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## Summary of Results

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On 20 April, 2005 an experiment to examine the effectiveness of Optimise fine lime was started at Craigknock farm, Scargill, North Canterbury. Five different Optimise treatments were compared with Aglime and nil lime.

### **Soil pH levels**

These were not affected until six months after the treatments were applied. On 14 October, both optimise ultra fine lime at 250 and 500 kg/ha gave similar soil pH values to 2500 kg/ha of aglime. By 12 December, Optimise ultra fine lime at 500 kg/ha was giving similar soil pH values to the aglime. By the 28 of February, 2006 none of the lime treatments had any effect on soil pH, and this was the case until the end of the experiment.

### **Dry matter production**

None of the treatments affected biomass production by the pasture when harvested on 28 December, 2005. While another harvest was planned, the lack of any effect on soil pH meant this planned harvest was cancelled.

## Methods

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On 20 April, 2005 an experiment to examine the effectiveness of Optimise fine lime was started at Craigknock farm, Scargill, North Canterbury. The pasture is located at an altitude of approximately 1000ft and consisted of approximately 61 % grasses (both unimproved and improved species, 3 % clover, 3 % weed and 33% dead material. The soil pH at the beginning of the experiment was 5.4 and Olsen P values averaged 32 mg/L.

### **Treatments applied consisted of the following:**

1. Nil (control)
2. Aglime at 2500 kg/ha
3. Optimise ultra fine lime pellets at 125 kg/ha
4. Optimise ultra fine lime pellets at 250 kg/ha
5. Optimise ultra fine lime pellets at 500 kg/ha
6. Optimise ultra fine lime pellets plus RPR at 250 kg/ha
7. Optimise ultra fine lime pellets plus Sulphur at 250 kg/ha

All treatments were applied using a motorised small plot fertiliser spreader. Plot size was 1.4 by 8 m. The treatments were replicated 4 times in a randomised complete block design.

### **Measurements**

Soil pH was measured in each plot on 6 June, 16 August, 14 October 12 December, 2005, 28 February, 23 May, 7 November, 2006 and on 10 May 2007.

Biomass was measured on each plot on 28 December, 2005.

## Results

### Soil pH

There were no significant treatment effects until the third sampling on 14 October. On that date, Aglime, Optimise at 250kg/ha and Optimise at 500 kg/ha all gave plots with average soil pH values of about 5.7 (Figure 1). These were all higher than the control value of 5.5. At the 14 December sampling, soil pH values declined in most plots. However, Aglime and Optimise at 500kg/ha maintained soil pH values of 5.7. These values were significantly greater than the control value of 5.525. None of the other treatments gave values that were statistically significantly different to the control value.

By the 28 February, 2006, none of the lime treatments had any effect of soil pH. This remained the case until the end of the experiment in May 2007. Some extra samples taken outside the plots revealed a soil pH of 5.57. This is slightly lower than the soil pH of 5.737 recorded from the nil plots within the experiment. However, when the soil pH values (range from 5.53 to 5.675 over the 8 sampling dates) from the nil plots are examined over time, it is likely that this variability is inherent in the site.

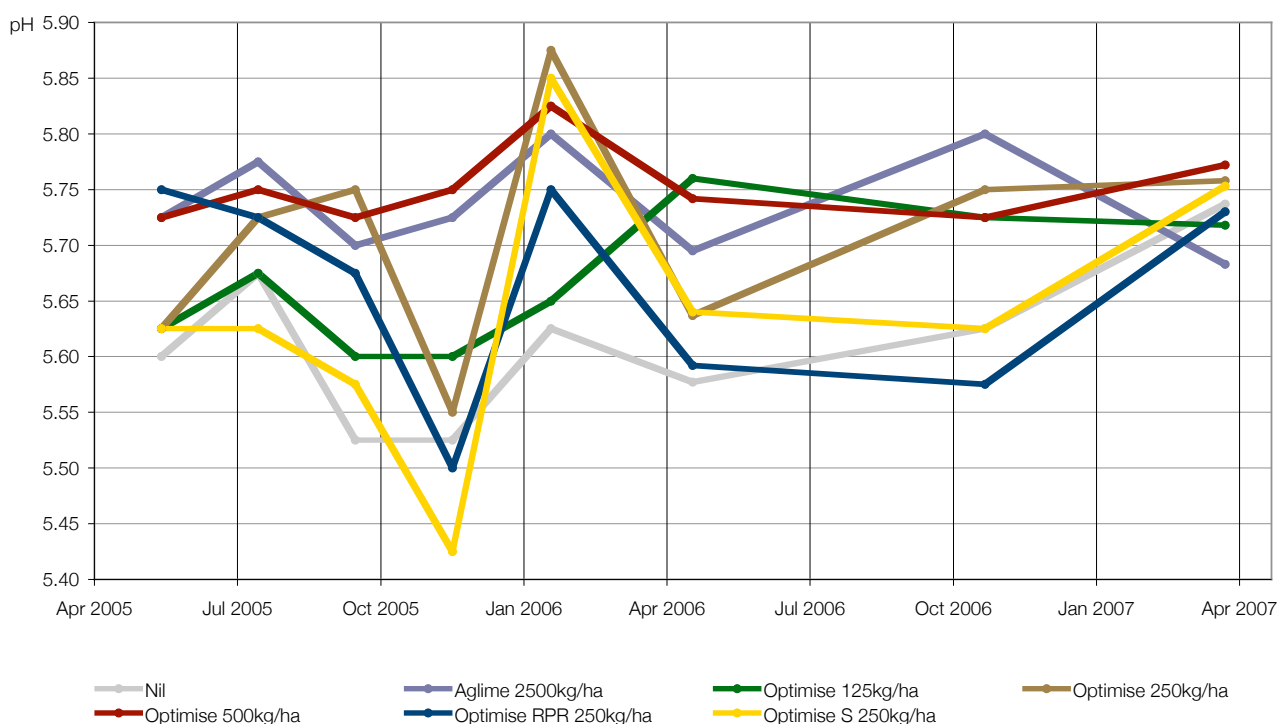


Figure 1. The change in soil pH at Scargill over time with seven different treatments

### Biomass

None of the soil treatments produced increases in pasture biomass (Figure 2). The grand mean was 412 g DM/m<sup>2</sup>.

### Discussion

The effect that lime has on soils is markedly affected by the fineness of the particles, and the hardness of the rock used.. Brady (1974) said that the finer the particles of lime, the more rapidly they go into solution and the more rapid will be the rate of reaction. The results presented here do at least partially support this. Soil pH changes did not appear until 14 October, about 6 months after application. However, to obtain a similar shift in soil pH as that which occurred with 2.5 t of Aglime/ha required only 250 to 500 kg of Optimise fine lime/ha. Agricultural lime usually consists of a range of particle sizes and can be derived from rock of varying hardness which can affect reactivity. Any comparison between agricultural lime and Optimise fine lime will be affected by the quality of agricultural lime used as the control.

While McLaren and Cameron (1996) suggested that soil pH changes due to lime application may last 3-4 years, these results showed that all lime applications had an effect that lasted only about 1 year. However, the duration of the response is dependent upon rainfall and application rate (McLaren and Cameron, 1996). There is some indication that there may have been some lateral movement of lime in the plots, as in May 2007, the nil plots had a pH of 5.74 which was a bit higher than the 5.57 recorded from samples taken near the experimental site. However, the soil pH values of the nil plots ranged from 5.53 to 5.675 over the 25 months of the experiment and it is likely that this variability is inherent in the site.

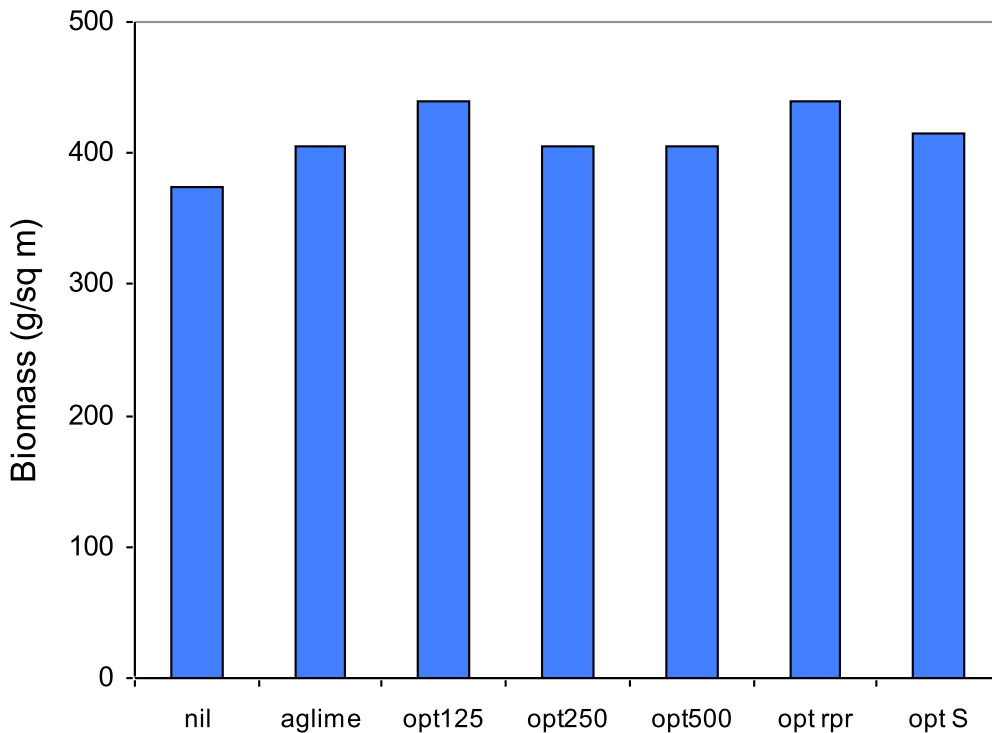


Figure 2. Biomass production of a pasture at Scargill eight months after applying various soil amendments

## References

- Brady, N.C. 1974. The Nature and Properties of Soils. Macmillan Publishing Co. New York, United States of America 639 pp.
- McLaren, R.G. and Cameron, K.C. 1996. Soil Science – Sustainable Production and Environmental Protection. Oxford