



Residuals are not always ideal

Observations from monitoring 15 motivated farms in the Dairy UP project have found that despite the best intentions, there are times when the pasture on offer is too high (>2700 kg DM/ha), leaving greater than desired residuals (>1700 kg DM/ha). On the other hand, in the autumn slow growth is observed that often results in residuals far lower than 1700 kg DM/ha. Previous research shows a potential loss in regrowth rate of 25% for the following grazing where residual drops to <1,300 kg DM/ha. Several important things emerge from these observations.

Fluctuating growth rates

Growth rates change rapidly with seasonal conditions. This means at key times it can be hard to stay with a set rotation length and or stocking pressure – we need to recognise conditions that slow or speed growth rates and respond quickly.

Unlocking the potential of Kikuyu

Dairy UP's P1 project aims to unlock the potential of Kikuyu pastures used by NSW dairy farmers. P1 is a suite of five projects that collectively explore new management options to grow and utilise more Kikuyu over summer and increase the productivity of Kikuyu-based pastures.

P1a: Remote pasture management using advanced sensing technologies.

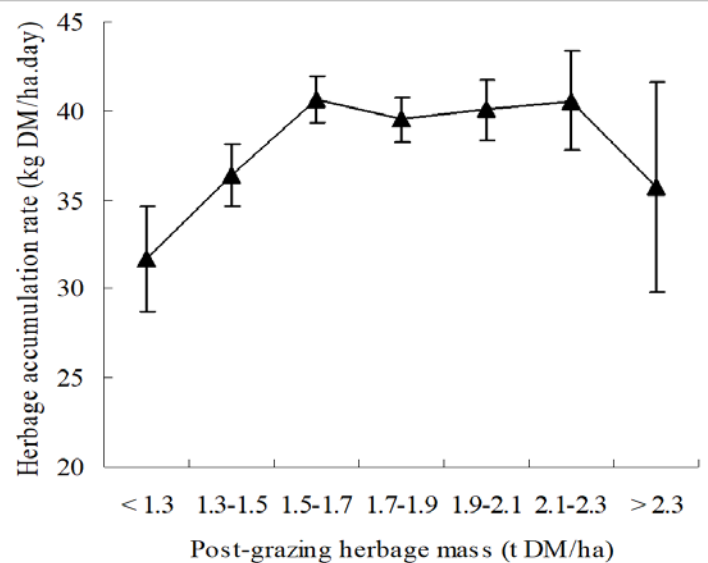
P1b: Antinutritional Factors (toxicity) P1c: Genetic Diversity of Kikuyu.

P1c: Genetic variability

P1d: Carbon on NSW Dairy Farms.

P1e: Nutritional Value.

This document provides some insights based on mid-project results from P1a.



▲ Impact of post grazing residual on regrowth



Targets and terminology

Targets are a useful tool and help refine what is ideal but different terms mean different things to different people, so the outcomes from using these targets are variable.

For example, the Pasture for Profit program is based on terms such as 3-leaf stage, 2700 kg DM/ha on offer and “canopy cover.” But these terms actually mean different things to different people (and their advisors too). If six farmers or six agronomists had to visually estimate one paddock’s residuals in terms of kg DM/ha we would probably get 12 very different answers.

Dairy UP’s P1 project is focussing specifically on unlocking the potential of Kikuyu pastures for dairy farms. It’s assessed a range of tools that improve pasture production and utilisation.

Satellite imagery

Dairy UP researchers are exploring the accuracy of satellite imagery on pasture biomass and therefore growth rates at any time.

There are many other research projects looking at similar objectives, but this allowed a good look at the coastal farming system of kikuyu and ryegrass. Fifteen farms at Bega, Tocal, Taree and Lismore were monitored using rising plate meters at five locations on each farm. The results were compared to satellite derived data from the Pasture IO platform.

It was not an easy task including some challenges that were expected. For example, as the regrowth of ryegrass or kikuyu reached “canopy cover” the satellite measurements of greenness and so growth – that is, NDVI – were less accurate because the reflection of light waves didn’t change, but biomass continued to increase.

However, the number of satellites now in orbit has increased, providing greater accuracy and the ability to miss cloudy days. There’s now a real opportunity to automatically measure and monitor pasture growth.

The results were encouraging but without adding the rising plate meter data, the variations were

too high to confidently adjust supplements and grazing pressures at least in this region and given the conditions we faced.

However, the satellite results provide trends and could rank the relative amount of pasture in each paddock well. That is the data could provide insight into which paddock was next to graze but not necessary how much was really on offer.

This is not a closed case, as the technology continues to advance. Satellite data may provide more accuracy at lower biomass for example for monitoring residuals.

The data may also be able to provide more detail on pasture variability, such as how much pasture growth varies across a paddock and where is it consistently low or high. This aspect has yet to be fully explored but it is used widely in cropping.

Pasture accounting

Pasture monitoring platforms such as Pasture.io also offer some unexplored opportunities. For example, if a biomass measurement is accurate, it can automatically calculate pasture harvested per paddock over the year. It can monitor targets such as biomass pre- and post-grazing and rotation intervals.

This would help understand **the hidden cost** of less-than-ideal residuals. Already Pasture.io provides massive computing facilities for a dairy farm in that it measures growth on every paddock and calculates the feed wedge of the farm on any given day. It also calculates growth rates, leaf intervals and provides the platform to insert other weather data that could be useful.

All this data adds a level of complexity for an already complex industry: more electronic mediums when we are saturated with them, and it has had limited appeal to farmers who are pressed for time to manage farms.

There is opportunity for the platform and or Pasture.io to be used by consultants and other service providers to build their own service capabilities to reduce the load on farmers.



Growing degree days

Field trials conducted by the Dairy UP team at the Corstorphine farm in Camden investigated the decline of Kikuyu quality with age. They found the quality of leaves declines with every day beyond the optimum grazing interval.

They used a simple technique called Growing Degree Days GDD to quantify this. The approach involves adding up the daily mean temperature above a minimum that the plants don't grow (usually 0°C for C3 plants like ryegrass and 10°C for C4 plants like kikuyu).

Being a daily measurement, it combines temperature and age effects on plant maturity and is also used to quantify measures of other things such as leaf stage interval and reproduction stimuluses.

There is an opportunity to automate the calculation of growing degree days within Pasture IO or other platforms. This could provide greater insight into the maturity of each rotation. The real power of this data is that it helps farmers anticipate the need to change course earlier and so make better decisions for rotation length. While this this is only fine tuning what we already

do, it may prove very helpful.

Summary

Dairy UP research is moving pasture research forward but not without challenges. Satellite imagery is helpful but it needs more refinement and so more research. Dairy UP is working on many more pasture related projects, such as kikuyu varieties, kikuyu poisoning and carbon budgets for kikuyu pastures.

Read more

The hidden losses of pasture utilisation, [Australian Farmer, December 2024, p 188-190](#)

More info

Dairy UP Project lead

Professor Yani Garcia
University of Sydney
sergio.garcia@sydney.edu.au

www.dairyup.com.au

Delivery organisations



Partner organisations



Additional program supporters, collaborations or partnerships

Charles Sturt University | DairyBio | DataGene | Eagle Direct | Entegra
Macquarie University | NSW EPA | smaXtec | UC Davis | University of Technology Sydney
