



Effect of lime on pasture establishment and production in the Timor area

C.M. Rose

NSW Agriculture, PO Box 168, Scone, 2337

Timor in the Upper Hunter Valley, is mainly a beef grazing area based on permanent pastures. Awareness of soil acidity is very low in the area. Acidity is not considered a problem. Yet problems with poor establishment, production and persistence of temperate grasses and lucerne occur on some soil types.

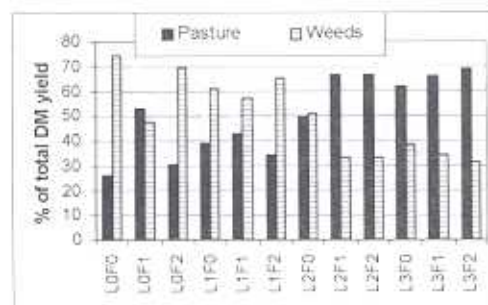
The site has a solodic soil with a top soil pH (CaCl₂) of 4.8, but pH increases with depth (6.0 at 20-40cm). High soil aluminum was not a problem, phosphorus levels were moderate whilst sulphur was very low. Traditionally this property received superphosphate once every two years. Liming has never been considered necessary.

Method

Replicated (3) 5m*6m plots had four lime treatments of 0, 1, 2 and 3 t/ha (L0, L1, L2, L3) incorporated to 10cm at sowing. These plots were split (5m*2m) for 3 fertilizer treatments - Nil, single superphosphate, SF45 (F0, F1, F2). The single superphosphate was applied at 380 kg/ha (42 kg/ha sulphur and 33 kg/ha phosphorus). The SF45 was applied at 100 kg/ha (42 kg/ha sulphur and 5.6 kg/ha phosphorus). The plots were sown in the autumn 1998, to *Sirosa phalaris*, Currie cocksfoot and Aurora lucerne. The lucerne was inoculated and lime coated. Cuts were taken seasonally (5 cuts) for dry matter yield and sorted into pasture components. Soil samples (0 - 10cm) were taken after 12 months for pH.

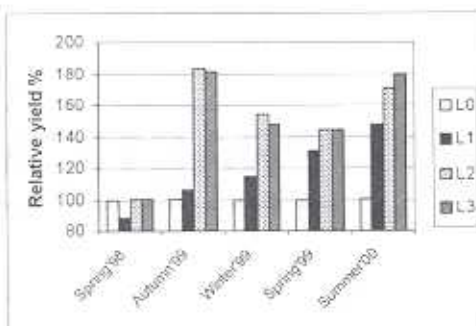
Results and discussion

Establishment was good but wireweed invasion occurred. This problem became a useful visual tool at the site. By the Autumn '99 harvest it was evident that low lime plots were dominated by wireweed while high lime plots had a greater sown pasture component (see figure 1).



L0: Nil lime; L1: 1t/ha; L2: 2t/ha; L3: 3 t/ha
F0: Nil Fertiliser; F1: Single super; F2: SF45

Figure 1. Weed and pasture component of Autumn '99 harvest



L0: Nil Lime; L1: 1t/ha; L2: 2t/ha; L3: 3t/ha

Figure 2. Pasture yield of lime treatments (averaged over fertilizer treatment) relative to nil lime



High lime plots had a pasture yield at least 40% greater than the zero lime plots over all the harvests (see figure 2).

Single superphosphate had a large effect on yield in most cuts (see figure 3). This is probably due to the larger amount of readily available sulphur and phosphorus. The 42 kg/ha of sulphur in the superphosphate is in the readily available form. The SF45 treatment only has 7 kg/ha. The other 35 kg/ha is in the elemental form only becoming available over time. The large superphosphate application also applied 33 kg/ha of phosphorus while the SF45 treatment supplied only 5.6 kg/ha. As we did not have an equal phosphorus treatment, which nutrient contributed most can not be determined. This large application of single superphosphate is three times the commonly used rate.

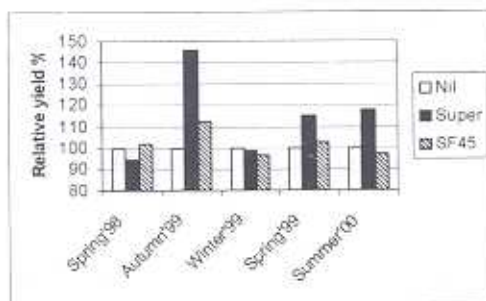
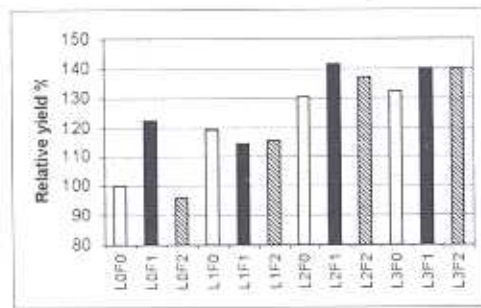


Figure 3. Pasture yield of fertiliser treatment (averaged over lime treatments) relative to nil fertilizer



L0: Nil lime; L1: 1t/ha; L2: 2t/ha; L3: 3 t/ha
F0: Nil Fertiliser; F1: Single super; F2: SF45

Figure 4. Cumulative pasture yield (5 harvests) relative to nil lime, nil fertilizer.

Single superphosphate in the nil lime plot increased the cumulative pasture yield by 21% but 2 t/ha of lime increased the yield by 30% without fertilizer. When fertilizer is added as well, the pasture increased a further 7 - 12%. (see figure 4).

The soil tests revealed an increase in pH with increased lime application as would be expected with incorporated lime.

Conclusion

Acid soils have not been considered a problem in the Timor area but this trial shows that on this soil type, lime does improve pasture production more than fertilizer alone. Lime promotes a stronger pasture that is more competitive with weeds. This is despite there being no soil aluminum problem and acidity not continuing to depth. When conventionally sowing temperate pastures in this soil type, lime application should be considered.

Acknowledgments

Acid Soil Action funded this project. The trial was sown at Waverley Station, Timor, and the co-operation of the manager, Tony Lettice is greatly appreciated. The help with sowing, harvesting and sorting by Luke Scowen, assistant at Scone, is also appreciated.