

## Trial 2. HYC Wheat Disease Management x Variety (FAR NSW W23-04a)

### Key Points:

- The highest yielding cultivars in the trial were Stockade and Scepter grown under the highest fungicide input (9.1 & 8.7t/ha).
- Scepter gave almost 2t/ha response to fungicide compared to AGTW005 that generated a 0.36t/ha yield increase comparing untreated to a four-unit fungicide approach.
- There were small but significant differences in grain quality due to fungicide management that were of most significance with the more susceptible milling wheats such as Scepter.
- The most profitable approach to fungicide management with three of the four varieties (Stockade, RGT Cesario & Scepter) was four units of fungicide input based on flutriafol followed by three foliar fungicides.
- With the most resistant cultivar AGTW005 a 0.36t/ha yield response to fungicide was not sufficient to pay for the full fungicide approach, and the nil fungicide approach was the most profitable, although with this variety margins were very similar irrespective of expenditure outlay.

### Treatments:

Four varieties were exposed to four levels of fungicide input in order to clarify how disease resistance of particular varieties and lines held up to lower fungicide input. The four varieties RGT Cesario, Stockade, AGTW005 and Scepter were tested with four programmes varying from no fungicide input, one fungicide unit at flag leaf (GS39), three units of fungicide based on flutriafol and a 2 spray “straddle” program (so called because the two fungicides are applied either side of the flag leaf). These three treatments were compared to a four-unit approach (full protection approach) based on flutriafol and three foliar fungicides at GS31, GS39/45 & GS55-63 (Table 1).

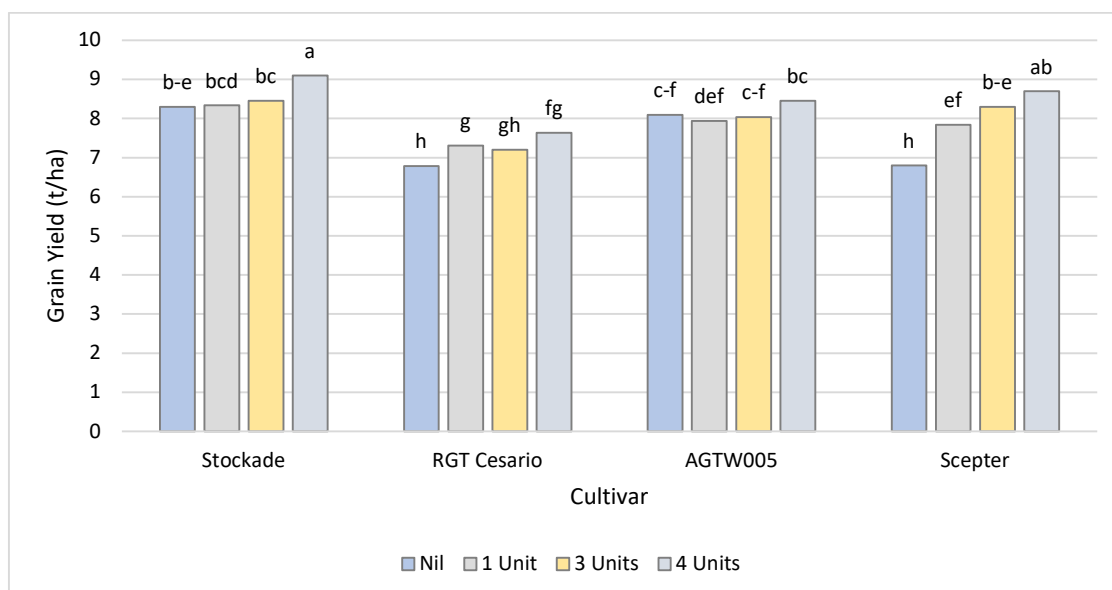
During the course of the season stripe rust was identified and sent to Sydney University for pathotyping. This confirmed the 238 and 239 rust pathotypes were present on NSW HYC site.

**Table 1.** Treatment details for fungicides strategies.

|                | Sowing                                     | GS31                | GS33/37              | GS39/45              | GS55-63            |
|----------------|--------------------------------------------|---------------------|----------------------|----------------------|--------------------|
| <b>Nil</b>     | Standard                                   | ---                 | ---                  | ---                  | ---                |
| <b>1 Unit</b>  | Standard                                   | ---                 | ---                  | Revystar<br>750mL/ha | ---                |
| <b>3 Units</b> | Standard seed trt +<br>Flutriafol fert trt | ---                 | Revystar<br>750mL/ha | ---                  | Radial<br>840mL/ha |
| <b>4 Units</b> | Standard seed trt +<br>Flutriafol fert trt | Prosaro<br>300mL/ha | ---                  | Revystar<br>750mL/ha | Opus<br>500mL/ha   |

*Note: The final application date for Radial and Opus is GS59 not GS63, (poor weather delayed head wash sprays until early flowering)*

The highest yielding cultivars in the trial were Stockade and Scepter grown under the highest fungicide input (9.1 & 8.7t/ha). Scepter gave almost 2t/ha response to fungicide compared to AGTW005 that generated a 0.36t/ha comparing untreated to a four-unit approach. With AGTW005 there was no statistical difference between nil fungicide applied and 3/4 units of fungicide (Figure 1).



**Figure 1.** Influence of wheat cultivar and fungicide strategy on grain yield (t/ha) – P value=0.001, LSD (P=0.05)=0.47.

Grain quality again indicated slightly inferior test weight and screenings with Stockade, although higher fungicide did result in slight improvements in test weight (Table 2 & 3).

**Table 2.** Influence of wheat cultivar on grain quality (protein (%), test weight (kg/hL), screenings (%), and thousand seed weight (TSW g).

| Cultivar          |             | Protein          | Test Weight      | Screenings       | TSW              |
|-------------------|-------------|------------------|------------------|------------------|------------------|
|                   |             | %                | kg/hL            | %                | g                |
| 1                 | Stockade    | 11.4 c           | 75.2 c           | 6.2 a            | 35.5 b           |
| 2                 | RGT Cesario | 12.9 b           | 75.8 bc          | 4.5 b            | 35.7 b           |
| 3                 | AGTW005     | 13.4 a           | 76.2 ab          | 3 c              | 35.2 b           |
| 4                 | Scepter     | 11.4 c           | 76.9 a           | 4 b              | 42.7 a           |
| <b>Mean</b>       |             | <b>12.28</b>     | <b>76.0</b>      | <b>4.4</b>       | <b>37.3</b>      |
| <b>P Value</b>    |             | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>&lt;0.001</b> |
| <b>LSD P=0.05</b> |             | <b>0.21</b>      | <b>0.73</b>      | <b>0.52</b>      | <b>1.72</b>      |

The most profitable approach to fungicide management with three of the four varieties was four units of fungicide input based on flutriafol followed by three foliar fungicides, this result related to yield increases that though not significantly better than three units of fungicide, were sufficient to pay for the extra input (Table 3).

Although flutriafol gave control of stripe rust and early STB and appears to be associated with higher yields in Scepter, in other cultivars it is the early GS31 fungicide that was important in the success of the four-unit approach, since the profitability of the three-unit approach was lower than the single flag leaf fungicide.

With the most resistant cultivar (AGT W005), 0.36t/ha yield response to fungicide was not sufficient to pay for the full fungicide approach and the nil approach was the best, although with this variety

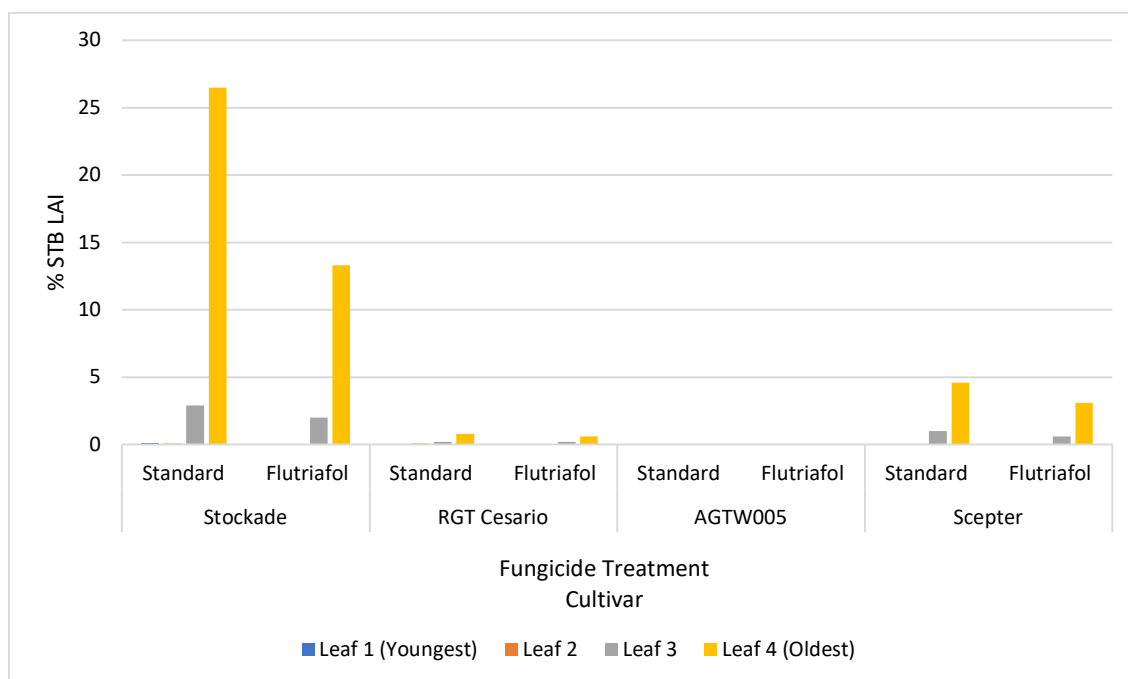
margins are very similar irrespective of expenditure outlay (a result that might be expected with a more resistant variety such as AGT W005).

**Table 3.** Influence of fungicide strategy and cultivar on profitability – Margin (\$/ha) (Gross income minus cost of fungicide units and application costed at \$15/ha).

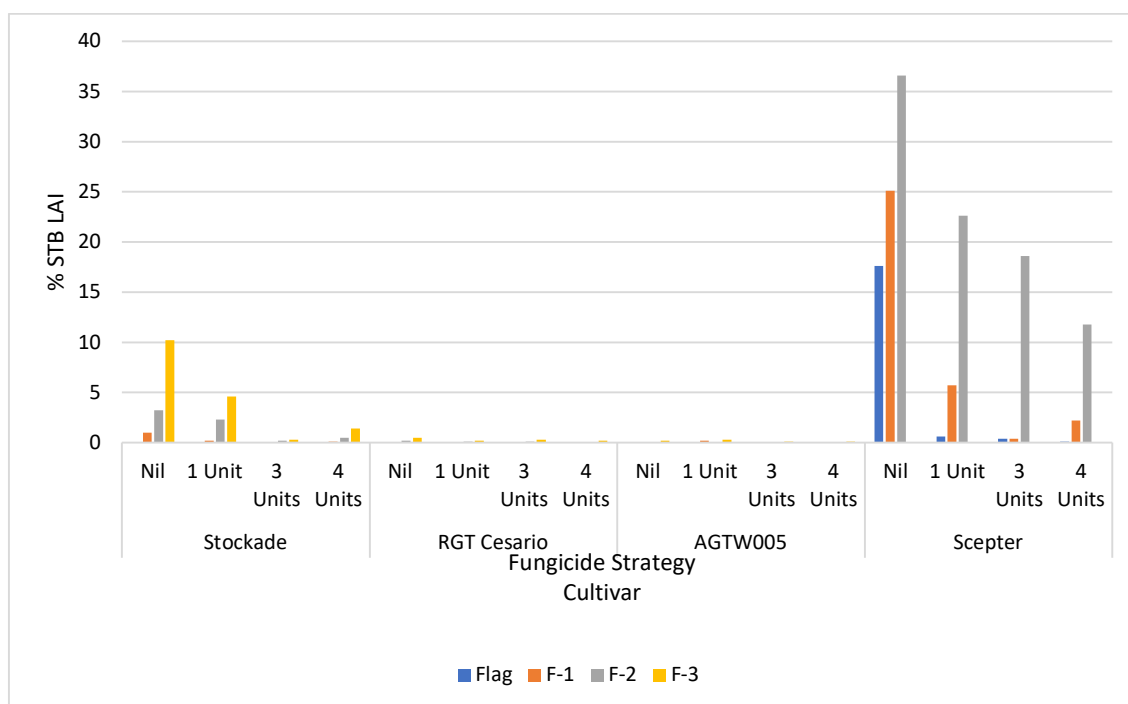
|                    | Grain<br>Yield<br>(t/ha) | Protein<br>(%) | Test<br>Weight<br>(kg/hL) | Screeni<br>ngs (%) | Grade | Price<br>(\$/t) | Income<br>(\$/ha) | Costs<br>(\$/ha) | Margin<br>(\$/ha) |
|--------------------|--------------------------|----------------|---------------------------|--------------------|-------|-----------------|-------------------|------------------|-------------------|
| <b>Stockade</b>    |                          |                |                           |                    |       |                 |                   |                  |                   |
| Nil                | 8.30                     | 11.3           | 74.4                      | 6.5                | AGP1  | 295             | 2449              | 0                | 2449              |
| 1 Unit             | 8.34                     | 11.4           | 75.5                      | 6.4                | AGP1  | 295             | 2460              | 45               | 2415              |
| 3 Units            | 8.45                     | 11.5           | 74.9                      | 6.1                | AGP1  | 295             | 2493              | 86               | 2407              |
| 4 Units            | 9.10                     | 11.3           | 76.0                      | 5.7                | AGP1  | 295             | 2685              | 110              | 2575              |
| <b>RGT Cesario</b> |                          |                |                           |                    |       |                 |                   |                  |                   |
| Nil                | 6.78                     | 12.9           | 75.0                      | 5.1                | SFW1  | 295             | 2000              | 0                | 2000              |
| 1 Unit             | 7.31                     | 12.9           | 75.6                      | 4.4                | SFW1  | 295             | 2156              | 45               | 2111              |
| 3 Units            | 7.20                     | 13.1           | 75.7                      | 4.4                | SFW1  | 295             | 2124              | 86               | 2038              |
| 4 Units            | 7.64                     | 12.8           | 76.9                      | 4.1                | SFW1  | 295             | 2254              | 110              | 2144              |
| <b>AGTW005</b>     |                          |                |                           |                    |       |                 |                   |                  |                   |
| Nil                | 8.09                     | 13.4           | 76.1                      | 3.6                | SFW1  | 295             | 2387              | 0                | 2387              |
| 1 Unit             | 7.94                     | 13.5           | 76.0                      | 3.0                | SFW1  | 295             | 2342              | 45               | 2297              |
| 3 Units            | 8.04                     | 13.3           | 76.5                      | 3.0                | SFW1  | 295             | 2372              | 86               | 2286              |
| 4 Units            | 8.45                     | 13.3           | 76.3                      | 2.5                | SFW1  | 295             | 2493              | 110              | 2383              |
| <b>Scepter</b>     |                          |                |                           |                    |       |                 |                   |                  |                   |
| Nil                | 6.80                     | 11.4           | 75.1                      | 5.1                | AUH2  | 340             | 2312              | 0                | 2312              |
| 1 Unit             | 7.84                     | 11.4           | 77.4                      | 3.7                | APW1  | 340             | 2666              | 45               | 2621              |
| 3 Units            | 8.30                     | 11.5           | 77.1                      | 3.8                | APW1  | 340             | 2822              | 86               | 2736              |
| 4 Units            | 8.70                     | 11.4           | 78.1                      | 3.4                | APW1  | 340             | 2958              | 110              | 2848              |

*Note: Margin figures in green = most profitable, in red = least profitable*

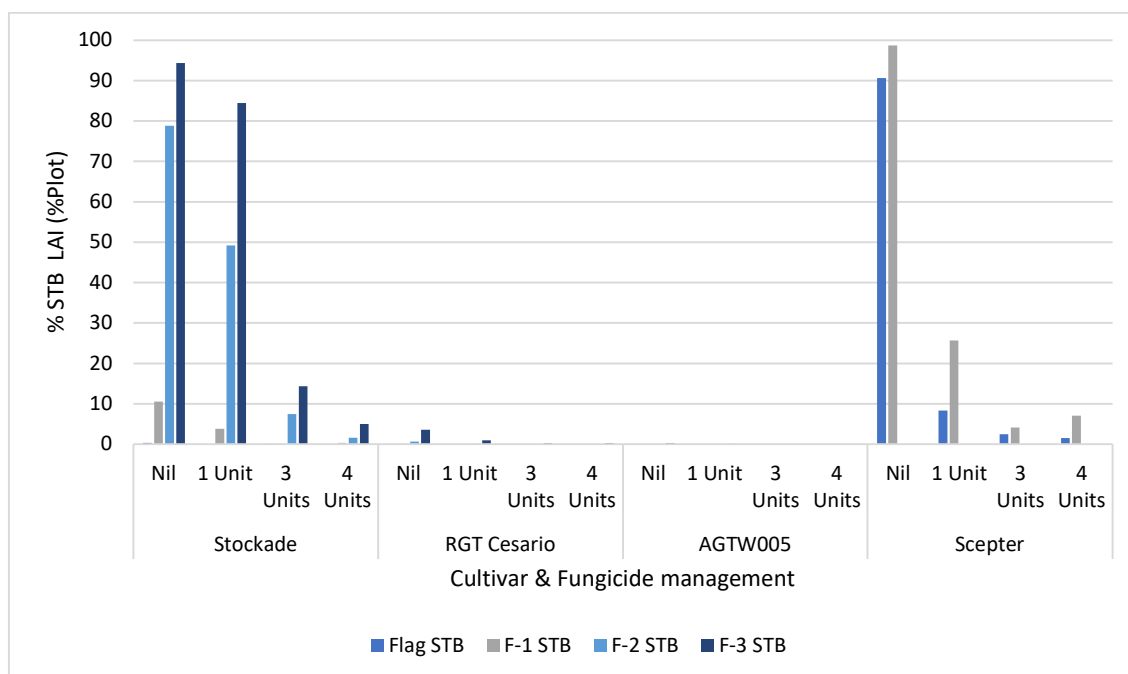
The responsiveness of Scepter to increasing fungicide input is clearly seen in the STB assessment conducted at mid flowering (Figure 3) where the lowest levels of infection were already evident in the four-unit approach that had only just had its head wash/flag leaf top. Note that unlike Stockade that had high level of STB infection the STB infection in Scepter was higher in the canopy, and as a consequence caused more damage (Figure 3).



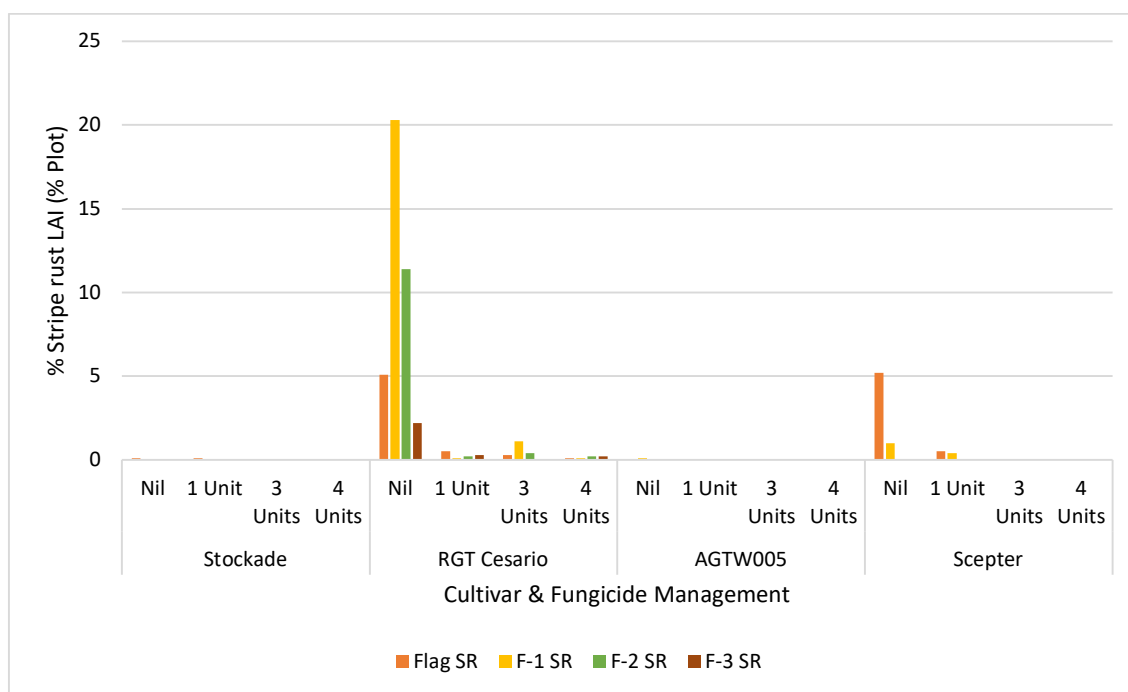
**Figure 2.** Influence of at sowing fungicide treatments on Septoria tritici blotch (STB) leaf area infection (%LAI) by leaf layer. Assessed at GS31 for each cultivar, calendar date various.



**Figure 3.** Influence of fungicide strategy and cultivar on Septoria tritici blotch (STB) leaf area infection (%LAI) by leaf layer. Assessed 19 September, growth stage 39-65 depending on cultivar.



**Figure 4.** Influence of fungicide strategy and cultivar on Septoria tritici blotch infection (%LAI) on a whole plot basis. Assessed 24 October, growth stage 77-85 depending on cultivar.



**Figure 5.** Influence of fungicide strategy and cultivar on Stripe rust leaf infection area (%LAI) on a whole plot basis. Assessed 24 October, growth stage 77-85 depending on cultivar.

**Table 4.** Trial input and management details.

|                          |                                            |                            |
|--------------------------|--------------------------------------------|----------------------------|
| <b>Varieties:</b>        | RGT Cesario, Stockade, AGTW005 and Scepter |                            |
| <b>Sowing date:</b>      | 21 April 2023                              |                            |
| <b>Harvest date:</b>     | 18 December 2023                           |                            |
| <b>Seed rate:</b>        | 180 seeds/m <sup>2</sup>                   |                            |
| <b>Basal fertiliser:</b> | 21 Apr                                     | 120 kg/ha MAP (12kg N/ha)  |
| <b>Nitrogen:</b>         | 2 Aug                                      | Urea 217kg/ha (100kg N/ha) |
|                          | 5 Sep                                      | Urea 108kg/ha (50kg N/ha)  |
| <b>Fungicide:</b>        | As per treatment list                      |                            |

**Table 5.** Active ingredients and chemical loading (g/L) for products used.

| Name       | Active 1            |         | Active 2      |         | Type |
|------------|---------------------|---------|---------------|---------|------|
| Fungicide  |                     |         |               |         |      |
| Flutriafol | Flutriafol          | 500 g/L | ---           | ---     | SC   |
| Opus       | Epoxiconazole       | 125 g/L | ---           | ---     | SC   |
| Prosaro    | Prothioconazole     | 210 g/L | Tebuconazole  | 210 g/L | SC   |
| Radial     | Azoxystrobin        | 75 g/L  | Epoxiconazole | 75 g/L  | EC   |
| Revystar   | Mefentrifluconazole | 100 g/L | Fluxapyroxad  | 50 g/L  | EC   |