Disease Management for Wheat

KEY POINTS

- Some diseases such as, Fusarium head blight, and viral diseases, must be managed before symptoms appear to protect yield potential.
- The use of host plant resistance and timely planting may help to prevent many disease problems.

Cultural Management Practices

Proactive approaches to managing pests are often more effective and economical than in-season, reactive methods. Common cultural practices for pest control in wheat are:

- **Timely planting** (after the Hessian fly-free planting date, where applicable) is important for avoidance of certain diseases. Planting prior to this date allows an extended period of vegetative growth (between planting and the first freeze) for diseases to colonize the crop. Early planting may necessitate the use of resistant products, diligent scouting, and seed treatments.

- **Seeding rates and nitrogen fertility** rates that are too high can result in excessively thick, lush stands that may have reduced air circulation and light penetration into the canopy, making the crop more vulnerable to foliar and head diseases. This is especially true where planting dates are relatively early to near normal for the geography.

- **Planting multiple wheat products of differing maturities**, staggering planting dates, and choosing products with resistance or tolerance to key pests and diseases can help to minimize the risk of severe losses. Planting different maturities has the added advantage of helping with the logistics of harvesting and planting the next crop.

- **Use of tillage and crop rotation** can help in the management of diseases that survive in the soil or crop residue because it breaks the organism’s life cycle by removing the host or interrupting winter survival.

- **Broad fungicide seed treatments** are commonly used on commercial wheat seed. Fungicide seed treatments can provide protection from certain seed and soilborne pathogens when limited management options are available. Such diseases may include smuts, bunts, root rots, damping-off, take-all and general seed rot.

- **Scouting** is an essential part of disease management that can help preserve yield potential and improve the economics and sustainability in a farming operation. Effective scouting, knowledge of disease life cycles, and management thresholds can help to ensure pesticide applications are made at the appropriate times and pest densities may help avoid unnecessary applications.

Diseases

**Barley Yellow Dwarf Virus (BYDV)** (Figure 1) is a viral disease transmitted by several species of aphid. Infection can occur in the fall or spring. However, the potential for significant symptom expression and yield loss is greatest from fall infections. Symptoms commonly occur in patches throughout the field and can include stunting, reduced tillering, and a yellow or reddish discoloration of the flag leaf, leaf tips and margins. Plants may also appear unusually erect with thickened, stiff leaves. Significant yield loss can result. Management strategies may involve timely planting (to avoid prolonged periods of aphid feeding for viral transmission), planting resistant products, insecticidal seed treatments to help reduce early-season aphid populations, and foliar insecticides to control aphid populations in the crop if thresholds are reached.

**Fusarium head blight (head scab)** (Figure 2) can become a serious problem when favorable conditions for spore production (warm and humid weather) occur when wheat is blooming and inoculum is present (commonly in corn stubble). Individual spikelet to entire heads may become infected. Infected spikelet's will turn tan to brown and may have salmon-colored fungal growth. Grain may appear white to pinkish and shriveled with low

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**Figure 1.** Barley yellow dwarf. Photo courtesy of Brian Olson, Oklahoma State University, Bugwood.org.

**Figure 2.** Fusarium head blight. Photo by Mary Burrows, Montana State University, Bugwood.org.
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test weight or fail to develop altogether. A crop with more than five percent infected kernels may contain enough mycotoxins to be harmful to humans and animals.¹

Harvested grain containing mycotoxins may result in significant dockage at the elevator or mill and in rejection of the grain if levels are above acceptable thresholds. Management involves avoidance of susceptible wheat products and use of a triazole fungicide applied at early flowering when weather conditions are conducive for spore production. The effectiveness of tillage and crop rotation may be limited because spores can blow in from neighboring fields.

Leaf rust is characterized by small, randomly distributed orange-brown lesions on upper leaf surfaces and leaf sheaths that do not coalesce (Figure 4 top).

Stem rust pustules are larger, dark reddish-brown and can be found on upper and lower leaf surfaces, stems and spikes. Initially the lesions will be scattered but may coalesce in heavy infestations (Figure 4 bottom).

Stripe (yellow) rust (Figure 3) is characterized by linear rows of bright yellow-orange pustules that follow leaf veins. These diseases can develop rapidly in appropriate temperatures and prolonged periods of leaf wetness. Severe losses can occur due to significant loss of tissue resulting in a reduction in kernels, test weight, and grain quality, as well as lodging. Plant resistant products where available. Foliar fungicides can be effective if applied before the infection becomes severe.

Wheat Streak Mosaic (WSMV) is vectored to wheat by the wheat curl mite. The source of both the wheat curl mite and WSMV is volunteer wheat. Infected plants are stunted and tiller poorly. Leaves on infected plants turn yellow from the leaf tip to the leaf base, veins usually remain green (Figure 5). When the mites land on a wheat plant they move to the youngest unfurling leaf and begin feeding. Losses due to WSMV depends on the variety, the weather, the percent plants infected, and the time of infection. Fall infection is the most severe and can cause a loss of 50% or more. Volunteer wheat with 1/4 to 1/2 miles of the new field should be killed at least 2-3 weeks prior to emergence. Planting after fly-free date is recommended. Plant a variety that is resistant to the virus or the curl mite. There are no chemicals effective or labeled for curl mite control.²

Sources:

Performance may vary from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower’s fields. ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. All other trademarks are the property of their respective owners. ©2018 Monsanto Company. 180320105444 03015018 RDH.