K-STATE Research and Extension

Fusarium Head Blight

Department of Plant Pathology | MF3458 | Wheat Disease

Fusarium head blight, also known as head scab, is a problem in approximately 3 out of 10 years. The risk of disease is generally greatest in eastern portions of the state, with sporadic problems occurring infrequently in central Kansas. The disease is rare in western Kansas, where dry conditions generally suppress disease development; however, the disease may occur in irrigated fields in western Kansas.

Fusarium head blight causes large tan lesions that encompass large portions of the wheat head (Figure 1). The symptoms of the disease are most evident during the late-milk and early-dough stages of kernel development. Infected spikelets are often brown at the base and have masses of orange fungal spores on the edges of the florets (Figure 1 inset). Infections may damage the stem within the head, causing segments above the infection to die prematurely and turn white. The head symptoms are quickly masked by the maturation of the wheat crop; growers may not realize the full extent of the damage until harvest, when the Fusarium damaged kernels are visible in the grain. Diseased kernels are shriveled and have a white, chalky appearance (Figure 2). In some cases, the infected kernels may have a pink discoloration. The diseased grain may also contain mycotoxins that can negatively impact the health of animals and humans. Deoxynivalenol (DON) is the most common mycotoxin associated with Fusarium damaged wheat. This mycotoxin is sometimes called "vomitoxin."

Quick Facts

- Fusarium head blight is most common in eastern and central Kansas. The disease is rare in western Kansas but can occur in irrigated fields.
- Fusarium head blight causes large tan lesions that encompass large portions of the wheat head. The disease damages the grain directly, with infected kernels appearing white and chalky. Some kernels have a pink discoloration.
- The fungus that causes Fusarium head blight survives in the residues of corn, wheat, barley, oats, and many wild grasses. Infection takes place during flowering or early stages of grain development and is favored by damp weather.
- No single management option provides high levels of disease control; therefore, the disease is best managed with a combination of genetic resistance and fungicides.
- Disease losses can be reduced by harvesting fields with the lowest disease levels first, adjusting harvest equipment to remove diseased kernels, and segregating loads of healthy and diseased grain.

Figure 1. *Fusarium head blight causes tan lesions that can encompass large portions of the head. Infected spikelets are often brown at the base and have masses of orange fungal spores on the edges of the florets (inset).*

Figure 2. *Grain damaged by the disease often contains white, chalky kernels. Some kernels may also have a characteristic pink discoloration.*

Life Cycle

The fungus that causes Fusarium head blight, *Fusarium graminearum*, survives in the residues of corn, wheat, barley, oats, and many types of wild grasses. The fungus reproduces on these residues during periods of wet weather, with spores moved by wind or splashing rain to developing wheat heads. Planting wheat in fields with large amounts of corn or wheat residue often increases the risk of disease. Wheat is most vulnerable to infection during flowering and early stages of grain development. The disease is most likely to develop when temperatures are between 65 and 80 Fahrenheit; frequent rainfall creates extended periods of high relative humidity, which favors disease reproduction and infection during these growth stages.

Management

Fusarium head blight is a difficult disease to manage, and no single management option provides satisfactory control. Although no wheat varieties have a high level of genetic resistance to Fusarium head blight, selecting wheat varieties with moderate levels of resistance can greatly reduce the risk of severe disease. Varieties such as Everest and Zenda have the best available resistance to Fusarium head blight. For the latest information about genetic resistance see *Wheat Variety Disease and Insect Ratings*, MF991.

Fungicides also can help suppress the development of Fusarium head blight. The level of efficacy is generally much lower than efficacy achieved for leaf diseases such as leaf rust or tan spot. Even the best available fungicides provide only about 50 percent suppression of the disease and mycotoxin accumulation. While this level of suppression is unlikely to protect fully susceptible wheat varieties, fungicides can be combined with moderately resistant varieties to provide higher levels of disease control. The most effective fungicide applications are made when the wheat crop is at the flowering stages of growth or very early stages of grain development (2 to 3 days after flowering has finished). See *Foliar Fungicides for Wheat Disease Management*, EP130, for more information about fungicide options.

When the disease problems develop, yield losses can be reduced by harvesting fields with lowest levels of Fusarium head blight first. Where the crop is still at milk or dough stages, it may be possible to note disease levels before maturity. After maturity, information about genetic resistance can help guide harvest priorities. Varieties with moderate levels of genetic resistance are likely to have lower levels of disease than those with susceptible disease reactions. Harvesting fields with lowest disease levels first can prevent further degradation of grain quality.

In many cases, test weight and grain quality can be improved by adjusting air flow on the combine to remove the most damaged kernels during harvest. Grain elevators and growers with on-farm storage can help prepare for harvest by planning to segregate loads of grain with differing disease levels. Where possible, avoid mixing healthy grain with loads of grain having higher disease levels. In extreme cases, it may be possible to use seed cleaning equipment to remove the diseased kernels and improve the marketability of the crop.

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