A new grazing management strategy for Northern Dairy:

Part 3 Grazing management targets and strategies

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The Queensland Department of Agriculture and Fisheries (DAF) C4Milk team has developed a new grazing management strategy called PUP grazing (PUP: Proportion of Un-grazed Pasture) for tropical and temperate grasses and legumes for Northern dairy systems. This article, which is the 3rd and last of a series, covers the practical applicability of PUP grazing. The previous two articles (Part 1 and 2) published in Northern Horizons in July and September 2017 described the key grazing management principles of PUP grazing which are also briefly covered in this article.

The PUP grazing management strategy is an improved version of current grazing management recommendations (Diagram 1). For example the current recommendation for grazing ryegrass and kikuyu are based on grazing at 2 to 3 and 4 to 5 leaves, respectively. The PUP strategy uses the same pre-grazing leaf stages, the difference is in the grazing intensity. Current recommendations target a 5 centimetre post grazing residual, our approach to this is different, PUP grazing allow the milking cows to graze the top leaf stratum of high quality without forcing the cows to graze the bottom stemmy stratum of poor quality (Image 1, page 4). Then if necessary pasture residues are reduced to 5 cm but not with milking cows.

PUP grazing is based on the horizontal utilisation of all leaf material, leaving the low quality stemmy and contaminated material behind (Image 1). This grazing strategy provides a solution to the management of pastures with variable stem heights. The inclusion of the new grazing management target integrated into the currently recommended targets allows us to achieve both maximum pasture utilisation and cow productivity.

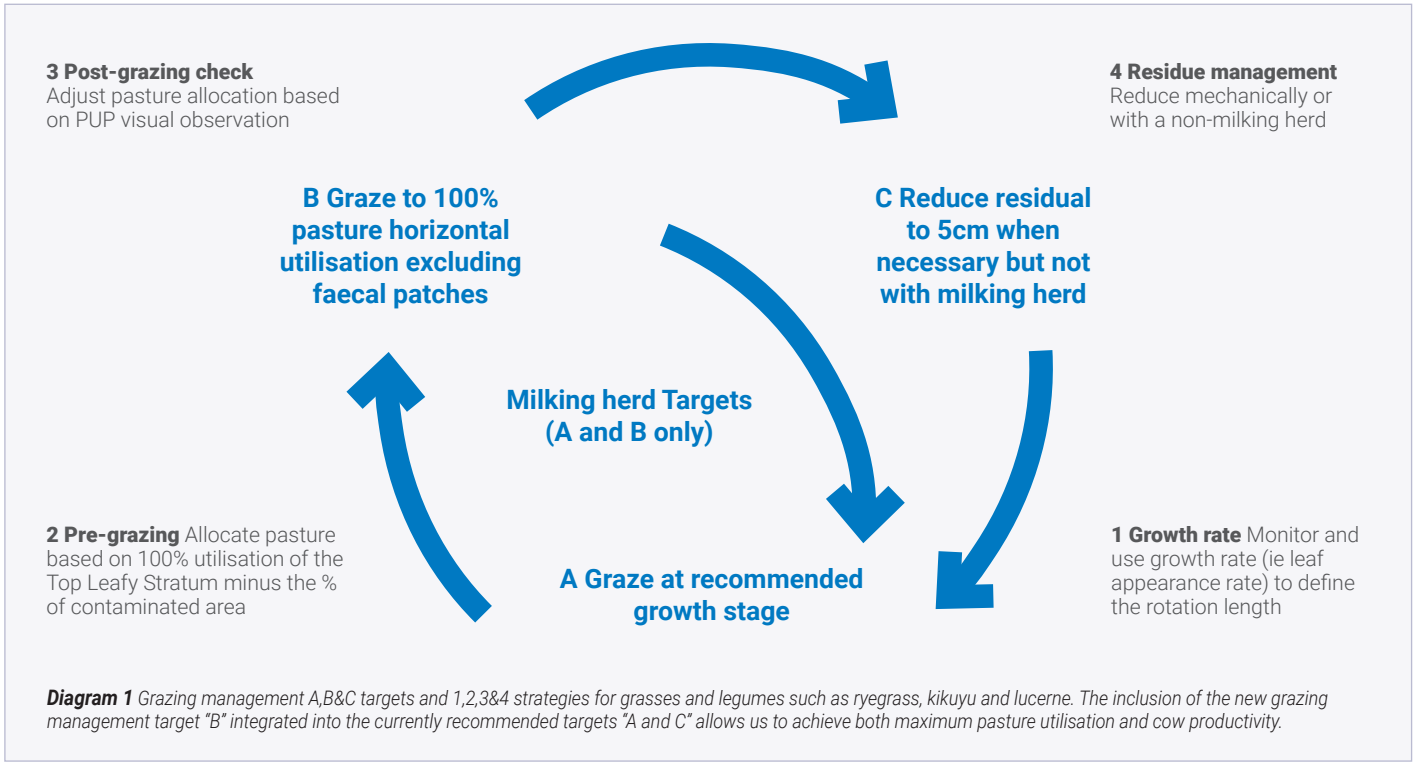

Diagram 1 *Grazing management A,B&C targets and 1,2,3&4 strategies for grasses and legumes such as ryegrass, kikuyu and lucerne. The inclusion of the new grazing management target "B" integrated into the currently recommended targets "A and C" allows us to achieve both maximum pasture utilisation and cow productivity.*

What is PUP grazing? PUP is the measure of the Proportion of Un-grazed Pasture remaining following grazing. It is a quick and simple way to assess if we have allocated enough pasture to fully feed cows.

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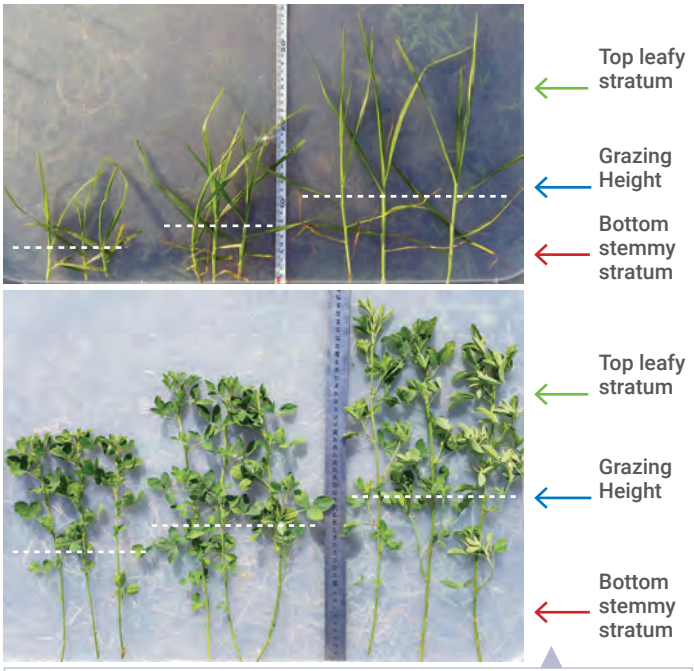

Image 1. *Plant structure and grazing height (horizontal dashed lines) for kikuyu and lucerne pastures observed during grazing trials at Gatton. The nutritive value is much higher for the top leafy stratum compared to the bottom stemmy stratum, with higher crude protein and energy and lower fibre concentrations. Dairy cows strongly prefer to graze the top leafy stratum and they only consume the bottom stemmy stratum once the top leafy stratum has been heavily depleted. However, dairy cows may graze stem in preference to grazing pasture previously contaminated by either urine or faeces.*

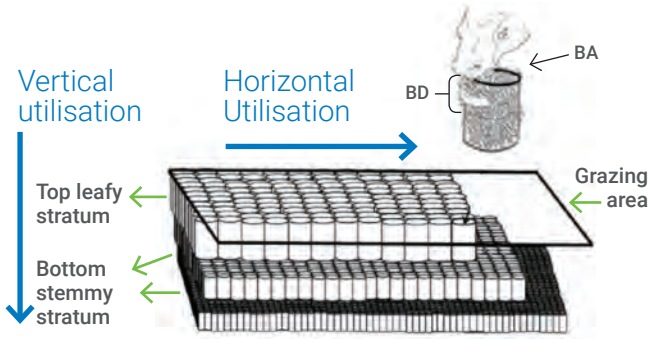

Diagram 2 *Representation of the grazing down process. Cows graze down the pasture both vertically and horizontally. The new grazing management strategy is based on the horizontal utilisation of the pasture. The cylinders represent bites taken from the pasture by the cows (BD and BA mean bite depth and bite area). Dairy cows can take large bites and achieve high levels of pasture intake and diet quality only when grazing the top leafy stratum. Bite size, intake and diet quality decline when cows are forced to graze the bottom stemmy stratum. Therefore, animal performance declines when the top leafy stratum has been grazed across the area of the pasture (horizontal utilization of the pasture) irrespective of the height of the bottom stemmy stratum. Consequently, targeting 100 % horizontal utilisation of the pasture area excluding contaminated pasture clumps consistently allow the milking cows to graze the top leafy stratum of a pasture, ensuring higher diet quality and larger pasture intakes. This is the basis of our new grazing strategy called PUP grazing. The diagram is adapted from Gregorini et al. (2013).*

Pasture intake, diet quality and milk production decline when cows are forced to graze the bottom stemmy stratum.

Pasture intake and cow productivity

Dairy cows can achieve high levels of pasture intake and diet quality only when grazing the top leafy stratum (Image 1, Diagram 2). Pasture intake, diet quality and milk production decline when cows are forced to graze the bottom stemmy stratum. **Since the height of the bottom stemmy stratum is highly variable for all pasture species a fixed ideal pasture residue height to achieve high pasture intake is not recommended.** Instead we recommend "Target B" in Diagram 1, which is expanded on below.

Targeting 100 % horizontal utilisation of a pasture strip excluding contaminated pasture clumps will consistently allow the milking cows to graze the top leafy stratum of a pasture, ensuring higher diet quality and larger pasture intakes (Target B in Diagram 1). This is the basis of our new grazing strategy called PUP grazing.

Grazing management targets and strategies

Diagram 1 shows the currently recommended grazing management targets (targets A and C) and the additional PUP grazing target (target B). To achieve these 3 targets in practice 4 strategies may be used. These are applicable to all improved grasses and legumes such as kikuyu, ryegrass and lucerne.

Target A: Graze at the recommended growth stage

Follow current recommendations for ideal growth stage. The current rules for grazing ryegrass and kikuyu are based on 2 to 3 and 4 to 5 leaves, respectively. To consistently graze the pasture at the ideal growth stage monitor and use growth rate to define the rotation length (Strategy 1 in Diagram 1). For example if the target leaf stage for ryegrass is 2 leaves and the leaf appearance rate is 10 days per leaf, then the rotation length should be 20 days.

Target B: Graze to 100% pasture horizontal utilisation excluding faecal patches (PUP grazing target)

To successfully achieve this target there are two key steps required when allocating pasture to cows (strategies 2 and 3 in diagram 1).

Strategy 2: Pasture allocation should be calculated based on 100% utilisation of the top leafy stratum on offer (TLS on offer) excluding the proportion of contaminated area (faecal patches). Therefore, the TLS on offer and proportion of contamination need to be estimated. The current range of pasture meters in use provide an estimate of the total pasture on offer rather than the TLS on offer. DAF is developing new ways to simply estimate the TLS on offer for common pasture meters and pasture species used by the northern industry. Also there is a simple practical way to estimate the proportion of contaminated area by simply walking a transect across a post-grazed pasture and count both the steps taken on faecal patches and the total number of steps taken. From this you can calculate what percentage or proportion of the pasture is contaminated. For example if this is 10%, then simply add 10% extra to your next pasture allocation.

Strategy 3: To make sure pasture allocations are correct it is important to proceed with post-grazing visual inspection of the pasture. If the visual observations indicate that 100 % of pasture area was grazed except the faecal patches then the allocation was correct (see image 2 and 3) and cows are likely to achieve high levels of intake. If you identify that the cows have left un-grazed areas of un-contaminated pasture which they should have eaten, then reduce the pasture allocation at the next grazing to ensure this plant material is consumed and not wasted. If cows have grazed the whole area of the

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pasture including the plant material around the faecal patches then it is highly likely that pasture intake by the milkers has already been compromised. In this over-grazing situation an increase in pasture allocation would be considered the remedy. However, if an increase in pasture allocation compromises the rotation length due to limited pasture area, then the right decision would be to increase supplementation in the bales or through the PMR to increase the total intake, reducing the pressure for the milkers to graze so intensely.

Target C: Reduce residual to 5 cm when necessary but not with milking herd

It is important to maintain the productive capacity of a pasture by meeting its agronomic needs. If pasture residues have accumulated excessively, meaning there is a lot of rank dead stem and leaf material in the base of the pasture, then the productive capacity may be compromised. We think this situation can be avoided by the following strategies.

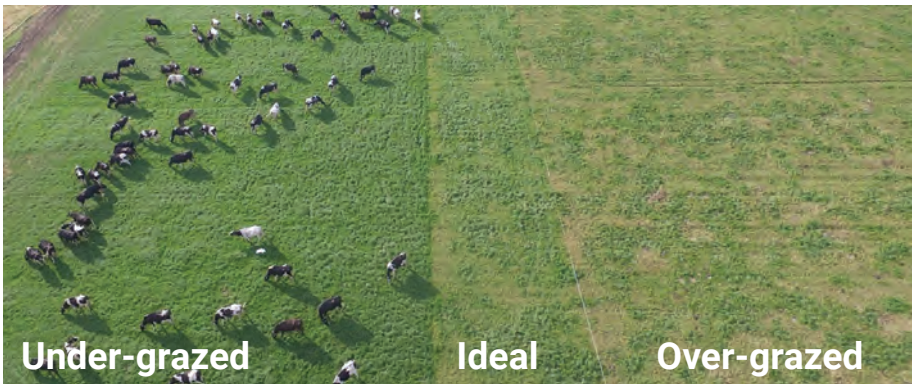

Image 2 *Post-grazing visual observations are important to make sure pasture allocations are correct to achieve high levels of pasture intake and cow productivity. Photo of annual ryegrass.*

Image 3 *Example of post-grazing images of annual ryegrass showing signs of ideal and over grazing. In the ideal situation, where high pasture intake is achieved, 100 % of the pasture area is grazed except around faecal patches. In the over-grazed situation the pasture is further grazed around the faecal patches indicating that pasture intake may have been compromised.*

As indicated in Diagram 1, we ideally need aim to graze at the recommended leaf stage being target A. We allocate using the PUP method being target B. If the pastures are consistently grazed at the ideal growth stage (Target A) then it is likely that by grazing 100 % of the pasture area excluding faecal patches (Target B) a residual of 5 cm between faecal patches would be achieved (Target C). This will allow for a constant green cover of leaves to be maintained resulting in high pasture growth and utilisation. However, if the bottom stemmy stratum accumulates excessively over time, pasture growth and utilisation may be compromised by virtue of the pasture ultimately losing density over a season. Therefore, pasture residues need to be reduced to 5 cm every couple of grazings to maintain future plant structure and improve overall utilisation on an ongoing basis. Some options for managing residual pasture, without forcing cows to graze harder, is to slash or mulch periodically or use a secondary herd such as dry cows or heifers to control the residue heights (strategy 4 in diagram 1).

Conclusions

By incorporating the new PUP grazing management target to the already recommended targets (Diagram 1) pasture based dairy systems can achieve the following:

1. Milking cows are never forced to graze the bottom stemmy stratum which is of poor nutritional quality.
2. Milking cows consistently graze the top leafy stratum which is of higher quality allowing you as a manager to achieve target pasture intakes irrespective of the height of the bottom stemmy stratum.
3. The potential for high pasture growth and utilisation as some green leaf remains post grazing.

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