Soil Acidification on Pastures

Reducing the effects of soil acidification on predominately sandy soils.

Trial Update June 2020.

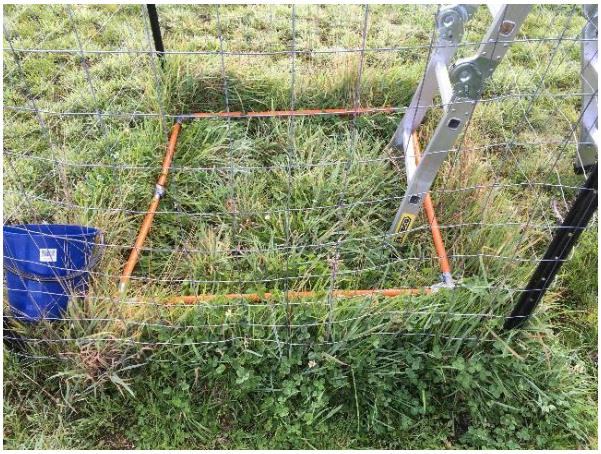
Reason for Trial

Much of the coastal farming regions in the north east of Tasmania sit on top of a sandy soil profile, which has a natural tendency towards acidity, and most landholders on these soils have a liming program to combat acidity. Some other areas including the Fingal Valley also have low pH.

Permanent pasture farming systems usually lack opportunities to cultivate lime into soils and tend to test soil down to 100mm, leading to undetected soil pH differences between surface and deeper soils.

After an initial call out for expressions of interest in late 2018, 15 landholders put their hands up to host demonstration trials.

Farm kocations ranged from Pipers Brook, Waterhouse, Tomahawk, the northern side of Winnaleah (sandier profile) and areas close to Avoca and Fingal.



Trial Design, Products and Rate

Suitable pastures that exhibited relatively low pH levels were identified. On 6 December 2018, a spreader truck applied one lime strip, 50 m long x 40 m wide (2000 m2) for each participating farm. The rest of the paddock was the control (untreated). One reinforced cage (1 x 1 m) was installed for both the limed and untreated sections. This allowed pasture within the cages to be cut and measured for dry matter and other tests, without any complications from preferential grazing.

The two lime products used were a blend of standard aglime and superfine lime, and a prilled lime (Calciprill). Only one of these products was used at each trial location.

High rates were applied in hope of getting a quick response. The fine lime was applied at 5 tonnes/ha at 4 sites, and Calciprill was applied at 620 kg/ha on the remaining sites.

Testing

Soil tests in November 2018, August 2019 and May 2020, tested for pH.

Dry matter levels were captured using a plate meter (when ungrazed) and by cuts within the 1 x 1 m cages. These were weighed pre and post drying. Other tests included:

- Feed tests;
- Plant nutrient tests; and
- Pasture composition analysis

This project is supported by NRM North, through funding from the Australian Government's National Landcare Program.

Australian Government | National Landcare Program

Results

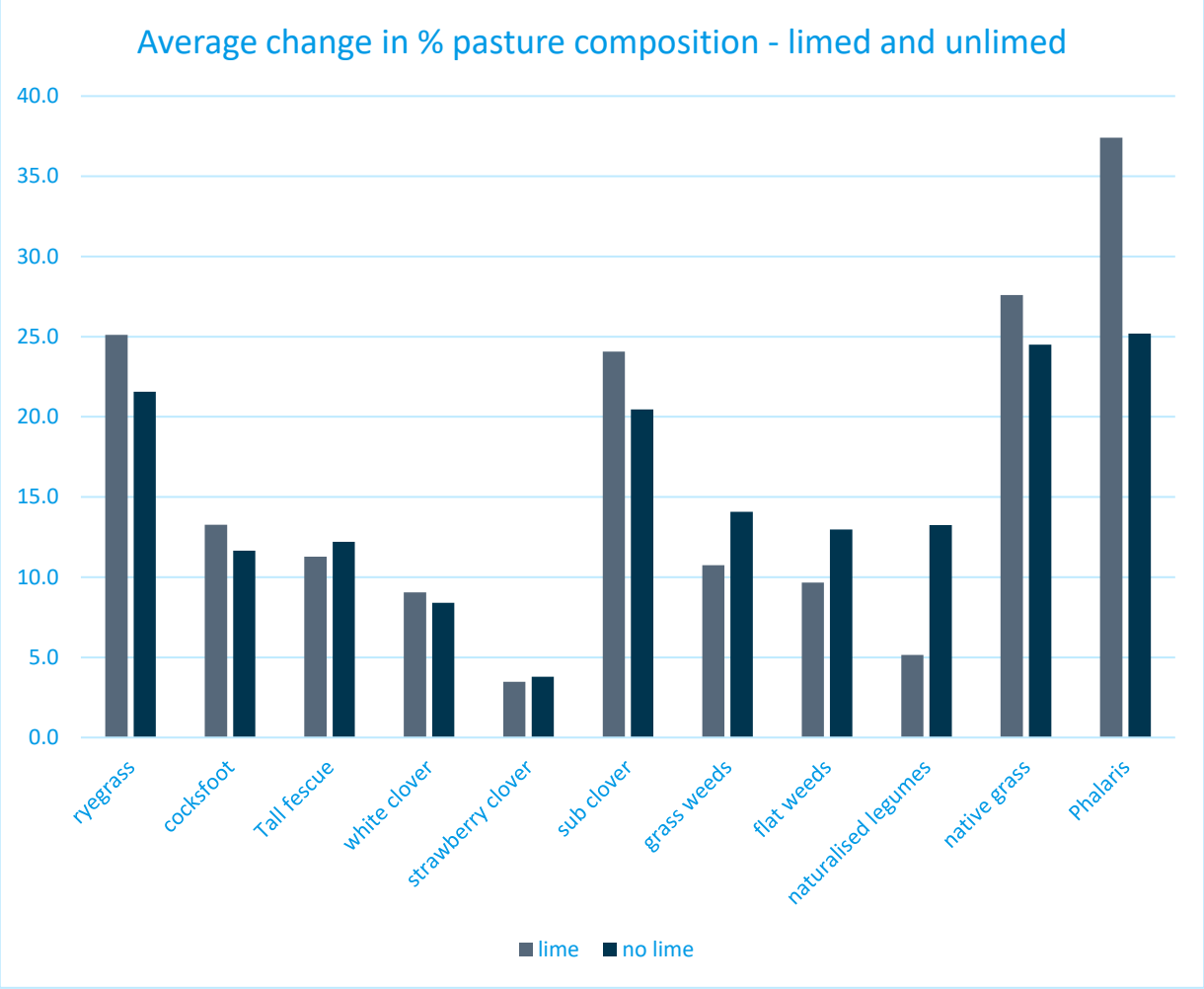
18 months after lime spreading, the variation in results across the 15 trial sites was still too strong to draw conclusions on most tests. However, some substantial results were observed, including improved calcium availability and beneficial changes to pasture composition.

Despite the addition of lime, the average topsoil pH declined when measured with a 100 mm soil profile. We suspect this is due to the sampling depth. With soil acidification processes continuing over the preceding 18 months, and surface-applied lime only interacting with the top few centimetres of soil, the average 100 mm soil pH can be expected to decline over the period. However, 100 mm soil pH in the limed plots did not decline as much as the untreated areas.

Topsoil calcium availability and calcium saturation in cation exchange sites did increase across the trial plots.

Half of the trial locations had a pasture composition assessment in May 2020, identifying beneficial changes to pasture composition from liming.

A graph of the average change in pasture composition from liming is presented below.



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Summary

These pasture liming demonstration trials, across 15 farms, used superfine lime products and exclusion cages to identify improvements in pasture productivity and soil pH. After the first 18 months, calcium availability and pasture composition has improved. Many other tests have yet to provide conclusive results, in part due to the high variability between sites. Given further time, the calcium carbonate in added lime may become active deeper in the soil profile and provide further answers. NRM North will continue to measure and monitor the trial sites in future years.

The improvements in pasture composition observed across the trial sites is encouraging. It appears to indicate that pasture composition may be more sensitive to topsoil pH and calcium availability than many laboratory tests.

The observed reduction in weeds and increase in desirable, sown species, can be expected to increase livestock weight gain and/or carrying capacity of the pastures. This could offset the cost of the lime and provide for growth of the industry in the permanent pasture areas of Tasmania.

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