

WHEAT IN THE BIRDCAGE



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Welcome to the third edition of 'Wheat in the Birdcage'.

In this issue, you'll hear about how the trial is progressing, how the final inoculation went, and what disease levels are present within the trial. Plus, I'll give you an insight into what is left for this trial in 2021.



Figure 1: Wheat varieties infected at GS30. From Left to Right: Orion, Scout, Denison, Impala, Razor CL Plus, Illabo (varieties in rows of two).

Trial update

The final inoculation was applied to all varieties on September 1, at an average growth stage of GS47. Variation in growth stages between varieties ranged from GS39 for Illabo, all the way to GS53 for Scout, Impala, and Razor CL.

We've seen that the actual development speed of the varieties within the trial are very similar to the predicted development speeds (Table 1). During the final inoculation at GS45, plots treated at inoculation timings at GS14 and GS30 were displaying promising levels of disease infection, however; there was little difference noticed between them.



Table 1: Growth stages of trialed varieties on September 1, 2021.

Variety	Development Speed	Growth Stage
Illabo	Quick Winter	39
Denison	Slow Spring	41
Orion	Mid-Slow Spring	43
Scout	Mid Spring	53
Impala	Mid Spring	53
Razor CL Plus	Quick-Mid Spring	53

By early October, all varieties in the trial had started grain fill although they were at different stages. Illabo was at the watery ripe stage (GS71), while the faster varieties of Scout, Impala, and Razor CL Plus were at the early dough stage (GS83).

The earlier wheat varieties like Scout, Impala and Razor CL Plus are still some time off from harvesting which means the last issue of Wheat in the Birdcage won't go out until that data has been collected.

Disease assessments were conducted on all treatments on October 7 (Figure 2). Some interesting results have come from this which will be touched on next.



Figure 2: Septoria leaf infection at 30% (left), 80 % (middle) and 100% (right).



INFECTION DATA

Disease assessments for all plots have been completed and I have found some good results. As predicted, varieties with the least resistance to septoria have shown significantly greater levels of infection (Table 2). Impala had an average of 33.61% of its entire leaf area showing symptoms of septoria infection. Disease symptoms are small black spores within pale lesions as shown below (Figure 3).

Table 2: Percentage of leaf area infection (LAI) per plant for each variety in the trial.

Variety	LAI %	Resistance rating
Impala	33.61 ^c	VS
Razor CL Plus	34.1 ^c	SVS
Scout	14.21 ^b	S
Illabo	3.87 ^a	MSS
Denison	9.71 ^{ab}	MS
Orion	5.88 ^a	MRMS
LSD (P ≤ 0.001)	5.94	



Figure 3: Flag leaf of Impala inoculated at GS45 (left), and flag leaf of Orion inoculated at GS45 (right).



Despite a resistance rating of moderately susceptible-susceptible (MSS), Illabo had the equal lowest infection percentage out of all the varieties. This could be considered an unexpected result, but disease pressure this season was very low and demonstrates that strong resistance to septoria tritici blotch was not essential for limiting infection this year.

Table 3: Average leaf area infection percentage (LAI) per plant for all varieties at each inoculation timing.

Timing	LAI %
Control	11.05 ^a
GS14	17.39 ^{ab}
GS30	24.62 ^b
GS45	14.52 ^a
LSD (P ≤ 0.05)	8.698

HOW DID I MEASURE INFECTION PERCENTAGE?

From each plot, three plants were randomly selected, and every leaf was then scored to determine leaf area infection (%) present on leaves. This was often done from the flag leaf to approximately flag -3 (third leaf below flag) before leaves became too senesced to score. Examples of scored leaves are shown above (Figure 2). Senescence resulted in only three leaves being scored at times, while other plants had five leaves scored. Senesced leaves like in the example above is able to be scored, but if the leaves were to breakdown anymore, it becomes difficult to determine the difference between disease and degraded leaf tissue.

As mentioned, disease infection levels overall were not very high this season. We know that septoria spreads within the plant canopy with the assistance of rainfall and while the conditions experienced in June and July were ideal for this, conditions became very dry after the first week of August, which greatly limited septoria’s ability to reproduce and spread.

WHEN WAS INFECTION LEVEL AT ITS PEAK?

The GS30 inoculation timing showed the highest disease levels in the trial. A possible explanation for this is that there was more leaf area present to become infected with the spray of spores, meaning more even infection over the plant. Although the GS45 application had an even greater leaf area present, the crop canopy was on the verge of canopy closure, limiting infection on the leaves further down the plant.

The application of inoculum at GS14 had the most time to develop and spread up the plant canopy to cause a greater level of infection. As described previously, the poor conditions for disease spread at that time limited the movement of disease to the upper leaves.



These results show that varieties with improved resistance have significantly lower septoria infection on wheat plants. This will have a follow-on effect for the next season; while septoria persists on stubble over the summer, inoculum levels will be greatly reduced. Growing crops with higher resistance will lower the risk and severity of infection event in the following growing seasons.

WHAT IS NEXT FOR THE TRIAL?

Yield assessments are the last field activity to be done for this trial. This will be completed using harvest index cuts across one metre and two rows per plot. Grain yield will then be calculated, and the data will be analysed for yield loss over infection timings and released in the next and final issue of 'Wheat in the Birdcage'.



Figure 4: The septoria trial in the bird cage at Waite, photo taken October 7, 2021.

