

WHEAT IN THE BIRDCAGE



by Declan Anderson

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Hello, and welcome to the first edition of 'Wheat in the birdcage.'

I am Declan Anderson, Hart's 2021 Regional Intern. I joined the Hart team in February of this year and have a two year contract which is really exciting.



I grew up on a mixed cropping farm consisting of grains and prime lamb in northwest Victoria, just outside a small town called Ouyen. After I finished school, I went off to university in Adelaide to study a Bachelor of Agricultural Science, allowing me to increase my understanding of the many areas involved with farming. My focuses at university were soil sciences and agronomy and I have already begun using this knowledge at Hart. I applied for the internship as I want to make a positive impact on agriculture in some form and this opportunity at Hart is certainly giving me the chance to gain the knowledge and experience

to achieve this. I am looking forward to experiencing what differences a higher production cropping region entails outside of my time within the Mallee, although this season has not started all too differently from the normal Mallee conditions.

My role allows me to work alongside Hart's Research & Extension Manager, Bek Allen, and collaborate with other researchers, growers, and advisors on a range of projects; from trial planning and design, monitoring and sampling, right through to statistical analysis and report writing.

As a bonus, I also get to work on extension; that is, communicating our research to you, our audience.

There are several key projects I will be personally focussing on this season:

- long-term seeding systems trial
- gibberellic acid effects on oaten hay head emergence and vetch biomass production
- group B tolerant oat varieties
- pre-emergent herbicides for annual ryegrass control in wheat and
- [rainfall variability](#).

I will share some information about those trials throughout the year but there is one more that I am particularly eager to share with you in more detail; a project looking at septoria tritici blotch (also know as STB) in wheat, we'll keep it simple and refer to it as septoria from here on.





Figure 2. Septoria tritici blotch infection on wheat.
(Source; GRDC, 2015)

What is septoria exactly?

Septoria tritici blotch is a fungal disease that infects the leaves of wheat plants. It initially spreads from the previous year's infected stubble when in damp or wet conditions. The spores are blown by wind from that stubble and infects current season wheat crops. Once the plant is infected, the disease is spread in-crop by rain splash during the growing season.

Recognising septoria infection early can be difficult as signs of the infection can take anywhere from 3-4 weeks to appear. When infection symptoms do appear, pale grey to dark brown blotches appear on the leaf tissue, along with black fruiting bodies.

Why do you need to know more about septoria tritici blotch?

Septoria has not previously caused too much concern for growers in the Mid-North region. However, in 2016 a state-wide change was noted, where varieties derived from Mace or Wyalkatchem became more susceptible to septoria.

Scepter, a derivative of Mace and one of the most commonly grown varieties in the Mid-North, is very prone.

Some strains of septoria are also seen to be developing resistance to azole fungicides which means varietal selection is more becoming an even more important tool to lessen the impact of septoria during a growing season.

Septoria has been known to cause annual crop losses of up to 20% overall, with individual crop losses having the potential to be up to 60% (GRDC 2014; GRDC 2016).



About the trial (and the birdcage...)

The trial is located in the birdcage at the Waite Campus of the University of Adelaide and is in collaboration with the cereal pathology team from SARDI.

The birdcage is an enclosed area at Waite where many groups host trials that will be protected from bird damage. There is a large mesh net suspended around all sides of

the birdcage so there is no way birds can enter (without someone leaving a door open...).

This trial will aim to highlight the genetic resistance ratings of current wheat varieties and how varied infection timings may affect yield loss across those varieties.

Infection timing is key here. Current data states there is typically only one large infection event at the start of the growing season, but newer infection models of septoria suggest there are multiple infection events throughout a season.



Figure 1. Septoria trial in the birdcage after seeding.

What does the trial look like?

This trial was sown on May 14 with a split plot block design with four replicates and six varieties.

Seed was hand spread evenly over the rows before raking soil into the row.

The trial area is irrigated as needed to maintain ideal disease conditions.

The six varieties that have been selected for this trial possess varying levels of genetic resistance and are summarised in the table below.

Variety	Septoria tritici blotch Resistance rating
LPRB Impala	VS
Razor CL Plus	SVS
LPRB Scout	S
Illabo	MSS
Denison	MS
LPRB Orion	MRMS

VS = Very susceptible | SVS = Susceptible – very susceptible
 S = Susceptible | MSS = Moderately susceptible – susceptible
 MS = Moderately susceptible | MRMS= Moderately resistant – moderately susceptible



Most varieties of wheat grown in South Australia have a poor genetic resistance to septoria, with the majority having susceptible ratings. Winter wheats, like Manning, are the only varieties that express some improved resistance, although the majority of winter varieties are still MSS. This results in limited varietal choice options when selecting for genetic resistance to septoria.

Although many of the varieties included in this trial are either new or not commonly grown within the Mid-North region, their selection was based on their powdery mildew disease ratings and grain classification. Here's why...

The most commonly grown wheat varieties, like Scepter, are S to SVS for septoria resistance, with extremely poor powdery mildew resistance ranging from VS to SVS. Scepter is possibly the most commonly grown wheat variety in the Mid-North as it has a great yield potential and good resistance to rusts and yellow leaf spot. It is, however, susceptible to both septoria and SVS to powdery mildew; the birdcage is prone to powdery mildew infection, therefore, we did not want this disease to affect the outcome of this trial.



Figure 3. Wheat seedling emergence in the bird cage at Waite.

How do we infect the trial with septoria?

Introducing septoria to our wheat plots will be done through inoculation. Inoculation in this case, is the process in which septoria spores are sprayed onto the leaf tissue of wheat plants.

The four inoculation timings for this trial are as follows:

- No inoculation (control)
- GS14
- GS30
- GS45

These timings were chosen as current spore trapping data suggests this is when infection events are occurring during the growing season. The first inoculation timing (GS14) was completed on June 18 with good success. We will now have to wait for 3-4 weeks to start seeing visual symptoms of septoria.



Next steps

Over the next month or two, we will inoculate our second treatment (at GS30) across all varieties.

Over the remainder of the 2021 season, I will continue to update you on this trial; follow my newsletters to stay updated with variety

performance, disease, and yield loss information.

To find out more about disease resistance of wheat varieties grown in the Mid-North, see the [2021 South Australian Crop Sowing Guide](#) or the [2021 Cereal Variety Disease Guide](#).

References



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