Profitability of liming and fertilising native pastures in the Yass district.

F.J. Leech
NSW Department of Primary Industries, Yass, NSW 2582.

Introduction

There is limited knowledge of the effects on production when liming and fertilising native perennial based pastures in the Southern Tablelands of NSW. There is a high proportion of undulating country in the Yass district consisting of native perennial pastures. A long-term grazing demonstration was established in 1998 in the Binalong area (35 km NW of Yass) to assess the economics of liming and fertilising such pastures when grazed by wethers for wool production. Monitoring of lime movement into the soil profile, pasture production and botanical composition also occurred. This paper will focus on the economic results during the period 1999–2004.

Materials and Methods

The demonstration consisted of three paddocks (approximately 4.4 ha). The treatments were as follows:

- Paddock 1 – limed @ 2.5 tonne/ha and 125 kg/ha single superphosphate applied annually;
- Paddock 2 – limed @ 2.5 tonne/ha and 125 kg/ha single superphosphate applied every three years;
- Paddock 3 – 125 kg/ha single superphosphate applied every three years.

Liming occurred as a once only application on Paddocks 1 and 2 in autumn 1998. Single superphosphate was applied in autumn and molybdenum fortified superphosphate was used every three years on all paddocks. The treatment used on Paddock 3 was regarded as the district practice by the Binalong Landcare Group.

The demonstration site was set stocked with merino wethers to simplify the management. Stocking rates were adjusted across each treatment in order to keep body weight of all animals the same. This results in similar wool characteristics across all treatments and allows profitability to be a direct measure of the paddock treatments.

The soil is granite based consisting of a sandy loam topsoil over a medium clay subsoil. Soil pH_{CaCl2} (0–20 cm) was 4.2 with approximately 35% available aluminium. The pasture consisted of approximately 35% native perennial grass, 5% other naturalised perennial grasses, 30% legume, 20% annual grass and 10% broadleaf weeds when sampled in early spring. The main pasture species were:

- wallaby grass (*Austrodanthonia* spp.);
- weeping grass (*Microlaena stipoides*);
- native/naturalised legume species;
- introduced legumes, mainly subterranean clover (*Trifolium subterraneum*); and
- annual grasses.

Average annual rainfall is 650 mm with slight winter dominance.

Results and discussion

Economic results have been calculated for the demonstration for the period January 1999 to January

Table 1 Summary of the economic data for the Binalong demonstration site under three fertiliser and liming treatments averaged over the 5 year period, 1999–2004.

	Paddock 1	Paddock 2	Paddock 3
	Super annually + lime	Super every 3 years + lime	Super every 3 years
Stocking rate (wethers/ha)	14.4	11.2	8.8
Total clean wool (kg/ha)	59.9	43.4	34.8
Total wool income ($/ha)	508	395	328
Total cost ($/ha)	352	289	218
Profit ($/ha)	156	106	110
Difference to Paddock 3 ($/ha Profit)	46	-4	not applicable

2004. Seasonal conditions have varied widely over this period hence adding value to the results.

Profitability was highest where superphosphate was applied annually (Table 1). More frequent superphosphate application (Paddock 1) increased pasture production enabling stocking rate to be increased compared to the normal district practice of applying fertiliser once every three years (Paddocks 2 and 3). Due to higher stocking rates, wool production per hectare was increased resulting in a higher return. These results are similar to those at the Bookham Grazing Demonstration site (Graham *et al.* 1998 and Leech and Graham 2003).

The results suggest that topdressing native perennial grass based pastures with lime may not be a sound economic practice (Table 1). Paddock 2 was $4/ha less profitable compared to Paddock 3. This is not surprising as many of the species found in this pasture are well adapted to moderate to high levels of acidity and therefore are not likely to exhibit marked increases in production. The results strongly indicate that the most significant impact has come from the additional phosphorous applied to Paddock 1 i.e. annual superphosphate application in Paddock 1 compared to an application every three years in Paddocks 2 and 3.

Conclusion

The economic data collected over a five year period does indicate it maybe marginal to lime native based perennial pastures in the Yass district. However, there is a distinct economic advantage in fertilising such pastures with single superphosphate. In order to realise this economic advantage stocking rate must be increased to utilise the extra pasture grown. Correctly matching stocking rate to increased pasture growth requires pasture management skills including assessment and fodder budgeting. In addition, under a wool growing enterprise, seasonal pasture growth needs to be managed to minimise variations in wool micron and staple strength.

The data generated has been used to provide better recommendations to local producers as well as being used as a teaching aid for courses such as PROGRAZE and Benchmarking and Understanding Soil Chemistry.

References

Graham, P., Williams, M., and Garnsey, R. (1998). The effect on wool production of adding Super to a native pasture. *In* 'Proceedings of the Grasslands Society of NSW Inc – 13th Annual Conference'. pp. 63–64.

Leech, F. and Graham, P. (2003). Native Pastures – A Productive Resource. *In* 'Proceedings of the Third National Native Grasses Stipa Conference: Sustainability and Beyond'. Cooma, NSW. pp. 87–89.

Acknowledgments

Thanks must go to the Giles family of Binalong for providing the land to run the demonstration and for their on-going support and to the Binalong Landcare Group who instigated the work and who have been highly supportive in the running of the demonstration. The financial support of Acid Soil Action is also gratefully acknowledged.