

WHEAT DISEASES AND THEIR CONTROL WITH FUNGICIDES

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Disease pressure can develop any time environmental conditions are favorable for disease development. Diseases that occur frequently in Tennessee are barley yellow dwarf, leaf rust, powdery mildew, Septoria glume and leaf blotch and loose smut.

Glume blotch is most consistent in its ability to reduce yields year after year. Leaf rust and powdery mildew only cause damage in certain years when environmental conditions are favorable for these diseases.

Barley Yellow Dwarf: This virus disease in the past has received little attention in wheat, but it is becoming a limiting factor to production in some areas. The light green to yellowish and sometimes reddish foliage and stunting induced by the virus are similar to the symptoms attributed to non-parasitic factors such as nutrient deficiencies and poorly-drained soil. The virus is transmitted from plant to plant by several species of aphids which feed on wheat. Some degree of control of barley yellow dwarf can be obtained by planting late in the fall, but early enough to provide an adequate root system that will withstand low winter temperatures. Aphid vector control with seed-applied insecticides has been found to be effective in controlling this virus disease.

Leaf Rust: *Puccinia recondita f. sp. tritici* - Rust appears as small, round or oblong raised orange-red pustules, mainly on the upper surface of the leaves. Leaf rust, when severe, reduces both grain yield and test weight. It is transmitted by wind-borne fungus spores. Foliar fungicides are effective in controlling leaf rust.

Powdery Mildew: *Erysiphe graminis f. sp. tritici*
Diseased plants are usually found in the spring in moist areas of fields where the growth is rank. Powdery mildew is very noticeable on the leaves as a white-powdery mass which often covers the entire blade. Later, the affected leaves turn yellow and die prematurely. Heavy attacks of powdery mildew cause plants to lodge and kernels to shrivel. Foliar fungicides are effective in controlling powdery mildew.

Glume Blotch: *Stagonospora (Septoria) nodorum* - Glume blotch may first be noticeable on the lower leaves as small oblong lesions which are light brown with dark borders. After heading, the fungus moves to the head. First indication of infestation is the brown discoloration of the glume (chaff). As the grain matures, the glume takes on a black peppery appearance which is due to spores (pycnidia) of the fungus.

Infection of the leaves can be serious and severe attacks on the head can significantly reduce yield and grain quality. Glume blotch is primarily a warm weather disease. Both glume and leaf blotch fungus spores live through the summer in crop residue. General control measures include plowing under crop residue immediately after harvest (unless using no-till practices), allowing at least one year between wheat crop and use of foliar fungicides.

Leaf Blotch: *Septoria tritici* - Leaf blotch is more noticeable early in the spring, when it appears as irregular reddish-brown spots scattered over the leaf

blade. The spots, often with ashen white centers, contain many black specks. Lesions tend to be restricted laterally and assume parallel sides. The damage caused to portions of the leaf can reduce yields. Leaf blotch also damages the seedling and tillers.

Tan Spot: *Pyrenophora tritici-repentis* – Tan spot develops on both upper and lower leaf surfaces. The spots start out as brown or tan colored flecks, expanding into lens-shaped blotches from 1/8-3/4 inch long, often with yellow borders. Later these lesions may coalesce and become dark brown at their center containing conidia (spores) of the fungus. Dark pseudothecia of the fungus appear as dark, raised specks on mature wheat straw. Foliar fungicides are effective in controlling tan spot.

Loose Smut: *Ustilago tritici* - Loose smut is easily recognized as soon as the affected heads emerge from the boot. Smut-infected heads appear earlier than normal ones and a loose, dark-colored spore mass replaces the seed in the head. Spores are washed and blown away by rain and wind, and by harvest, nothing remains of the head except a bare spike. Loose smut may reduce the yield but does not affect grain quality.

The disease is seed-borne within the wheat kernel and may be controlled by treating the seed before planting with various fungicides.

Head Blight or Scab: *Fusarium* spp. - Head blight, also called pink mold, white heads or tombstone scab, is manifested by the premature death or blighting of spikelets of the head. The disease appears on all small grain crops and is especially important in humid regions. Prolonged rainy spells during the blooming stage of the wheat will enhance conditions for infection. Significant yield losses result from floret sterility and poor seed filling.

Grain from head-blighted fields is less palatable to livestock and sometimes contains sufficient mycotoxins to induce muscle spasms and vomiting in humans and certain non-ruminant animals. The toxins apparently remain stable for years in stored grain. Bread made from scabby wheat has been described as intoxicating. Control with crop rotation and fungicides are only slightly effective.

Take-All: *Gaeumannomyces graminis var tritici*. - The term "Take-All" originated in Australia more than 100 years ago and referred to a severe seedling blight disease. Today, Take-All is best recognized as a root and shoot disease of winter wheat that interrupts plant development and seriously suppresses yield.

Take-All is most obvious near heading on plants grown in moist soil. Diseased crops appear uneven in height and irregular in maturity. Severely diseased plants easily break free at the crown when pulled from the soil.

Infested plants are stunted, mildly chlorotic, have few tillers and ripen prematurely. The heads are bleached (white heads) and sterile. Roots are blackened and brittle from fungal invasion. A black-brown dry rot extends to the crown and basal stem. Control by crop rotation and other cultural practices is not very effective. Foliar fungicides are not effective in controlling this disease.

*A complete description of all wheat disease can be found in "Compendium of Wheat Diseases (2nd edition), sold by The American Phytopathological Society.

WHEAT FOLIAR FUNGICIDE POINT SYSTEM

This point system should be used only as a guide to determine the need for application of foliar fungicides. It does not guarantee an economical return. If a "zero" is indicated in category # 1 or 3, then the field **should not** be sprayed.

		<u>Points</u>
I. Yield Potential (5-7 days before first spray)		
	1. 40 b./A or above	= 150
	2. 30-39 b./A.	= 50
	3. Below 30 b./A.	= 0
		I. _____
II. Cropping History		
	1. Wheat in field last year	= 150
	2. Wheat in field two years ago	= 75
	3. First time in wheat three years or longer	= 25
		II. _____
III. Fertility (total Nitrogen)		
	1. Applied 90-120 lbs. of Nitrogen/A.	= 150
	2. Applied only 60-90 lbs. of Nitrogen/A.	= 75
	3. Applied no nitrogen	= 0
		III. _____
IV. Seeding rate (assuming 80% plus germination)		
	1. Planted 2 or more b./A.	= 100
	2. Planted 1.5-2.0 b./A.	= 75
	3. Planted less than 1.5 b./A.	= 25
		IV. _____
V. Disease at application time (stage F10.3).		
	1. Severe (disease starting on flag leaf)	= 150
	2. Moderate (bottom & middle leaves diseased)	= 100
	3. Light (disease found on lower leaves)	= 75
	4. No foliar disease present	= 25
		V. _____
VI. Seasonal rainfall prior to first application		
	1. Above normal	= 150
	2. Normal	= 100
	3. Below normal	= 25
		VI. _____
VII. Traditional Disease Pressure		
	1. Heavy	= 150
	2. Moderate	= 75
	3. Light	= 25
		VII. _____

Total Points _____

After inspection of each field (boot stage), producers should total the number of points to determine the probability of a yield increase

Total Field Points

750-1000
500-749
Below 500

Chances of Yield Increase

Excellent
Fair
Poor