Caucasian clover (*Trifolium ambiguum*) is persistent in New Zealand montane, improved rangeland but requires regular sulphur application for productivity

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Key words: Caucasian clover, Kura clover, *Trifolium ambiguum*, persistence, sulphur

Introduction Caucasian clover (Cc) became dominant after 10 years in a 25 species, grazed pasture under higher rates of phosphorus (P) and sulphur (S). At low P and S inputs, Cc persisted but was unproductive on the low fertility tussock grassland site (Scott, 1998). This paper records the outstanding persistence and productivity of Cc when S and P were applied regularly to two rangeland sites in the upper Rangitata valley(Lat 43°S, Long 171°E).

Methods Jarvis *et al*. (1998) reported responses of hexaploid Monaro Cc to S fertiliser for an experiment which was established (500m asl, 940 mm rainfall) in spring 1992. P at 5 rates and S at 4 rates were applied in 1998 and again in 2001. Plots were cut in December each year to obtain spring/early summer herbage accumulation and botanical composition. A similar experiment was established on a higher terrace (700m asl, 1000mm rainfall) in 1975 (Lucas *et al*., 1981). This site has been top-dressed at 2-3 year intervals at 200kg/ha sulphur superphosphate (8% P, 20% S) for the last 20 years.

Results and discussion Figure 1 shows the large DM response of Cc to S and P in 2002 after treatments were reapplied in 2001. Three years later the responses to P were less marked especially at low S (Figure 2). The mean 2005 yields were less that half those of 2002. Craighead and Metherell (2006) also indicated that S applications are required more regularly than P. In the 1975 experiment, Cc has persisted in the sward for more than 32 years and is still a significant contributor to the pasture under intensive continuous grazing by red deer. The grass component was dominated by *Agrostis capillaris* and *Anthoxanthum odoratum* at both sites. The 15% cover of the prostrate invasive *Hieracium pilosella* present at the start of each experiment was suppressed after 3 years by the application of P and S fertiliser and Cc seed.

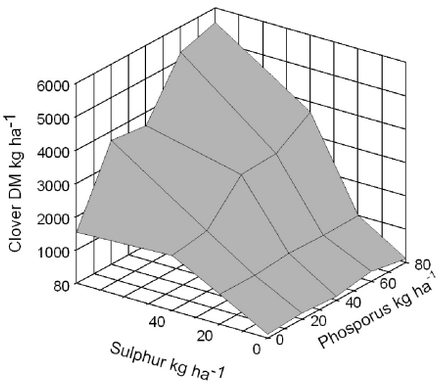

Figure 1 *Cc DM (kg/ha)* 2002.

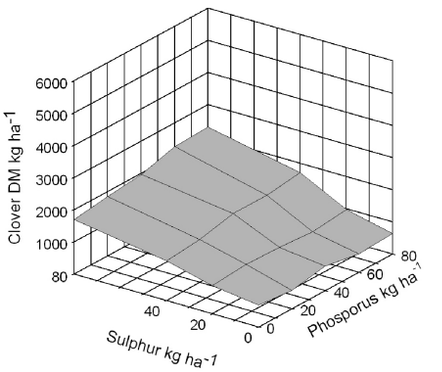

Figure 2 *Cc DM (kg/ha)* 2005.

Conclusions Caucasian clover is well adapted to the montane rangeland regions of New Zealand. Persistence is currently demonstrated at sites at 700 and 550m a.s.l. where Cc was sown in spring 1975 and 1992. Sulphur applications are required every 2-3 years to maintain productivity at these inland sites

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