

INTEGRATED MANAGEMENT FOR WHEAT DISEASES

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As wheat production continues to increase in Wisconsin (Fig. 1), the management of wheat diseases, especially with the use of foliar fungicides, has become an even more important topic of discussion (Fig. 1). With estimated foliar fungicide prices in the \$25-30/acre range (application cost plus fungicide cost) for 2009, an integrated management approach for controlling wheat diseases is important. What does it mean to take an integrated management approach for controlling wheat diseases? This is a multi-step process of decisions (Esker et al., 2008a; Hollier and Hershman, 2008) and includes: (i) scouting fields, (ii) identifying the growth stage, (iii) knowledge of the disease risk, (iv) knowledge of the disease reaction of the variety planted (Conley et al. 2008), (v) stand quality coming out of dormancy, (vi) crop development, (vii) weather, (viii) knowledge of the types and differences in foliar fungicides, and (ix) wheat prices.

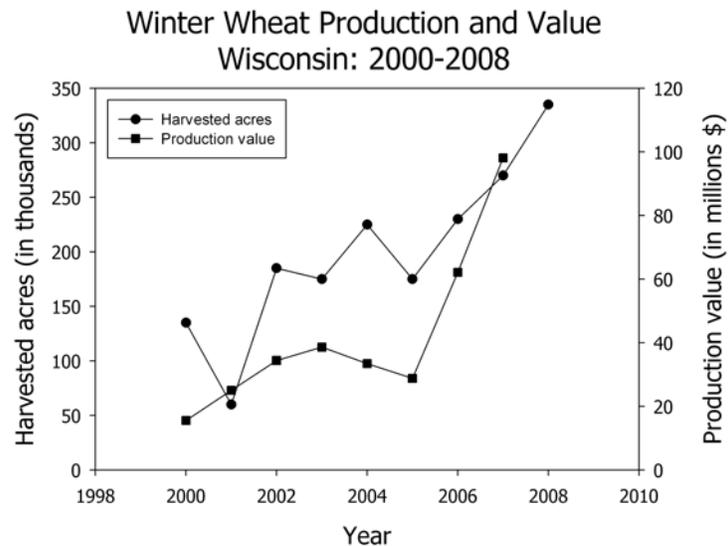


Figure 1. Winter wheat production in Wisconsin (in harvested thousands of acres) since 2000 and the corresponding value of that production (in million \$) (Source: USDA-NASS).

Most decisions for the application of a foliar fungicide for wheat will be made when the growth stage is Feekes 8 (flag leaf emergence). Why? The flag leaf is the most important leaf in terms of yield, as upwards of 50% or more of the final yield depends on its health. When scouting for wheat diseases, there are steps that should be taken to make the most appropriate estimate of the disease level. This includes scouting the entire field and making assessments from different locations. Our recommendation is to scout in at least 10 areas of the field and examine 10 plants. This provides for an estimate of disease levels on 100 plant samples. Avoid field edges when scouting.

Most critical for determining the need for a foliar fungicide for wheat disease management is the proper identification of the different wheat diseases (Esker et al., 2008b). In Fig. 2, there

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are pictorial representations of some of the most common wheat disease that might be seen in Wisconsin in a given season. Yearly occurrence of each disease is highly dependent on many factors, especially variety resistance and weather. Also, occurrence of each disease will not be at the same growth stage, as some like powdery mildew and Septoria leaf blotch can be seen around flag leaf emergence, while one like Fusarium head scab is a flowering disease. For the rust diseases and Fusarium head, there are some very useful sites that can be consulted to determine the risk of disease occurrence in Wisconsin each growing season. These include the USDA's Cereal Rust Laboratory website (<http://www.ars.usda.gov/Main/docs.htm?docid=9757>) and also the Fusarium Head Blight Prediction Center (<http://www.wheatscab.psu.edu>) (Esker and Conley, 2008).

Also, in the past few years, there has been an increase in black point disease reports around the state. Black point disease is caused by a fungal complex that includes (but is not limited to) the following fungi: *Alternaria*, *Fusarium*, and *Helminthosporium*. Affected kernels will appear black-pointed and dockage can occur. Conditions that favor development of black point include warm, humid or wet weather during grain maturation.

Summary of 2008 Foliar Fungicide Trials

The 2008 winter foliar fungicide trials illustrated that knowledge of multiple factors is required to most effectively control wheat diseases and improve yields. At the Arlington ARS trial, the most effective fungicide treatment was the application of Proline® at Feekes 10.5.1, where there was a higher level of Fusarium head scab. Yield was 8% higher with this treatment, compared to the untreated check (95 bushels per acre versus 87 bushels/acre). In contrast, at the West Madison ARS trials, results were different depending on the trial. In the variety by fungicide timing trial, there was a main effect of variety as Pioneer 25R47 had a 15% higher yield over Kaskaskia (119 bushels/acre versus 104 bushels/acre). However, no effect of foliar fungicide was observed. In a second trial that had only Kaskaskia as the variety, with 15 different fungicide treatments, applications of Headline and Quilt at Feekes 9 (early boot stage) had yields that were 8 to 12% higher than the untreated check. Powdery mildew was the primary disease observed in this trial.

Changes in Fungicides in 2009

In the Pest Management in Wisconsin Field Crops (UWEX, A3646), there have been changes to Table 5-5 about fungicides for control of foliar diseases of small grains (Boerboom et al., 2008). Products that have been added because of new registrations or changes to their label include: Bumper 41.8 EC (propiconazole), Caramba (metconazole), Folicur 3.6 F (tebuconazole), Proline 480 SC (prothioconazole), and Prosaro 421 SC (propiconazole and tebuconazole). Also, consult the label carefully, especially to determine the growth stage for the last allowed application. In 2007, there were reports of grain loads being held at elevators to test for fungicide residues.

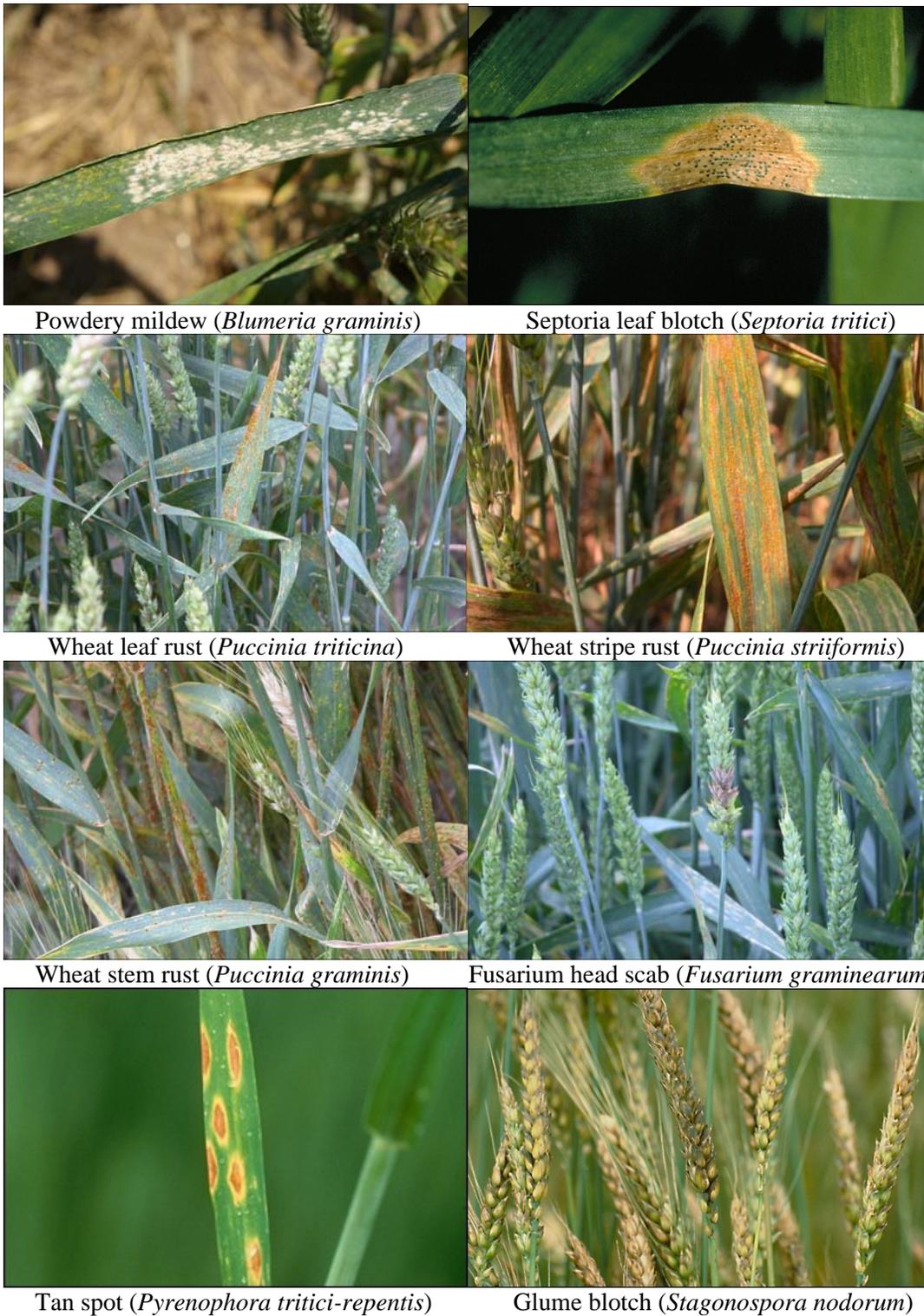


Figure 2. Pictorial representation of some of the most common wheat diseases that can be controlled with foliar fungicides in Wisconsin. Image Sources: C. Grau and P. Esker (UW-Plant Pathology) and the APS Digital Image Collection.

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