

# Establishment of perennial wallaby grass (*Austrodanthonia caespitosa*) compared with annual rye corn as a citrus mid-row ground cover crop for semi arid areas.

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## Introduction

Irrigated mid-row cover crops are used by the horticultural industry to improve soil organic matter and to reduce erosion and vehicle compaction. However, increased focus on salinity and improved horticultural water use efficiency has resulted in the industry moving away from traditional types of irrigation such as overhead sprinkler systems and flood irrigation, to more efficient and localised drip and low level under-canopy systems. This has important implications for mid-row management in low rainfall (< 300 mm) horticultural areas as rainfall cannot be relied on to establish and maintain traditional annual cover crops (eg rye corn and oats etc.) year in and year out.

In the semi-arid horticultural areas of NSW, Victoria and SA most alternative native cover crop work has focused on sub-shrubs, with limited work on native grasses. In higher rainfall areas native perennial grasses have been successfully established in the mid-row of vineyards without irrigation (Henschke 2003; Vic DPI 2005). Reported benefits included increased insect biodiversity and water infiltration, more efficient moisture use and reduced weeds burdens. Other potential benefits include frost and disease tolerance, pleasing appearance, reduced herbicide use and reduced mid-row maintenance.

The aims of this experiment were to determine whether a C3 winter active native perennial grass such as *Austrodanthonia caespitosa* could be successfully grown in semi-arid citrus mid-rows to maintain year round ground cover in comparison with a traditional annual cover crop.

## Methods

The experimental site was NSW DPI Dareton Research Station (142°00'E, 34°05'S) in south western NSW's Sunraysia horticultural region with an average annual rainfall of approximately 286 mm. Soil at the site was a red earth with a well drained sandy loam texture. Two replicated plots of *A. caespitosa* and annual rye corn were located in each of seven mid-rows of Imperial mandarins.

All seed was sown into a dry seed bed on the 27 May 2005. Rye corn was direct drilled at the district average of 50 kg/ha. *A. caespitosa* seed was hand broadcast at the rate of 10 kg/ha and then lightly raked. All plots were initially watered with 8 mm using a water cart due to the absence of an opening break which occurred a week later.

The site was sprayed with glyphosate prior to planting, and subsequent broadleaf weed control was undertaken using 150 g/L MCPA and 25 g/L Dicamba mixed and applied at 120 mL in 40 L water over 80 m<sup>2</sup> to the *A. caespitosa* plots only.

Mandarin trees were pruned, fruit harvested and the under-canopy sprayed using glyphosate. All plots were slashed to 9 cm at the end of the growing season.

Measurements were made of plant establishment, dry matter production and ground cover.

## Results and discussion

Total rainfall over the growing season between June and the end of November 2005 was 259 mm. Annual rye corn rapidly outgrew *A. caespitosa* and produced approximately seven times the dry matter biomass (Table 1) of *A. caespitosa*. Rye corn was slashed twice compared with once for *A. caespitosa*. The greater

**Table 1** Performance of *A. caespitosa* and rye corn sown as mid-row crops in a mandarin orchard in 2005.

	Average number of plants/m <sup>2</sup> at end of growing season (30 November 2005)	Average ground cover % at end of growing season (30 November 2005)	Average ground cover % at end of summer (28 February, 2006)	Total DM production kg/ha
<i>A. caespitosa</i>	136	43	79	916 slashed once
Rye corn	78	86	70	6288 slashed twice

biomass production of rye corn over the growing period meant that ground cover was almost twice as high as for the *A. caespitosa* plots at the beginning of summer. However, by the end of summer the ground cover was slightly higher in the *A. caespitosa* plots due to the slower but continued growth of *A. caespitosa* and the faster breakdown of rye corn. Ground cover values include dry leaves shed by the mandarin trees.

Rye corn out-competed weeds without the use of herbicide until the end of its growing season when glyphosate was used to control broadleaf weeds. In contrast *A. caespitosa* required three applications of selective herbicide to control broad leaf weeds over the same period.

The authors believe that the true test of *A. caespitosa* as a ground cover will be in its second year when it is expected to grow more rapidly from established butts than from seed, thereby possibly out-competing weeds and reducing the need for herbicide. Rye corn will need to be re-sown in autumn.

## References

- Henschke, P. (2003). Use of native grasses in vineyards; Native grass South Australia. 2(1).
- Victorian Department of Primary Industries (2005). Viticare Trials (1); Native grass cover crops. Information sheet. 