



Grasslands NuSiral – a new white clover cultivar for dryland pastures

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White clover is Australia's main perennial pasture legume with the white clover zone occupying over 7.8 m ha with potential to extend to 16 m ha (Australian Temperate Pastures Database). Despite the importance of white clover, Australia lacks persistent cultivars. White clover improvement in Australia began at Glen Innes in 1988 and has included germplasm collection and conservation, support research to identify breeding objectives, and breeding for dryland environments. Current breeding projects combine Australian and New Zealand expertise and world-sourced germplasm collections to develop white clover cultivars with better drought tolerance and improved persistence. The first breeding project has produced a promising new variety – Grasslands NuSiral.

Breeding

Grasslands NuSiral is a synthetic variety developed by phenotypic selection from 3 cycles of single plant selection from a random Siral population maintained by NSW Agriculture. Selection was undertaken by AgResearch in the field at Lincoln, New Zealand commencing in 1994. Siral was an introduction (CPI 19434) from Algeria collected during an FAO-CSIRO collecting mission to the Mediterranean region in 1954 (Anon 1990). Siral has strong winter growth in mild climates, good recovery characteristics in response to moisture stress, and broad adaptation (Lovett & Neal-Smith 1974, Anon 1990). Siral showed good performance in both winter-rainfall and summer-rainfall environments at a wide range of dryland sites in a study of 17 prominent white clover cultivars at 18 field sites in the Australian white clover zone. It also expressed outstanding cool season performance which was attributed to stolon survival through summer/autumn moisture stress and ability to produce late autumn/early winter regrowth (Norton *et al.* 1995). However, poor seed production (Clarke *et al.* 1990) caused it to be removed from commercial use. To overcome this limitation in an otherwise promising cultivar, selection was undertaken within Siral for i) intensive flowering and high seed production, ii) uniformity of vegetative characteristics, and iii) freedom from alfalfa mosaic virus symptoms. The selection program achieved an 18% improvement in the uniformity of leaf size, a 12% improvement in autumn growth, a 16% improvement in cool season growth, and a 97% increase in seed yield (Clifford, unpublished data).

Morphological characteristics

Grasslands NuSiral was granted PBR status in March 2000; a summary of data from PBR testing in New Zealand was published in 1999 (Anon 1999). It has also been characterised under glasshouse and field conditions at Glen Innes in northern NSW; results are presented in Table 1.

**Table 1. Morphological characteristics of Grasslands NuSiral and other prominent white clover cultivars.**

	NuSiral	Haifa	Siral	Waverley	Sustain	Irrigation	El Lucero	Prestige	se [†]
Leaf									
Leaf markings [‡]	Present	Distinct	Present	Absent	Faint	Variable	Present	Faint	-
Leaf area (mm ²) [‡]	259	301	-	-	-	-	-	-	61.5
Leaf area (mm ²) [‡]	178	204	-	263	123	169	219	99	25.3
Flower									
Flower size [‡]	Medium	Large	Medium	-	-	-	-	-	-
Flower prolificacy [‡]	High	Medium	Low	-	-	-	-	-	-
Flowering onset (days) [‡]	36	40	-	43	47	47	36	43	-
Flower density (no. m ⁻²) [‡]	687	440	-	340	527	367	427	627	80.7
Stolon									
Stolon number (no. m ⁻²) [‡]	213	167	-	131	213	222	198	318	31.0
Stolon thickness (mm) [‡]	1.9	2.1	1.9	-	-	-	-	-	0.35
Stolon thickness (mm) [‡]	2.7	2.8	-	2.9	2.4	2.4	2.7	2.0	0.14
Growing point density (no. m ⁻²) [‡]	113	73	-	69	102	102	89	140	22.1

† Standard error (P<0.05) for comparison within rows ‡ Characteristics in the glasshouse # Characteristics in the field

The data show that Grasslands NuSiral is a medium-large leaf cultivar intermediate in leaf size between G. Sustain (medium-leaf) and Haifa (large-leaf). White crescent leaf marking is strongly defined but not as pronounced as in Haifa. The variety has thick stolons comparable to large leaf types like Haifa, Waverley and El Lucero. Stolon density of Grasslands NuSiral is comparable to Haifa, G. Sustain and Irrigation and growing point density of Grasslands NuSiral is very high. It is early-flowering and expresses exceptional flowering prolificacy. Moreover, Grasslands possesses the plant type attributes known to be desirable for broad adaptation to dryland pasture conditions in Australia (Norton *et al.* 1995). Merit testing of G. NuSiral is currently occurring in Australia (3 sites in New South Wales, 3 sites in Victoria), New Zealand, Europe, USA and South America.

Acknowledgements

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References

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