

Tan spot of wheat is caused by a parasitic fungus called *Pyrenophora tritici-repentis*. Tan spot is one of the five most damaging wheat diseases in Kansas based on annual disease loss estimates. The disease is often most severe when wheat is planted into fields with large amounts of wheat residue remaining on the soil surface. Tan spot can cause yield losses of 25 percent or more in individual production fields.

## Symptoms

The initial symptoms of tan spot are small dark brown spots that expand to become tan elliptical or diamond-shaped lesions with a yellow halo (Figure 1). Frequently, there is a small, dark-brown spot in the center of the lesion. The lesions often merge as they grow, resulting in large sections of affected tissue. Older infected leaves eventually begin to die from the tip back.

In Kansas, the first tan spot symptoms usually appear in late March. When the infection is severe, fields planted with a susceptible variety may become yellow in less than a week. The appearance of these fields usually improves as plants grow and new leaves mask the old, infected leaves. If weather remains conducive, the disease is likely to move onto the middle and upper leaves. Tan spot is capable of infecting the developing grain, but kernel infection is rare in Kansas.

Several similar diseases can be confused with tan spot. *Septoria tritici* blotch (speckled leaf blotch),

## Quick Facts

- Symptoms of tan spot include elliptical or diamond shaped lesions that have a yellow halo. Tan spot lesions often have a dark fleck in the center.
- Tan spot is often most severe in fields with large amounts of wheat residues left on the soil surface, because the debris harbors the fungus that causes the disease. Even one year of crop rotation away from wheat significantly reduces the risk of tan spot.
- Tan spot also can be managed by selecting resistant varieties or with a fungicide spray. A fungicide application made between flag leaf emergence and flowering should provide effective disease control and a yield increase.

caused by *Septoria tritici*, produces elongated tan lesions that contain small, black fungal fruiting bodies and give the lesion a speckled appearance. Careful examination usually allows a clear distinction between tan spot and *Septoria tritici* blotch.

Tan spot is also confused with *Stagonospora nodorum* blotch. The fungus that causes this disease, *Stagonospora nodorum*, produces small, light-brown



Figure 1. Symptoms of tan spot include tan lesions with a yellow halo. Tan spot lesions often have a dark fleck in the center.



Figure 2. The fungus that causes tan spot produces black reproductive structures on old wheat residues. Image provided by Bill Bokus, Kansas State University.

fruiting bodies within lesions that help distinguish it from tan spot. These fruiting bodies are much smaller and more difficult to see than with *Septoria tritici* blotch. During periods of dry weather, *Stagonospora* may not produce these characteristic reproductive structures, making it difficult to distinguish from tan spot.

Leaves are commonly infected with all three diseases, and accurate diagnosis often requires laboratory examination. Knowing which of the three diseases is most prevalent is not important for spray decisions because all three diseases respond similarly to fungicides. Disease information is an important part of variety selection because different genes control the resistance to each disease.

Nutrient deficiencies also can cause some varieties to exhibit brown lesions with a yellow halo that can be confused with tan spot. In Kansas, chloride deficiency is the most common cause of this type of disorder. It differs from tan spot in that symptoms are uniform and all leaves show symptoms simultaneously.

### Life Cycle

The tan spot fungus survives in the debris from previous wheat crops. Small, black fruiting bodies of the fungus are often abundant on old residue (Figure 2). In Kansas, these fruiting bodies mature in early March and produce the first generation of spores called ascospores. The ascospores are discharged from the fruiting bodies during periods of wet weather but typically travel only about 6 inches.

The fungus is capable of producing a second type of spore, known as conidia, on colonized wheat residues, which can also contribute to these first spring infections. During periods of wet weather, the lesions resulting from these initial infections begin producing additional generations of conidia in about 10 days. The conidia are moved by wind and can travel greater distances than the ascospores; however, most travel less than 30 yards.

Infection and disease development are favored when temperature is between 68 and 82 degrees

Fahrenheit and frequent rain or heavy dew keeps the foliage wet. The duration of favorable temperature and moisture required for infection varies with temperature and the resistance level of a variety. Susceptible varieties can be infected after 6 hours of favorable conditions.

Numerous other grasses — including rye, wheatgrass, smooth brome, and quackgrass — can also be hosts of the tan spot fungus. Under most conditions, tan spot remains at low levels in these grasses, and their potential contribution to disease problems in wheat is not well understood. Given the number of spores that are produced from wheat residue, it is unlikely that these grasses contribute significantly to disease outbreaks in wheat.

### Control

The best control for tan spot is crop rotation. Even one year out of wheat drastically reduces the fungal population and the risk of severe disease. A full year of fallow is also effective. Burning or tilling the soil to destroy wheat residues is also an option on ground that is not highly erodible. Planting cultivars that are less susceptible to tan spot also reduces the risk of severe disease. See the *Wheat Variety Disease and Insect Ratings*, MF991, for more information about cultivar reactions to tan spot and other diseases.

Foliar fungicides can also be used to control tan spot. The top two leaves contribute greatly to grain yield, and protecting these leaves from disease usually results in a yield increase. Fungicide sprays timed between flag leaf emergence and flowering result in good disease control and ensure that these critical leaves are protected as long as possible. A number of systemic fungicides — including Approach Prima, Headline, Nexicor, Prosaro, Quilt Xcel, TrivaPro, and TwinLine — provide good control of tan spot. Additional information on product efficacy can be found in the *Foliar Fungicide Ratings for Wheat Disease Management*, EP130.

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