

S TRIPE RUST REVIEW

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Many growers are hoping for a wetter season this 2007 to compensate for the devastating drought of 2006. Should 2007 be a wet season then Stripe rust (SR) will be a significant event and these notes will be a timely reminder. The notes were not published in the Central West Farming Systems 2006 Compendium.

In 2005 many of the district's wheat crops sustained damage from stripe rust. For many wheat growers it was an "eye-opener" of a rust season; as the last SR pandemic was 23 years ago. There were numerous reports last season of crops losing 50% of yield potential, and with a threefold increase in screenings.

The 2005 season provided a graphic demonstration of what this disease can do to wheat yields and farm incomes given satisfactory seasonal conditions. At Cowra Agricultural Research Station, H45 (unprotected) had its yield reduced to just 110kg/ha (screenings 52%), compared to the adjacent Sunstate yielding 6.13t/ha (screenings 3.1%).

While the impact of stripe rust was not as devastating in the West Wyalong district as at Cowra, both the Variety and SR Management trials at Quandialla (see Table 1), provided very typical injury results. The SR resistant Sunstate in the SR Management trial yielded 4.32t/ha compared to the "unprotected" H45 (the control treatment), which yielded only 1.73t/ha. The unprotected H45 yield was 40% of the Sunstate. The H45 protected by Bayleton® at full flag (Z39) yielded 3.06t/ha, or 71% of Sunstate while the best "protected" H45 treatment had an average yield of 3.48t/ha or 81% of the Sunstate.

Table 1. Yield Response (t/ha) of H45 to Stripe Rust at Quandialla 2005.

Sowing Treatments	Z39 Foliar Treatment	
	Nil	1.0l/ha Bayleton® 125EC
Control/Nil	1.73	3.06
Baytan® - seed	2.08	3.23
Jockey® - seed	2.03	2.85
Impact® - fertiliser	1.46	2.74
Triad® - fertiliser	2.37	3.48
Nil – Sunstate	4.32	CV: 8.8%

The level of protection provided by the foliar spray, Bayleton® at Z39 (alone), nearly doubled the yield of the “control” H45 to 3.06/ha. The Bayleton® also reduced the screenings to a third of the untreated plots (see Table 2). A single application of Bayleton® at full flag saved 1.33t/ha of grain (\$198.84/ha) while costing \$24.60/ha, applied by an aircraft.

Table 2. Screenings Response of H45 to Stripe Rust at Quandialla 2005.

H45 Sowing Treatments	Z39 Foliar Treatment	
	Nil	1.0l/ha Bayleton® 125EC
Control/Nil	16.8%	5.6%
Baytan® - seed	17.1%	4.6%
Jockey® - seed	16.8%	5.7%
Impact® - fertiliser	26.8%	7.4%
Triad® - fertiliser	12.2%	4.4%
Nil – Sunstate	3.6%	3.5%

This was one of six trial sites across the Riverina region, and subsequently the Bayleton® was applied a fraction early (Friday 30/09/05); may be just 2 days early. This Z39 treatment of H45 subsequently secured 71% of the Sunstate yield. Do not spray too early.

In a well managed research situation it is reasonable to expect 90% to 95% yield protection from a foliar protectant applied at Z39. In timing trials at Tamworth ARC, Steven Simpfendorfer showed that you only need to be eight days late, with a susceptible variety to have the level of yield protection fall from 90% to 70%. Timing is everything.

100% yield protection is not possible because you can only protect those visually uninfected leaves the spray covers on that day. Timing of the treatment is targeted at the full extension flag leaf on the main stem of the plant, and as a result while most of the second tillers flag will be protected, maybe half the third tiller flag, but the flags of the fourth, fifth and sixth tiller are likely to have no significant protection at all as they emerge several days later. Also individual plant development often varies significantly across paddocks, particularly in paddocks exceeding 40ha in size.

The days when H45 had a consistent 10% yield advantage over Sunstate are gone. Even a heavily medicated H45 crop is now likely to yield only 85% of a Sunstate crop when yield potentials exceed 3.0t/ha. High yields – high levels of Stripe rust injury potential.

In the Quandialla trial the average of the seed or fertiliser protectants (alone) lifted H45 yield to 47% of the Sunstate. While that 7% yield increase over the control is statistically significant, it is not financially rewarding. There is significant merit to seed treatment, read on.

We need to also bear in mind this trial was sown rather late on 18 June (day 169). Full flag leaf (Z39) was 2 October (day 275). The gap is 106 days or 15 weeks, so it is possible to suggest the plants had an adequate level of SR protection from emergence to nearly Z39 from the seed and fertiliser treatments. The level and length of protection from the seed or fertiliser treatments could have been considerably less had this trial

been sown before 1 June. The use of the seed and fertiliser protectants in conjunction with Bayleton® produced an average yield of 3.08t/ha, which was an increase of 0.65% over the Bayleton® alone at Z39.

While the seed and fertiliser treatments have little “direct” yield protection to your crop, they are useful tools that reduce the volume of SR inoculant produced prior to flag leaf emergence. These tools can provide a significant but indirect benefit to the district and national crop’s yield potential when everyone participates to reduce the incidence of early infection.

A second consideration is that while some rust susceptible varieties will be sown this season, due to a shortage of the seed of new resistant varieties, as an industry you should aim to reduce the potential for the development of a virulent new race of SR by using an effective seed dressing. Consult the NSW DPI Winter Crop Variety Sowing Guide.

Dr Colin Wellings suggested that a paddock of wheat with a 10% level of SR infection can produce two to three mutants per hectare. That may not sound all that significant, but there was over 500,000 hectares of H45 sown in the South Western region, with substantially more than 10% SR infection last season.

If a new virulent SR mutant is produced anywhere in Australia that can compromise the current tolerant varieties, it may cost farmers an extra \$30.00 to \$40.00 per hectare per year for the next ten to twenty years to grow wheat.

I strongly endorse the use of seed dressings on all wheats. All seed should have bunts and smut protection, the cost of smut protection is between \$1.60 to \$2.00 per hectare. The cost of using a seed protectant that controls also SR, such as Triadimenol (Baytan® etc) is very affordable at \$3.80 per hectare or a triticonazole dressing (Real® etc) at \$9.00 per hectare in 2006.

Dress all wheats for SR protection this year, including those with the highest SR tolerance rating of 8. Please note that these varieties are not a “bullet-proof” 10 resistance. As an industry; everyone needs to make their own small contribution to prevent the development of a virulent mutant SR race arising from this season.

The SR management trial at Quandialla sits very well with prior established experience:

- Grow varieties with the highest SR resistance;
- Use a seed dressing on all varieties to protect against SR and smuts;
- SR treatments prior to Z39 are unlikely to have a direct yield or income benefit;
- A well timed foliar treatment at Z39 is more important than the foliar product brand;
- Wheat varieties with a tolerance rating of 6 or less and a yield potential of 3.0t/ha or greater should show a positive economic reward when applying a foliar treatment at Z39 this season.

The SR trials at Weethalle (see Table 5) and Merriwagga had low yield potentials below 2.0t/ha, and those trials failed to demonstrate any significant treatment differences to the controls. To sustain significant rust injury there needs to be enough moisture for a yield of 3.0t/ha or greater. When yield potentials are low, the economics of applying a foliar treatment varies relative to the SR tolerance of the variety. Each situation needs to be objectively assessed on its merits.

Table 2B. Protein Response (t/ha) of H45 to Stripe Rust at Quandialla 2005.

Sowing Treatments	Z39 Foliar Treatment	
	Nil	1.0L/ha Bayleton® 125EC
Control/Nil	11.8%	11.2%
Baytan® - seed	12.0%	10.9%
Jockey® - seed	12.4%	11.4%
Impact® - fertiliser	12.9%	11.3%
Triad® - fertiliser	12.0%	11.4%
Nil - Sunstate	12.3%	

Table 3. Fungicide Cost/ha Response (t/ha) of H45 to Stripe Rust at Quandialla 2005.

Sowing Treatments	Z39 Foliar Treatment	
	Nil	1.0L/ha Bayleton® 125EC
Control/Nil	\$1.60	\$24.60
Baytan® - seed	\$3.80	\$26.80
Jockey® - seed	\$17.00	\$40.00
Impact® - fertiliser	\$25.60	\$48.60
Triad® - fertiliser	\$6.60	\$29.60
Nil – Sunstate*	\$1.60	

* Raxil® Seed Dressing
 Plant Costs: \$16.00/ha

Table 4. Gross Margin Response (\$/ha) of H45 to Stripe Rust at Quandialla 2005.

Sowing Treatments	Z39 Foliar Treatment	
	Nil	1.0L/ha Bayleton® 125EC
Control/Nil	\$168	\$350
Baytan® - seed	\$219	\$374
Jockey® - seed	\$199	\$303
Impact® - fertiliser	\$56	\$278
Triad® - fertiliser	\$260	\$409
Nil - Sunstate	\$676	

Field costs: \$90.00/ha

Table 5. Yield Response (t/ha) of H45 to Stripe Rust at Weethalle 2005.

Sowing Treatments	Z39 Foliar Treatment	
	Nil	1.0L/ha Bayleton® 125EC
Control/Nil	1.05	0.99
Baytan® - seed	0.99	0.92
Jockey® - seed	0.88	0.96
Impact® - fertiliser	1.00	1.01
Triad® - fertiliser	1.22	1.05
Nil - Sunstate	1.19	