

White clover breeding for dryland pastures

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Despite the importance of white clover for dryland pastures, Australia lacks well adapted cultivars. Overseas cultivars are commercially available but have limited application to Australian dryland environments due to poor match between country of origin and most of the Australian white clover zone. The major problem is that presence and yield fluctuate from year to year and this lack of reliability, particularly in marginal environments, is due to poor persistence through summer moisture stress (Archer & Robinson 1989). This paper describes a breeding project aimed at identifying heat-

and drought-tolerant germplasm for the development of new white clover cultivars for dryland environments.

Methods

A breeding strategy utilising world-sourced germplasm has been developed as a collaborative NSW Agriculture - NZ AgResearch project. Methodology involves:

- evaluation of lines to select parent genotypes;

- development of breeding lines by polycrossing parent genotypes; and
- progeny testing for final selection of experimental varieties.

Results and Discussion

A set of 140 lines plus 10 cultivar standards were selected for evaluation on the basis of characteristics important for persistence and yield under conditions experienced in the dryland temperate pasture zone. The criteria used were:

- medium-large leaf/early flowering;
- high nodal root frequency;
- stoloniferous/medium leaf;
- drought tolerance; and,
- novel characteristics (eg. virus resistance).

Seedlings were propagated in the glasshouse and transplanted into plot culture (150 lines X 5 reps) in the field at Glen Innes in 1994. The lines will be evaluated for three years in mixed grazed swards. The evaluation phase will run for three years and measurements (yield, summer persistence,

winter activity, stolon density) will be made to facilitate selection of elite genotypes. Breeding lines will be developed by polycrossing elite lines and these will be progeny tested at regional sites. Seed yield will be assessed at this time.

New cultivars will have increased tolerance of summer moisture stress, improved adaptation to grass competition and better persistence under sheep and cattle grazing. This will provide stable legume based pastures, restore soil fertility and improve the quality of the pasture resource in the temperate perennial pasture zone.

Acknowledgments

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References

- Archer, K.A. and Robinson, G.G. (1989). The role of stolons and seedlings in the persistence and production of white clover (*Trifolium repens* L. cv. Huia) in temperate pastures on the northern tablelands, NSW. *Australian Journal of Agricultural Research*, **40**: 605-616.