

Lime trial, Piquet Hill Farm, Te Akau

Results and Conclusions



A lime trial on Piquet Hill Farm, Te Akau commenced in October 2015 with financial assistance from Beef & Lamb NZ, with further funding from Avoca Lime Company and Rorisons Lime Company. The trial continued until June 2019 with the aim to look at pasture production responses.

The site selected had starting pH of 5.0. Four treatments of lime, (1.25, 2.5, 5 and 10 tonne/ha) were applied on four replicated 2m x 2m plots and compared to four control plots.

The findings below are specific to this site at Te Akau. The summary of the trial is below.

Pasture species showed increasing of ryegrass and clover and decreasing weed content with increasing lime rate. The table below shows the percentage of each species the winter of 2018 survey.

PASTURE SPECIES	Ryegrass	Sweet Vernal	Chewings Fescue	White Clover	Subterranean Clover	Lotus Minor	Weeds
Control	29	44	10	6	16	7	47
1.25 tonne	33	47	1	2	29	7	41
2.5 tonne	60	48	2	4	24	12	12
5 tonne	73	45	1	16	25	4	13
10 tonne	79	47	0	21	22	4	5

Soil test changes Soil pH increased and exchangeable aluminium levels decreased with increasing rates of lime. A reason for poor plant production on low pH soils is aluminum toxicity. This occurs when the plant available aluminium increases to a point where it limits root growth.

The effect of lime increasing pH and reducing aluminium toxicity is believed to be a major reason for the improvement in pasture species and increases in pasture production.

pH change	Control	1.25 tonne	2.5 tonne	5 tonne	10 tonne	Exch Al	Control	1.25 tonne	2.5 tonne	5 tonne	10 tonne
Year 1	5.0	5.3	5.4	5.5	5.5	Year 1	14.6	10.1	5.4	5.3	4.0
Year 2	5.3	5.3	5.4	5.7	5.8	Year 2	12.5	10.1	5.3	3.7	3.4
Year 3	5.3	5.3	5.7	5.8	6.1	Year 3	10.9	9.7	3.0	3.1	1.7
Year 4	5.0	5.2	5.4	5.7	6.2	Year 4	7.8	6.2	3.8	3.4	1.1

Avoca ideal value for pH 6.3

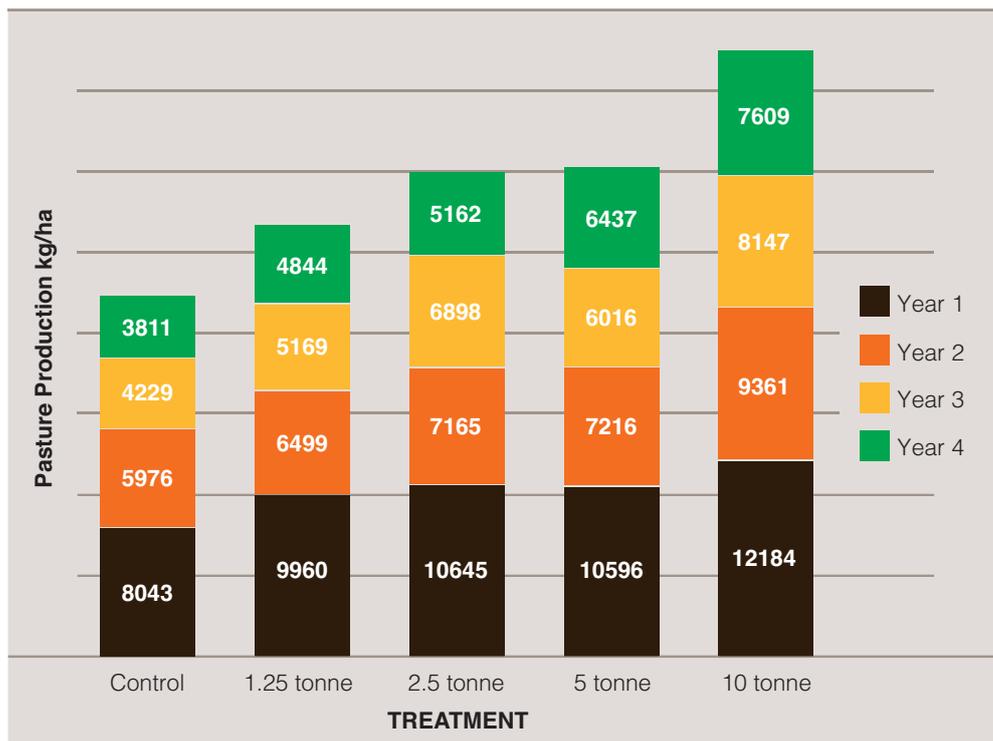
Standard ideal value for aluminium <3.0

Pasture production

over the total 4-year trial showed increasing pasture production with increasing lime rates. The table opposite is a summary of response per year over control.

Lime application	Year 1	Year 2	Year 3	Year 4	Total (Yrs 1-4)
1.25 tonne/ha	24%	9%	22%	27%	20%
2.5 tonne/ha	32%	20%	63%	35%	35%
5 tonne/ha	32%	21%	42%	69%	37%
10 tonne/ha	51%	57%	93%	100%	69%

Total pasture production per year is shown in the following graph.



Robin Boom's Conclusions

- If pH and calcium levels are low and this is compounded with aluminium toxicity and drought susceptibility the economics of applying lime whether by plane or truck can be highly economic.
- Although lime had little effect on feed quality over the spring and summer seasons, it enhances pasture feed quality in the autumn with less dead material and more green leaf. It may be this effect that farmers particularly notice as far as pasture utilisation goes, giving the appearance of improved palatability and increased utilisation of pastures
- Lime improves pasture recovery post drought and may make hill country pastures more resilient to droughts through better root growth where aluminium toxicity occurs.
- These results fly in the face of standard expected pasture dry matter responses of between 8-12% increase in production when pH levels are around 5.0, and are in line with some local farmer observations in the Te Akau/Waingaro region who have applied lime and anecdotally noticed significant changes in pasture and stock performance.
- With improved pasture performance and greater pasture recovery post drought, liming provides opportunities to fatten lambs and growing cattle faster with better quality pasture species during the autumn period in particular.

The results from this particular trial are specific to this site with its unique climate, soil type, stocking regime and pasture composition. It may be that results differ from sites with similar background soil fertility levels.

Acknowledgements

Avoca thanks Robin Boom from Agronomic Advisory Services for overseeing and recording the lime trial.

Also thanks to Ravensdown for providing initial lime for trial and laboratory services through ARL.

Special thanks to Piquet Hill Farm for allowing this trial to be run on their property and providing personnel in laying trial down and assistance in data collection for the first year.



Phone: (09) 433 5720

www.avocagroup.co.nz

**LIME AND
FERTILISER**
SINCE 1947