

Demonstration of Yellow Leaf Spot management in direct drilled crops in the Mallee

This demonstration investigated some practical options for direct drilling wheat into wheat stubbles in the Mallee.

Summary

Yitpi wheat is highly adapted to the Mallee environment. It is consistently one of the highest yielding varieties and has excellent quality characteristics.

Yitpi is not the best variety for direct drilling into wheat stubble as it is very susceptible to Yellow Leaf Spot (YLS)

The incidence of Yellow Leaf Spot was low in 2004 (dry start to the season)

The fungicides Bumper and Folicur had little visible activity on the extent of YLS; however Amistar Xtra did have some effect (but the current cost makes its use prohibitive)

Crops which are not nutrient deficient are unlikely to respond to zinc or nitrogen to reduce the infection level of YLS

Alternative wheat varieties to Yitpi for sowing into wheat stubble which deserve further investigation in the Mallee are Pugsley and Wyalkatchem (neither is resistant to CCN; Wyalkatchem has a short coleoptile which needs to be taken into account when planning to use high rates of trifluralin).

Background

Direct Drill cropping into stubble is gaining in popularity in the Mallee. As rotations tighten with more intensive cropping practices, disease management becomes critical. The most common wheat variety sown in the Mallee is Yitpi. Yitpi has a good disease resistance spectrum, but it is very susceptible to Yellow Leaf Spot (YLS). During the early tillering phase the disease can affect tiller formation and slow overall growth. In years with moist conditions during June and early July, the disease can become quite severe. Yitpi crops may turn yellow and show restricted growth. The actual yield penalty with YLS infection during the early growth phase has not been determined.

This demonstration investigated the effect of YLS on crop establishment and early crop growth for several varieties of wheat sown into a Yitpi wheat stubble, and also the effect of fungicides applied during the early growth stage of Yitpi wheat. Two additional treatments, zinc and additional nitrogen (N) fertiliser, were included because of widespread interest in the effect of these two nutrients on the potential level of YLS in crops.

Methods

The demonstration was located south-east of Hopetoun, on a Mallee sandy loam overlying a light clay. The previous crop was Yitpi wheat and there was 80% standing stubble cover at seeding.

(i) Cereal variety demonstration

Wheat varieties: Yitpi, Annuello, CLF JNZ, Pugsley, and Wyalkatchem were sown on May 13 into (i) a standing Yitpi wheat stubble, and (ii) into an area with burnt stubble (directly adjacent to the standing stubble). All varieties were sown at a seeding rate of 175 seeds/m².

Crop establishment (plants/m²) and YLS infection were assessed at GS15 (5 leaf).

(ii) Fungicide demonstration

Yitpi wheat was sown at 175 seeds/m² on May 13 into standing wheat stubble (adjacent to the demonstration above). Immediately prior to seeding, one plot was sprayed with 5L/ha of Zincsol and a second plot was drilled with 50kg/ha of urea. Fungicides were applied at GS13 (3 leaf stage). An additional 2L/ha of Zincsol was applied to the plot to which zinc had been applied at seeding.

The fungicides used in the demonstration were: Bumper (propiconazole) at 250ml/ha, Folicur (tebuconazole) at 145ml/ha, and Amistar Xtra (azoxystrobin + cyproconazole) at 400ml/ha.

Yellow Leaf Spot was assessed at the five- leaf stage (GS15), 39 days following application of the in-crop fungicide applications. Leaf infection was scored for six leaves on ten randomly selected plants from each treatment.

Results

(i) 2004 season

Soil moisture at sowing was very low as there had been no rain from late December 2003 to May 2004. Conditions remained dry and at no period during early crop establishment was it continuously wet for a two day period. Yellow Leaf Spot infection starts within a wheat crop when the fungus is released from old wheat stubble and is spread by rain splash. The 2004 season was not conducive to high disease pressure from YLS.

2004 growing season rainfall (April-Oct) at Hopetoun was only 157mm (a decile 3). The crops were sown early and got away to a good start but by July (late tillering) plants were clearly water stressed. Low spring rainfall severely restricted the crop between flowering to grain fill (October).

(ii) Wheat variety demonstration.

The extent of YLS and yields of the different wheat varieties are presented in Table 1.

Table 1. Yellow Leaf Spot variety rating; extent of YLS on Leaf 3 and 4; and crop yield for both burnt and standing stubble.

Variety	YLS Rating*	Yellow Leaf Spot (% of leaf infected)				Yield t/ha	
		Leaf 3 [^]		Leaf 4 [^]		Burnt	Standing
		Burnt	Standing	Burnt	Standing		
Yitpi	S-VS	40	100	20	30	1.4	1.2
Annuello	S	0	90	0	50	1.1	1.2
CLF JNZ	S#	0	80	0	10	1.0	1.1
Pugsley	MS-S	10	60	0	20	1.1	1.1
Wyalkatchem	MS-S	0	60	0	10	0.9	1.3

* YLS rating: VS=very susceptible; S=susceptible, MS=moderately susceptible

YLS rating for CLF JNZ is assumed to be the same as for Janz

[^] Leaf 3 and 4 are the third and fourth leaf to emerge (Leaf 5 is the newest leaf and was clean at the inspection; ie. no infection with YLS)

(iii) Effect of fungicide on YLS in Yitpi wheat

The level of YLS assessed 39 days after fungicide application is presented in Table 2. Tiller number and crop yield is also presented in the same table. Leaf 5 and 6 (not presented in the table) were relatively clean at the time of assessment (with less than 10% of the leaves infected with YLS). Tiller number is important as in previous seasons it has been observed that YLS results in a reduction of viable tillers. The Amistar Xtra had the highest level of control

Table 2. Impact of fungicides, zinc treatment and urea on tiller number, YLS and yield of Yitpi wheat.

Treatment	Number of tillers/plant	Yellow Leaf Spot (% of leaf infected)				Yield t/ha
		Leaf 1*	Leaf 2*	Leaf 3*	Leaf 4*	
Control	1.6	90	87	62	38	1.0
AmistarXtra	1.5	73	60	30	10	1.0
Bumper	2.0	94	85	59	30	1.2
Folicur	1.6	88	80	61	38	1.1
Zincsol	1.4	98	93	74	35	1.0
Urea	2.2	98	96	83	46	1.2

* Leaf 1 is the first leaf to emerge (hence it is the oldest leaf); Leaf 2 is the next leaf to emerge etc. Leaf 5 and 6 are not represented in the table because they were clean of disease.

Interpretation

2004 season started off very dry with no extended wet periods and hence the level of Yellow Leaf Spot infection was relatively low. Crops suffered more from moisture stress than leaf disease.

Wheat (all varieties) sown into burnt stubble had much less yellowing on the leaves compared to wheat sown into standing wheat stubble. Yitpi had visibly more YLS, even when sown on burnt stubble. Of the other commonly sown wheat varieties in the Mallee, Annuello appeared to have more yellowing on the leaves compared to CLF JNZ, Pugsley and Wyalkatchem (there were no visible differences between the last three varieties in the amount of yellowing on the leaves). Yields were reasonably similar for all five varieties. There were also no clear differences in crop yield between the crops being sown into burnt or standing stubble. It appears that YLS did not have a lasting effect on the crop in such a dry season.

The fungicide treatments – Bumper and Folicur – had little impact on reducing the level of disease. AmistarXtra did reduce the extent of yellowing on the older leaves, however at an approximate cost of \$45/ha, it is unlikely to be an economic option for crops sown in the Mallee. The zinc and urea treatments had no impact on the extent of leaf yellowing.

Commercial Practice

Yellow Leaf Spot has caused severe yellowing of Yitpi crops in seasons with a wet establishment period (May- July). Crops usually outgrow the disease when temperatures increase in August. It is not known what the yield penalties have been in crops suffering from heavy infection of YLS – these crops have slow growth and reduced tillering, hence it is expected that there is an association yield loss.

In 2005 many Yitpi wheat crops will be sown into paddocks with a high level of wheat stubble from the 2003 season. There has been insufficient rain during the 2004 summer and winter to break these stubbles down. YLS does carry over between seasons on stubble and the potential for a YLS infection will not have been reduced very much because the stubble is two seasons old. Farmers sowing Yitpi into 2003 stubbles should consider the same management as if it was 2004 stubble.

With the current range of fungicides, it is not economical to apply a fungicide on a crop at the 3 leaf stage. Crops need to be sprayed before the disease establishes and the risk of little or no economic return is too great. On paddocks with a good fertiliser history (especially in relation to zinc) it is unlikely that zinc or N nutrition will alleviate the disease if it establishes (however it is known that crops with poor overall nutrition are more susceptible to disease).

When sowing Yitpi on wheat the BCG's recommendation is to burn the stubble or at least cultivate the paddock to reduce the amount of exposed stubble.

If burning is not an option then another wheat variety should be grown to reduce the possible impact of YLS. Options are:

Annuello: a reasonably performing wheat variety, susceptible to YLS but less so than Yitpi. Annuello is not as resistant to stripe rust as Yitpi.

CLF JNZ: generally lower yielding than Yitpi. No CCN resistance or tolerance, not as resistant to stripe rust as Yitpi (but has the added benefit of being able to use Clearfield technology herbicides for the control of brome grass)

Pugsley: a variety not widely sown in Victoria. No CCN resistance (may have some tolerance); equal or better compared to Yitpi in stripe rust resistance.

Wyalkatchem: a shorter season wheat compared to Yitpi with good potential for the Mallee. No CCN resistance or tolerance. Slightly less resistance to the WA strain of stripe rust than Yitpi. Wyalkatchem has a short coleoptile and this must be considered when using high rates of trifluralin.