Register of Australian Herbage Plant Cultivars

A. Grasses
18. Wheatgrass
Thinopyrum ponticum (Podp.) Z.-W. Liu & R. R.-C. Wang (tall wheatgrass) cv. Dundas

Reg. No. A-18a-2
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Origin

Dundas tall wheatgrass is a synthetic cultivar derived from 50 parental genotypes selected from a spaced plant nursery containing 2000 plants of cv. Tyrrell and 400 each of the USA cvv. Largo and San Jose. The nursery was established under non-saline conditions at the Pastoral and Veterinary Institute (PVI), Hamilton, Victoria. Soil and climatic details of the site were provided by Smith *et al.* (1994). The nursery was sown in the autumn of 1990, with Tyrrell plants obtained through seed from five separate seed production paddocks in Victoria and southern New South Wales. This seed was obtained from the Agriculture Victoria seed testing station at Burnley. The spaced plant nursery at PVI was grazed periodically by sheep. Plants were assessed for seasonal productivity, leafiness, height, tiller density, anthesis date, crown area, disease resistance and stem digestibility over 3 years, 1990–93.

Dundas was developed as a leafy, productive alternative to the existing tall wheatgrass ecotype, cv. Tyrrell. Tyrrell is the only cultivar of tall wheatgrass available commercially in Australia (Oram 1990). Tyrrell developed through the processes of natural selection from seed sent to Australia from the USA in the mid-1950s (Rogers and Bailey 1963). Subsequent to this, seed from this line was released commercially in the USA as cv. Largo. While Tyrrell was originally known in Australia as Largo, selection pressure had caused the development of 2 distinct lines (Lohmiller 1976, cited in Oram 1990). To avoid confusion the Australian line was renamed Tyrrell, after a salt-affected shire and salt lake in Victoria. Tyrrell has long been known to be amongst the most salt-tolerant of pasture plants (Rogers and Bailey 1963) and is well adapted to environments in southern Australia. However, Tyrrell has the reputation for providing only low quality forage (Oram 1990), especially when mature (Warren and Casson 1992).

In 1991, 15 plants with the desired leafy and productive phenotype were polycrossed. The half-sib progeny from this polycross where sown in both a saline and non-saline environment to monitor any effects of selection on establishment and productivity in both environments.

The spaced plant nursery at Hamilton was evaluated for a further 2 years and 50 plants were selected in 1993. Genotypes from all 5 sources of Tyrrell were included in the final set of 50 parental genotypes in an attempt to provide a cultivar which, while phenotypically uniform, was broadly adapted to the wide range of environments in which tall wheatgrass is grown. Tall wheatgrass is a decaploid with $2n = 70$ chromosomes (Wang *et al.* 1991). Therefore, a cultivar based on 50 plants can be regarded as having a broad genetic base.

Dundas was recommended for registration by the Victorian Plant Varieties Committee in December 1998. Dundas has been registered for protection under Australian Plant Breeders Rights legislation (Anon. 1999)

Morphological description

The valid taxonomic name for cvv. Tyrrell and Dundas is *Thinopyrum ponticum* (Lui and Wang 1993). The 2 cultivars are morphologically similar; a full morphological description of Tyrrell was given by Oram (1990). The large variability both within and between certified seed lines of Tyrrell that enabled the selection of Dundas was detailed by Smith *et al*. (1994). Significant variation was found for each of the 9 agronomic and nutritive value traits measured. In general terms Dundas is a summer-active perennial grass with an erect growth habit reaching 1.5–2 m under favourable conditions at flowering. On an individual plant basis, Dundas can be distinguished from Tyrrell by its shorter plant height and smaller number of reproductive tillers. Tyrrell and the parent genotypes of Dundas were 3–4 days later flowering than the cvv. Largo and San Jose at Hamilton (Smith *et al.* 1994). The parent plants of Dundas are more leafy and have more vigorous early season growth than Tyrrell.

Agronomic characteristics

Dundas was sown in four agronomic experiments in Victoria. Three of the experiments were in saline environments (Glenthompson, Kerang, Woorndoo) which were sown in 1996, the fourth was sown in spring 1995 at Hamilton on a basaltic clay prone to waterlogging. Four phalaris (*Phalaris aquatica* L.) cultivars (Sirosa, Australian, Uneta and Holdfast) and 2 tall fescue (*Festuca arundicaea* Schreb.) cultivars (Demeter and AU Triumph) were also sown at Hamilton. Dundas and Tyrrell were sown with equal densities of live seed at each site. Dundas established well at all 4 sites with seedling densities 11–26% greater than Tyrrell; the difference was greatest at

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Woorndoo and smallest at Kerang. At Hamilton, seedling densities of Dundas were equivalent to the phalaris cultivars but were significantly ($P<0.05$) lower than those of the tall fescue cultivars (P. Evans pers. comm.).

At Woorndoo, the dry matter yield of Dundas in the establishment year, measured on 16 January 1997, was 43% higher than Tyrrell, 113% higher than Sirosa phalaris and 153% higher than Demeter tall fescue. All of these differences were significant ($P<0.05$).

At Hamilton from August 1996 to mid January 1997, dry matter yields of the varieties were not significantly different from July–October 1996. Yield of Dundas was 49% greater than Tyrrell in November and 15% greater than Tyrrell in January. The total dry matter yield of Dundas in 1996 was 3 t/ha compared with 2.6 t/ha from Tyrrell, but this difference was not significant ($P>0.05$). While the dry matter digestibility of Dundas was consistently higher than Tyrrell in this trial, the differences were not significant. The total yield of digestible dry matter of Dundas was 29% greater than Tyrrell in 1996. The results indicate that the extra yield of Dundas has not been achieved through the production of coarse, stemmy material, which in tall wheatgrass has poor nutritive value compared to the leaves (Smith *et al*. 1994).

The herbage yields of the tall wheatgrass cultivars at Kerang were low due to the high salinity at this site. In 1996 the dry matter yield of Dundas (0.7 t/ha) was significantly ($P<0.05$) greater than Sirosa phalaris (0.4 t/ha) in this environment. This was in contrast to the non-significant difference between Tyrrell tall wheatgrass and Sirosa phalaris. However, the 21% increase in dry matter yield of Dundas compared to Tyrrell was non-significant.

Dundas is expected to be a suitable replacement for Tyrrell in both saline and non-saline environments in southern Australia and should play an important role as a productive, summer-active perennial pasture species in the reclamation of land affected by high watertables and salinity.

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