

Overview

Kikuyu is a highly productive stoloniferous tropical pasture. It is a spring and summer active pasture. For farms where cows can consume greater than 5kg DM/cow/day of kikuyu, then this technical note offers new insight into potential grazing strategies to increase economic milk production.

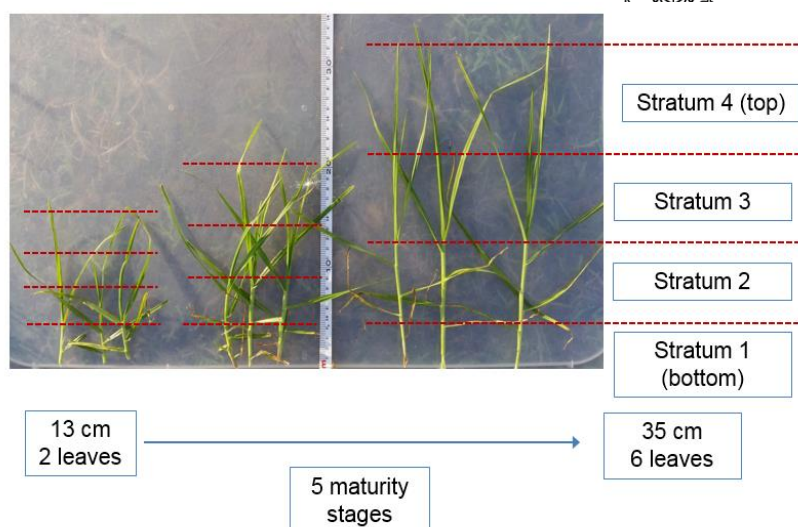
Maximising pasture intakes can be challenging, particularly if a partial mixed ration is also being fed. However, C4Milk has been working extensively on an improved approach called 'PUP' grazing. The new strategy works on the traditional grazing principles for kikuyu, but the allocation of pasture is based around the proportion of ungrazed/ contaminated pasture (PUP).

PUP strategies aim to achieve higher kikuyu utilisation and improved rates of intake, by offering cows greater amounts of pasture. This allows cows to readily graze the best quality leaf on offer and reduces the pressure to consume poor quality pasture. The following technical note makes reference to the principles of PUP grazing applied to kikuyu pasture management.

Grazing management

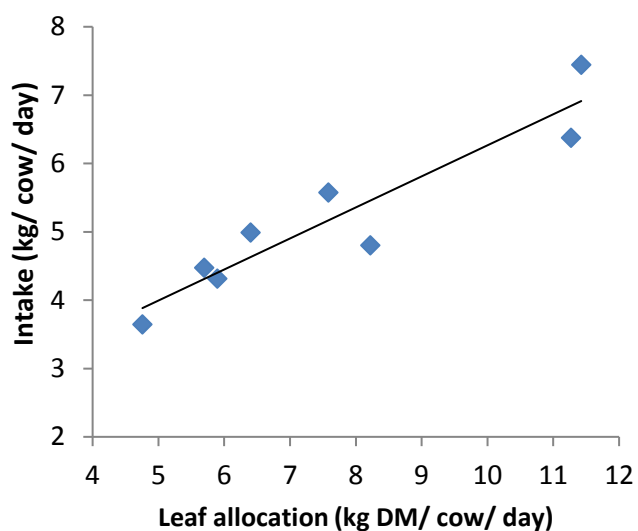
- Image 1 outlines the different 'strata' or pastures proportions referred to in the descriptions of PUP grazing management.
- Making an informed decision about pasture allocation is centred around quantifying what is on offer both in terms of quantity and quality.
- The amount of kikuyu consumed by a milking cow is primarily dictated by the quantity on offer. However, pasture factors that also influence intake are:
 - the height of the pasture
 - the amount of previous faecal and urine residual contamination
 - the quality of the pasture consumed

Image 1 - The horizontal, dashed lines represent heights sampled for quality analysis.



- Dairy cows will naturally select the highest quality pasture to graze which is the top stratum of nutritious leaves. Cows consistently graze the top of the pasture while actively avoiding the bottom stratum which consists of the plant's stems.
- The top leaves represent approximately 53% of the total pasture on offer regardless of the height of the pasture. Cows readily graze this 53% irrespective of whether the height of the pasture is short, medium or tall.

Figure 1 - The effect of leaf allocation on intake of kikuyu pastures.



- Cows will consistently avoid grazing between 20 to 40% of the area allocated due to urine and manure contaminated patches from previous grazing cycles.
- Cows reduce intake when they are forced to graze contaminated pastures. They will re-graze pasture previously grazed in the strip rather than lightly graze contaminated pastures.
- Forcing the cows to re-graze previously grazed patches means they will graze plants lower, consuming more stem, increasing NDF% and lowering milk production.

Image 2 - Cows avoiding contaminated pasture, demonstrated by the long leafy patches around the faecal matter and surrounding harder-grazed area.



- The quality of Kikuyu ingested deteriorates the harder cows are forced to graze, so balancing plant agronomic needs with cow quantity and quality needs is very important.
- The pasture quality did not change significantly with increased pasture height. This can be seen in tables 1, 2 and 3, outlining crude protein (CP) %, metabolisable energy (ME), and neutral detergent fibre (NDF) % at different pasture heights.
- ***This challenges the idea that a taller pasture is of poorer grazing quality particularly if the cows are only grazing stratum 3 and 4.***
- Offering cows a reasonable amount of pasture allows them to readily graze the best leaf with little effort. The quality of leaf is consistently high in strata 3 and 4.
- Allocating more pasture leads to the cows eating more (Figure 1). Consistently increasing allocation will lead to a larger amount of pasture residual.
- The residual needs to be reduced to 5 to 8 cm to maintain future pasture quality and improve utilisation. Some options for managing residual pasture, without forcing cows to graze harder, is to slash or mulch periodically or use a secondary mob such as dry cows or heifers to control the residual.

Nutritional Value

- Well managed kikuyu combined with the addition of lablab or lucerne pasture can achieve pasture intakes in excess of 10 kg DM/cow/day with an average diet NDF value below 30%.
- The shaded areas in Table 1 represent ideal grazing strategies to increase crude protein and keep total crude protein of pasture above 30%.
- The highest levels of crude protein intake are achieved if the top 3 strata are grazed - irrespective of the pre-grazing height.

Table 1 - Crude protein (% DM) of kikuyu from top (stratum 4) to bottom (stratum 1) of the pasture at 5 levels of pasture pre grazing height (cm)

Stratum	15 cm	20 cm	25 cm	30 cm	35 cm
4 (top)	32.6	31.7	30.8	29.9	29.0
3	28.8	28.6	28.4	28.2	28.0
2	26.4	26.2	26.1	26.0	25.9
1 (bottom)	22.7	22.3	21.9	21.5	21.1

- The highest levels of energy intake are achieved if the youngest leaves in strata 4 are grazed, as depicted by the shaded areas in Table 2.
- Shorter pastures will contribute more energy to a diet as a whole, due to being less mature.

Table 2 - Metabolisable energy (MJ/kg DM) of kikuyu from top (stratum 4) to bottom (stratum 1) of the pasture at 5 levels of pasture height (cm).

Stratum	15 cm	20 cm	25 cm	30 cm	35 cm
4	11.7	11.3	10.9	10.5	10.1
3	10.1	10.0	9.9	9.8	9.7
2	9.3	9.2	9.1	9.0	8.8
1	8.5	8.3	8.1	7.8	7.6

- Kikuyu has an NDF higher than 40%. This is a major limiting factor in cow intake levels of kikuyu. To limit the effect of NDF, cows are best to be offered the top 2 strata of

pastures, as depicted by the shaded areas in Table 3.

Table 3 - NDF content (% DM) of kikuyu from top

Strat-um	15 cm	20 cm	25 cm	30 cm	35 cm
4	39.4	41.0	42.6	44.2	45.7
3	41.8	44.1	46.4	48.6	50.9
2	47.5	48.8	50.0	51.2	52.5
1	57.9	58.6	59.3	60.0	60.7

(stratum 4) to bottom (stratum 1) of the pasture at 5 levels of pasture pre-grazing height (cm).

Economic Value

- Kikuyu can be mistakenly considered a cheap feed in comparison to other pastures if not managed intensively. Kikuyu is hardy and reliable making it a popular choice.
- Table 5 demonstrates that kikuyu needs to be aggressively grown and utilised to achieve a cost per unit of feed below 14c/kg DM.

Table 5 –The cost (\$) of kikuyu under varying utilisation (DM utilisation kg/ha) and levels of irrigation (mL/ha)

Irrigation	7140 kg/ha	9520 kg/ha	11900 kg/ha
3.2 mL/ha	\$0.14	\$0.11	\$0.08
4.8 mL/ha	\$0.16	\$0.12	\$0.10
5.6 mL/ha	\$0.17	\$0.13	\$0.10

- The key to improving the return from kikuyu is to offer the best material (top 53%) to milkers and manage the residual with dry cows or heifers.
- The addition of other pastures such as lablab or lucerne to a diet based on kikuyu can increase both the energy and crude protein of the diet. This reduces the need for expensive crude protein additives and leads to a much improved margin over feed cost.



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C4Milk financial analysis.

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