Caucasian clovers for high country : future research perspectives

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Caucasian clover (Trifolium ambiguum Bieb.) is a long-lived, perennial legume of cold alpine origin, which was first introduced into Australia in 1931 as an aid to soil stabilization on seriously-eroded areas in the Snowy mountains. Domestication was complicated by the fact that the species forms a natural polyploid series (1). Field testing did not occur until the 1950's and larger-scale sowings did not take place for a further 10 years, when locally- grown seed was available. This work led to registration of two cultivars, Summit and Treeline (2).

More recently domestication of Caucasian clover was extended to pastures and highland forest areas of both Australia and New Zealand and two more cultivars were registered: Forest and Prairie (3). These lines appear to be particularly suited to New Zealand climates, and their performance there has generated considerable interest in the species as a whole.

Further evaluation of lines of Caucasian clover has been made in the Monaro pastoral region of NSW, where problems with pasture legume persistence occur. These investigations have included (i) productivity compared to other clover species, (ii) phosphorus requirements, (iii) persistence, (iv) seed production, and (v) herbage quality (4,5). The results favour two new lines provisionally named Alpine and Monaro. Both have exhibited persistence at high elevation during extended dry conditions when the traditional subterranean clover and white clover pastures failed and when naturalized white clover died (4). Caucasian clover has been found to have a lower external P requirement than white clover to produce the same amount of dry matter. Monaro has a lower internal P requirement than other Caucasian clovers and may survive better in soils of low P status (5).

Caucasian clover has been found to have resistance to 7 major white clover viruses (AMV, CYVV, PSV, PCVMV, BYMV, WCMV, CYMV) (6). Other work has demonstrated that successful hybridization of Caucasian clover and white clover is possible (7).

Further development of these Caucasian clover lines points to some further areas of research. A study of the symbiosis of rhizobia in order to select for more efficient and effective nitrogen fixation, especially by the hexaploid lines,is needed. Further investigation of the low phosphorus requirement of these clovers may be rewarding. Caucasian clover seedling vigour requires improvement and an optimum sowing strategy needs to be determined.

There is a strong possibility that in elevated pastoral areas Caucasian clover could be important as a replacement for grazing lucernes, which are being increasingly weakened owing to spotted alfalfa aphid attack and root pathogens. There is also a potential to utilize Caucasian clover/white clover hybrids.

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