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DoloZest® News

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Much to be learnt from the past

On the 24th of October Newsroom.co.nz published an article titled, *Green dream pushes farmers into the red.* It is worth reading in full and the link is on the bottom of page 2.

In a nutshell, after 3 years of a multi-species regen programme pasture growth and total farm performance declined to a point where financial viability was under serious threat.

How it was allowed it evolve to this point when leading MPI officials knew that this particular process was, in their words, *"a belief system with no sound scientific base"* remains unknown.

There is much that can be discussed and debated however the requirement for ongoing inputs of phosphorus and sulphur remain a foundation of intensive pastoral farming in this country.

As a rule of thumb there is around 500kg/ha of naturally occurring phosphorus in unfertilised soils throughout the country and without replacement of that removed in milk, meat, and wool, the growth of clover slows.

Without clover a nitrogen deficit occurs, lower fertility species steadily dominate, and total pasture growth drops along with animal production.

Were clover not the foundation of permanent grazed pasture, the requirement for ongoing inputs of phosphorus would be less, however because the ability of clover to access available phosphorus is less than grasses and other species, regularly topping up the plant available pool of P is essential.

The reason for the lack of growth on the Tomogalak Gorge farm was probably more to do with a loss of sulphur. Sulphate sulphur the plant available fraction in low ASC soils, typical of most soils in this country, is readily leached and because sulphur is a component of protein regular inputs are essential.

The conventional approach to this is the application of single superphosphate which usually contains 11% sulphur and 9% phosphorus. Initially the responses were marked and immediate, however in the 80 years since its introduction, pasture growth has steadily declined.
The use of urea in the late 1980s provided an immediate burst in growth as the soil carbon built up over years of pastoral farming was destroyed.

The subsequent 30% decline in total annual pasture growth since is well documented but not discussed by industry leaders.

Leading the way
The work by Functional Fertiliser in creating the environment that favours clover growth and providing the fungi and bacteria necessary for optimum performance may in part now be followed by research at Lincoln University funded by Ravensdown and the Government's Sustainable Food and Fibres Future initiative.

The focus of the project is on introduced fungi that have the potential to reduce nitrate nitrogen losses and mitigate greenhouse gas emissions.

After 25 years of monitoring work which includes independent research verifying the claims of a 30% increase in growth with a 70% reduction in nitrate nitrogen losses, we're prepared and willing to contribute should an approach be forthcoming.

The Agmardt funded work on carbon sequestration showed that FF systems are continuously sequestering and therefore carbon positive which means no net increase in atmospheric methane or nitrous oxide.

In the Ravensdown press release, (see the links at the end) the word mitigate is used, an acknowledgement that there are environmentally negative outcomes to their programmes.

The quickest way to remove carbon dioxide from the atmosphere is by sequestering it in soil under permanent grazed pasture. When using the Functional Farming System greenhouse gasses are of no consequence and a matter of academic interest only.

The consequence of reliance on synthetic nitrogen
The application of any synthetic nitrogen sparks an increase in bacterial activity. Energy is required as populations build and that comes from the consumption of organic matter - carbon compounds.

Because nitrogen and carbon in the soil are always linked, any 'burning' of carbon releases nitrogen for plant growth.

This is the reason for the first application providing the greatest response. Each subsequent application has less readily available carbon available for bacteria to destroy.

Initially total soil carbon levels decline imperceptibly however it is the labile or mobile fraction that is affected. That is the fraction provided by the most recently deposited dung, old root, and litter on the soil surface.

Table 1

	% Root Growth Stoppage Three Days After Forage Removal			
% Forage Removal	Test 1	Test 2	Test 3	Test 4
90	100	100	100	100
80	100	100	91	81
70	78	97	77	76
60	50	80	54	36
50	2	8	38	13
40	0	0	0	0
30	0	0	0	0
20	0	0	0	0
10	0	0	0	0
0	0	0	0	0

This represents four tests with three different grass species. From Crider, 1955.

Nitrogen not taken up immediately by plants moves down through the soil profile taking with it primarily calcium, resulting in a steady decline in soil pH.

Even when lime is applied to counteract the pH decline, because the soils are largely biologically inert it stays largely unreacted. We regularly receive soil tests from conventionally farmed properties where there is no appreciable shift in soil pH or calcium content after a lime application.

Nitrogen fixed by clover in response to declining plant available levels does not result in harmful losses. It is a highly efficient and effective means of providing the nitrogen necessary for intensive farming and growing.

Biology is the key
Without vibrant beneficial biology soil is nothing other than dust or rock. It's the addition of beneficial biology and the creation of a habitat that favours their growth that is an essential part of the success of the FF programmes.

The requirement for annual, sometimes twice a year inputs is due to the affect that excessively wet and dry conditions have on their populations.

Soils compress under the pressure of grazing and vehicles. Healthy soils rapidly regain their shape and it is only when this doesn't occur that compaction has occurred.

Ideally soil is 25% air and 25% moisture, and the compressing effect of downward pressure must be countered for plant growth to be maximized.

Grazing intervals over summer
We've recently received trial work from 1955 which we think is perhaps even more relevant today.

This table shows the effect on grass root mass after grazing.

From November onwards grasses tend to seed head as a result of increased soil temperatures and sunlight hours.

Conditions from now until mid/late March favour clover growth. Grasses being more erect can shade clovers and taking pastures down to a lower level and slowing root growth allows clover to access the sunshine required to maximise growth.

Lower grazing provides the opportunity to achieve the optimum 30 day grazing interval over summer.

As well as fixing nitrogen free-of-charge clover is also 3 to 4 times higher in calcium, the essential element for milk production and bone growth.

Clover is also always higher in energy than grasses resulting in outstanding animal growth rates.

In horticulture maximizing calcium availability results in strong stems less likely to be damaged by wind.

The higher brix levels also mean a reduction in pest and disease damage, along with earlier crop maturity.

There are only upsides to a well-structured, biologically active soil and CalciZest applied as a soil improver or as part of a total nutrient input provides the following benefits.

- Increased yield
- Earlier maturity
- Outstanding animal health and performance
- Less pest and disease pressure

https://www.newsroom.co.nz/green-dream-pushes-farmers-into-red
https://www.scoop.co.nz/stories/SC2207/S00048/new-research-harnesses-soil-fungus-for-environmental-mitigation.htm