Register of Australian Herbage Plant Cultivars

A. Grasses
2. Perennial ryegrass
Lolium perenne L. (perennial ryegrass) cv. Avalon

Reg. No. A-2a-12

Registered 26 May 2000

Originators: V. M. Croft, P. J. Cunningham, M. W. Anderson, K. F. Smith, and K. F. M. Reed

Agriculture Victoria, Pastoral and Veterinary Institute, Private Bag 105, Hamilton, Vic. 3300, Australia.

Registrar: W. M. Kelman

CSIRO Plant Industry, GPO Box 1600, Canberra, ACT 2601, Australia.

Released by Head Licensee, Vicseeds Pty Ltd, 20 Old Melbourne Road, Lara, Vic. 3212, Australia.

Australian Journal of Experimental Agriculture, 2000, **40**, 1199–1200.

Origin

Avalon perennial ryegrass is a synthetic variety derived from 6 parental genotypes selected from a spaced plant nursery of the cultivar Victorian, which was selected from local ecotypes in central and western Victoria (Anon. 1990). Avalon was developed as a more productive and disease resistant alternative to Victorian perennial ryegrass for use as pasture in the high rainfall zone (>650 mm average annual rainfall) of southern Australia.

Victorian perennial ryegrass has previously been shown to exhibit a wide variation for aspects of plant morphology and flowering (Rogers 1989). The source material for Avalon was collected in 1992 from 56 farms located in Gippsland, Western and Central Victoria. Clonal ramets were taken from plants in good perennial ryegrass paddocks that had not been sown to ryegrass for at least 50 years. Some paddocks had not been sown down since settlement. One hundred plants from each paddock were transplanted, along with standard cultivars, into a spaced-plant nursery at Hamilton, Victoria, for characterisation and selection. After 12-months, 79 plants were selected on the basis of superior late spring growth, erect growth habit and later-flowering tendencies compared with the general population.

These genotypes were open-pollinated in an isolated environment to generate half-sib families. The families were evaluated at Hamilton, Timboon and Balmoral in Western Victoria over 3 seasons as replicated 1 m drill rows. The original 79 genotypes were vegetatively cloned and screened under glasshouse conditions for resistance to crown rust (*Puccinia coronata* f. sp. *lolii*) and stem rust (*Puccinia graminis*) using the methods of Clarke *et al.* (1997), barley yellow dwarf virus and ryegrass mosaic virus resistance, seedling fluorescence, endophyte (*Neotyphodium lolii*) presence and associated toxins (lolitrem B and ergovaline).

Using a selection index and data from screening tests, 6 plants were identified as having superior progeny performance and disease resistance and used to form a synthetic cultivar. Prebasic seed will be maintained by Agriculture Victoria, at Hamilton. Avalon has been granted Plant Breeders Rights (Application 97/320) under the breeders synonym Syn 2.95 (Croft 1999).

Morphological description

Avalon is a late-maturing perennial ryegrass with medium leaf width and length and a large number of relatively short tillers. In a spaced-plant trial in 1998 at Hamilton, Victoria, Avalon was about 8 days later flowering than Victorian perennial ryegrass, with maturity time similar to the cultivars Ellett, Banks and Vedette. However, Avalon is significantly shorter at inflorescence emergence than Ellett, Banks and Vedette (Croft 1999). Avalon is currently the only cultivar of perennial ryegrass developed from Australian germplasm with the late maturing characteristic.

Agronomic characters

A trial consisting of 4 replicates of 1 by 2 m pure grass sward plots was established at Heywood, Victoria, in 1997 to compare the agronomic performance of Avalon against the Victorian ecotype and a number of other cultivars of perennial ryegrass. In the first year of this trial, the seasonal and total dry matter yields of the cultivars were not significantly different. In autumn of the following year, however, the seasonal dry matter production of Avalon (0.60 t/ha) was significantly higher than Victorian (0.36 t/ha). The dry matter yields of Ellett (0.49 t/ha), Aries (0.47 t/ha) and Grasslands Nui (0.49 t/ha) were not significantly different to Avalon (Gellert *et al.* 1999). Similar rankings were obtained for herbage production in the following winter. Avalon was significantly (P<0.05) higher yielding (0.54 t/ha) than Victorian (0.21 t/ha) but not Ellett (0.44 t/ha), Aries (0.36 t/ha) and Grasslands Nui (0.37 t/ha). The spring production of the cultivars was not significantly different. Following the harsh summer of 1998–99, large differences in the dry matter yield of the cultivars were measured over the next autumn. The yield of Avalon (0.8 t/ha) was significantly (P<0.05) greater than Victorian (0.31 t/ha), Ellett (0.50 t/ha), Aries (0.43 t/ha) and Grasslands Nui (0.49 t/ha). The differences in dry matter yield in the later harvests represent differences both in yield potential and stand density.

A similar trial was established at Hamilton in autumn 1997. A total of 10 harvests were taken over the ensuing 3 years. At none of these harvests was the dry matter yield of Avalon

 10.1071/EA00085

significantly different from Ellett, Aries, Victorian or Grasslands Nui. The period 1997–99 was extremely dry at Hamilton and this may have prevented differences in growth potential being expressed. Further agronomic testing is currently being conducted at Bega, Terang and Kerang as part of the Australian Pasture Plant Evaluation program.

Avalon perennial ryegrass has been bred for use in high rainfall environments (>650 mm) or under irrigation. However, the growth potential of the cultivar is best expressed under higher rainfall conditions where the growing conditions allow extended seasonal growth. The cultivar will primarily be sown as a component of dairy pastures.

References

Anon. (1990). Victorian perennial ryegrass. In 'Register of Australian herbage plant cultivars (3rd edn)'. (Ed. RN Oram) pp. 10–11. (CSIRO Australia: Melbourne)

Clarke RG, Villalta ON, Hepworth G (1997) Evaluation of resistance to five isolates of *Puccinia coronata* f. sp. *lolii* in 19 perennial ryegrass cultivars. *Australian Journal of Experimental Agriculture* **48,** 191–198.

Croft VM (1999) Perennial ryegrass (*Lolium perenne*) 'Avalon'. *Plant Varieties Journal* **12,** 42–43.

Gellert VM, Smith, KF, Reed KFM (1999) Capturing the yield potential of the Victorian perennial ryegrass ecotype. In 'Proceedings of the 11th Australian plant breeding conference'. Adelaide, 19–23 April. (Eds P Langridge, A Barr, G Anricht, G Collins, A Granger, D Handford, J Paull) pp. 255–256. (CRC for Molecular Plant Breeding: Adelaide)

Rogers ME (1989) Variation in turf-type morphological characters within *Lolium perenne* L. cv. Victorian. *Australian Journal of Experimental Agriculture* **49,** 851–859.