

3. Crop Disease Management Trials

3.1 Wheat

3.1.1 Released and Potential Wheat Varieties Trialled With and Without Fungicides - Southwest Victoria

Locations:

Inverleigh (Peels Rd, Inverleigh)
Mininera (Mininera – Tatyoon Rd, Mininera)
Hamilton (Forts Rd and Skenes Woolshed Rd, Strathkellar)

Funding:

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Researchers:

Mick Keating (Trials Manager) and Chris Bluett.

Authors:

Chris Bluett and Angela Clough, DPI.

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Rainfall (mm) April – November 07:

Hamilton : 470mm Mininera : 478mm
Inverleigh : 415mm

Summary of Findings:

The incidence of stripe rust was severe at Hamilton and far lower at Mininera and Inverleigh. Subsequently, differences in grain yields of stripe rust susceptible varieties with and without fungicides was particularly dramatic at the Hamilton site whilst there was no difference at Mininera and only five varieties differed at Inverleigh.

Grain yields at the Hamilton site varied from 2 t/ha to 12 t/ha and 14 of the 26 varieties had a significant increase in grain yield when fungicides were applied. The CSIRO red winter wheat crossbred CS95102.1 produced the highest grain yields at all sites and under all treatments, yielding at least 1.1 t/ha higher than any other variety trialed. The next highest yielding varieties varied between different sites and treatments. The Hamilton trial shows that in a year with high leaf disease pressure, the combined choice of variety and management practice is essential to obtaining high grain yields.

Background to the trial:

These trials were established to allow grain growers to assess the grain yields of released and upcoming wheat varieties under “with fungicide” and “without fungicide” management regimes. Hopefully, these results will alert growers to the need to consider their preferred disease management strategy during variety selection.

▼ **Table 3.1: Trial inputs**

| | |
|---------------|---|
| Sowing dates: | 21/05/2007 at Mininera, 24/05/2007 at Inverleigh 15/05/2007 at Hamilton |
| Harvest date: | 28/12/2007 at Mininera 02/01/2008 at Inverleigh 08/01/2008 at Hamilton |

| | Type | Product | Rate |
|---|----------------------------|---------------------------------|--|
| Herbicides and insecticides applied | Pre-sowing knockdown | Roundup Powermax | 2L/ha |
| | Post sowing pre-emergence | Talstar | 100mL/ha for RLEM |
| | In-season weed control | Tigrex | 500mL/ha Inverleigh 500mL/ha Hamilton |
| | | Glean | 15g/ha Hamilton only |
| At sowing fertiliser | | DAP | 100kg/ha |
| Fungicides (Applied to fungicide treated plots only) | Growth stage range 30 – 32 | Nufarm Opus 125 (epoxiconazole) | 200 mL/ha |
| | Growth stage range 37 – 45 | Nufarm Opus 125 | 250 mL/ha |
| | Growth stage range 57 – 65 | Nufarm Hornet (tebuconazole) | 145 mL/ha |

Cost per hectare (22/02/2008 : Both chemicals are \$45/L (ex GST). Total fungicide cost: \$26.80/ha

Trial Design:

All trials were arranged in a Latinised design with three replicates, two fungicide treatments (+/-) and 26 varieties. Fungicides were applied as an experimental treatment at three times. Three times is more than most grain growers would use but was required to ensure crop protection given the varieties in the trials had a broad maturity range. Trials at Hamilton and Inverleigh were sown on 1.7m raised beds with 15cm row spacings and 8 rows per plot. Trials at Mininera were sown on flat land with the same plot spacing. All trials were direct drilled into stubble with knife points and presswheels using a cone seeder.

Trial Results:

Grain yields of the varieties significantly differed at all three sites. Hamilton and Inverleigh also had significant differences for the fungicide treatments and had significant variety x fungicide interactions. Applying fungicides did not change grain yields at Mininera.

▼ Table 3.2: Results

| | Hamilton | Mininera | Inverleigh |
|--|----------|----------|------------|
| Site mean grain yield without fungicide (t/ha) | 6.87 | 7.85 | 5.31 |
| Site mean grain yield with fungicide (t/ha) | 8.67 | 7.86 | 5.50 |
| Variety | *** | *** | *** |
| Fungicide | *** | NS | ** |
| Variety x Fungicide | *** | NS | ** |

NS = not significant *** is $p < 0.001$ ** is $p < 0.01$

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ABB seeds

- Suited to medium to high rainfall areas
- Excellent resistance to stripe rust with adequate leaf and stem rust resistance
- Mid-late season maturity between Chara and Kellalac
- Classified as AH in Vic, SA and APH in southern NSW

Evaluated prior to release by

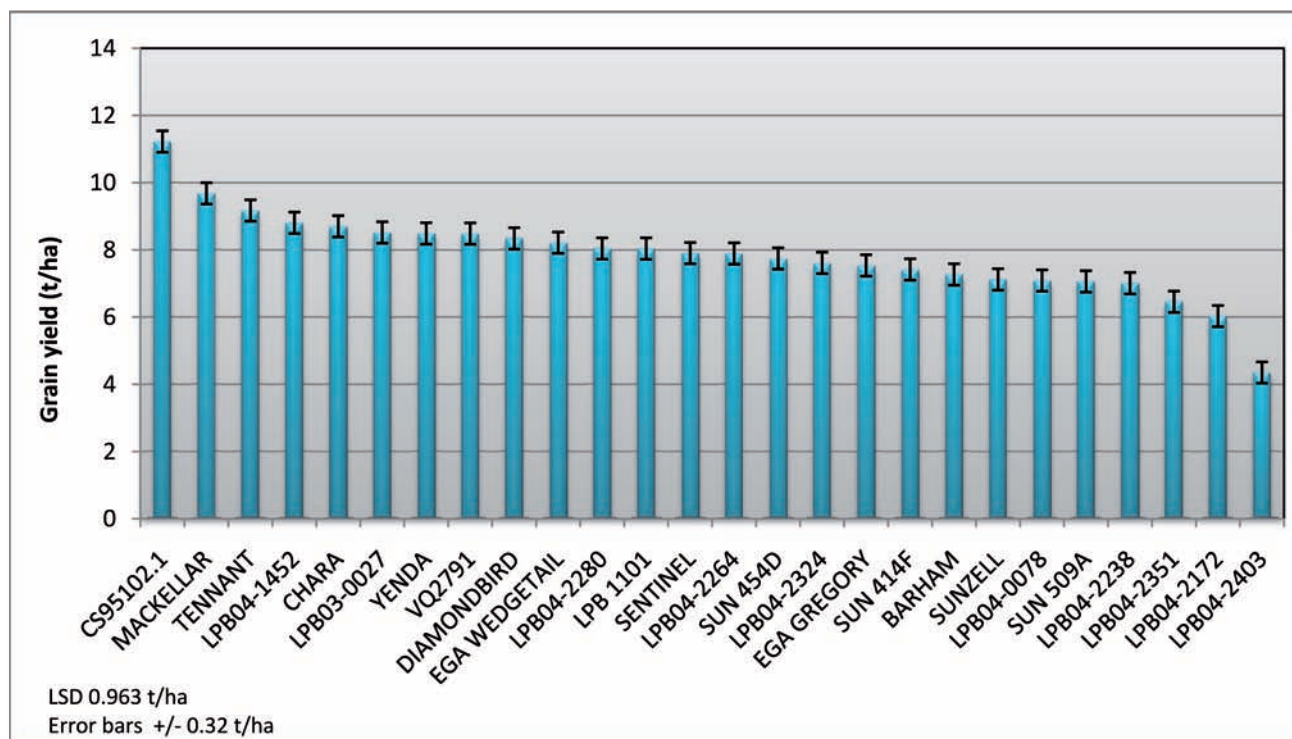




Contact: Nicholas Evans, Cultivar Manager - 0428 406 627
 nicholas.evans@abb.com.au
 www.abb.com.au

Mininera DPI Wheat x Fungicide Trial

The following chart shows that the CSIRO crossbred CS95102.1 produced a significantly higher grain yield than any other variety in the trial. Chara was highest yielding milling variety. (Overlapping error bars mean the varieties have statistically yielded the same eg Diamondbird and EGA Wedgetail). Fungicides did not affect grain yields at Mininera.



▲ Figure 3.1: Comparative grain yields for wheats at Mininera

Inverleigh DPI Wheat x Fungicide Trial

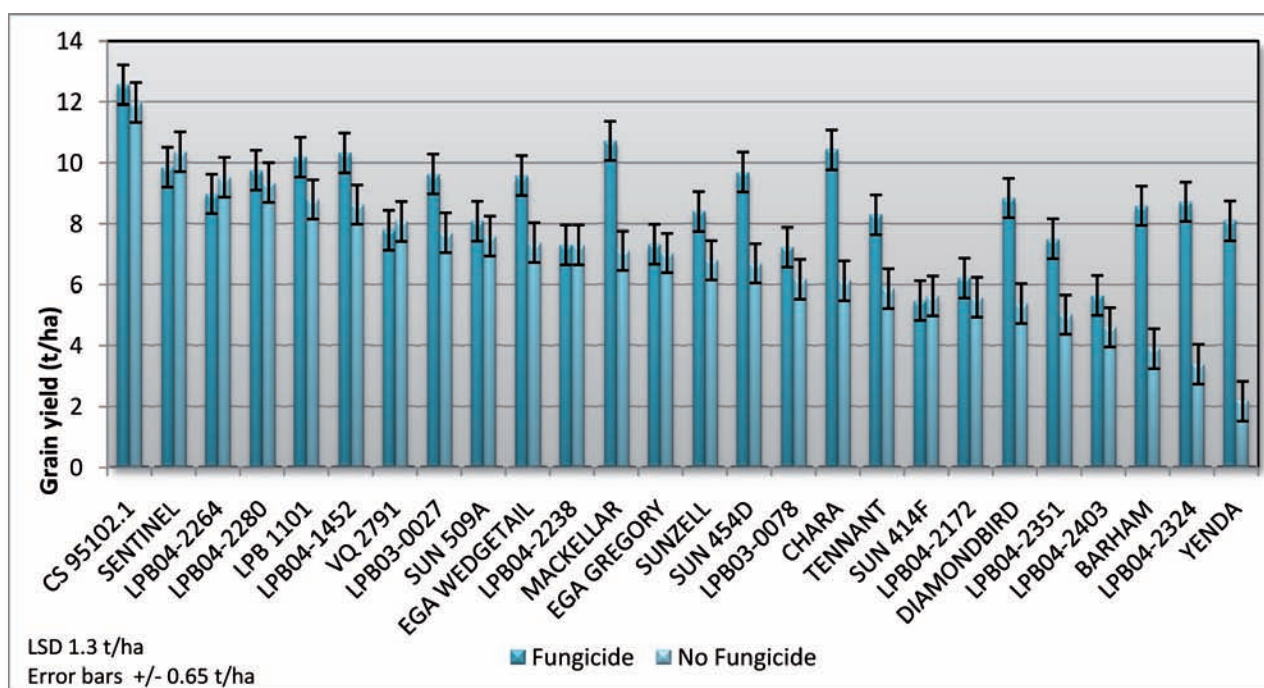
Four of the 26 varieties trialled at Inverleigh yielded significantly higher with fungicides than without fungicides (shown in Table 3.3). The improved grain yield of Tennant and Mackellar under fungicides is of note as these varieties were considered resistant to stripe rust until quite recently. The grain yield of LPB04-2403 declined in the presence of fungicides and this result cannot readily be explained. Regardless of the fungicide treatment, CS95102.1 yielded significantly higher than any other variety trialled followed by equally high yielding Yenda (6.60 t/ha), Tennant and Mackellar.

▼ Table 3.3: Variety yields with and without fungicide

| Variety | No Fungicide | Fungicide |
|------------|--------------|-----------|
| CS95102.1 | 7.66 | 8.27 |
| TENNANT | 6.30 | 7.15 |
| MACKELLAR | 6.25 | 7.39 |
| CHARA | 5.06 | 5.76 |
| LPB04-2403 | 3.69 | 3.02 |

Hamilton DPI Wheat x Fungicide Trial

Hamilton, the highest yielding trial and the site most affected by stripe rust, (Figure 3.2) shows that the CSIRO crossbred CS95102.1 produced a significantly higher grain yield than any other variety in the trial with or without fungicide application. (Overlapping error bars mean the varieties and/or treatments have statistically yielded the same eg CS95102.1 with and without fungicide.) The highest yielding milling variety without fungicide was Sentinel while Chara and Sentinel were the equally highest yield milling varieties when fungicides were applied. The difference between the highest and lowest yielding varieties was more than five fold in the absence of fungicides. However, that gap was narrowed to just over two fold when fungicides were applied.



▲ Figure 3.2: Hamilton fungicide x wheat – ranked by 'no fungicide' treatment

Trial Observations:

Neighbouring NVT trials were monitored throughout the flowering period for low temperature which may be indicative of frost events. Hamilton and Inverleigh cereals experienced one night below -2°C in mid October. Mininera cereals had 3 nights slightly below -2°C . These low temperatures did not produce any evident frost damage.

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