

Leaf Blotch Diseases of Wheat - *Septoria tritici* Blotch, *Stagonospora nodorum* Blotch and Tan Spot

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Septoria tritici blotch (also known as speckled leaf spot), *Stagonospora nodorum* blotch and tan spot (also known as yellow leaf spot) are the three most frequently occurring leaf blotch diseases of wheat in Ohio. These diseases all have the potential to cause significant grain yield and quality losses if the environmental conditions are favorable for their spread and development during late May and June. In years when wet and windy weather prevails during mid to late spring, losses can be as high as 20 to 30 percent. The combination of *Septoria* and *Stagonospora* leaf blotches and Tan spot may cause serious damage to the sugar-producing green leaf tissues. The greatest yield losses occur when the flag leaf and the two leaves below the flag leaf become damaged before grain fill is complete. Reduction of the healthy area of these leaves before the soft dough stage often leads to shriveled and lightweight kernels.

The Fungi Causing Leaf Blotch Diseases

Stagonospora blotch is caused by *Parastagonospora nodorum* (*Phaeosphaeria nodorum*), and *Parastagonospora avenae* f. sp. *triticea* (*Phaeosphaeria avenaria* f. sp. *triticea*), *Septoria* blotch by *Septoria tritici* (*Mycosphaella graminicola*), and Tan spot by *Drechslera tritici-repentis* (*Pyrenophora tritici-repentis*). Spore shape and size can be used to differentiate among *Stagonospora*, *Septoria* and *Drechslera* species. In Ohio, *Parastagonospora nodorum* is most important, but occasionally *Septoria tritici* and *Drechslera tritici-repentis* cause yield losses in some locations. *Parastagonospora nodorum* causes disease on leaves and glumes of the head (glume blotch), whereas *Septoria tritici* and *Drechslera tritici-repentis* affect leaves primarily. *Stagonospora* glume blotch is one of the leading causes of poor seed quality Ohio. It affects seed germination and causes seedling blight when infected seed are planted without adequate seed treatment.

Symptoms of *Septoria tritici* Blotch

Symptoms of *Septoria* are usually detected on lower leaves in the fall and early spring. Although plants are susceptible to infection at any stage of development, the spread of *Septoria tritici* blotch usually decreases in late May as temperatures increase. As a result, *Septoria tritici* blotch tends to be more

common on lower leaves of plants early in the growing season than on upper leaves. The initial symptoms are yellowish or chlorotic flecks on leaves, especially those in contact with the soil. These flecks enlarge into irregular lesions, brown-to-reddish brown in color. As the lesions age, the centers become somewhat bleached with gray or ash-white centers, with small, dark brown to black specks. These are pycnidia or spore producing bodies of the fungus. The presence of small, black pycnidia in lesions is the most reliable in-field character for identifying the disease (**Fig. 1A**).

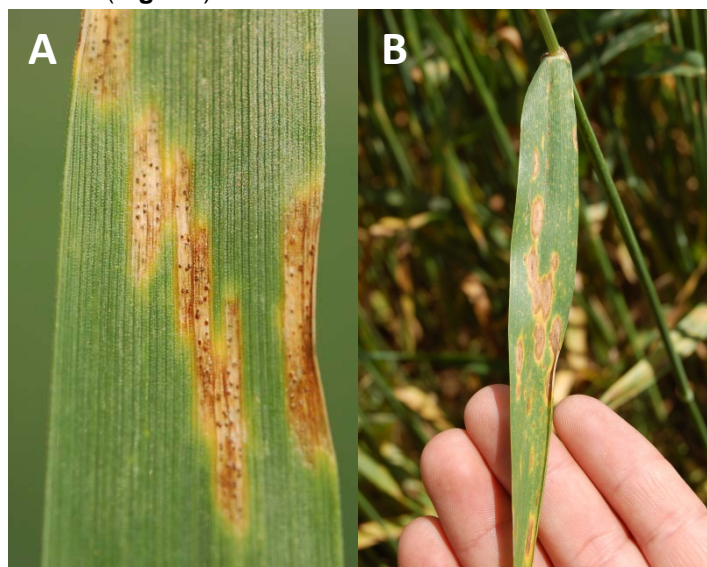


Fig. 1. Typical symptoms of **A**, *Septoria tritici* blotch with distinct black pycnidia and **B**, *Stagonospora nodorum* blotch.

Symptoms of *Stagonospora nodorum* Blotch

Symptoms usually appear within two or three weeks of head emergence and as such are found predominantly on the upper leaves (although all leaves are susceptible). Leaf lesions begin as very dark brown flecks or spots, sometimes with a yellow halo. These small irregular lesions expand into oval to lens-shaped lesions with dark brown centers (**Fig. 1B**). On the wheat heads the lesions begin as either grayish or brownish spots on the chaff, usually on the upper third of the glume (**Fig. 2**). Although both leaf and glume blotch may occur simultaneous, it is not uncommon to find leaf blotch without glume blotch and vice versa. As the lesions enlarge, they become dark brown and the centers turn grayish-white in color as tiny light brown pycnidia develop within them. Unlike *Septoria* leaf blotch, pycnidia of *Stagonospora* leaf blotch are not as easy to see with the naked eye.

<http://www.oardc.ohio-state.edu/ohiofieldcropdisease>



Fig 2. Typical lesions of *Stagonospora glume blotch* on wheat spikes. **Fig. 3.** Tan spot lesions. Insert shows close-up of dark center. (courtesy S. Wegulo)

Symptoms of Tan spot

At first, lesions appear as tan to brown flecks, which later expand to form irregular oval- or lens-shaped lesions with a yellow or chlorotic halo and a dark fleck in the center. Like *Stagonospora*, tan spot may develop at any time during the growing season, but well-developed lesions are most frequently observed later in the season. As the disease develops, individual lesions may coalesce, damaging large areas of the leaf. One of the biggest problems identifying tan spot is its similarity to *Stagonospora* leaf blotch. The main difference between the two diseases is the absence of dark fruiting bodies (pycnidia) in tan spot lesions. However, it is difficult to tell the two diseases apart before pycnidia are produced in *Stagonospora* leaf blotch lesions or under dry conditions which may prevent pycnidia production.

Disease Cycle and Epidemiology

P. nodorum, *S. tritici*, and *D. tritici-repentis* survive on wheat residues and volunteer wheat plants. These fungi can survive for several years in wheat stubble on the soil surface. *P. nodorum* infects seed and is seed borne. Studies in New York indicate that seed infection above 3% significantly contributes to fall infection of seedlings resulting in survival of the pathogen over winter and the development of epidemics in the spring. Thus, seed borne inoculum is an important source of the fungus for *Stagonospora* blotch development, but is less important for *Septoria* blotch and Tan spot.

Leaf infections require extended periods of leaf wetness. *P. nodorum* and *D. tritici-repentis* infections occur primarily during later growth stages, usually during and after heading, whereas *S. tritici* is more common on plants earlier in the spring during stem elongation to flag leaf emergence. This is partly because *S. tritici* is most aggressive under cool conditions with temperatures between 50° and 68°F (15° to 20°C), whereas warmer temperatures between 68° and 81°F (20° to 27°C) favor infection by *P. nodorum*. Infections

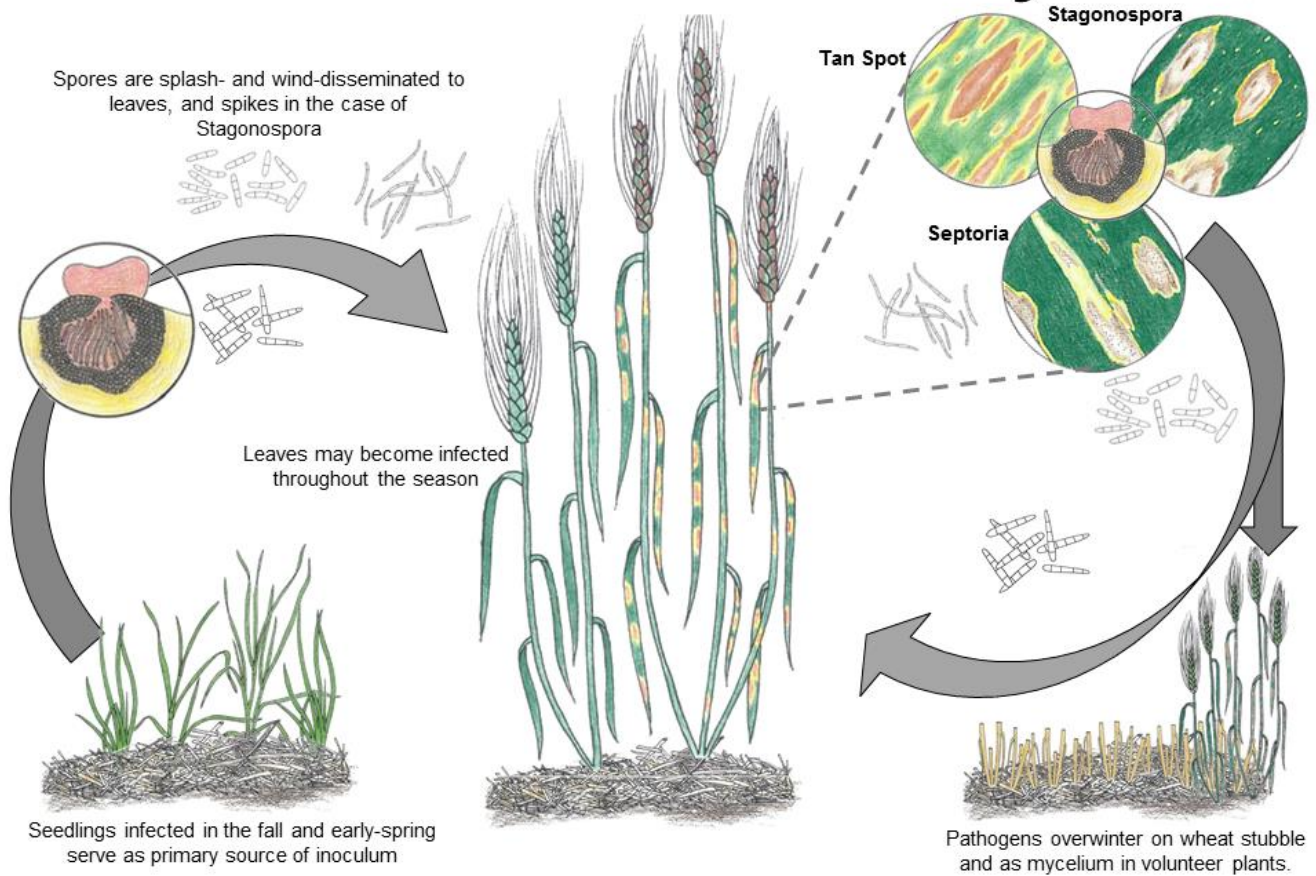
by *D. tritici-repentis* occur and tan spot develops under a wide range of temperatures, once moisture is not limiting.

Spread of all three diseases is favored by wet, windy weather. During periods of wet weather, the fungi spread rapidly from the lower leaves to the upper leaves. Dry weather not only prevents infections, but also slows down lesions development and spore production.

Management

1. Crop rotation: Since these leaf blotch pathogens can survive in infested wheat residues for several years, a rotation where wheat is planted in only 1 of 3 years is recommended.
2. Destroy volunteer wheat, rye, barley, and wild grasses in the field before planting.
3. Varieties differ greatly in their reaction to infection by *Parastagonospora nodorum*, *Septoria tritici* and *Drechslera tritici-repentis*. In areas with a history of high disease pressure, plant varieties resistance to these diseases. All varieties are susceptible to infection to some extent, but planting varieties with good levels of partial resistance will limit yield losses. Varieties with resistance to *Stagonospora nodorum* leaf blotch may be susceptible to the glume blotch phase of the disease and vice versa. Select varieties with moderate resistance to both phases of this disease where possible.
4. Plant certified, disease-free seed that has been treated with a recommended, seed-protectant fungicide.
5. Planting Date: Sow winter wheat after the Hessian fly-safe date recommended for your county.
6. Fertilize wheat based on a soil test. Adequate amounts of N, P, and K should be applied at planting to insure good seedling growth in the fall. Spring top dress nitrogen at moderate levels to achieve your yield goal, but excessively high rates of nitrogen will make the field prone to damage by *Stagonospora* blotch. Avoid high rates of nitrogen that would increase the potential for lodging.
7. Fungicide application may be necessary if susceptible varieties are planted and environmental conditions favor disease development. Several fungicides are available to manage leaf blotch, and most of fungicides that control *Stagonospora* and *Septoria* leaf blotch also control tan spot. These products should be applied to prevent disease development on the flag leaf and the leaf below the flag leaf. A single full-rate application at flag leaf emergence or at heading is usually sufficient to provide adequate control. Early green-up fungicide applications are not as effective at protecting the upper leaves as applications made between flag leaf emergence and heading.

Leaf Blotch Disease Cycle



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