

### Overview

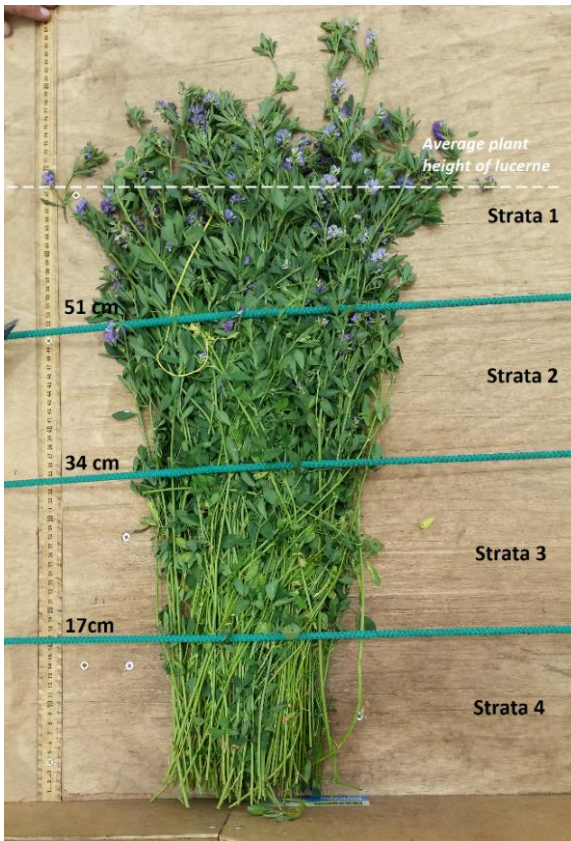
In northern dairy systems, lucerne is generally included in diets in the form of hay and silage. Lucerne grazed as a pasture is less favoured on farm due to concerns about bloat and plant persistence issues. However, a C4Milk animal feeding trial (2016) has shown these risks can be overcome with good management practices, resulting in high dry matter intakes and profitable milk production.

C4Milk's newly developed PUP grazing management strategies aim to achieve greater utilisation and improved rates of pasture intake. This technical note offers new insights into the refined grazing principles in regard to lucerne, that can lead to increased milk production.



### Grazing Management

- Recent C4Milk (2016) findings support a new approach to grazing pastures, including lucerne, called PUP grazing (proportional uneaten pasture). PUP is based on maximising pasture growth and animal pasture intake.
- Current recommendations suggest to graze lucerne to a height of 5cm. This is to ensure there is minimal damage to the crown of the plant which is the site of stored energy reserves used for plant regrowth.
- PUP grazing principles suggest to allocate greater amounts of pasture than previously recommended. By allowing for consumption of strata 1 and 2 (see Image 1 for detail) and not forcing cows to graze further into the sward, cows selectively graze the higher quality plant material that can increase intake.
- The recent C4Milk trial demonstrated PUP grazing principles, resulting in cows grazing up to 9kg DM/ cow of lucerne pasture per day (DAF, 2016). By cows selectively grazing the top sections of the plant, ideally at heights of around 50cm, lower NDF and higher protein levels are present in the pasture consumed (Table 1 & 3).
- To meet the agronomic requirements of lucerne, it's recommended to remove the residual stem and leaf using a secondary grazing herd (dry cows) or mechanically harvest.



**Image 1 – Identification of different heights and strata of a lucerne plant, as outlined in PUP grazing management.**

## Nutrient Value

- As pasture height increases, C4Milk research has found that crude protein (CP) declines. If cows are forced to graze lower in the sward, particularly with lucerne (<50 cm), then CP% will be below 30%.
- As depicted in Table 1, the shaded areas represent grazing strategies to increase crude protein intake and keep above 30%.

**Table 1 – Crude protein levels of grazing depth % at different pasture heights.**

Crude Protein %		Pasture Height (cm)			
		30	40	50	60
Grazing Depth %	50	34.1	31.8	29.4	27.1
	60	32.8	30.5	28.1	25.8
	70	31.5	29.2	26.9	24.5
	80	30.2	27.9	25.6	23.3

- Cows that graze strata 1 and 2 of lucerne irrespective of pre-grazing height consume the

youngest stems and leaf resulting in energy intakes greater than 10 MJ ME/kg DM.

- Once lucerne matures to 60 cm in height, the plant is taller and older resulting in potential leaf drop and more lignification particularly in strata 3 and 4.
- As depicted in Table 2, the shaded areas represent grazing strategies to achieve energy intakes above 10 MJ/kg, suggests not to graze lower than 70-80% of pasture depth.

**Table 2 – Metabolisable energy levels of grazing depth % at different pasture heights.**

ME (MJ/kg)		Pasture Height (cm)			
		30	40	50	60
Grazing Depth %	50	11.2	10.9	10.6	10.3
	60	10.9	10.6	10.3	10.0
	70	10.6	10.3	10.0	9.7
	80	10.3	10.0	9.6	9.3

- C4Milk research has found that pastures lucerne 30 – 40 cm in height are lush and have an NDF of below 30% at any grazing intensity.
- Lower levels of NDF will allow cows to increase intake in the total diet leading to greater milk production.
- Pastures higher than 50 cm have more lignin in the base or stratum (Table 3). Unless cows are consuming the top 60% (strata 1 and 2) of the plant, grazing below this level will result in cows consuming significantly more NDF, thus resulting in less pasture intake.
- As depicted in Table 3, the shaded areas represent grazing strategies to keep NDF% below 30%.

**Table 3 – Neutral detergent fibre levels of grazing depth % at different pasture heights.**

NDF %		Pasture Height (cm)			
		30	40	50	60
Grazing Depth %	50	23.2	24.8	26.4	28.0
	60	25.1	27.0	29.0	30.9
	70	27.0	29.3	31.5	33.7
	80	28.9	31.5	34.0	36.6

- Furthermore the data in Table 4 indicates that selecting a pre-grazing height of 50 cm instead of 60 cm, can result in a reduced NDF%.
- If cows are forced to graze further down to strata 3, there is a significant increase in NDF%.

**Table 4 – Demonstrating the effect of grazing intensity (strata depth) on average NDF% of lucerne consumed.**

Strata	NDF% consumed @ 50cm pre-grazing height	NDF% consumed @ 60cm pre-grazing height
1 (top)	19.5	21.7
2	31.7	32.3
3	-	51.3
4 (bottom)	-	-
Average NDF%	29.0	36.6

## Economic Value

- Lucerne is a high quality feed which is cheap feed source in comparison to other high quality feeds, irrespective of which irrigation strategy is undertaken.
- Table 5 shows the cost (\$) of Lucerne under varying utilisation (DM utilisation kg/ha) and different levels of irrigation (mL/ha).
- Table clearly outlines that the greater the utilisation of the feed, the cheaper the feed becomes.

**Table 5 – Cost of lucerne at differing rates of utilisation.**

	13 700 kg/ha	18 300 kg/ha	23 000 kg/ha
8.5 mL/ha	0.10	0.07	0.06
12 mL/ha	0.12	0.09	0.07
15 mL/ha	0.14	0.11	0.09

- Lucerne is a competitively priced feed given its high crude protein and energy and low NDF content.

**Table 6 – Comparison of lucerne to other pastures.**

Sample	CP %	NDF %	ME %	Yield t DM/ ha	\$/ KG DM	\$/KG CP
Lucerne Pasture	30	24	11	12	0.11	0.36
Kikuyu Pasture	22	50	10	11	0.09	0.41
Lablab Pasture	35	29	10	5	0.15	0.42



Scan this QR code for links to C4Milk financial analysis.

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The project is funded and supported by the Department of Agriculture and Fisheries and Dairy Australia.

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