



The classic farm discussion group pasture topics are when to graze, for how long and when to spell it and that's for only several species.

# Regen ag's up to 40 species too many

BY: JOANNA GRIGG

**H**igher legume content in any pasture must be the goal.

But adding a plethora of herbs, legumes, flowers or vegetables all together is not the answer, Dr Derrick Moot, Professor of Plant Science, Lincoln University says.

Like kids eating every jelly bean except the black ones, stock favouritism means the tastier legumes disappear first. Next to follow are those less able to compete for light and nutrients, or those annuals not managed for reproduction.

Farmers considering following the Government's push for embracing Regenerative Agriculture and its suggestion for sowing up to 40 species in one pasture,

in a "suck and see" approach, should consider how that might work in reality.

Moot suggests farmers carefully consider the species mix in a permanent sward and how they need to plan to maintain the composition and quality over time. High legume content is the king for sheep and cattle growth and lactation.

Research shows that perennial ryegrass and plantain will dominate at the expense of white clover over time, especially with nitrogen fertiliser (Myint, Wood, Black, Lincoln University, 2019). Research on dairy farms shows optimal milk production occurring when pastures contain 40% legumes (Cosgrove, 2005).

Moot is concerned that farmers who follow blanket recommendations for very high levels of pasture diversity without a clear focus on what species and why, nor

good science around how to manage them for a particular purpose, may emerge from the experience disappointed.

Regenerative Agriculture has at its core a message of diversity of pasture species. Its emerging popularity follows unsustainable monoculture practices (namely cereal crops) in Australia and North America, which can use up soil nitrogen and organic matter.

In a letter to Agriculture Minister Damian O'Connor, May 2020, Dr Moot and Dr Warwick Scott (retired Senior Lecturer in Plant Science) said they support several aspects of conventional agriculture that are promoted within Regenerative Agriculture.

"Practices such as rotational grazing, high quality leafy legume based pastures, direct drilling, overcoming nutrient deficiencies, and landscape farming to provide ecosystem services."

But they also believe that the scientific principles underpinning New Zealand's current agricultural systems are in danger of being devalued by a system that they see as having several serious shortcomings.

In particular, Moot describes the promotion of pasture mixes of up to 40 species as of no benefit to farmers.

"In parts of Europe farmers get paid for the number of different species they grow in a sward and that sward may never be grazed by an animal. It's a completely different set of drivers here in New Zealand."

Farmers in NZ have existing systems to graze and maintain a three-way grass, legume and herb mix successfully. They can maintain a legume-dominant system through lucerne stands, red and white clover with plantain, or a subterranean clover and grass combination, depending on their environment.

Moot queries the need to complicate it further with more species and a range of cultivars with different flowering dates and growth activity.

"Ecological principles show that it is virtually impossible to maintain beyond a year or two, as competition for light and nutrients causes extensive self thinning.

"Our own research shows that no more than three (grass, legume, herbs) make up over ninety percent, regardless of the number sown.

"In irrigated and high rainfall environments, no matter what we start

with we end up with mainly ryegrass with about twenty percent legume, even if we look after it. Ryegrass catches the light and handles the grazing, so dominates.”

### LARGE RESIDUALS

Moot queries encouraging large pasture residuals and then drilling into these because excessive vegetation can block coulters. Moist areas with thatch would be prone to slugs and springtails, increasing the chance of establishment failure from insect damage. Crushing machinery may be appropriate on dry stony soils but could cause compaction on moist heavier soils, he said.

Direct drilling is certainly advocated wherever possible to maintain soil structure and minimise loss of soil carbon. At times, however, full cultivation is required to prepare an adequate seedbed.

Regenerative Agriculture endorses talk about the importance of spelling pasture as if it's something new, Moot said.

“Ask a New Zealand hill country farmer and they will tell you how they graze blocks hard at some times of the year and at other times let seeds regenerate, particularly in dryland environments.”

Many of the principles of Regenerative Agriculture are not new here and do promote best management practice.

“Our dairy grazing has always embraced rotational grazing with pre and post heights balancing pasture growth and quality.”

Minimizing set-stocking in sheep and beef systems is also advocated as best



Get reacquainted with a sward stick and tried-and-true rotational grazing strategies rather than looking for species-mix silver bullets. Ideally keep pastures between 1500 to 3000 kilograms of drymatter per hectare.

management practice and is actually the basis of the lucerne grazing system Lincoln University developed for dryland regions, Moot said.

Leaving higher residuals at every grazing lowers pasture quality but it can be used when necessary to retain moisture and aid recovery after drought. Moot recommends farmers concentrate on appropriate grazing management for their pastures in their system rather than follow a one-size-fits-all approach.

Recent work by Dr Alistair Black is revisiting plant trials last done in the 1960s and 1970s. The research is taking dry matter measurements from 270 different plots, with pastures ranging from single species swards through to mixes of up to six different species.

“We are looking for combinations of species that over-yield – in other words give a better growth output than they do singularly,” Moot said.

“We found this with a grass, clover and herb mix – ryegrass, plantain and clover giving a synergy of growth and quality.”

### YE OLDE GRAZING LAWS

Go back 10 years to when sward sticks were handed out by seed agents and farmers were posted pasture quality guides from the newly rebranded Beef + Lamb NZ. These pasture quality resources showed what 20%, 40% and 60% legume content looked like in a mixed sward pasture.

Dr Derrick Moot, Lincoln University, would like farmers to pull these resources out again and use them.

“It's our grazing management that is key to growing quality meat and wool as well as profitability and sustainable soil management.

“It is about building and maintaining dry matter and quality, not all about the number of species in the mix.”

The ideal pasture height for stock performance and for protecting soils, and your bank balance, is 1500 to 3000 kilograms of dry matter, he said.

This pasture height is also safer for parasite larvae intake. He admits it is not possible to achieve this all year round but it should be the target.

“Sheep and beef farmers must refocus on good pasture management, not get distracted by faith-based silver bullet solutions.”

He said set-stocking should be avoided.

Plants should not be grazed continually beyond their critical leaf index area if you want production – in other words, not to the boards time and time again. Once plant green leaf drops below three m<sup>2</sup> of leaf per m<sup>2</sup> of ground it is suboptimal for light interception and water use efficiency. He said rotational grazing followed by a spelling period is a conventional idea, but needs to be revisited by some farmers.

“Don't be afraid to mob stock ewes and lambs to create feed ahead of them.”

Do this with lucerne when lambs are about three weeks of age, he said. This gives the benefits of rotational grazing, followed by a single spell during flowering to build root reserves.

Soil fertility is not enhanced by adding microbes, he said. Rather, add sulphur as this is particularly important for legumes and is used up over time, becoming in short in most hill country environments.

“Soil is a jungle of many microbes, mostly on the point of extermination due to shortage of moisture. After moisture, the numbers take off.”

He points farmers towards the Lincoln University Dryland Farming page and the Beef + Lamb NZ Knowledge Hub as good places to sharpen up on grazing management.

### LOWER STOCKING RATE LINKED WITH LOWER PROFITS

A study in Australia\* examined the findings of a National Environmental Science Programme report “Graziers with better profitability, biodiversity and wellbeing” by Ogilvy, Gardiner, et al.

The original report concluded that a cohort of Regenerative Agriculture graziers were more profitable. The study concluded that this analysis was inappropriate as a measure of profitability and that the cohort were less profitable over 10 years (2007-2016) with return on investment of 1.66% compared with 4.22% for graziers who said they did not practice Regenerative Agriculture.

This was most closely linked to differences in stocking rates. The study notes that there was no quantifying of environmental differences, which would have been highly valued.

\*Regenerative Agriculture – Counting the Costs, John Francis, Holmes Sackett consultancy, Australian Farm Institute, May 2020.

