

Stripe and stem rust management for 2007

John Stuchbery (John Stuchbery & Associates)

Take Home Messages

- The risk of rust outbreaks in 2007 will be high if there is a build up of inoculum on volunteer cereals over summer.
- Rust diseases will need to be managed to protect returns.
- Resistant varieties are the best form of management where possible.
- There has been a change in the resistance status of some varieties to stripe rust due to a mutation in the WA strain. It now attacks varieties that rely on the VPM source of resistance.
- Strategies to control stripe rust based on foliar fungicides and seed and fertiliser dressings can be equally effective but can suit different circumstances.
- Stem rust is potentially more damaging than stripe rust but risk will be low if there is no build up of inoculum on volunteer cereals over summer.
- Reduce area sown to susceptible varieties if the risk of stem rust is high.
- There are foliar fungicides registered for stem rust control but timing is critical.

Introduction

2007 will be a critical season for many businesses and it is important to make the most of opportunities to generate income. This means managing pests and diseases to optimise crop production whilst still managing costs. Rust diseases have the potential to dramatically affect production but they can be managed cost effectively.

Stripe rust has been the main disease causing problems in wheat in recent years due to the appearance of a new strain and the low resistance levels of popular varieties to this strain. Stem rust needs to be considered due to its potential to cause large losses in susceptible varieties. Of lesser importance is leaf rust but it too could cause damage in susceptible varieties.

Background on rust diseases

The severity of rust diseases in any given season depends on inoculum build up on volunteer hosts over summer, suitable environmental conditions for the disease to develop in the crop, and the growing of susceptible varieties. The risk of an epidemic developing will increase dramatically if there are susceptible hosts growing by early autumn. Suitable conditions for disease development in the crop will ultimately depend on seasonal conditions and many of the commonly grown wheat varieties are susceptible hosts of the various rust diseases.

Managing Stripe Rust

Stripe rust is a persistent problem because the optimum conditions for infection and sporulation are temperatures in the range of 12- 15° C and 4 to 6 hours of leaf wetness. These conditions occur in most years in the cropping areas of Victoria so it is likely that stripe rust will appear in 2007. The potential for yield loss depends on variety resistance and the growth stage at which infection occurs.

New Strain

The WA strain of stripe rust has mutated and it now has activity on varieties which carry the VPM resistance. Varieties carrying this resistance have previously been highly resistant to the WA strain, but there is now doubt as to their resistance status. This is currently being evaluated in glasshouse trials. Varieties affected include **Carinya, Ellison, Braewood, Marombi, Pugsley, Rudd, Sunbri, Sunlin, Sunstate, Sunvale, Ventura and Young**. These varieties should not be grown, until further evaluation has been completed.

Exposure to these varieties should be minimised if possible but if they must be grown due to shortage of seed, the level of disease should be manageable. The level of susceptibility likely in the presence of the new strain will depend on the background genetics of each variety. Information to date suggests that these varieties will not drop back to a very susceptible rating but be more likely to be moderately susceptible which is manageable(see below).

Control volunteer wheat over summer and autumn

Controlling volunteer wheat over summer and autumn keeps the inoculum levels low at the start of the season and effectively extends the time taken for inoculum levels to build up to damaging levels; the more mature the crop when infected, the lower the potential yield losses. While inoculum will blow in from surrounding areas during an epidemic, cleaning up volunteers on farm will delay the development of rust in crops on that farm.

Resistant varieties

Resistant varieties are the ultimate form of rust management but options to use this strategy in 2007 are limited. Most of the popular varieties have mediocre or poor resistance to stripe rust and supply of seed of new varieties is limited. A change of varieties on a large scale also requires significant expenditure in a year where cash flow is extremely tight.

Foliar Fungicides

Well timed foliar fungicides have proved extremely cost effective and will form an essential part of the rust control strategy for 2007. The effectiveness of this strategy relies on early detection of the disease and application of fungicide when disease levels are still low. Regular monitoring of crops is essential.

Two fungicides may be required if the epidemic develops early. Research has clearly demonstrated that a fungicide application at flag leaf emergence is essential to protect grain fill and to minimise yield loss. Fungicide may also be required prior to flag leaf emergence to keep inoculum levels in crop low if the disease appears earlier in the season. There may be opportunities to combine these earlier fungicide applications with herbicide application.

Timing of spraying is critical, spraying early to contain the epidemic without follow up to protect the flag leaf can be a wasted effort. Spraying after anthesis is unlikely to produce economic return in varieties rated moderately susceptible or higher, particularly in Mallee environments.

There are a number of products on the market which effectively control stripe rust and the features of these products have been listed in previous BCG manuals. Choice of product depends on the length of protection required, the amount of eradicant activity required, and to a lesser extent, price. The advantages and disadvantages of foliar strategy are summarised in Table 1.

Table 1: Advantages and disadvantages of foliar fungicide strategy for stripe rust control

Advantages	Disadvantages
Foliar fungicide	
<ul style="list-style-type: none"> • good control can be achieved • cost effective • expenditure is deferred until the problem arises. 	<ul style="list-style-type: none"> • effectiveness is highly dependent on timing • crops need to be monitored closely • sufficient capacity is required to apply fungicide to large areas of crop in a short time
Seed and fertiliser Dressings	
<ul style="list-style-type: none"> • provide early protection and delay development of the epidemic in the crop • allows more flexibility in timing of foliar fungicide applications • may reduce the need for pre-flag emergence fungicide applications north of the divide 	<ul style="list-style-type: none"> • the cost is incurred at the start of the season before the problem develops • a foliar fungicide is required prior to flag leaf emergence in longer season environments • dust associated with application and handling of treated fertiliser with some products

Seed and Fertiliser Dressings

The seed dressing Jockey, and the fertiliser dressings Intake in Furrow (previously known as Impact in Furrow) and Triademefon WP are registered for the control of rust diseases. Research has demonstrated that these provide protection well into the season and north of the divide, this usually lasts until flag leaf emergence. In high pressure years when epidemics develop early, and in longer season environments, protection may run out before flag leaf emergence.

It is important to note that these treatments will not provide season long protection in all but the short season environments, and that the flag leaf will still need to be protected if rust is evident. A strategy based on seed and fertiliser dressings must include a foliar fungicide application at flag leaf emergence. Failure to protect the flag leaf will result in the loss of all the benefits of the early protection provided by the seed and fertiliser dressings.

Caution is needed with fertiliser dressings where fertiliser rates are being reduced this season. As fertiliser rates are reduced, the amount of fungicide per tonne of fertiliser needs to be increased to maintain the rate per hectare of fungicide. The Intake in Furrow label specifies a limit of 6 litres of product per tonne of fertiliser. The triademefon label does not specify a maximum amount of product per tonne of fertiliser but the affects on handling the increased amount of product per tonne of fertiliser are not known.

Baytan and Real are also registered for early suppression of rust disease however protection runs out relatively early in the season and does not save on the number of foliar fungicides required in high pressure years. It is difficult to justify the use of these products for rust control.

A stripe rust control strategy based on seed and fertiliser dressing provided there is foliar spray follow up if required is equally effective to a stripe rust control strategy based on foliar fungicide alone. The relative strengths and weaknesses are summarised in Table 1.

Stem Rust

Stem rust affects all plant parts and epidemics develop rapidly. Stem rust has the potential to cause greater yield loss than stripe rust in susceptible varieties. The relevance for Victoria is that large areas are sown to Yitpi, which is susceptible. The optimal conditions for infection and sporulation are temperatures around 30° C and moist humid conditions. These conditions are not that common in north western Victoria during the growing season so the incidence of stem rust is lower compared with stripe rust where optimal conditions occur in most years. The risk of stem rust will be low if there is no build up of inoculum on volunteer wheat growing over summer and autumn.

Clean up volunteers over summer

As for stripe rust, controlling volunteer wheat and barley (stem rust can also survive on barley) over summer and autumn keeps the inoculum levels low at the start of the season. It is unlikely that a stem rust epidemic will develop if there is no build up of inoculum over the summer and autumn.

Resistant Varieties

Resistant varieties are the best form of protection against stem rust. Reducing exposure to susceptible varieties (Yitpi, Wyalkatchem) is highly recommended if there has been a build up of inoculum on volunteer wheat over summer in the region or in neighbouring regions. Unlike the situation with stripe rust with most varieties having some level of susceptibility, many of the popular varieties are resistant to stem rust and it will be possible to reduce the area sown to susceptible varieties without making large investments in new varieties.

Foliar Fungicides

Control of stem rust with fungicides is achievable provided it is applied when disease is at low levels. It is very difficult to control the disease once it is established in the crop so monitoring and timing of application are critical. The crop canopy can be quite thick and leafy at that time of year and achieving stem coverage can be difficult. There are a range of products registered to control stem rust. In trials conducted in SA in autumn 2006, 290 ml/ha Folicur (tebuconazole) provided the best control of stem rust. Propiconazole 500ml/ha is also registered and has been effective in previous research work and in commercial paddocks in 2003 at Nhill.

Seed and Fertiliser Dressings

As stem rust typically develops late in the season, seed and fertiliser dressings do not last long enough into the season to provide protection. Fungicide control must be based on foliar fungicides.