

6.2 ASSESSING DIFFERENT LEAF DISEASE CONTROL STRATEGIES IN WHEAT (YALLA-Y-POORA VIC)

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Location: Yalla-Y-Poora SFS Trial Site

Acknowledgements:

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Rainfall (2005): 543 mm

GSR: (Apr – Nov) 359 mm

Summary:

For a highly susceptible variety such as Chara to stripe rust and leaf rust and where the level of infection is high, the following needs to be considered :

- Where either Jockey ® or Impact ® is used, it would seem that a follow up fungicide spray at GS39 is likely to give the best results.
- The reliance on either Jockey ® or Impact ® alone did not give sufficient long term protection against the foliar diseases and profit was reduced.
- The use of either Jockey ® as a seed treatment or Impact ® fertiliser treatment gave an economic benefit compared to the control, where no fungicide strategy was applied.
- There may be a benefit to using both Jockey ® and Impact ® in combination, although this needs further testing.

Background:

There is still confusion as to what is the best fungicide strategy to adopt when growing wheat. There are various seed dressings, fertiliser treatments and foliar fungicides that can be used to address the stripe rust and leaf rust problems. These in some cases can be used on their own and in other cases in combination. It is believed that seed and fertiliser treatments will give good protection until late tillering (GS30) although there is some evidence to suggest that they may have some longer term benefits.

Objectives:

To evaluate different foliar disease management strategies on a highly susceptible wheat variety (Chara) to both stripe rust and leaf rust.

Methodology:

The trial was sown on the 1st of June firstly with Impact treated fertiliser (where required) and then sown with MAP at 100kg/ha. A treatment list below (Table 6-3), shows the various interactions implemented. Other details are as follow:

- Sowing rate was set at 108kg/ha, with the aim of establishing 200 plants/square metre.
- 200 kg Urea (92 kg/ha N) applied on 7th September.
- Trifluralin was applied at 1.2L/ha IBS, with Tigrex at 750ml/ha applied on the 28th July 2005.
- The foliar fungicide Tilt Xtra ® was applied at 250 ml/ha on 2 separate occasions, namely 15th September (GS32) and 27th September (GS39) to the treatments as per the treatment list.
- The trial was harvested 29th December 2005.
- Impact ® fertilizer treatment at 400 mls per hectare.
- Jockey ® seed treatment at 450 mls per hectare.

Table 6-3: Fungicide Trial Treatment List

| Trt | Seed/Fertiliser Trt | Foliar Fungicide |
|-----|-----------------------------|------------------|
| 1 | Nil | Nil |
| 2 | Nil | GS32 |
| 3 | Nil | Gs39 |
| 4 | Nil | GS32 + GS39 |
| 5 | Jockey seed treatment | Nil |
| 6 | Jockey seed treatment | GS32 |
| 7 | Jockey seed treatment | GS39 |
| 8 | Jockey seed treatment | GS32 + GS39 |
| 9 | Impact fertiliser treatment | Nil |
| 10 | Impact fertiliser treatment | GS32 |
| 11 | Impact fertiliser treatment | GS39 |
| 12 | Impact fertiliser treatment | GS32 + GS39 |
| 13 | Jockey + Impact | Nil |
| 14 | Jockey + Impact | GS32 |
| 15 | Jockey + Impact | GS39 |
| 16 | Jockey + Impact | GS32 + GS39 |

Results

Table 6-4: Yield And Grain Quality Data

| Trt | Yield kg/ha | Protein % | Retention % | Screenings % | Test Wt kg/hl |
|----------------|--------------|--------------|---------------|---------------|---------------|
| 8 | 6.045 | 13.92 | 97.84 | 2.147 | 76.38 |
| 15 | 5.940 | 13.97 | 97.19 | 2.780 | 74.55 |
| 14 | 5.907 | 14.05 | 97.53 | 2.450 | 75.91 |
| 7 | 5.865 | 13.68 | 97.48 | 2.538 | 76.36 |
| 13 | 5.850 | 13.40 | 96.45 | 3.553 | 72.66 |
| 11 | 5.783 | 12.90 | 97.58 | 2.417 | 75.78 |
| 4 | 5.768 | 13.93 | 97.53 | 2.442 | 75.38 |
| 12 | 5.758 | 13.85 | 97.73 | 2.293 | 75.61 |
| 6 | 5.697 | 13.27 | 96.26 | 3.660 | 72.78 |
| 10 | 5.690 | 13.43 | 97.26 | 2.743 | 74.50 |
| 16 | 5.667 | 14.35 | 97.59 | 2.395 | 75.27 |
| 5 | 5.383 | 13.25 | 96.08 | 3.927 | 73.41 |
| 2 | 5.315 | 14.13 | 97.51 | 2.465 | 76.16 |
| 3 | 5.295 | 14.03 | 97.70 | 2.305 | 75.53 |
| 9 | 5.282 | 14.00 | 96.75 | 3.237 | 74.08 |
| 1 | 4.820 | 13.80 | 95.63 | 4.340 | 71.69 |
| Average | 5.629 | 13.75 | 97.13 | 2.856 | 74.75 |
| LSD 5% | 0.619 | 0.981 | 0.9554 | 0.9527 | 1.6098 |
| CV | 8.91 | 5.40 | 0.91 | 30.82 | 2.31 |

Figure 6-2: Grain Yield Comparisons Between Treatments

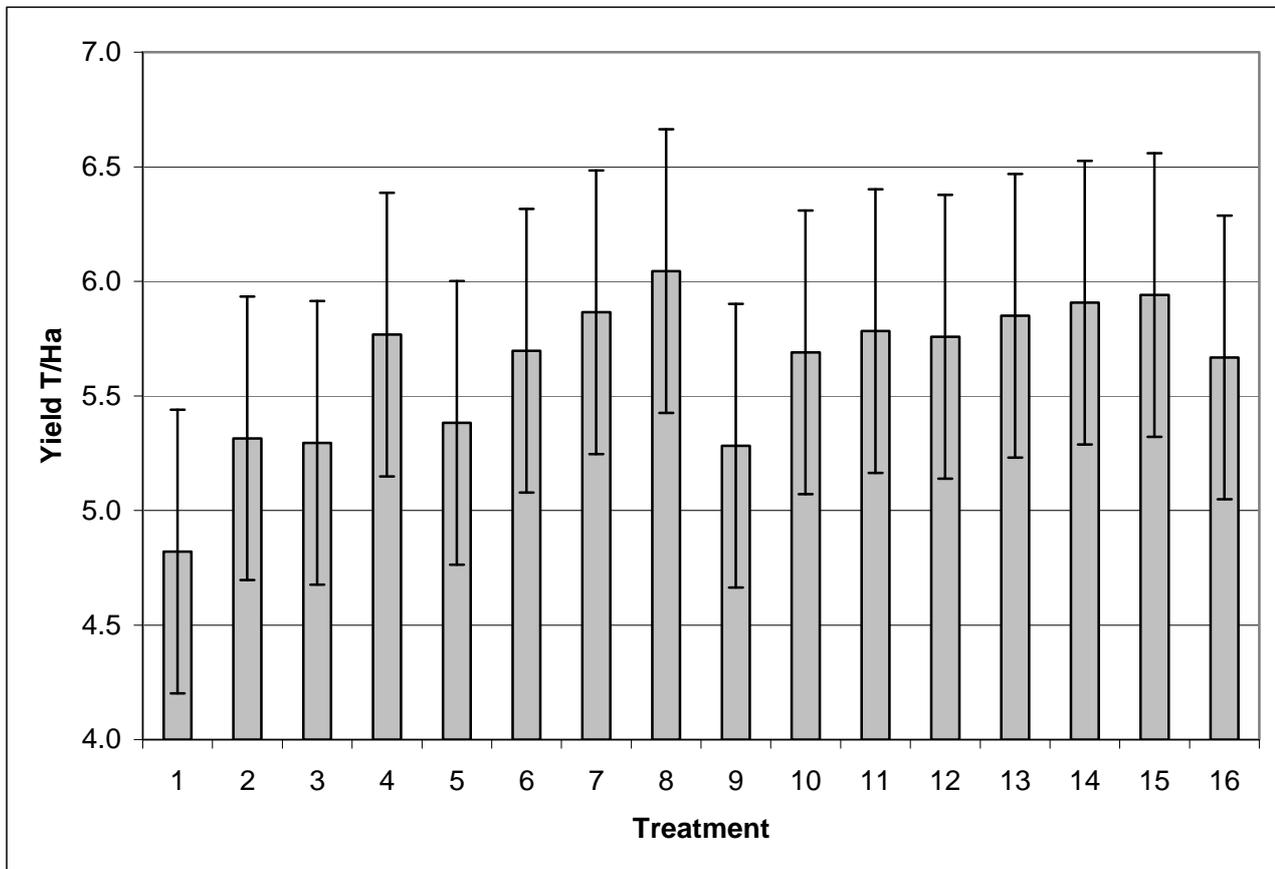


Table 6-5: Economic Analysis (Net Benefit) Of The Different Fungicide Strategies Compared To The Control

| Trt | Group | Yield T/ha | Test Wt kg/hl | TGW Grams ¹⁶ | Net Benefit \$/Ha |
|-----|----------------|--------------|---------------|-------------------------|-------------------|
| 1 | A | 4.820 | 71.69 | 29.6 | \$0.00 |
| 2 | A | 5.315 | 76.16 | 33.2 | \$49.30 |
| 3 | A | 5.295 | 75.53 | 33.6 | \$46.50 |
| 4 | A | 5.768 | 75.38 | 35.8 | \$92.72 |
| | Average | 5.300 | 74.69 | 33.05 | |
| 5 | B | 5.383 | 73.41 | 34.2 | \$58.82 |
| 6 | B | 5.697 | 72.78 | 33.8 | \$82.78 |
| 7 | B | 5.865 | 76.36 | 36.2 | \$106.30 |
| 8 | B | 6.045 | 76.38 | 35.4 | \$111.50 |
| | Average | 5.748 | 74.73 | 34.9 | |
| 9 | C | 5.282 | 74.08 | 33.2 | \$44.68 |
| 10 | C | 5.690 | 74.50 | 35.4 | \$81.80 |
| 11 | C | 5.783 | 75.78 | 36.0 | \$94.82 |
| 12 | C | 5.758 | 75.61 | 36.8 | \$71.32 |
| | Average | 5.628 | 74.99 | 35.4 | |
| 13 | D | 5.850 | 72.66 | 32.0 | \$104.20 |
| 14 | D | 5.907 | 75.91 | 33.6 | \$92.18 |
| 15 | D | 5.940 | 74.55 | 36.4 | \$96.80 |
| 16 | D | 5.667 | 75.27 | 33.6 | \$38.58 |
| | Average | 5.841 | 74.60 | 33.9 | |

¹⁶ One range only was assessed for TGW's.

Key: Grain valued at \$140/Tonne and cost of each treatment including application was determined at \$20 per treatment per hectare. Impact of grain quality on price was not calculated

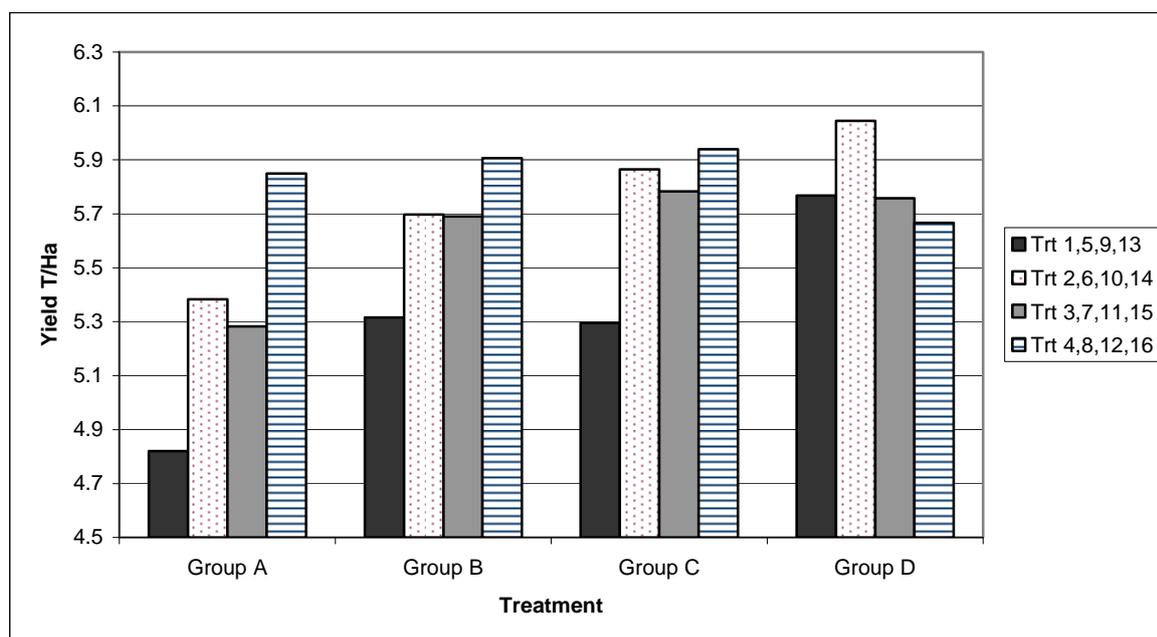
Group A : No Jockey and no Impact, only foliar sprays (except Trt 1)

Group B : Jockey seed treatment plus follow up foliar sprays (except Trt 5)

Group C : Impact fertiliser treatment plus follow up foliar sprays (except Trt 9)

Group D : Jockey seed treatment plus Impact fertiliser treatment with follow up foliar sprays (except Trt 13)

Figure 6-3: Grain Yield Comparison Between Treatment Groups



Discussion

Disease presence on the lower foliage was discovered in early September when the crop was approaching GS30 (early stem extension). Spraying of fungicide on the required treatments took place on the 15th September, when the crop was nearing GS32 (second node) and then again at GS39 (full flag leaf emergence). Variances in leaf infection appeared to occur soon after the first application of fungicide, with untreated plots showing severe infection and resultant yield penalties (see Photo 6-1 and Photo 6-2).

Photo 6-1: Early Detection of Rust On Lower Leaves



Photo 6-2: Resultant Outcome If Left Untreated



In terms of grain yield, treatment 8 gave the best result. There was however no significant difference between the top 11 treatments (8, 15, 14, 7, 13, 11, 4, 12, 6, 10 and 16). Each of these treatments were higher yielding than the control where no fungicide was applied.

Treatments 5, 6, 7 and 8 all involved a Jockey seed treatment with nil, GS32, GS39 and GS32 + GS39 foliar treatments respectively. It would appear that the highest yielding treatment involved 2 foliar sprays (GS32 + GS39) in addition to the Jockey treatment, although this was not significantly higher yielding than the GS32 or GS39 foliar treatments. It was however higher yielding than the Jockey seed treatment with no follow up fungicide spray.

A similar pattern exists for treatments 9, 10, 11 and 12 which all involved Impact treated fertiliser. It would appear that Treatment 9 which was purely the Impact treated fertiliser with no follow up spray, gave the worst yield of this group. As fungicide spray was added, yield generally improved, although not significantly.

Where both Jockey seed treatment and Impact fertiliser treatment were used (treatments 13, 14, 15 and 16) there appeared to be no pattern to the results. Treatment 13 which did not involve a follow up fungicide spray, was just as good as the other treatments.

If we compare each of these groupings, an interesting picture starts to emerge. Group D gave the best result and is suggesting that perhaps a Jockey seed treatment in combination with a fertiliser Impact treatment is providing added disease protection and that perhaps a foliar spray may not be required. This will require further work before a conclusion can be reached. This combination treatment may well be giving more effective control of root diseases such as Take-All which is contributing to the higher yield.

Both the Jockey seed treatment (Group B) and the Impact fertiliser treatment (Group C) gave added protection against stripe rust and leaf rust compared to Group A which relied solely on foliar sprays.