

## Yield by environment interactions for warm-season perennial grasses

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In north-west NSW, warm-season perennial grasses are needed to rehabilitate marginal cropping land and degraded native grasslands. Environment by yield interactions of four warm-season perennial grasses were investigated as part of the third stage of a species evaluation program.

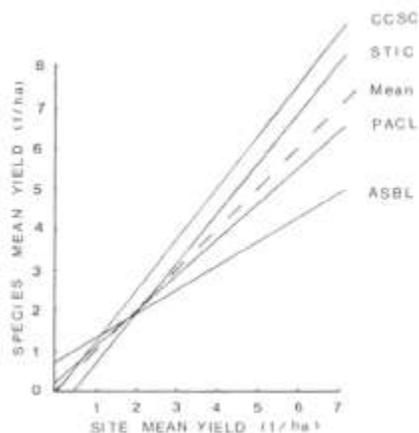
### Methods

The dry matter yield of 3 introduced grasses, *Panicum coloratum* var. *makarikariense* (PACL), *Cenchrus ciliaris* (CCSC), *Setaria incana* (STIC), and one native grass *Atriplex lappacea* (ASBL) was determined at 6 sites over 1 to 3 years. These sites were located in the 400 to 600 mm annual rainfall zone between Walgett and

Species by environment interactions were analysed following the Methods of Finlay and Wilkinson (1). A linear regression of yield for each species on the mean yield of all species for each site was calculated.

### Results and discussion

Considerable seasonal fluctuations in the climatic conditions, particularly summer rainfall, are experienced in the north-west of NSW. It is desirable for species in this environment to have a high degree of general adaptability.



**Figure 1. Regression lines show the relationship of individual yields of four species to the mean of all species grown at different sites and seasons.**

PACL exhibits average stability over all environments. It produced average yields in all years and at all sites. ASBL shows a greater degree of environmental stability. Large changes in the environment are associated with relatively small yield changes. Its greatest potential exists in an unfavourable environment.

STIC and CCSC both exhibit the opposite behaviour to ASBL. They are more sensitive to environmental conditions and are both better adapted to favourable environments where their high yield potentials can be attained. CCSC however, can produce at least average yields even under unfavourable climatic conditions in north-west NSW. Other factors, including persistence and ease of establishment should be considered when selecting a grass species for this environment.

1. Finlay, K.W. and Wilkinson, G.N. (1963). Aust. J. Agric. Res. 14:742-54.