

### 3.6.4 Grain yield of early sown wheat and triticale without grazing - Cressy, Tas

**Location:**

"Coy Farm", Cressy, Tasmania.

**Funding:**

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**Take home messages:**

- A replicated trial was conducted to compare grain yield from two winter wheat varieties, Revenue and Einstein and the triticale variety Endeavour.
- Revenue was significantly higher yielding than Einstein which in turn out-yielded Endeavour. Revenue appears to have set a new plateau in wheat yield potential in Tasmania across a range of sowing dates both in grain-only and in dual purpose trials.
- For early sowing without grazing new germplasm is required with stronger stem strength. The lack of lodging in Einstein (and Alberic in 2008-09) suggests that the CSIRO material (and Australian material in general) is not as suited for early sowing as some European material.
- Later flowering varieties are required to confidently sow in March without grazing. Future breeding and screening work should target a variety with similar flowering date to Tennant (and Einstein).

**Background/Aim:**

In the U.K. planting dates for grain-only wheat crops have progressively shifted back to September ie comparable with March in Australia. This enables development of a vigorous plant root system entering winter and has the added advantage of removing moisture from the soil profile in Tasmania.

Leaf disease and lodging are recognised problems with early sown crops. In Tasmania potential problems with early sowing are reduced through grazing but given the high grain yields overseas it would be informative to evaluate early sowing of a grain-only wheat crop. This is of particular relevance in Tasmania where the crop can be watered up in a dry summer/autumn. The major limiting factors of excess vegetative growth and greater disease pressure due to the longer growing season can be reduced through adequate applications of fungicides and plant growth regulators and use of stronger stemmed varieties. An additional constraint when sowing in March is flowering too early and an associated higher risk of frost damage.

In 2008-09 four wheat varieties were assessed for grain yield with a March sowing. Lodging in Tennant and Mackellar in particular was extensive, resulting in reduced yields and there was minor lodging in Revenue. In contrast there was very little lodging in the French variety Alberic.

The objective of this study was to compare the early sowing performance of a high yielding Australian wheat variety with reasonable lodging resistance (Revenue) with an English variety recognised for strong stem strength (Einstein). As an additional comparison, the new triticale variety Endeavour was included as it has a strong winter habit (vernalisation requirement) before flowering.

**Trial information:**

Varieties: Revenue (95102.1) wheat  
Einstein wheat  
Endeavour triticale

Revenue, a CSIRO-bred winter wheat, has yielded exceptionally well in yield trials in Tasmania for 6 years and will be the new standard in wheat varieties. Einstein is a relatively late flowering (for Australia) English variety with good stem strength, being currently multiplied for release by PlantTech. As a comparison it is probably not quite as late as Tennant but has a higher yield potential. Alberic was not included in the 2009-10 trial as despite good performances in Tasmania there were no plans by Grainsearch to release this variety. Endeavour is a dual purpose triticale replacement for Breakwell with a strong vernalisation requirement (according to mainland data).

There were four replicates in a randomised complete block design. The trial was sown on 22<sup>nd</sup> April with 9:13:17:4 fertiliser at 250kg/ha and followed a potato crop. To reduce waterlogging damage, nitrogen was initially applied as a foliar spray (12kgN/ha) on 17<sup>th</sup> July. Two additional 50kgN/ha topdressings were subsequently applied as urea. To cover the large range of growth stages, three fungicides were applied across the trial (11<sup>th</sup> September, 20<sup>th</sup> October and 11<sup>th</sup> November). The trial was harvested on 11<sup>th</sup> January. Harvested plot sizes were 8m x 1.5m wide.

**Growing season rainfall (Mar-Nov): 589 mm**

**Results and discussion:**

*The season:* Establishment was good but winter rainfall was very high, particularly in August and total rainfall over the winter period at the nearby Cressy Research Station was the highest on record. The waterlogged conditions continued into spring when plants were reaching maximum growth rates. After early-mid December there was little further rainfall resulting in a sharp finish to the growing season. Barley Yellow Dwarf Virus was not evident (4 insecticide applications) and rusts were controlled. There was a small amount of sharp eyespot.

*Grain yield:* Revenue was significantly higher yielding than Einstein which in turn out-yielded Endeavour (Table 1). Revenue appears to have set a new plateau in wheat yield potential in Tasmania across a range of sowing dates both in grain-only and in dual purpose trials. Einstein was 6 days later than Revenue to flower and so was more affected by the sharp finish to the season. With irrigation during grain fill higher yields can be expected.

The yield of uncut Endeavour was disappointing given that the grain yield after cutting was slightly higher (5.30 t/ha, not significantly different). The uncut Endeavour was particularly tall with a poor harvest index due to excess growth. There was also a small amount of head loss prior to harvest but only in the order of 0.3 t/ha. Results from a May sown triticale variety trial in 2009-10 were affected by waterlogging damage but Endeavour appeared to yield reasonably well.

The later than planned sowing was not conducive to lodging. However whereas there was minor lodging (not greater than 10 degrees) in two of the Revenue plots there was none in Einstein plots. The stronger stem strength of Einstein could also be physically felt by brushing over the canopy. In Endeavour, despite the tall habit, there was also no lodging (but also not so much yield!).

**Summary:**

Revenue has continued its run of high yields across a range of sowing dates and in grain-only and dual purpose trials. These consistent performances suggest the high yield potential of Revenue is reasonably robust across different environments.

The lack of lodging in Einstein (and Alberic in 2008-09) suggests that the CSIRO material (and Australian material in general) is not as suited for early sowing as some overseas material. This is not surprising given that in trials in Australia the selection pressure for resistance to lodging is generally far less intense than in Europe. Plant growth regulators can be applied to shorten plant height and increase stem strength. In the adjacent canopy management trial there was no significant PGR effect on grain yield.

The main issue with early sowing of Revenue without grazing will be flowering too early with the risk of frost damage. Future breeding and screening work should target a later flowering variety with similar flowering date to Tennant (and Einstein) and improved stem strength. In 2010-11 additional overseas wheat germplasm will be evaluated including at least six new European varieties.

**Table 1.** Grain yield (t/ha) from early sown winter cereal trial, Cressy, Tasmania, 2009-10.

Variety	Yield (t/ha)	
Revenue	8.28	a
Einstein	6.94	b
Endeavour	5.02	c
l.s.d. (5%)	<b>1.21</b>	
cv%	<b>8.0</b>	