

The domestication of *Danthonia Linkii*, a native Australian grass

G M Lodge

NSW Department of Agriculture, Agricultural Research Centre Tamworth, 2340 NSW

Native and natural pastures in New South Wales cover about 60 million hectares, much of which area is unsuited to crop production and the sowing of exotic pasture species because of low or unreliable rainfall. Even in the higher rainfall Slopes and Tablelands areas of New South Wales, natural pastures predominate. For example, approximately 71% of the 5.4 million hectares of rural holdings on the northern Slopes and Tablelands are comprised of native and natural pastures, which when undeveloped carry less than 2.0 DSE per ha.

In these environments, conditions for pasture growth are favourable, fertilizer is used over some 40% of the total pasture area and large areas of sown pasture occur on the Tablelands. Despite these developments, carrying capacities are alarmingly low, averaging only 3.0 DSE per ha.

Present animal production from native and natural pastures is severely restricted by the low availability of green forage in winter and early spring (1). The sowing of winter green native perennial grasses would not only increase production by extending the length of the effective grazing season, but would also reduce costs. Native grasses are adapted to the environment. They have evolved under harsh conditions of periodic drought and inherent low soil fertility. As such they could have less re-establishment and lower maintenance costs than pastures based on more traditional grass species. In recent droughts the adaptability of the native perennial grasses to harsh conditions has proved valuable to graziers. While the concept of domestication of native grasses is relatively new to Australian agriculture, it has been widely and successfully used overseas to develop new cultivars from native ecotypes. Yearlong green species such as *Danthonia* are among the most highly regarded grasses of native pastures and provide substantial quantities of high quality green forage in winter (2). The NSW Department of Agriculture has recently undertaken a program to domesticate *Danthonia* spp by a two stage process of selection and breeding. In the first stage plants will be collected from natural populations and evaluated to determine the extent of their genetic variability and to identify desirable traits and superior individuals. Both agronomic and floral characteristics are being examined together with measurements of seed retention and yield, and seedling vigour. The second stage of the program involves the selection or breeding of advanced lines for release as new cultivars. Cytogenetical studies are being conducted to determine the ploidy level of the plants collected and assess their suitability for breeding (3).

At Tamworth 3,000 individual *D linkii* and *D richardsonii* plants collected from 500 sites in New South Wales have been planted out in nursery rows. These are being assessed for vegetative morphology, growth, time of flowering, seed retention, seedhead morphology and seed dormancy. Studies are also being conducted on seed yield and seedling vigour, characteristics considered essential for successful domestication (4).

The overall objective of this program will be to provide seed supplies of *Danthonia* spp for commercial sowings. As yet no native grasses have been domesticated for use in Australian agriculture.

1. Lodge, G M and Roberts, E A 1979. Aust J Exp Agric Anim Husb 19 698-705.
2. Lodge, G M and Whalley R D B 1983. Aust Rangel J 5(1) 20-7.
3. Brock, R D and Brown, J A M 1961. Aust J Bot 9 62-91.
4. Harlan J R 1960. J Range Mgt 13(2) 86-9.