Australian perennial wheat research – Overview and initial results
Plant A (CPI 148030a)

Plant B (CPI 148030b)
2010 (a)

Cowra
2010 - Woodstock
Cowra – 2010 (2009 sowing)
2010 – Woodstock (2009 sowing)
Evaluation of perennial wheat germplasm in an Australian environment

Newell, Larkin, Hayes & Norton
Site Overview

- **Soil:** Red Chromosol
  - $pH = 5.2$
  - $Al\% = 1.5$
  - Colwell P = 30
  - Organic C% = 0.9
  - CEC = 4.9

- **Previous Crop:** Lucerne
- **Nursery 1** Chinese and Argentine Perennials
- **Nursery 2** USA Perennials WSU & KLI
- **Nursery 1** sown 3rd Jun. Nursery 2 sown 18th Jun
- **Fertiliser** 100kg/ha DAP + 25kg/ha Urea
- **Nurseries 1 & 2** irrigated post harvest (19/10/08)
Nursery 1 yield data
2008
Nursery 2 yield data 2008

Number of days after sowing until flowering

Yield - WSU accession
Yield - Control (EGA Wedgetail)
Yield - TLI accession
Days to flowering
Grain yield l.s.d. ($P = 0.05$)
Nursery 2 yield data 2008

Grain yield (g/m)

235's

Yield - WSU accession
Yield - Control (EGA Wedgetail)
Yield - TLI accession
Days to flowering
Grain yield l.s.d. (P = 0.05)

Number of days after sowing until flowering
Nursery 2 yield data
2008

Grain yield (g/m)

Number of days after sowing until flowering

- Yield - WSU accession
- Yield - Control (EGA Wedgetail)
- Yield - TLI accession
- Days to flowering
- Grain yield l.s.d. (P = 0.05)

267’s
Mug shots: Flowering heads of P. Wheat
**Nursery 2 yield data 2008**

<table>
<thead>
<tr>
<th>Days to flowering</th>
<th>Yield - WSU accession</th>
<th>Yield - Control (EGA Wedgetail)</th>
<th>Yield - TLI accession</th>
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- **Grain yield l.s.d. (P = 0.05)**

- **Grain yield (g/m)**

- **Number of days after sowing until flowering**
268b (Tenacious Glumes)
Regrowth
Regrowth

Nursery 1
3rd year regrowth

Average Score
Black Mountain
Dundas
Family 10
OK7211542
Otrastajuscaja 38
Th. Intermedium
Nursery 1 yield data
2008

Nursery 1 CARS 08
Yield Data

- Grain Wt lsd 65.9
- Average DAS to Flower lsd 2.45
Nursery One Secondary Yield

- 2008 Harvest lsd 41.79
- March 09 Harvest lsd 5.367
- Harvest 2009 lsd 22.55

Grains:
- OK7211542: 93.6
- Otrastajuscaja 38: 29.6
- Mtn Rye: 12.5
- Th. Intermedium: 3.5

Yield in grams:
- OK7211542: 19.08
- Otrastajuscaja 38: 11.2
- Mtn Rye: 0.28
- Th. Intermedium: 0.315

NSW Government Industry & Investment

Otrastajuscaja 38
Mtn Rye
Th. Intermedium
Regrowth
15 lines regrew out of 56 (27%)
Samples of varieties were assessed for tolerance to WSMV, Stripe Rust, Leaf Rust and Stem Rust.

Varieties containing Intermediate Wheatgrass and Tall wheatgrass in their pedigree showed resistance to WSMV. (Kansas and China Breeding Lines)

All varieties had high resistance to Stripe Rust and Leaf Rust.

Most varieties were in the susceptible range for Stem Rust.

OK 7211542 and the MegaWheats had triple rust resistance.

OK 7211542 was able to perenniate.
Conclusions

- 18 lines demonstrated an ability to regrow after grain harvest
- Nine lines demonstrated a capacity for multiple grain harvest
- Seven lines demonstrated an ability to survive into year 3
- Promising resistances to the major diseases
- = Proof of concept: Perennial wheats are possible in Australian environments