

## Competition as a factor in sub-clover cultivar replacement

A.M. Bowman and G.W. King<sup>1</sup>

Department of Agronomy and Horticultural Science, Sydney University

<sup>1</sup> Now Department of Wool Science, University of New South Wales

The older cultivars of subterranean clover have traditionally been regarded as aggressive in establishment and growth in much of temperate NSW. A better understanding of the competitive mechanisms involved would aid in deriving pasture replacement programs and plant selection criteria. for the new cultivars that have better disease resistance and persistence.

### Methods

Three subterranean clover cultivars, Larisa(L), Woogenellup(W) and Yarloop(Y), were grown alone and in mixtures (50:50) in three temperature-controlled glasshouses for 63 days in three replicates, with daily watering. A range of agronomic features that might be important in determining competition for light were measured, such as height, LAI, and leaf number, as well as top and root weights.

### Results

The mixed Larisa-Woogenellup sward had very low total growth (Figure 1) compared to the other swards in which cultivars were grown either alone or together. The level of growth rate suppression was more marked for Woogenellup than Larisa (Figure 2) over the 63 day period. The growth rates of Yarloop and Larisa were both improved when grown together, but Yarloop was suppressed when grown with Woogenellup. The Larisa plants apparently cause competitive stress to plants of Woogenellup, but were not as competitive to Yarloop plants, as were other Yarloop plants.

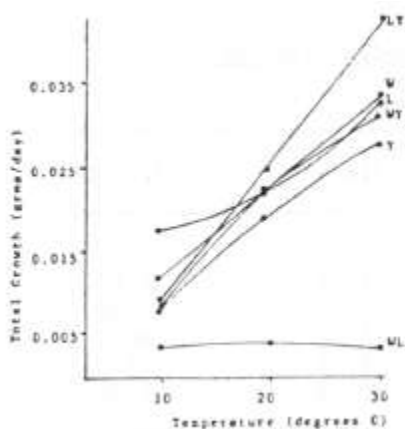


Figure 1. Total Growth at 63 Days

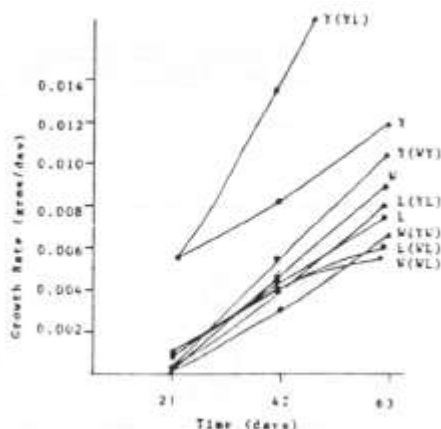


Figure 2. Cultivar Growth Rates at 20°C

### Discussion

Several morphological characteristics could contribute to the relative growth occurring under competition. Black(1) found that Yarloop could dominate Tallarook due to a height advantage, allowing greater interception of light before the light could reach the lower Tallarook canopy. In this experiment, high correlations were found between plant height and growth rate for all cultivars when grown alone. When grown in mixtures, however, the level of the correlation between growth and height for Yarloop remained

unchanged, but for Woogenellup it declined from 0.86 to 0.70 ( $P < 0.05$ ) as competition for light from Yarloop affected Woogenellup growth. Overshading may not only be due to height, as mutual shading of leaves may occur when plants are crowded together(2) at a similar height. The Larisa and Woogenellup cultivars hold their leaves at similar heights in the canopy. Thus in the Larisa/Woogenellup sward, mutual shading may decrease available light to both the cultivars and thus the total growth.

1. Black, J.N. 1961. *Aust. J. Agric. Res.* 12 810-20

2. Donald, C.M. and Black J.N 1958. *Herbage Abstracts* 28 1-6