

Calcium and Magnesium versus Biohelp bugs

With more and more people quoting the importance of a balanced cation system I thought it was important to pass on an experiment I have conducted on my own property to quantify what I have been saying for several years now. The Ca:Mg ratio is only a small step towards a healthy abundant soil.

Like most folk when I heard of the importance of the ratio of Calcium to Magnesium in the soil it seemed to make good sense. After all we need a balanced diet why not the soil. I have heard various experts telling us of the ability of the correct ratio to open up the soil structure due to the repelling effect of the positive charges on the Ca and Mg ions. This effect is supposed to work like the two positive charges of two batteries repelling each other. Ewen Cambell of Probitas used to do a demonstration of this with lime and magnesium oxide. When the correct ratio of Ca:Mg was reached his hand would slide down through the mix with great ease. Very convincing but does it really work like that in the field and does adding Biohelp products to it improve it further. One of the other theories was the feed ration would automatically reach an optimum when this ratio of Ca:Mg:K:Na was corrected. The breakdown of organic matter would also improve. Most of the farmers worries would be solved.

Well I trailed this theory on my own block.

My block is typical of many light land farms in Canterbury. The soils are medium quality fine loams prone to compaction and going very hard in summer. My land contains about 50% stones. Putting a spade into the ground is very difficult both due to hardness and stones. No fertiliser or lime had been applied to my paddock for 25 years. Hay had been cut off the block nearly every year. The paddock was grubbed and re-sown every 8-10 years. New grasses quickly disappear and the good old drought resistant species of brown top cocksfoot and sorrel remain.

I purchased the property in Feb 2006. In 2006 it was left to grow from Feb till Nov for Hay. *We cut 40000kg DM off 3.8 Ha.* The season was good for growing grass. I took a herbage test of the hay. It was low in P,S, Cu,Zn,Se,N,Mg.

I started treating half the block with Pasture Grow 3 litres and 1-2 litres of Microlife in Spring 2006. Every year since I've done 2 applications. Cost average \$100/Ha/Yr.

In March 2007 I calculated the amount of Calcium/Magnesium required to bring about the optimum balance of cations. The fert mix ended up 2.5 ton lime, 1 ton Dolomite plus 200kg of RPR, 8 Kg borate 48 for good luck,(total cost \$400/Ha freighted and applied at \$30/ton) and I got it applied across the whole property. Sulphur was low but it wasn't practical to apply it at this time so I left it out.

I topped the areas treated with Biohelp (the only ones with enough grass to cut) in May and left it for hay the following Spring. *We cut 4000Kg off 3.5 Ha.* Throughout

the summer we maintained a green tinge on the Bio treated areas throughout the dry time. The only one in the district to do this (except where lucerne has been planted).

In 2008 our first grazing animal arrived in Feb with a dry matter intake requirement of 4380KgDM/Year (a 700kg horse@12KgDM/day). He was fed grass with a total of 30 Kg DM extra throughout winter. 2 calves also grazed for 1 month in spring. In Oct I shut up 1.7 Ha (the Biohelp treated paddocks) for hay. We cut 1000Kg DM in a very poor season. (At least half of it went back into the ground when it went dry quickly). The areas lightly grazed through winter only treated with fertiliser/Lime/Magnesium never recovered through Spring. In Dec another 2 horses arrived in skinny condition and were grazed on the Biohelp treated paddocks. **I calculate the equivalent of 3300KgDM/Ha/Yr is now growing on Biohelp treated areas with around 1800Kg/Ha/Yr growing in fert only areas.** Thus there is a very big difference in growth response over the 2 years since we started Biohelp treatment. Started at 1000KgDM/Ha/Yr.

We didn't have rain in Dec, Jan, Feb and it got very dry. In mid Feb we got 2.5 inches of rain over 2-3 days. Within 24 hours the green colour was back and within 48 hours, growth was visibly noticeable in spite of a lack of sunshine. I went out and put a spade in the ground looking for grass grub. To my surprise I only found 3 grass grub in 15 spade fulls. This was in spite of the little blighters flying every night across our land for 2.5 months. The soil had softened in the Biohelp treated areas to the point where, I could get the spade down past the stones to $\frac{3}{4}$ depth with relative ease. When the spade hit a bigger stone I could alter the angle a little and push the stone out of the way or aside. The soil was forgiving enough to let it move aside. Soil moisture was as good as I've seen in spite of the dry season. I went and dug in the untreated area where fert alone had been applied. I "chipped my way down to $\frac{1}{3}$ a spade depth. The stones didn't move out of the way regardless of my 100kg mass jumping on the spade in any direction. 50% of the soil 1-2 inches below the surface was still bone dry in spite of receiving the same rain.

Once the grass grew a little bit, I took soil and herbage tests from Biohelp treated and untreated areas. We were growing 3 times as much DM as when we started and I wanted to see if there were significant differences showing up in the tests we usually use to assess pasture growth potential and animal growth potential.

All in all I would say that the untreated pastures are growing $\frac{1}{2}$ to $\frac{1}{3}$ that of the treated areas.

I want to bring your attention to several important facts.

Soil tests aren't drastically different. P levels are less in the untreated areas in spite of 200Kg/Ha of RPR. There has been a small change in the plant P levels in the fert treated areas but a much larger change in Biohelp treated areas. Plant growth is not limited by low soil P levels because the plants have all the P they require (HT

herbage test). This also applies to Nitrogen, potassium and sulphur. (The 4 big items for bulk plant growth. NPKS). In addition I have applied by hand to an area the equivalent of 500Kg/Ha of crop15. There was no response to it by the old grasses at all-nothing visual and nothing measurable in Dry matter.

Soil chemists e.g Ravensdown might tell us that higher K levels grow more grass but not quality but that isn't the case here because soil K levels have come back since 2002 but the amounts the plants are absorbing has gone up. Growth has gone forwards very significantly in Biohelp treated pastures and only a little in fert treated areas.

The animal dietary mineral balance and digestibility figures on the HT tell us getting the Ca;Mg figures about right has improved the feed quality in some areas but not others. e.g digestibility is down but most minerals are better off. The ME levels of the grass are down and are significantly below the Biohelp treated grass. The feed quality of brown top, cocksfoot and sorrel and clover has changed sufficiently in the Biohelp treated side to be able to milk cows off it successfully given irrigation to keep the moisture up in summer and extra molasses and cobalt. Who'd thought that possible?

I used to believe in Albrechts theories of get the cation balance right and everything will come right. Grass species will change the soil will get softer and deeper etc. I have been saying for some years now that this theory is only partly correct. It only unleashes a small change along the path to abundance. Soil microorganisms in the correct balance will take us a lot further and for a lot less cost. I now have evidence to support my statements.

Soil organisms have a much greater impact on plant growth and quality than I ever realised.

I could work out my monetary return from fert as \$400/Ha for 800KgDM (1000+1800- 2000KgDM/Ha i.e. 2 seasons growth) over 2 years (\$0.50/kgDM) Pasture Plus and Microlife 3350+1000-2000-800=.1550kgDm/Ha extra at a cost of \$0.12/Kg DM.

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