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## 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 than 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 .

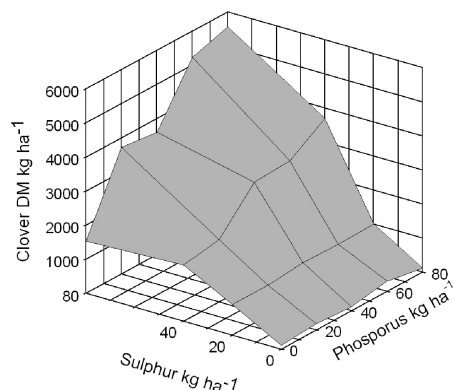


Figure 1 Cc DM (kg/ha) 2002 .

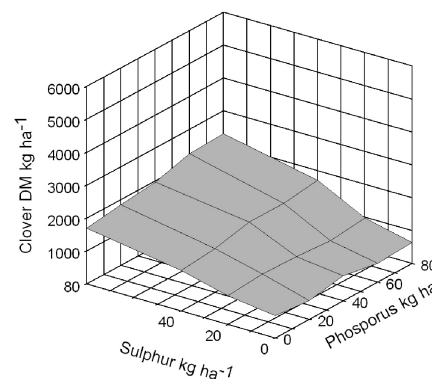


Figure 2 Cc DM (kg/ha) 2005 .

**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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