennial ryegrass

- Leaves: hairless, defined mid-rib, ribbed on upper surface, shiny underneath
- The emerging leaf is folded
- Reddish /purple base _____
Dead leaf material may need to be peeled back to see this
- Plants are made up of a number of tillers
- Each tiller:
 - has its own leaves and roots
 - maintains three live leaves which develop from the growing point at the base of the tiller
 - is capable of producing new or daughter tillers
 - has one leaf growing at a time – as the fourth new leaf emerges, the oldest leaf dies
 - lives for about one year



- Spring and autumn are key periods of tillering
 - production/growth of new tillers
- Tillers can be classified as vegetative (leafy) or reproductive
- A reproductive tiller can be identified by looking for, or feeling for, nodes on the stem (this will feel like a small bulge or thickening if you run your fingers along the stem)



- When tillers become reproductive the stem elongates and eventually, if the tiller is not grazed, a seed-head is produced
- Poa and Italian ryegrass are commonly mistaken for perennial ryegrass.
- Poa leaves are boat-shaped and usually a lighter yellowish-green in colour.
- The most reliable difference between perennial and Italian ryegrass is that emerging Italian ryegrass leaves are rolled, not folded like emerging perennial ryegrass leaves.

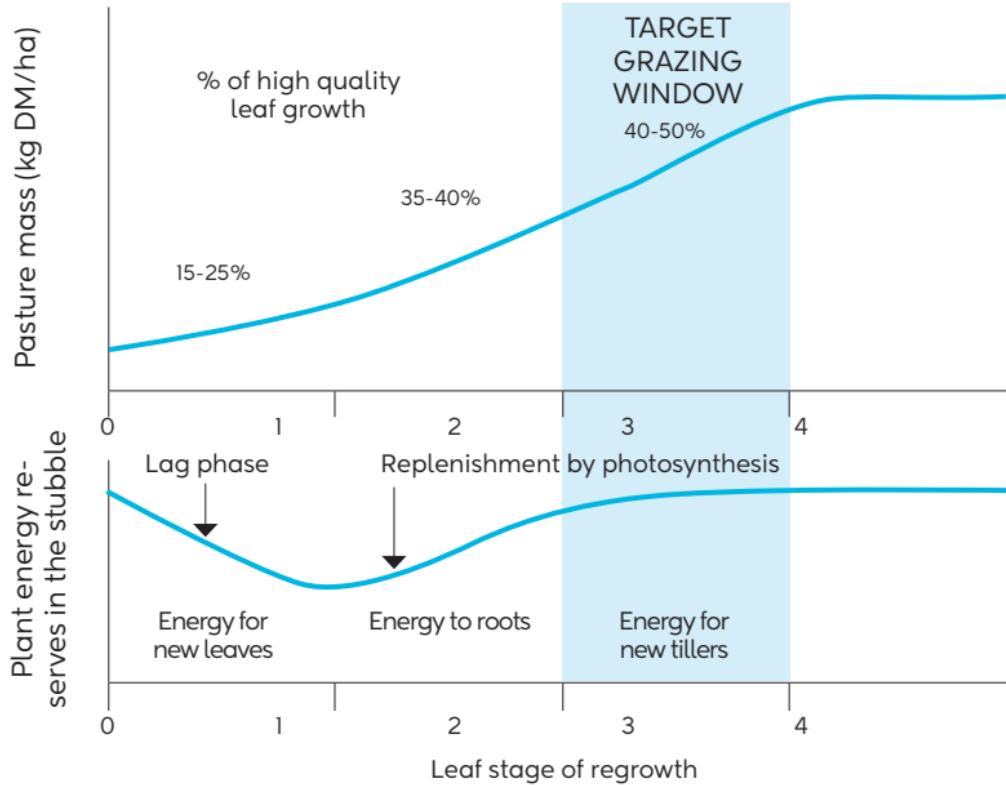


Leaf stage approach to grazing management

Leaf stage:

- determined by the number of leaves per tiller
- can be used to identify when a paddock is ready to be grazed
- reflects the tillers energy status and ability to recover after grazing
- is only measured on vegetative (leafy) tillers.

- Graze between the 2 and 3 leaf stages of regrowth to optimise production of high quality pasture; earlier if canopy closure occurs (see p12)
 - Grazing may occur closer to the 2-leaf stage when demand per hectare is low or when moving into surplus
- After the 3-leaf stage, older leaves die resulting in wastage, and feed quality falls as dead material builds up.
- Grazing when there are two or less leaves per tiller limits both yield and regrowth, as it prevents the plant from fully replenishing its energy reserves.



TIP: First leaf contributes less when using low N inputs or grazing below target residuals

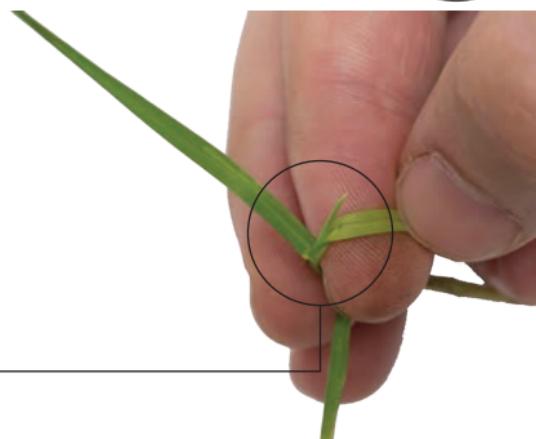
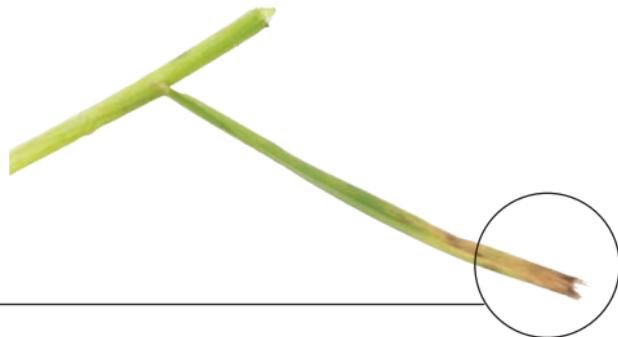


Leaf stage

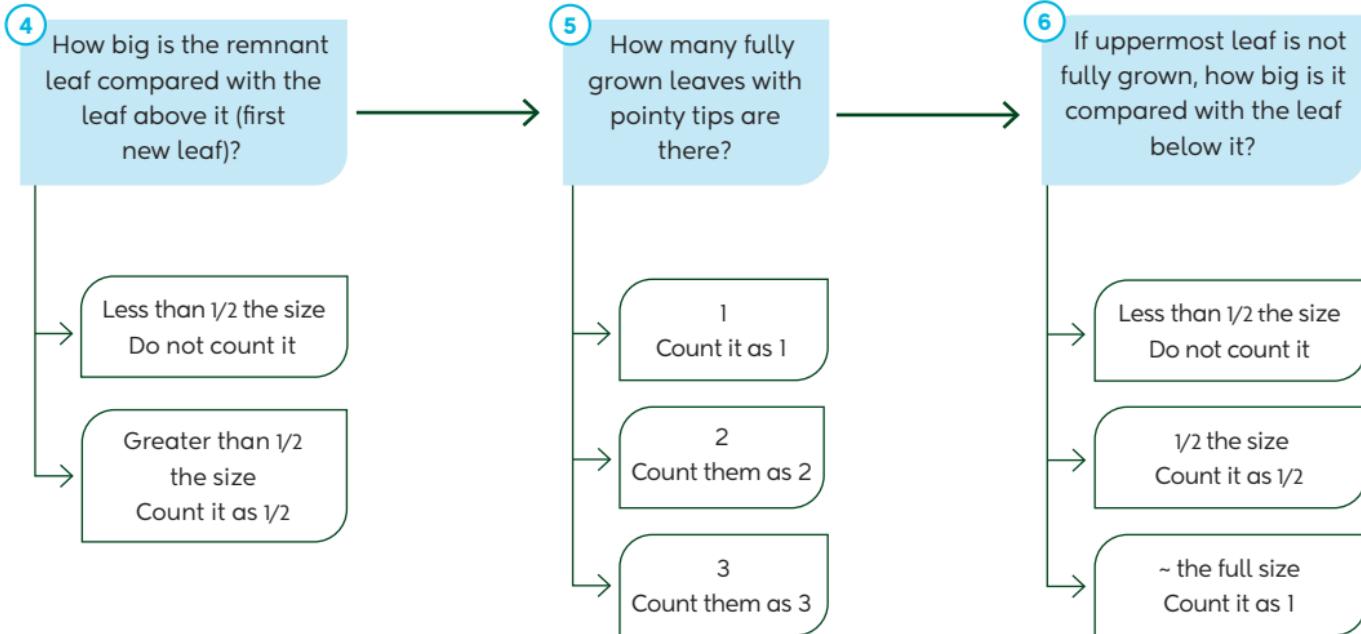
Steps to estimate leaf stage

– to the nearest $\frac{1}{2}$ leaf

- 1 Choose a perennial ryegrass tiller
- 2 Check that the tiller is vegetative
- 3 Check if the tiller has a remnant leaf (one that was grazed at the last grazing and has a blunt tip).
If more than one remnant leaf just include the uppermost remnant leaf.

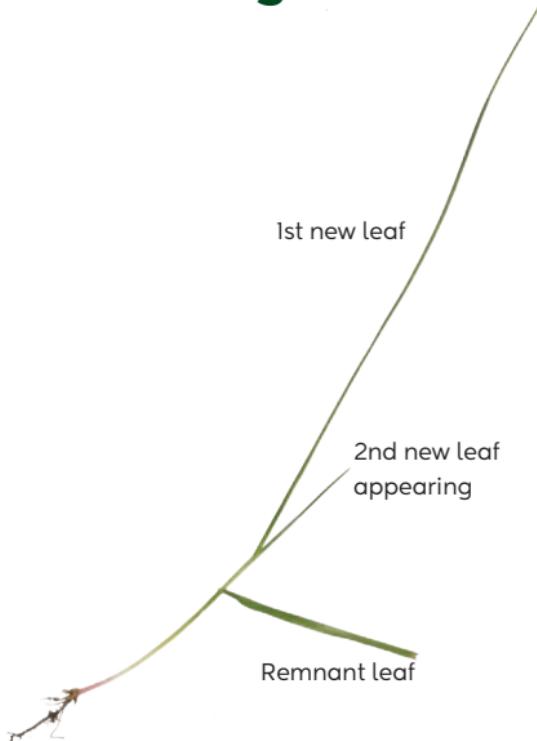


Note: Leaves are fully grown when the next leaf has begun to emerge. For the uppermost leaf you may need to unfold it along the mid-rib to check this.

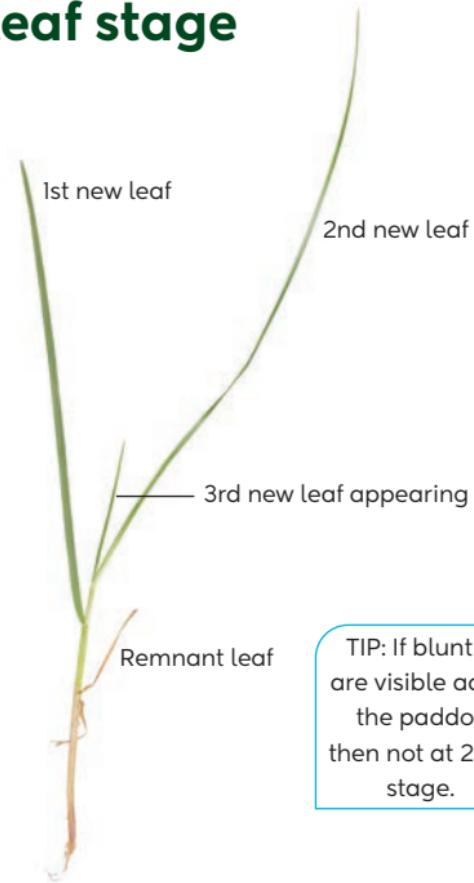


Repeat for 10 tillers from across the break or paddock.

1 – leaf stage

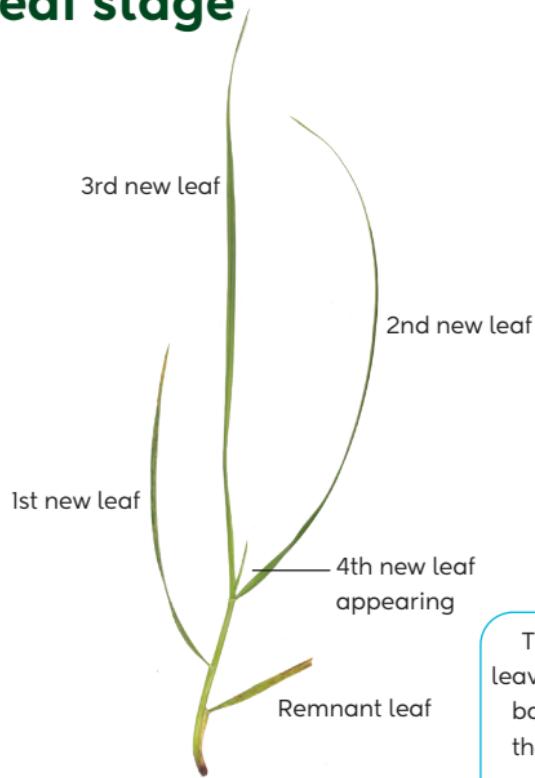


2 – leaf stage

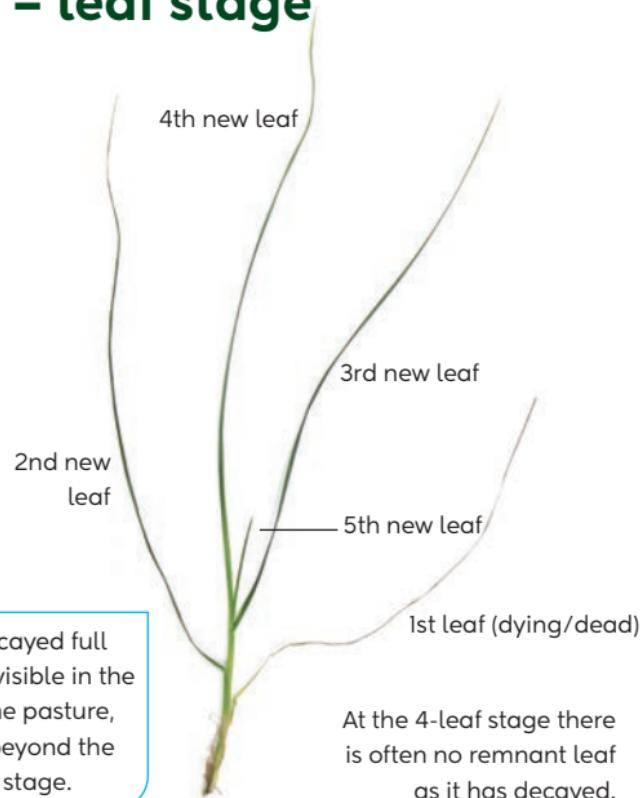


TIP: If blunt tips are visible across the paddock then not at 2-leaf stage.

3 – leaf stage



4 – leaf stage



TIP: If decayed full leaves are visible in the base of the pasture, then it's beyond the 3-leaf stage.

At the 4-leaf stage there is often no remnant leaf as it has decayed.



Canopy closure

If pastures are at or nearing canopy closure they need to be grazed or conserved regardless of leaf stage.

- Standing in the paddock you can't see the base of the pasture and very little bare ground or soil
- Grass leaves beginning to fold over rather than stand upright
- Yellowing at base.

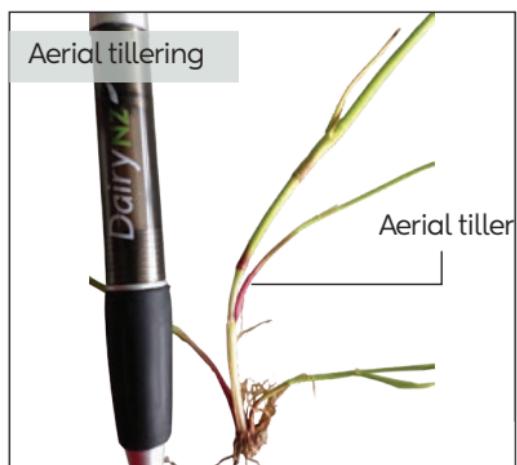
Canopy closure = ↑ shading, ↑ tiller death, ↓ new tiller growth, ↓ clover content, ↑ aerial tillers, ↑ stem production.

If canopy closure is happening repeatedly, re-assess nitrogen policy, check target residuals are being achieved and ensure rotation length is not too long. Under modern grazing practices, natural reseeding of perennial ryegrass is rare, so plant survival depends on tillering (through daughter tillers).

Canopy closure



Aerial tillering



Pasture allocation

Correct assessment of pre-grazing yields will enable:

- good allocation of pasture to the herd
- management of yields within the desired range
- good animal performance – focus on quality and leaf content
- target post-grazing residuals to be achieved.

Walk into the paddock and observe variation in pasture, weeds, bare patches etc and score accordingly.

Target pre-grazing yield

Stocking rate (cows/ha) x pasture requirement
(kg DM/cow/day) x rotation length (days) +
residual (kg DM/ha)

e.g. $(3 \times 18 \times 21) + 1500 = 2634 \text{ kg DM/ha}$

Pasture quality

	Energy (MJ ME/kg DM)
Green leaf	10.5-12.5
Soft stem	10-11
Hard mature stem	6.5
Dead material	6.5

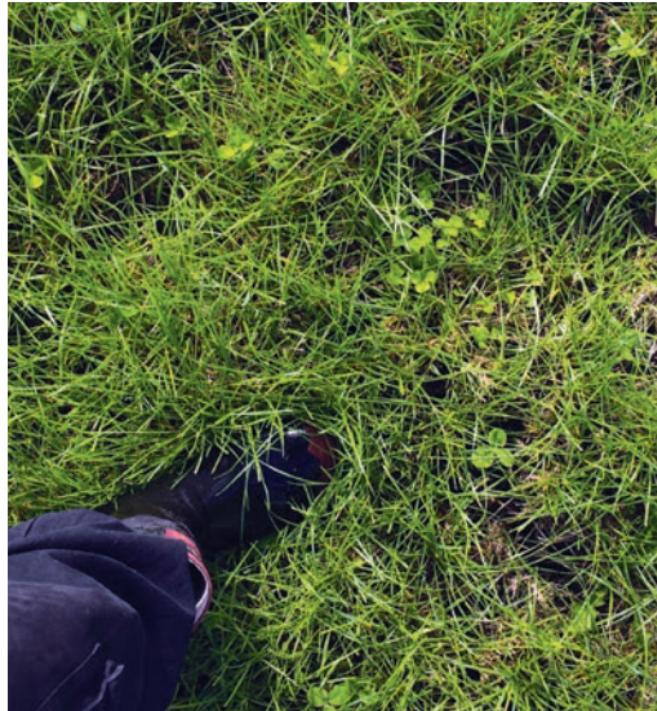
HINT: A crossbred cow producing 1.8 kg MS will require 16 kg DM of 12 ME pasture or 18 kg DM of 11 ME pasture.

TIP: Managing pasture well increases growth and utilisation. This increases profit per hectare, and footprint decreases.





2000 kg DM/ha



2500 kg DM/ha



3000 kg DM/ha



3500 kg DM/ha





Post-grazing residuals

Focus on the post-grazing residuals to optimise pasture utilisation and subsequent pasture growth and quality.

Target a post-grazing residual of 1500-1600 kg DM/ha or 7-8 clicks using a rising plate meter during spring and early summer (calving to Christmas)

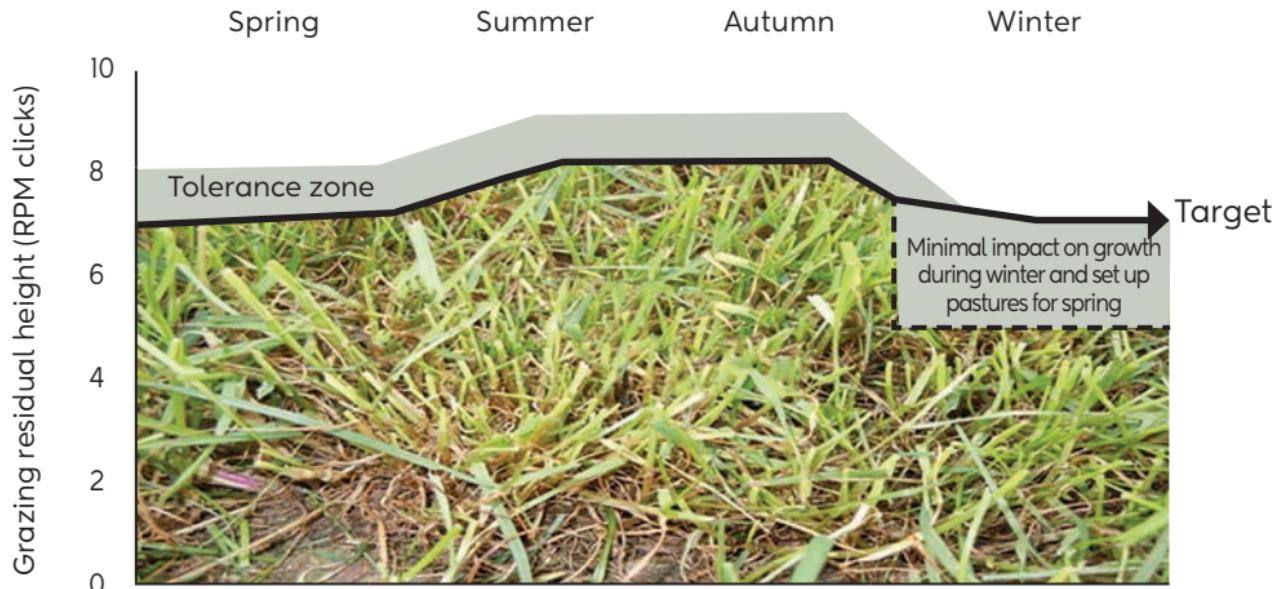
- Lower residuals will reduce regrowth
- Higher residuals reduce pasture quality at subsequent grazings and increase pasture wastage.

Achieving target post-grazing residuals and good animal performance requires:

- Accurate pasture allocation
- Maintaining pre-grazing cover around 2800-3200 kg DM/ha during spring
- If your targets are not being met, check your pre-grazing covers are correct and consider use of corrective actions e.g. post-graze topping.

Think of a simple way to record residuals daily such as on the whiteboard in the farm dairy. Residual measurement is also key to AI tools (such as in AIMER Vision and Halter Pasture Pro) for delivering accurate information.

Schematic representation of target post-grazing residual height (compressed height) throughout the season.



Winter equation example:

$$1\text{cm} = 2 \text{ clicks} \quad \text{clicks} \times 140 + 500 = \text{kg DM/ha}$$

RPM = rising plate meter

cm	clicks	kg DM/ha
3	6	1340
4	8	1620
5	10	1900





1300 kg DM/ha or 6 clicks





- Very little to no leaf remaining in the paddock
- Lot of bare ground or soil visible
- Little herbage remaining around the clumps and the clumps are not obvious in the paddock

RESIDUAL BELOW TARGET/OVER-GRAZED



Post-grazing residuals



1500 kg DM/ha or 7 clicks





- Very little leaf remaining between the clumps
- Clumps are small with a “sharp” shape and are distinct across the paddock (dinner plate size)
- Tops and sides of the clumps are well eaten into
- Clumps make-up~15% of the area

TARGET RESIDUAL 7-8 CLICKS

TIP: Cows will only willingly eat what's grown since the last grazing.



Post-grazing residuals

1750 kg DM/ha or 9 clicks





- Quite a bit of length / grazeable green leaf between the clumps
- Grazeable leaf remaining around the clumps
- Clumps not as "sharp" as with 1500kg DM/ha
- Some uneaten leaves in area between clumps ("waving in the wind").

RESIDUAL ABOVE TARGET/UNDER-GRAZED



Post-grazing residuals

1900 kg DM/ha or 10 clicks





- Between the clumps is not grazed well
- Good quality, grazable leaf remaining
- Very large, rounded clumps with some clumps completely un-grazed
- Little herbage is removed from around dung pads
- Clumps make-up~30% of the area

RESIDUAL ABOVE TARGET/UNDER-GRAZED



Post-grazing residuals

1500 vs 1700 kg DM/ha



1500 kg DM/ha



1700 kg DM/ha

- More leaf remaining
- Some grazeable leaves between clumps
"waving in the wind".

1700 vs 1900 kg DM/ha



1700 kg DM/ha

TIP: "Turn that grass into milksolids. Use it or lose it."



1900 kg DM/ha

- Larger clumps
- More green leafy material remaining
- Some clumps entirely ungrazed.



1300 vs 1900 kg DM/ha



1300 kg DM/ha (6 clicks)

- Good pasture quality at next grazing
- Pasture yield reduced due to an increased 'lag phase' in the regrowth cycle
- Repeatedly grazing to this level will reduce persistence.



1900 kg DM/ha (10 clicks)

- Will lead to reduced quality and reduced tillering and persistence
- Review pasture allocation
See more at dairynz.co.nz/feed
- If pre-grazing covers are above target consider closing paddocks for silage.

Residuals from different pre-grazing yields



1500 kg DM/ha from pre-grazing of 2800 kg DM/ha

- Green colour at base.



1700 kg DM/ha from pre-grazing of 4000 kg DM/ha

- Pale colour at base (stemmy).



Post-grazing residuals

TARGET: 7- 8 clicks – late spring





- Very little leaf remaining between the clumps
- Majority of clumps are small and distinct
- Tops and sides of the clumps well eaten into and have a sharp shape
- Slight increase in dead material in the base of pasture compared to early spring
- Pasture moving to reproductive state – change in colouration in the base – more stem
- Clumps make-up ~15% of the area.





Poor grazing management

Possible causes:

- Above target pre-grazing yield
- Above target post-grazing residuals
- Grazed beyond 3-leaf stage.

Consequences:

- Long stem remaining
- Unable to achieve target residual without severely impacting animal performance
- Wasted pasture.

Actions:

- Graze with dry cows, earmark for silage or top to reset the post-grazing residuals to 7-8 clicks.

REMEMBER: "Quality is king."



Wet weather management

Seek to minimise pugging and compaction damage.

A decline in pasture utilisation may have to be accepted in order to minimise soil and pasture damage, resulting in higher than desired post-grazing residuals at this grazing event. Corrective action must be taken at the next grazing to reset the post-grazing residual.

Management options:

- Select drier paddocks or cropping paddocks
- On/off grazing
- Graze lower pre-grazing yield and therefore allocate a larger area per day for a short period
- Accept higher residuals at this grazing event and use corrective action when able
- Use back fencing and graze from back to front of the paddock to prevent repeated pugging.



- Use gateways and races effectively, e.g., if possible, enter and exit the paddock through different gates.

Consider impact of reduced utilisation on feed offered.

Subsequent management:

- Aim to promote tillering and pasture recovery by achieving target pre-grazing yields and residuals, and through the use of nitrogen fertiliser
- Keep a record of wet/damaged paddocks to avoid successive pugging events in individual paddocks.
- Use portable water troughs or improve locations and numbers of permanent troughs.



Decision support tool

Put a ✓ in the coloured cell that best describes your situation. Complete as many rows as possible.

Add up the ✓'s in each column – if you have a high number in the Green column you are on target, a high number in brown indicates you are slightly off target and a high number in a grey column indicates you are well off target.

Assessing rotation length	Too short	Target	Too long
PRE-GRAZING YIELD			
Current leaf stage	1 per tiller	1-2 per tiller	2-3 per tiller
Does grazing now reduce potential DM eaten in this paddock?	Growth reduced considerably	Growth reduced	No
Has canopy closure occurred in this paddock?			No
			Some leaf wastage
			Considerable leaf wastage
			Some patches
			Lots of patches

Assessing feeding level	Suggests inadequate feeding	Target	Suggests over feeding
POST-GRAZING RESIDUAL			
Overall height	Less than 5 clicks	5-7 clicks	7-8 clicks
Proportion of area covered by clumps	None	Less than 10%	10-20%
Grazing of clumps	Completely grazed	Few small clumps	Small and sharp
Grazable leaf remaining	None		Rounded
			Untouched
			Large amount

SUPPLEMENT

Is supplement being wasted in paddock?			No	Small amount	Lots
Does the herd require supplement?	Yes, large deficit	Yes, small deficit		No, small surplus	No, large surplus
Is supplement being wasted in the system?			No	Small amount	Lots

COW BEHAVIOUR

The herd on entering the paddock	Run and bellow	Some bellowing	Graze quietly		Little grazing/ lie down
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PASTURE QUALITY AND REGROWTH

Paddock regrowth and quality at the next grazing	Considerably reduced regrowth	Reduced regrowth	Maximum regrowth and quality	Reduced quality	Considerably reduced quality
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MILK PRODUCTION

Have I optimised immediate and future milk production from pasture?	No, well below, cows over-grazed	No, below, cows over-grazed	Yes, target production and residuals	No, grazable pasture left	No, lots of grazable pasture left
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TOTAL NUMBER OF ✓



Tool

Useful calculations

Leaf emergence rates

Leaf emergence rate = days since grazing / leaf stage

- If pastures are at the 2-leaf stage 20 days after grazing the leaf emergence rate is 10 days (20/2)
 - pastures will be at the 3-leaf stage in ~30 days
- Leaf emergence rate will not be less than 8 days
- Depends on temperature and moisture.

Estimating days since paddock was grazed

Leaf stage x leaf emergence rate

e.g. $2 \times 10 = 20$ days

Rotation length

Rotation length = total area ÷ area grazed

Area to graze = total area ÷ rotation length

Pasture allocation

HERD DEMAND

Required per cow x number of cows = demand

$$\text{e.g. } 18 \times 200 = 3600 \text{ kg DM}$$

Tip: Is the pasture requirement for 12 or 24 hours?

SUPPLY PER HECTARE

Pre-grazing yield - residual = supply

$$\text{e.g. } 2800 - 1500 = 1300 \text{ kg DM/ha}$$

AREA REQUIRED

Demand ÷ supply = area required

$$\text{e.g. } 3600 \div 1300 = 2.8 \text{ ha/day}$$

(Area x supply) ÷ number of cows = pasture available/cow

$$\text{e.g. } (2.8 \times 1300) \div 200 = 18 \text{ kg DM}$$

Area allocation

M² PER COW TO COWS PER HA

10,000 ÷ m²/cow = cows/ha

$$\text{e.g. } 10,000 \div 140 = 71 \text{ cows/ha}$$

$$(1\text{ha} = 10,000 \text{ m}^2)$$

Tip: A stride is approx. 1 m.

AREA REQUIRED BY HERD

Total cows ÷ cows/ha = area required

$$\text{e.g. } 200 \div 71 = 2.8 \text{ ha}$$

BREAK SIZE

Area (m²) ÷ paddock width = required length for break

$$\text{e.g. } (2.8 \times 10,000 = 28,000 \text{ m}^2)$$

$$28,000 \div 150 \text{ m} = 187 \text{ m}$$

187 m
150 m
2.8 ha
(28,000 m²)

dairynz.co.nz

Post-grazing
height target