



## Tall fescue ecotype collection on the Northern Tablelands of NSW

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Tall fescue is one of the most widely sown introduced grasses in NSW and particularly on the northern tablelands of NSW. However, the most commonly used cultivar of tall fescue, Demeter does have some limitations including:

- poor persistence, especially in combination with drought and close grazing;
- low nutritive value during spring primary growth cycle; and,
- it is susceptible to disease.

Reviews by Easton *et al.* (1994) and FitzGerald (1997) highlight the potential to improve current cultivars of tall fescue such as Demeter through breeding for increased winter activity and retained summer activity for summer rainfall environments. As Demeter has valuable characteristics that need to be retained, a useful breeding strategy for developing a cultivar with improved persistence would involve the collection of ecotypes based on Demeter from northern NSW. This work would extend the current tall fescue breeding project "Tall Fescue Improvement for Australia" (a collaboration between Victoria and NSW) based on introduced germplasm.

The objectives of the tall fescue ecotype collection were to:

- extend the current germplasm collections of tall fescue to include ecotypes collected from an Australian environment; and,
- to collect tall fescue ecotypes adapted to a summer rainfall environment with increased winter activity, better persistence, improved feed quality in spring, increased seedling vigour and disease resistance.

### Methods

The target zone for the collection was the northern tablelands of NSW. The northern tablelands is characterised by cold winters, highly variable rainfall and low summer soil moisture conditions.

Plant samples were collected from 43 sites between latitudes 28°29'S and 31°18'S in spring and summer 1997/98. Sites were selected on basis of tall fescue pasture age being 12 years or older. Sites were more or less evenly distributed over the target zone to capture the maximum amount of genetic variation associated with broad geographic differ-

ences in environmental factors.

Vegetative samples were taken as opposed to seed samples. These samples depict what is actually growing in a given environment and are more likely to reflect adaptation. Sixty plant samples randomly distributed over the full extent of the population were collected at each site. Areas such as stock camps, rocky areas, low lying areas or ungrazed areas were avoided so as to prevent collection of plants that had been subjected to different growing conditions and selection pressures. At each collection site detailed information was recorded including details of slope, aspect, climate, vegetative cover, pasture history, land use and pasture management. A soil sample was taken from each site for analysis of pH, phosphorus, sulphur and exchangeable cations. Climatic details from the closest meteorological station were used when data was not available from the cooperating landholder.

### Results and discussion

The ecotypes were collected from a range of environments with sites ranging in altitude from 915 m to 1370 m and average annual rainfall of 675 mm to 1250 mm. The three major soil groups of the northern tablelands are represented (basalt, granite and trap) as are both cattle and sheep grazing enterprises.

Tall fescue pasture age varied from 12 to 70 years old, the majority of these paddocks were sown to Demeter, although, some other cultivars such as Alta are represented in the collection. Some of the pastures where ecotypes were collected had very little tall fescue (2.5%) whereas some were dominated by tall fescue (66%).

Preliminary measurements indicate that the ecotypes show variation in growth habit, leaf size (fine, intermediate and broad) and leaf softness (soft, intermediate and coarse). The majority of the ecotypes represent the intermediate leaf size and softness with some presence of fine, soft leaf types and broad coarse leaf types.

Characterisation of the collection will relate morphological differences of the ecotypes with habitat and environment. Evaluation of ecotypes under field plot conditions will screen for greater winter activity, persistence, improved feed quality, seedling vigour and disease resistance. Promising



ecotypes will be used in a breeding project aimed at developing cultivars for the northern tablelands.

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### References

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