Wheat leaf spots controlled with Fusarium fungicide timing

Research found that foliar fungicide application at early anthesis for Fusarium Head Blight control also provided adequate control of leaf spotting diseases. While leaf spotting diseases were slightly higher at this timing, yields were similar.

In years when environmental conditions are favourable, leaf spot disease can commonly occur on spring wheat on the Prairies. The leaf spot complex includes several diseases: tan spot, caused by Pyrenophora triticirepentis; septoria leaf blotch complex, caused by Phaeosphaeria nodorum, Mycosphaerella graminicola and Phaeosphaeria avenaria; and spot blotch, caused by Cochliobolus sativus. Yield losses in spring wheat of up to 15% are fairly common in Saskatchewan, but under severe epidemics, losses can be much higher.

A foliar fungicide application at the flag leaf stage is the recommended timing for control of leaf spot pathogens to preserve yield and quality. However, this application timing is too early for the recommended anthesis timing for Fusarium Head Blight (FHB) suppression.

A research study was implemented to compare a foliar fungicide application at anthesis stage (BBCH 61 to 65) for FHB management to an application at flag leaf stage (BBCH 39) for leaf spot control in spring wheat. The goal was to see if the anthesis timing would also adequately control leaf spot disease.
The research was carried out at Saskatoon, Indian Head, Melfort, Saskatchewan, and Brooks, Lethbridge and Lacombe, Alberta in 2013, 2014 and 2015, but not at all locations in all years.

Three fungicide application timing treatments consisted of a single application at flag leaf stage (BBCH39), a single application at anthesis (BBCH60) and a dual application at flag leaf and anthesis.

Three fungicide treatments were compared: prothioconazole + tebuconazole (Prosaro); tebuconazole (Folicur); or B. subtilis (Serenade Optimum), all applied in 40 L/ac (100 L/ha) of water.

Carberry, a CWRS wheat variety, was used in the study. It is moderately resistant to FHB, and is moderately susceptible to leaf spot diseases. Disease ratings were conducted at the soft dough stage (BBCH85).

**Early anthesis timing controlled leaf spots**

The site-years were split into high and low leaf spot severity. At the three high severity sites, Melfort, Saskatoon and Lacombe in 2014, the unsprayed check had a leaf spot severity rating of 73.2% by the soft dough stage (BBCH 85) of wheat. The lowest leaf spot severity was 20.2% with the dual fungicide application timing. Flag leaf application reduced leaf spot severity to 34.7%, and the single fungicide application at anthesis had a leaf spot severity of 41%.

The biological fungicide, B. subtilis did not reduce leaf spot disease compared to the untreated control. Across all treatment timings, tebuconazole reduced severity to 36.1%, and prothioconazole + tebuconazole to 27.6%.

Fusarium Head Blight severity was 4.0% or less, and no differences were observed among treatments.

There was no difference in yield between the flag leaf and anthesis foliar fungicide timings. The untreated check yielded 55 bu/ac (3676 kg/ha) and the three fungicide treatments averaged 62 bu/ac (4132 kg/ha). Both synthetic fungicides provided similar yields, but there was a 9.1% yield decrease with the biological fungicide compared to the untreated control, which could not be explained.

At the high severity sites, test weight was slightly higher with the synthetic fungicide treatments compared to the untreated control. Thousand kernel weight (TKW) was significantly higher with the fungicide treatments (36.0 g) compared to the untreated control (33.4 g). Fungicide timing also significantly affected TKW with the dual treatment having the highest TKW at 36.6 g, followed by
anthesis timing at 36.0 g, and flag leaf stage at 35.4 g. Protein content was similar with all treatments, including the untreated control.

At the 11 low disease severity sites, leaf spot severity was 16.2% in the untreated control, and 6.6% in the treatments with fungicide control. Yield, test weight and protein content were similar with all treatments. Thousand kernel weight was slightly lower with the flag leaf timing. Fusarium Head Blight severity was 3.9% or less, with no differences between treatments.

The results of this study found that applying a fungicide at anthesis yielded the same compared to flag-leaf application, even though leaf spot disease severity was slightly higher with anthesis timing. The researchers concluded that a foliar fungicide application targeting FHB control at anthesis will provide adequate control of leaf spot disease, with equivalent yield and similar grain quality. Two applications, one at flag leaf and another at anthesis, at the commodity prices and fungicide costs at the time of the study, were not economical as they provided a small incremental benefit compared to a single application at anthesis.

Funding was provided by the Cluster program of Growing Forward 2, and was administered by the Western Grains Research Foundation.


Photo by Sheri Strydhorst