

Effect of fertiliser and rest period on legume abundance in carpet grass dominated pastures

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Abstract: In carpet grass dominated pastures in the Macleay Valley single superphosphate had a strong positive effect on legumes with the greatest abundance at 500kg/ha. Urea inhibited legume abundance when applied alone, but not when applied with superphosphate. Native glycine appeared to be responsive to increased fertility and was favoured by longer rest periods.

Key Words: pasture, carpet grass, fertiliser, legume

Introduction

Carpet grass (*Axonopus fissifolius*) dominated pastures with low levels of legumes are common on the low fertility hillslope soils of the Macleay Valley (Rose *et al* 2005). The scarcity of legumes is thought to be primarily due to the low phosphorus status of these soils. This limits the carrying capacities of the pastures due to poor feed quality and low autumn to spring productivity. In 2005, two trials were set up at Collombatti (mid Macleay) and Bellbrook (upper Macleay) to study the effect of fertilisers and rest periods on pasture growth, and composition. This paper reports on the effects of these treatments on legume abundance at Collombatti.

Methods

The trial was designed as described in Rose & Rose 2009a. Legume abundance data presented in this paper was collected in May 2007 at Collombatti, at the end of the 22 month harvest period. Abundance of white clover (*Trifolium repens*) plus native glycine (*Glycine tabacina*) was rated by three separate assessors using eye estimation. Ratings were based on a 0-5 scale (0 being no legume and 5 being greater than 80% groundcover), using regular reference to 5 standard reference plots to avoid estimation drift.

Results and Discussion

Clover had only just begun to germinate at Bellbrook at the end of the harvest period, so measurements were only taken at the Collombatti

site. However, based on measurements taken at both sites in winter 2006, the effect on legumes was similar at both sites; although native glycine tended to be more common at Collombatti.

Lime application consistently increased clover abundance across all rest periods (see figure 1). This could be expected as the soil prior to liming had a $\text{pH}_{(\text{CaCl}_2)}$ of 4.6 and a high aluminium percentage (25.8% CEC) which would be expected to affect white clover. Both 250 kg/ha and 500 kg/ha superphosphate further increased the abundance of legumes compared to lime alone. The greatest abundance was at 500 kg/ha, although there is a smaller additional benefit compared to the 250 kg/ha treatment as the length of the rest periods increased. Both rates of urea applications reduced legume abundance, often to levels similar to nil fertiliser treatments. Possibly the stimulatory effect on summer/autumn grass growth and ground cover inhibited legume germination and development. There was no consistent beneficial or detrimental effect on legume abundance of applying urea and superphosphate, compared to superphosphate alone.

Increasing the length of rest periods up to 16 weeks increased legume abundance under nearly all fertiliser treatments. Possibly this allowed greater leaf development between harvests, hence stolon and stem growth. It may also be due to glycine species being an important component of the legumes present, and being favoured by longer rest periods. However, the 52 weeks rest depressed legume abundance compared to

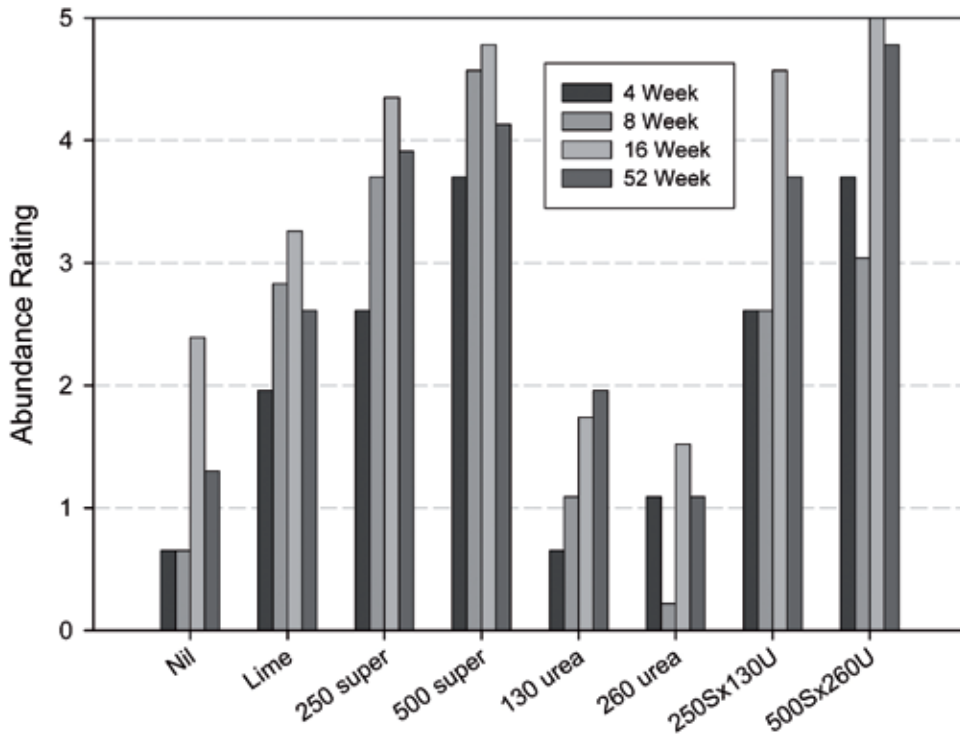


Figure 1: Effect of fertiliser and rest period on legume abundance in May 2007 at Collombatti (SS = Single superphosphate, U= Urea, Lime) Note: all treatments are plus lime except for the nil control plots.

16 weeks rest, but was still higher than 4 or 8 weeks rest. This could be due to a combination of increased shading from tall rank pasture over the summer and early autumn, but improved stored moisture when the plots were cut in April, stimulating legume growth.

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References

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