NORTHERN FOCUS
COVERING NORTHERN NSW AND QUEENSLAND

Do earlier fungicide sprays have later dividends?

By Greg Platz[1], Paul Castor[2] and Richard Daniel[3]

Consultants' Corner

Consultants' Corner is a new initiative by *Australian Grain*. This series of articles will highlight current GRDC-funded research with a particular focus on the commercial implications of adopting cutting-edge research.

Northern Grower Alliance project direction is determined by the issues and priorities established by five local consultative committees. These committees cover an area from the Liverpool Plains in the south, west to Gilgandra and Walgett and north to Moree/Narrabri and Goondiwindi. One new priority project for 2007 was to generate additional data on the management of spot form net blotch (SFNB).

Key questions

- What impact does SFNB have on yield and grain quality of the current barley varieties?
- Is there any benefit in fungicide application prior to flag leaf emergence? and,
- Can we provide additional data to support commercial management practices?

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KEY MESSAGES

- SFNB resulted in average yield losses of 220–350 kg per hectare.
- SFNB resulted in average test weight reductions of one to four kg per hectolitre.
- SFNB resulted in average screenings increases of six to14 per cent.
- Current fungicides will only suppress SFNB and limit its severity.
- Similar yield and grain quality benefits from early application timings.

SFNB symptoms in untreated Skiff at time of first spray, North Star 2007.

TABLE 1: Yield and grain quality summary data

	North Star (high disease)		Bellata (low disease)	
	Untreated	Fungicide ave	Untreated	Fungicide ave
Yield (kg/ha)	1217	1569 (+29%)	2969	3189 (+7%)
Test weight (kg/hL)	62	65	60	61
Screenings (%)	31	17	34	28
Net return v untreated ($/ha)	—	54	—	103

Net return = Gross return – fungicide product and application cost
Application cost = $15 per hectare each application

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WHAT WE DID IN 2007

Two detailed small plot trials were conducted on SFNB-susceptible barley varieties. One trial was in the North Star district of NW MSW on the variety Skiff, with a second site near Bellata on Kaputar. Both crops had been planted into 2006 barley stubble with SFNB present naturally before the first spray was applied.

In each trial 11 different fungicide approaches were compared, involving a combination of application timing, product, rate and also the impact of multiple applications. Applications were at:

- Jointing (GS30);
- 2nd node (GS32); and,
- Full flag leaf emergence (GS39).

Plot sizes were 4 x 10 metres with three replicates in both trials. All treatments were applied with DG nozzles as fine/medium droplets in 50 L per hectare total volume.

The primary focus of this work was to evaluate the impact of fungicide timing at two (GS32) and four weeks (GS30) earlier than current recommendations (GS39). But we also compared single applications with a number of multiple spray approaches.

Propiconazole 250 g/L (Tilt) was the main fungicide evaluated with use rates of 250 and 500 ml per hectare and comparisons of single application versus multiple timing. Amistar Xtra was also evaluated but only at 400 ml per hectare and when applied at GS32 and GS39.

RESULTS

Disease development

SFNB is generally described as a 'wet weather' disease. At both sites conditions were dry during July and most of August with only dews providing any leaf surface moisture. This level of moisture was clearly sufficient for the disease to continue to infect new leaves at both sites. This ability for the disease to 'tick along' – even without rain events – supports agronomists' field observations in recent dry years.

But the disease levels did increase dramatically following a three-day rain period in late August. Although SFNB will be much more active under rainy conditions, it can clearly progress up the plant even in the absence of rain events.

Disease management

Disease management was assessed by incidence (per cent of leaves with any SFNB lesions) and severity (per cent of leaf area affected by SFNB lesions). All fungicide approaches significantly reduced the severity of SFNB but with much less impact on disease incidence. There was no consistent difference between products, rates or timings at either site.

High levels of visible symptoms were still evident at both sites even when a two- or three-spray program had been applied.

The key message was that all treatments suppressed this disease but none fully controlled it.

Level of disease pressure

The North Star trial experienced very conspicuous levels of SFNB from jointing onwards. At the time of first spray, eight out of 10 uppermost emerged leaves had any level of SFNB lesions, with 100 per cent incidence on the next oldest leaf.

Even so, the level of disease in the untreated was still at or below current thresholds at 18 days after the third spray timing.

The Bellata trial had trace levels of SFNB from jointing onwards. At the time of first spray, two out of 10 uppermost emerged leaves had any level of SFNB lesions, with 93 per cent incidence on the next oldest leaf.

The level of disease in the untreated was still below current thresholds at 20 days after the third spray timing.

YIELD

Grain yield at the North Star was severely limited by prolonged moisture stress, with the untreated only yielding around 1200 kg per hectare. Although not statistically significant, all 11 fungicide approaches recorded higher yields than the untreated with an average advantage of about 350 kg per hectare (+29 per cent).

Grain yield at the Bellata site was affected by post-anthesis moisture stress but with the untreated still yielding around 3000 kg per hectare. Again not statistically significant, 10 of the 11 fungicide approaches recorded higher yields than the untreated with an average advantage of about 220 kg per hectare (seven per cent).

Early application (at GS30 and GS32) provided at least equivalent levels of yield benefit to application at full flag leaf emergence (GS39) or multiple spray approaches.

GRAIN QUALITY

Clear trends were apparent in grain quality assessment but again with no consistent difference between products, rates or the application timing.

At North Star all 11 fungicide treatments recorded higher test weight and lower screenings levels than the untreated.

At North Star, grain from all fungicide treatments was eligible for Feed 1 or Feed 2 whilst untreated grain was downgraded to Feed 3.

At Bellata all 11 fungicide treatments recorded higher test weight than the untreated with nine of the 11 also recording lower screenings levels.

At Bellata, grain from five fungicide treatments was eligible for Feed 2 with the untreated and all other treatments downgraded to Feed 3.

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THE BOTTOM LINE

Despite all yields being 1800 kg per hectare or less at North Star, 10 of the 11 fungicide approaches resulted in increased net returns compared to the untreated. The only treatment that did not provide a net benefit was where a multiple application of two sprays of Tilt at 500 ml per hectare were applied at GS32 and GS39.

Even under the low disease conditions at Bellata, nine of the 11 fungicide approaches resulted in increased net returns compared to the untreated. The only treatments that did not provide a net benefit were Tilt 250 ml per hectare applied at GS39 and a multiple application of Tilt 250 ml per hectare applied at all three timings.

In a year not considered conducive to SFNB, net benefits were obtained in 19 of 22 fungicide treatments across the two trials. The average level of net benefit was $103 per hectare at North Star and $54 per hectare at Bellata.

TO SUM UP

The work conducted in 2007 has started to provide some answers to the original questions posed by growers and agronomists.

- Across the two trials, SFNB caused average yield losses of between 220–350 kg per hectare together with test weight reductions of one to four kg per hectolitre and screenings increases of six to 14 per cent.
- Fungicide application up to five weeks earlier than currently recommended provided equivalent benefits to a flag leaf spray under these conditions.
- Economically attractive levels of benefit were obtained managing SFNB in two susceptible varieties – even in a drier season.

Where to next?

This is the first work done in the north west looking at early timing of fungicide application for SFNB management. Although the results are very encouraging, it is important that we repeat this work to examine the performance under different conditions. NGA plans to conduct four trials in 2008 that will also include an even earlier timing in an attempt to identify 'what is too early'.

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THE COMMERCIAL VIEW

SFNB concern prompts barley re-think

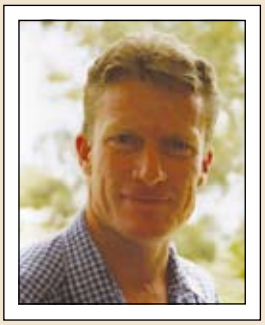
By Paul Castor

Spot form of net blotch was often present at worrying levels in barley crops of the border region during 2007 – to the point where a number of growers have reduced their barley plantings.

The trial work conducted by NGA last year will help provide greater confidence in the future management of SFNB with fungicides.

The disease was most severe in districts where barley is grown more intensively such as North Star and particularly where:

- Crops were planted into previous barley stubble (two year-old stubble in one case); and/or,
- Where early planting dates were used (early to mid May).



Paul Castor.

Over the past four to five seasons SFNB has made regular appearances in crops within the region.

While the impact of the disease is yet to be measured definitively, it is highly probable that significant yield and quality losses are occurring. It is most likely a key cause of the increasing issues with high screenings in regional barley crops.

Commercial experience with fungicide management of SFNB prior to 2007 had been very limited. A similar approach to the management of yellow leaf spot (YLS) in wheat had been thought appropriate. This involved crop monitoring during the later stages of jointing and treatment with fungicide if the severity of leaf symptoms on the flag and two lower leaves exceeded a set threshold level.

With YLS, these threshold levels are very rarely exceeded except under wet seasonal conditions (such as in 1998). But with SFNB, disease incidence has been much more regular even under the relatively dry conditions of recent years.

Fungicides treatments of these diseases at the flag leaf stage are unlikely to provide a visually pleasing result, particularly under high innoculum situations. In the absence of trial strips, it can be difficult to assess the benefit of any fungicide program.

Management but not control

I feel that this has limited the use of fungicides to help manage these diseases. We need to remember that we will only be able to manage and not control these diseases with fungicides.

Earlier treatments with fungicide may help reduce the level of innoculum development within crops and should provide the opportunity to reduce application costs. Earlier applications are more likely to be applied with groundrigs (rather than by contract aerial application) and may in some cases be tank-mixed with herbicides.

During 2007 a number of crops were treated with propiconazole from GS32. Disease incidence and severity on the three youngest leaves was evaluated to support treatment decisions.

Treatments were generally felt to reduce the severity but perhaps not the incidence of disease symptoms. Whilst not closely evaluated, it was also felt that treatment provided improvements in grain yields and quality.

Further trial work testing fungicide programs under different environmental conditions would be useful. This may also allow further development of threshold levels of incidence and/or severity of SFNB that would justify fungicide treatment at these earlier crop stages.

Anecdotal evidence suggests that some cultural practices may play an important role in the development of the disease. Later planting dates, isolation from previous barley crop residues and limiting early nitrogen availability may be important in limiting the development and impact of the disease. Research to test these observations and theories may be useful in the development of an integrated management approach for SFNB.